

# RIVER SEVERN LOWER REACHES CATCHMENT MANAGEMENT PLAN ACTION PLAN NOVEMBER 1995



## CATCHMENT KEY DETAILS

AREA	2022km <sup>2</sup>
POPULATION	512,200
<b>TOPOGRAPHY</b>	
MINIMUM LEVEL AOD	10M
MAXIMUM LEVEL AOD	425M
TIDAL RANGE (AVONMOUTH) MEAN SPRING TIDES	12.3M
<b>ADMINISTRATIVE DETAILS</b>	
COUNTY COUNCILS	AVON GLOUCESTERSHIRE HEREFORD & WORCESTER
DISTRICT COUNCILS	NORTH AVON COTSWOLD FOREST OF DEAN STROUD MALVERN HILLS SOUTH HEREFORDSHIRE WYCHAVON
BOROUGH COUNCILS	CHELTENHAM TEWKESBURY
CITY COUNCILS	GLOUCESTER
NRA	BRISTOL LOWER SEVERN AREA, SEVERN-TRENT REGION NORTH WESSEX AREA, SOUTH WESTERN REGION
WATER COMPANIES	SEVERN TRENT WATER PLC BRISTOL WATER CO PLC WELSH WATER PLC THAMES WATER PLC WESSEX WATER PLC
INTERNAL DRAINAGE BOARDS	LONGDON & ELDERSFIELD NORTH GLOUCESTERSHIRE WEST GLOUCESTERSHIRE SOUTH GLOUCESTERSHIRE
BRITISH WATERWAYS	GLOUCESTER SHARPNESS CANAL RIVER SEVERN
GLOUCESTER HARBOUR TRUSTEES	TIDAL RIVER SEVERN D/S MAISEMORE

## MAIN TOWNS AND LAND USE

THE TOTAL POPULATION OF THE CATCHMENT IS APPROXIMATELY 510,000. MAIN TOWNS AND SETTLEMENTS IN THE CATCHMENT ARE GLOUCESTER, CHELTENHAM, MALVERN, AVONMOUTH AND THORNBURY, STROUD, LEDBURY, CINDERFORD, LYDNEY, NEWENT, DURSLEY, CAM AND TEWKESBURY. THE MAIN LAND USES IN THE CATCHMENT ARE GRASS 40%, ARABLE 33%, WOODLAND 12% AND URBAN AREA 7%.

WATER QUALITY TOTAL CLASSIFIED LENGTH 363.8 km

## LENGTHS OF CLASSIFIED WATERCOURSE IN EACH GQA GRADE (km.) (1993)

GRADE A GOOD	6.2
GRADE B GOOD	137.5
GRADE C FAIR	154.6
GRADE D FAIR	39.4
GRADE E POOR	23.6
GRADE F BAD	2.5

## WATER RESOURCES

AVERAGE ANNUAL RAINFALL	790MM/a
MEAN FLOW OF SEVERN AT HAW BRIDGE	8,980 ML/d
TOTAL LICENSED ABSTRACTION	307,039 ML/a
NUMBER OF LICENSED ABSTRACTIONS COMPRISING	605
GROUND WATER	283
SURFACE WATER	322

## FLOOD DEFENCE

LENGTH OF MAIN RIVER IN CATCHMENT	349.7km
LENGTH OF RAISED FLOOD DEFENCES	162km
AREA OF LAND AT RISK FROM TIDAL FLOODING	25,800ha
NUMBER OF PROPERTIES AT RISK	2000

## FISHERIES

LENGTH OF WATERCOURSES DESIGNATED UNDER EC DIRECTIVE FOR FRESHWATER FISHERIES (78/659/EEC)

SALMONID	40.6 km
CYPRINID	
RIVERS	51.3 km
CANALS	25.0 km

## CONSERVATION

NUMBER OF SITES OF SPECIAL SCIENTIFIC INTEREST (SSSIs) 105(42 WATER BASED)

NUMBER OF SCHEDULED ANCIENT MONUMENTS (SAMs) 148

# FOREWORD

The NRA was created in 1989 as an independent environmental agency. In its role as 'Guardians of the Water Environment', the Authority is committed to preparing a sound plan for the future management of each of the Region's catchments.

The Action Plan for the River Severn Lower Reaches catchment is the second stage in the catchment management process. The plan translates the issues and problems highlighted in the Consultation Report into actions. These actions are timetabled and costed (where possible) and our aim is to deliver real improvements on the ground with the help of other parties. The work will continue into the new Environment Agency.

## THE FUNCTION OF THIS DOCUMENT

This document sets out a 5 year plan for the Catchment as a series of Activity Tables. The list of actions set out are supported by the ongoing activities of the NRA as described in Section 1. Section 2 describes how public consultation has been conducted and has influenced the Plan's formulation. Background information is provided in Section 3 to put these actions into context. Section 4 provides statements to Planning Authorities to allow a closer liaison between land use planning and water management.

The Actions will be revisited in an Annual Review document each year which will contain accounts of progress and further developments. This allows consultees to participate throughout the 5 year Plan.

We welcome the responses that were received during the Consultation period. The views and comments expressed have been carefully considered and incorporated where possible into this Action Plan.

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30/4/96

ENVIRONMENT AGENCY



099823

# RIVER SEVERN LOWER REACHES CATCHMENT



# CATCHMENT VISION FOR THE RIVER SEVERN LOWER REACHES

This vision for the catchment describes what the NRA would wish the catchment to be and how it might work toward that vision. This vision is long term and while it may only be partly achieved in the next five years, it is something we can all work towards.

## THE NRA AIMS:

- To ensure that water quality is appropriate for the current and future uses of the catchment.
- To protect ground and surface water resources.
- To provide flood defences to reduce the risk to people and property from flooding where this is cost effective and environmentally acceptable, to improve the system of flood warning on non-tidal rivers and to establish a warning system on the tidal River Severn.
- To conserve and enhance river corridors and reinstate degraded sections to their full potential in collaboration with other parties.
- To support and develop recreational activities.
- To sustain and, where possible, enhance the landscape of the catchment area.
- To improve and protect the fisheries in the catchment in particular the elver fishery, via fisheries management, habitat and environmental quality improvements.
- To support the development of small scale hydropower schemes where it can be demonstrated that they do not adversely affect other uses.
- To promote the principles of sustainability and environmental protection.

## THE NRA HOPES TO ACHIEVE THIS VISION BY:

- Seeking additional safeguards to protect water supplies by submission of proposals to the Department of the Environment that the River Severn and Gloucester - Sharpness Canal should be designated as Water Protection Zones.
- Working in consultation with other authorities to manage mining activities in the Forest of Dean.
- Ensuring that development or use of contaminated land in Cheltenham, Gloucester, the Forest of Dean and Avonmouth is accompanied by responsible remedial measures.
- Upgrading the quality of the Rivers Chelt and Frome by sewage treatment works' improvements and enhancing the quality of the major tributary of the Severn - the Warwickshire Avon, by actions detailed in the Avon's Catchment Management Plan.
- Seeking adequate rural sewerage systems to serve areas where pollution is evident. Support will be given to local schemes which will employ sensitive and sustainable methods of treatment.

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Class No .....
Accession No <u>ARCW</u>

- Seeking a reduction of diffuse nitrate and phosphate pollution by assisting the Ministry of Agriculture in managing Nitrate Vulnerable Zones and proposing to the Department of the Environment that the Gloucester-Sharpness Canal and the Rivers Severn and Leadon be designated as Eutrophic Sensitive Areas.
- Managing the residual flow in the Severn at Gloucester to meet requirements for water supply, navigation and fish migration.
- Restoring flow in the Glynch Brook in dry summers.
- Establishing a flood management strategy with Gloucester City Council using a combination of new roadworks, redevelopment of flood plain fringes, removal of redundant structures and installation of new flood defences.
- Providing flood alleviation works in Cheltenham in co-operation with Cheltenham Borough Council to give increased flood protection to more than 700 properties.
- Assisting the restoration of the Stroudwater, Thames and Severn and Herefordshire and Gloucestershire Canals where this does not adversely affect other uses.
- Seeking the return of otters to the catchment and protecting native stocks of brown trout, especially in the Forest of Dean, and crayfish in the Little Avon, from introduced species.
- Analysing the potential of river corridors:
  - a) Promoting the use of buffer zones and targeting areas for their establishment.
  - b) Planning and implementing a programme for landscape appraisal and focusing on restoring floodplain landscape, including archaeological features.
- Ensuring that development at Avonmouth does not reduce the present flood storage capacity or adversely affect wetland ecology by co-operation with Bristol and North avon Councils, the South Gloucestershire Internal Drainage Board and English Nature.
- Enhancing consultation with local authorities, agencies and developers within the planning process. This includes participation in the formal planning system and via Water Level Management Plans, Coastal and Catchment Management Planning.

The final overall aim encompassing all of these aspects is a sustainable water environment.

# CONTENTS

Foreword	
Map of the Catchment	
Catchment Key Details	i
Vision for the Catchment	ii
Contents	1
<b>1. INTRODUCTION</b>	<b>2</b>
1.1 The concept of Catchment Management Planning	2
1.2 The National Rivers Authority	2
1.3 Routine Work of the NRA	2
<b>2. REVIEW OF THE CONSULTATION PROCESS</b>	<b>4</b>
2.1 Method of Public Consultation	4
2.2 Results of Consultation and Further Action	4
2.3 The Way Forward	4
<b>3. OVERVIEW OF THE CATCHMENT</b>	<b>5</b>
3.1 Brief Description of the Catchment	5
3.2 Summary of Catchment Resources, Uses and Activities	6
<b>4. LAND USE PLANNING AND THE WATER ENVIRONMENT</b>	<b>10</b>
4.1 Land Use Planning and Catchment Management Planning	10
4.2 Land Use Statements	10
<b>5. ACTIVITY PLANS</b>	<b>13</b>
<b>6. FUTURE REVIEW AND MONITORING</b>	<b>35</b>

## LIST OF APPENDICES

APPENDIX 1	Note on new River Water Quality Schemes	36
APPENDIX 2	Statement on Public Consultation	
	a) List of Organisations and Individuals Responding to the Report	37
	b) Response to Comments Received	38
	c) Addendum to Consultation Report	50
APPENDIX 3	Glossary	55

# 1. INTRODUCTION

## 1.1 THE CONCEPT OF CATCHMENT MANAGEMENT PLANNING

The rivers, lakes, estuaries and coastal waters of England and Wales have never before been subject to such large and rapidly increasing demands from the users of water. Many different uses interact or compete for water and will inevitably come into conflict with one another. The National Rivers Authority is the major manager of the water environment in England and Wales and has the responsibility to reconcile conflicts between water users. Our Mission Statement expresses the following principles:

*We will protect and improve the water environment by the effective management of water resources and by substantial reductions in pollution. We will aim to provide effective defence for people and property against flooding from rivers and the sea. In discharging our duties we will operate openly and balance the interests of all who benefit from and use rivers, groundwaters, estuaries and coastal waters. We will be businesslike, efficient and caring towards our employees.*

We have chosen to use Catchment Management Plans to translate these principles into action. The plans describe our vision for each catchment, identify problems and issues and propose actions that may be taken to resolve them. The plans also form a framework to promote consistent and appropriate responses to development proposals and to influence the drafting of local plans.



River Severn at  
Wainlades

## 1.2 THE NATIONAL RIVERS AUTHORITY

The prime purpose of the NRA is to protect and improve the water environment in England and Wales and to regulate the use of water by industry, agriculture and private water and sewerage companies. It has statutory responsibilities for water quality, water resources, flood defence, fisheries, conservation, navigation and recreation. Those responsibilities cover rivers, lakes, canals, and underground waters ("controlled waters"). For Water Quality and Fisheries, its regulatory activities extend into coastal waters. It is a non-departmental public body, sponsored by the Department of the Environment.

In April 1996 the NRA will merge with Her Majesty's Inspectorate of Pollution and the Waste Regulation Authorities to form the Environment Agency. This new body will be responsible for the environmental protection of water, air and waste and will continue to seek to prevent and control pollution.

## 1.3 ROUTINE WORK OF THE NRA

The NRA meets its responsibilities through day to day operations. In addition to the actions specifically highlighted in this Plan, the NRA will continue to undertake routine works to protect and improve the water environment. They include:

- Monitoring
- Authorising - licences to abstract and impound water and consents to discharge
- Enforcement
- Operations
- Maintenance
- Improvements
- Liaison
- Emergency responses



For pollution control, an important task is to monitor the aquatic environment and any discharges to it. Water Quality is continuously assessed against the aim of achieving compliance with national and European legislation. Regular inspections are carried out at sites such as sewage works, waste disposal sites, industrial premises and farms. The pollution of water is a criminal offence and the NRA will prosecute when necessary. Equally important is the need to respond rapidly to pollution incident reports and to promote pollution prevention practice. There are around 3,000 sites in this catchment monitored for water quality and 120 sites for biological quality. Samples are taken to assess general quality and for local monitoring of specific discharges.

The responsibilities for water resources include licence determination, charging, policing and enforcement. Through these responsibilities an integrated approach is taken that aims to strike a balance between the needs of abstractors and the environment. Abstracting or impounding water without a licence can lead the NRA to prosecute offenders. There are a total of 322 surface and 283 groundwater licensed abstractions in the catchment, which are monitored by site visits. Information on flow, river levels, rainfall and groundwater levels is gathered from 32 stations and 21 boreholes. It is used to plan water resources and regulation as well as providing data for flood warning.

Flood Defence activities cover regulation and enforcement, maintenance and emergency response. Regulatory activities include the enforcement of flood defence legislation and bylaws and the determination of consents under it. Routine maintenance includes the clearance of debris from watercourses and the maintenance of river channels and flood defences. Emergency response involves the continuous monitoring of weather and river levels to forecast where and when flooding is likely to occur and issuing appropriate warnings. During flood events, defences are monitored and operated. There are 62 km of floodbanks in the Lower Severn Corridor and 100 km of sea/tidal defences at Avonmouth.

The NRA works closely with Local Planning Authorities through its Planning Liaison function. The NRA is a statutory consultee on both individual Planning applications as well as local and structure Plans in relation to their impact on the water environment. In 1994/95 the Lower Severn Area dealt with 3,238 planning applications as the primary contact (i.e. some applications overlap our regional boundaries) and consultations on 18 Local Authority Plans.

The NRA is responsible for maintaining, developing and improving fisheries. These duties include enforcement of fisheries law, scientific monitoring of fish stocks, fish rearing and stocking, fish rescues and advice to the general public. A fishery of particular importance to this CMP is the elver fishery. Around 600 elver licences are issued annually with a minimum of 200 inspected. It is also a duty of the NRA to regulate the Lower Severn fishery by enforcement of bylaws and liaison with other responsible agencies e.g. British Waterways (navigation). All major rivers and brooks in the catchment have been regularly surveyed since the late 1970s. There are data for over 200 sites. In addition to this, information is gathered from catch returns from both sport anglers and commercial salmon and elver fishermen.

The NRA also manages many recreational sites and has a general duty to protect and enhance water based recreation and amenity activities. In addition, the NRA has a duty to protect and enhance conservation interests in all of its operational and regulatory work, which is achieved through its Environmental Assessment procedures.

## 2. REVIEW OF THE CONSULTATION PROCESS

### 2.1 METHOD OF PUBLIC CONSULTATION

One of the objectives of Catchment Management Planning is to involve all interested parties in the planning for the future of river catchments. The NRA is therefore committed to the concept of public consultation on all its Catchment Management Plans. Comments and suggestions are welcomed from everyone with an interest in the water environment, ranging from large public organisations to individual members of the public.

Production of the River Severn Lower Reaches CMP has involved a number of stages since work commenced on the Consultation Report in the summer of 1994. A Forum was held on 18 January 1995 attended by 40 representatives from key external groups. Local authorities, national organisations and other representative bodies were invited to comment on an issues document, which identified and discussed the issues affecting the water environment in the catchment. As a result of these discussions the final list of issues was formulated.

The Consultation Report was launched on 22 May 1995 at the Jarvis Gloucester Hotel and Country Club. This marked the start of the formal consultation period. The Report concentrated on the issues in the catchment and the management options for their solution. Delegates at the launch represented a wide spectrum of interests from within the catchment, plus national groups and organisations. The launch was attended by 72 delegates who all received a copy of the report. Further copies were distributed to industry, local authorities, environmental groups, sport and recreation groups and the public.

The consultation aimed to obtain agreement on the catchment uses, consensus on the environmental objectives and standards required and detailed comment on the issues and options in the document.

A two month consultation period followed. During this time the Consultation Report was available in libraries throughout the catchment area and displays about the Consultation Report were exhibited in 6 of the main libraries. 950 copies of the Consultation Report and a large number of summary documents were sent out during the consultation period.

The NRA's Regional Committees (Regional Fisheries Advisory Committee, Regional Rivers Advisory Committee and the Regional Flood Defence Committee) met to discuss the Consultation Report and the future of the River Severn Lower Reaches Catchment.

### 2.2 RESULTS OF CONSULTATION AND FURTHER ACTION

A total of 90 written responses was received as detailed in Appendix 2. These responses provided useful feedback and many supported the objectives in the Report and the concept of catchment management in general. The NRA's vision for the catchment was shared or fully supported by a number of key organisations.

When responses were received, they were referred to the appropriate NRA departments for action where necessary. Written replies were sent to respondents after receipt, and where possible any queries were answered in this initial letter. These comments have all been considered and, where possible, incorporated into the Action Plan. A number of local issues were also raised in the course of the consultation procedure and, where appropriate, these matters have been referred to the appropriate department for action. Consideration has also been given to recently published NRA and external documents.

The NRA welcomes the comments received. Several changes to the issues raised in the plan have been made as a consequence of consultation. The general support shown for many of the objectives set out in the Consultation Document was appreciated.

Following the launch, a series of meetings were held with statutory bodies, water companies and other interest groups to discuss issues arising from the Report. A further consultation forum was also held on 12 September 1995 to enable the key players to make their final input into the agreed Action Plan. A number of ideas and changes were discussed and incorporated as a result.

### 2.3 THE WAY FORWARD

The Action Plan is a strategic policy framework for the management of the catchment. It includes a plan to achieve the vision for the River Severn Lower Reaches Catchment. The Action Plan will form the basis for improvements to the water environment by outlining the areas for work and investment proposed by the NRA and others. The Action Plan primarily covers the five-year period from 1995/1996 to 2000/2001. A number of the projects may take longer owing to funding availability and government policy.

The region will formally adopt the proposals in the Action Plan.

## 3. OVERVIEW OF THE CATCHMENT

### 3.1 BRIEF DESCRIPTION OF THE CATCHMENT

This River Severn Lower Reaches catchment covers the River Severn Corridor from its confluence with the River Teme, just south of Worcester, to just below its tidal limit at Gloucester plus the Avonmouth and Severnside areas.



River Severn at Upton

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

The River Leadon is a rural catchment and traditionally an area for hop-growing. This sub-catchment thus generates issues relating to agriculture, in particular the effects of farm pollution and water abstraction. The adjacent Forest of Dean is a popular area for visitors, but has historic and potential problems related to opencast, deep mining and quarrying which significantly contribute to the forest landscape.



River Leadon at Upleadon

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

The south west sub-catchments of the Cam, Little Avon and Avonmouth are areas where coastal defence predominates to protect from flooding. Avonmouth is criss-crossed by small drainage channels or "Rhines" which have been culverted in many cases to act as discharge channels from the extensive chemical works in Avonmouth. This will be covered in more detail in the Severn Estuary Catchment Management Plan.

In terms of land use, the catchment is predominantly rural, with the population centred on the main urban areas of Avonmouth, Cheltenham, Cinderford, Dursley, Gloucester, Great Malvern, Lydney, Stroud, Tewkesbury and Thornbury. The total population within the catchment is approximately 512,000, of which 41% is located around Gloucester and Cheltenham. The majority of development is concentrated around the existing urban areas. Future development within the catchment is to be led by the Statutory Development Plans of the local Planning Authorities.

A large proportion of the total area is under grass cover. The Forest of Dean and areas of the Leadon, Frome and Cam sub-catchments contribute to 12% of the catchment being forested. There is also a significant area of arable farmland. Although a proportion of the Avonmouth sub-catchment is rural, the impact of the Avonmouth chemical industries is highly significant.

### 3.2 SUMMARY OF CATCHMENT RESOURCES, USES AND ACTIVITIES

A detailed assessment of catchment uses was given in the Consultation Report. The following provides a summary of key points.

#### 3.2.1 DEVELOPMENT AND INFRASTRUCTURE

The County Councils of Gloucestershire, Hereford and Worcester and Avon and 10 District, Borough and City Councils have planning and administrative responsibilities within the catchment. Local Plans and Structure Plans have allocated an additional 23,500 dwellings to be built in the catchment between 1995 and 2011. The majority of new development is likely to be located within the Severn Vale and Gloucestershire County Council is considering the possibility of locating some of this as a new settlement. The County Structure Plan is currently under review. In Hereford and Worcester 3500 dwellings will be located within Great Malvern, Upton-on-Severn and Ledbury. In the southern part of the catchment future residential development will be allocated to the main urban areas (350 houses are required for Avonmouth and Severnside) and not within rural areas such as Thornbury.

The larger employment sites are to be located around or within existing urban centres. By 2001 about 525 hectares of new employment land are required for the catchment. The Avonmouth and Severnside area will provide 200 hectares. Retail developments have occurred at the urban fringe of some parts of the catchment e.g. Gallagher Retail Park in Cheltenham. Some 50 hectares is to be developed for retail, light industrial, business and residential use at Malvern Link

Recent completed or road schemes under construction include the widening of the M5 north of Tewkesbury, Cheltenham South West Distributor Road, Ebley By-pass, Brockworth By-pass and motorway junction, Lydney By-pass and the Second Severn Crossing.

Some proposed new roads include the Gloucester South-West By-pass, Brockworth By-pass to Elmbridge Court Roundabout and Cheltenham Extended Inner Relief Road. The Second Severn Crossing is to be linked with a road (M49) to the M5 near Avonmouth. The M49 will have junctions to serve the Avonmouth/Severnside Development Area. A further link is proposed from the M4 to the new bridge. As part of the strategic network the A403 will be realigned to form a North/South spine road through the development area.

The catchment has an extensive rail network. A rail freight terminal is planned at Avonmouth with a land requirement of some 22 hectares. In Gloucestershire the County Council is promoting the re-opening of railway stations (Cam and Dursley opened in 1994, Ashchurch will open in 1996).

#### 3.2.2 WATER RESOURCES AND ABSTRACTION

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



Mythe Water  
Treatment  
Works at Tewkesbury

The main uses of surface and ground water as a percent of total water quantity are as follows; Public Water Supply (64%), Power Production (21%), Fish Farming (5.5%) Cooling Water (2%) Industrial Use (2%), Transfer of Water (1.5%), Spray Irrigation (1%), Miscellaneous (3%).

There are a total of 605 abstraction licences allowing for a maximum 20,715 Ml/a (megalitres per annum) to be abstracted from groundwater and 286,324 Ml/a from surface water sources. The majority of licences (405) are for agricultural purposes and spray irrigation, giving a total potential abstraction of 3,414 Ml/a, of which 1,087 Ml/a is from groundwater and 2,327 Ml/a from surface water for these purposes.

The catchment has two main areas for groundwater abstraction. These are Oxenhall and Bromsberrow and the Newent area.

### 3.2.3 WATER QUALITY AND EFFLUENT DISPOSAL

The majority of rivers within this catchment, including the Gloucester-Sharpness Canal, fall into the categories "Good"(A-B) and "Fair"(C-D) under the NRA General Quality Assessment Scheme. This means that they can support game and coarse fisheries respectively provided the physical features and habitat are suitable. Some tributaries of the Leadon and a stretch of the Chelt downstream of Cheltenham fall into the "Poor" (E) category, owing mainly to sewage inputs. 2.5 km of the Hatherley Brook is classified as "Bad" (F).



Gloucester Docks

There are over 1000 consented discharges in the catchment. The main sewage discharges are from the Netheridge and Longford Works in Gloucester, the Hayden Works in Cheltenham, Stanley Downton in Stroud, Coaley, Malvern, Charfield and Wotton-under-Edge. In addition, there are a number of major trade effluents discharging to water company treatment plants, some of which include List I/List II substances under the EC Dangerous Substances Directive of Annex 1A list of substances. Consent standards for the relevant parameters are applied to the treatment plant discharge. Investments by Water Companies to improve the quality of discharges are constrained by the Asset Management Plan Programme (AMP).

During the period 93/94 there were 873 pollution incidents of which 7 were major, 331 were significant and 513 were minor. The main cause of incident was sewage followed by industrial and agriculture.

### 3.2.4 WASTE DISPOSAL AND MINERAL WORKING

The NRA has records of waste disposal sites in the catchment, including landfills, transfer sites, incinerator and process sites. The largest site is Hempsted Tip which, because of its construction and location, poses risks of flooding and uncontrolled emissions of tip leachate entering the watercourses.



Severn Vale from  
Tip Hill

Limestone is mainly quarried in the Forest of Dean, with some sandstone quarrying on a small scale. Sandstone is also quarried at Cromhall and Wickwar in the Little Avon sub-catchment. Coal has been historically mined in the Forest of Dean, however, it is confined to small scale production. Areas for sand and gravel extraction include river terrace deposits along the Severn Valley at Ripple and Ryall.

### 3.2.5 FLOOD DEFENCE

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

In the Severn valley from Tewkesbury to Gloucester there are 34 km of embankments protecting 5,000 ha of flood plain to an annual standard. Unprotected areas around Tewkesbury and the Avon confluence flood more frequently. Again these areas are vital to flood protection and impounded navigation levels inhibit drainage.

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

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



Flooding in Gloucester

The lowlands of the Severn comprise the flood plain above Gloucester and the coastal lowlands below. Both lie below river or tide flood levels and have local drainage problems. This problem is illustrated by the fact that all four Internal Drainage Boards (IDBs) which lie within the Lower Severn area are located along this part of the Severn. The Boards are: Longdon & Eldersfield IDB, North Gloucestershire IDB, West Gloucestershire IDB and South Gloucestershire IDB. These are all sovereign authorities wholly responsible for the internal drainage within their own areas.

A full flood warning service to NRA national standards is operated on three reaches of the Severn namely Powick to Mythe Bridge, Mythe Bridge to Ashleworth Quay and Ashleworth Quay to Minsterworth. A storm tide warning service, limited to the immediate area of the settlement, is

provided for Severn Beach near Avonmouth to the national standard. A limited flood warning service is provided on the Frome below Stroud. This does not cover the main urban areas but is targeted primarily at the Gloucester-Sharpness Canal to enable flood control sluices to be operated for the protection of the canal. At present there are no flood warnings in operation in the estuary.

### 3.2.6 FISHERIES

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

### 3.2.7 CONSERVATION, LANDSCAPE AND HERITAGE

The lower reaches of the Severn contains a wide variety of habitats and landscape features as well as being a popular tourist area. It also has a lot of archaeological interest, particularly with reference to navigation and the strategic value of the river itself. The attractive upland landscape of Areas of Outstanding Natural Beauty (AONBs) such as the Malvern Hills contrasts with the broad expansive floodplain of the Severn. However, there are a number of watercourses which, owing to past maintenance practices are in need of renovation and improvement in physical terms as well as a close examination of historical, archaeological, cultural and historical factors.



Cannop Ponds in the Forest of Dean

In the Forest of Dean, both the quality and landscape value of the environment are affected by mining activities. In the urban areas the rivers have in the past been canalised or culverted for various reasons which has degraded the river habitat. The Avonmouth sub-catchment is characterised by the rhine system which, in itself, is of habitat interest. It does, however, carry a legacy of industrial land usage. In addition to restoration, riverside amenity development is an objective in the Lower Severn. The integrated management of aquatic habitats via 'Water Level Management Plans' will be an important aspect of equating land drainage and conservation needs.

### 3.2.8 RECREATION AND NAVIGATION

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

The Forest of Dean has possibly the greatest identity and individual character as a recreational and tourist area, with the Cotswolds, Cheltenham and Gloucester also attracting a high visitor numbers. Other highlights are the Wildfowl and Wetlands Trust at Slimbridge and the restored Gloucester Docks. Some recreational activities are land based, but by their nature attract people to the river environment, eg. walking, picnicking and bird watching. Angling is prevalent throughout the area. There is a steadily increasing demand for water sport activities and various forms of boating and sailing. The "Severn Way" long distance footpath follows the river throughout Gloucestershire and into Avonmouth - a total of 51 miles and is currently being extended to Pill. The "Jubilee Way" links the Cotswold Way with Offa's Dyke via the Severn Bridge.

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

### 3.2.9 AGRICULTURE AND FORESTRY

The catchment is predominantly rural with a high proportion of agricultural land. Arable and grassland represent nearly 73% of the total area. Land use policy and development are key factors influencing the water environment. Use of fertilisers on arable land has contributed to the designation of two groundwater Nitrate Vulnerable Zones in the catchment. The Common Agricultural Policy has led to profound changes in agricultural practice not only in terms of crops and livestock reared (e.g. set-aside in the county of Avon accounted for 1.7% of total land use in 1992) but also in areas of diversification into recreational uses of land. Development Plans will play an important role in future land use, diversification and employment in agriculture in the catchment.

The Forest of Dean represents a significant proportion of the catchment. The two principal uses are commercial forestry and recreation as well as mining activities.

### 3.2.10 HYDROPOWER

There are 5 hydropower licences in the catchment, all located in the Cotswolds on the River Frome, River Cam, Horsley Stream and some springs. The licence on the River Cam has a major impact as far as water resources are concerned. The turbines rely on the whole river flow. At Bakers Mill there is a licence for hydropower on the River Frome. Presently the control of the lakes at this site is under review with the land owner, British Waterways and the NRA with respect to their flow into the canal and the Frome. Further development of hydropower in this sub-catchment is proposed.

## 4. RELATIONSHIP BETWEEN LAND USE AND THE WATER ENVIRONMENT

### 4.1 LAND USE PLANNING AND CATCHMENT MANAGEMENT PLANNING

Land use has the single most important influence on the water environment. It follows therefore, that land use changes, whether from increased urbanisation and other pressures for development, tourism, changing agricultural practices or afforestation, have important implications for the water environment. The impact of land use changes may not always become apparent in the short term. A better understanding of the complex relationship between land use changes and the water environment, with the time scales involved, is therefore essential if we are to succeed in the long term sustainable management of the catchment.

Agenda 21, the international blueprint for sustainable development, identifies the need for an integrated approach to the management of land and water resources. Government planning guidance (e.g. PPG12, PPG20, PPG23, Circulars 30/92 and 68/92) highlights the importance of communication between local planning authorities and the NRA and the relationship between land use and water matters. It is important that liaison takes place between the NRA and other agencies whose policies and actions impinge on the water environment.

The broad objective of catchment planning is to conserve and enhance the total river environment through effective land and resource management. However, while the NRA is well placed to influence some of the factors affecting the water environment, particularly within the river corridor, it has very little control over the mechanisms which determine land use change on a catchment-wide basis. This is largely the responsibility of local planning authorities through the implementation of the Town and Country Planning legislation. Government policies on agricultural subsidies also have an impact on land use, particularly in rural catchments.

The strategies and policies of statutory development plans are paramount, in that they set out the framework for land use change and provide the key reference for the determination of planning applications. The NRA encourages the inclusion of policies which reflect its concerns and responsibilities for the water environment.

To provide guidance for local authorities, the NRA issued its "Guidance Notes for Local Planning Authorities in the Methods of Protecting the Water Environment through Development Plans" in January 1994. In addition to these notes, further detailed guidance on areas of concern to the NRA are provided. For example, DoE Circular 30/92 "Development and Flood Risk"; "Policy and Practice for the Protection of Groundwater"; a Memorandum of Understanding has been signed by the local authorities, representative bodies and the NRA with regard to the scope and timing of providing floodplain maps. Without adequate consultation, there is an increased risk of inappropriate developments in the floodplain and similar areas of constraint. This circular and other Government policy guidance stress the importance that local planning authorities should attach to the NRA's advice.

It is recognised by the NRA that, to ensure that the catchment's environmental as well as economic needs are taken into consideration, close liaison must exist between Catchment Management Planning and Development Planning in order that land use changes are in the best interests of all catchment users.

### 4.2 LAND USE STATEMENTS

The following land use statements give a catchment perspective to documents such as the NRA Guidance Notes referred to above and are intended to assist local authority planners and others integrate water issues into their decisions and actions. They identify areas and potential uses of land which have particular implications for the water environment within the catchment.

In the Consultation Report the NRA described the State of the Catchment and its Targets under the categories of water quality, water quantity and physical features. Owing to the integrated nature of planning, these statements are grouped likewise.

For each statement, examples of Local Authority Development Plan policies are cited. This is not a comprehensive list of cross referenced policies but rather serves to illustrate the interface between NRA and Local Authority Planning activities.



## WATER QUALITY

**LU1** Full account needs to be taken of the availability and provision of sewerage and sewage treatment facilities in considering the location, extent and timing of new developments. This is particularly important in the rural areas such as the Leadon and Frome sub-catchments where this CMP highlights the problem of inadequate rural sewerage. Consideration must also be given to the implications of development on both the quality and quantity of surface run-off.

e.g. Stroud District Council Local Plan - Policy ENV 6

**LU2** Protection of the quality of water supplies from both surface and groundwater must be ensured in a long term and sustainable way. In this Catchment the principal areas of attention are Nitrate Sensitive Areas, Nitrate Vulnerable Zones, groundwater Source Protection Zones and the Gloucester-Sharpness Canal. These are influenced by application of fertilisers and pesticides to land and by activities around water sources which may affect quality.

e.g. Forest of Dean District Local Plan - Policy FC6;  
Avon County Replacement Structure Plan Consultation Document "Our Sustainable Future" - Strategic Principle 61

**LU3** Several issues in the CMP highlight the management of contaminated land, mineral and waste disposal sites. Any current problems must not be added to by the inappropriate design and siting of new sites. The future management of existing sites, including decommissioning of the nuclear power stations at Oldbury and Berkeley, must give due care and consideration to pollution control and waste disposal. Proposals for new sites must give due care to the protection of surface and groundwaters from pollution in their construction, operation and aftercare.

e.g. Gloucestershire County Structure Plan - Policy M2/WD7;  
Mineral Working in Avon Local Plan - Policy MLP30  
North avon Local Plan Policy - N4.2

**LU4** In the planning of new industrial sites and settlements due consideration must be given to both the siting and quality implications for potential new discharges into the water environment. Sources of indirect impact should also be considered, e.g. impacts on storm sewage and river or estuarine litter. The NRA aims to ensure that there is no deterioration in quality of rivers and coastal waters. Opportunities should be sought where available to use new development projects to improve unsatisfactory situations, such as upgrading of sewerage.

e.g. Bristol City Local Plan - Policy NE4

## WATER QUANTITY

**LU5** Full account needs to be taken of the availability and provision of water supplies in considering the location and extent of significant new developments. The key issues are quantity and location of abstractions. Both ground and surface water resources for agricultural irrigation, public water supply etc. are directly influenced by the placement and nature of new development and changes in land use. Regard must also be given to location of potential abstractors in relation to other users along a river.

e.g. Cheltenham Borough Council Local Plan - Policy PU8;  
Forest of Dean District Local Plan - Policy FC6

**LU6** The resources of all controlled waters must be protected - this includes rivers, lakes, groundwater and wetlands. The NRA seeks to protect these via control of abstractions (licensing) and management strategies of water levels using Water Level Management Plans. This requires the co-operation of local authorities, MAFF, the IDB's and conservation bodies. Five WLMPs have been identified in this Plan. Management of resources must protect supply for direct use and maintain flows sufficient for river life, fish migration and effluent dispersion.

e.g. Malvern Hills District Local Plan - A new Environment Policy (Landscape Policy 19)

## PHYSICAL FEATURES

**LU7** The conservation, fisheries, landscape, heritage/archaeological and recreational value of local river corridors must be protected and enhanced. This not only includes protection under conservation legislation and guidelines such as designation of AONBs, SAMs, SSSIs, Ramsar sites etc. but also prevention of soil erosion by inappropriate riverside land use and the consideration of increased flood risk. The use of the water environment as a conservation and recreational resource must be recognised and considered alongside quality and quantity considerations. Where development and infrastructure causes a reduction in the areas of wetlands, conservation sites, etc. suitable mitigative procedures and/or compensation areas should be sought.

e.g. Forest of Dean District Local Plan - Policy FNC5;  
Malvern Hills Local Plan - Recreation Policies 8/9/11-  
Nature Conservation Policy 5

**LU8** Fisheries, in particular salmon, are an important commercial and recreational resource in the Lower Severn. New development and land use change must not have an adverse effect, neither through change in the river habitat nor via reduction in water quality or quantity.

e.g. Cf. LU 6 (Fisheries do not usually feature specifically in land use plans)

**LU9** The lowlands of the River Severn are naturally prone to regular flooding. This must be a principal consideration in planning for the area. The NRA will continue to object to development in the floodplain at the planning stage to avoid any increase in flood risk (increased run-off, impoundment etc.). The NRA seeks to build partnerships and understanding to prevent placing further people and property at risk and to give existing residents adequate flood warning. Where appropriate and agreed with local authorities, changes in land use leading to a reduced need for flood defence will be considered with a view to abandoning those defences.

e.g. City of Gloucester Local Plan - Policy PU1;  
North avon Local Plan - Policy N27;  
Avon County Replacement Structure Plan Consultation Document "Our Sustainable Future" - Strategic Principle 62.

The NRA actively supports Agenda 21 and the principle of sustainability. It is an aim of the Catchment Planning Process to work with local authorities and others to develop, over the period of the Action Plan, realistic and measurable sustainability indicators and policies.

## 5. ACTIVITY PLANS

Implementation of the plan is based around the 37 key issues set out below. These have been modified where appropriate in the light of the consultation process and their resolution is considered necessary in order that the plan can be successful in achieving real improvements within the Catchment.

The issues are presented with a number of actions, a target timetable and the identification of responsible parties. Where possible, costs have been outlined for the period covered by the plan. This does not necessarily reflect the total cost of the schemes and is sometimes a projected estimate to be more accurately costed later.

### KEY

- > Greater than
- < Less than
- Action in the year indicated (numeric entry given if costs are known)
- U Unknown at this time
- R No additional costs to the annual budgetary provision (recurring or routine)
- £K £1000s

A number of 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. The timescales for actions may vary depending on future political and economic changes. All changes will be highlighted in the Annual Review.

### NOTES ON ABBREVIATIONS

ACC	AVON COUNTY COUNCIL	GCC	GLOUCESTERSHIRE COUNTY COUNCIL
AMP	ASSET MANAGEMENT PLAN	GHT	GLOUCESTER HARBOUR TRUSTEES
B&GAS	BRISTOL & GLOUCESTERSHIRE ARCHAEOLOGICAL SOCIETY	H&GCT	HEREFORDSHIRE & GLOUCESTERSHIRE CANAL TRUST
BR	BRITISH RAIL	HA	HYDRO ACTION
BW	BRITISH WATERWAYS	HMIP	HER MAJESTY'S INSPECTORATE OF POLLUTION
CC	COUNTY COUNCIL	H&WCC	HEREFORD & WORCESTER COUNTY COUNCIL
CCT	COTSWOLD CANALS TRUST	LA	LOCAL AUTHORITY
CoCo	COUNTRYSIDE COMMISSION	MAFF	MINISTRY OF AGRICULTURE FISHERIES & FOOD
CPRE	COUNCIL FOR THE PROTECTION OF RURAL ENGLAND	MOD	MINISTRY OF DEFENCE
DC	DISTRICT COUNCIL	NFU	NATIONAL FARMERS UNION
DoE	DEPARTMENT OF THE ENVIRONMENT	RASE	ROYAL AGRICULTURAL SOCIETY OF ENGLAND
EN	ENGLISH NATURE	RSPB	ROYAL SOCIETY FOR THE PROTECTION OF BIRDS
FA	FORESTRY AUTHORITY	S&T	SALMON & TROUT ASSOCIATION
FE	FORESTRY ENTERPRISE	STW	SEVERN TRENT WATER LTD
FWAG	FARMING & WILDLIFE ADVISORY GROUP	WRA	WASTE REGULATION AUTHORITY
GAP	GLOBAL ACTION PLAN (AGENDA 21)	WW	WESSEX WATER LTD

# SUMMARY OF ISSUES



## ISSUE 1 – ACHIEVEMENT OF RIVER WATER QUALITY OBJECTIVES

ACTIONS	RESPONSIBILITY									
	LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE	
			COST (£K)							
1. Pursue achievement of short term quality class within timescale set, by pollution prevention, liaison with public and other bodies and enforcement of pollution legislation	NRA	STW Farmers BW Industry WW	150	30	30	30	30	30		
2. Establish reasons for non-compliance with all long-term targets (See Table below) during period of Plan and pursue upgrading	NRA		50	10	10	10	10	10		

RIVER	STRETCH DESCRIPTION	REACH (KM)	RIVER QUALITY OBJECTIVES		
			CURRENT QUALITY	SHORT TERM OBJECTIVE	LONG TERM OBJECTIVE
Pool Brook	B4209 Bridge, Hanley Swan to R. Severn	3.2	RE3	RE3 (1995)	RE2
Bushley Brook	0.5Km DS of Horse Bridge to Mill Brook	4.1	RE5	RE4 (1995)	RE2
Bushley Brook	Confluence with Mill Brook to R. Severn	3.8	RE4	RE3 (1995)	RE2
Mill/Marlbank Brook	Sansome Farm to Trib DS Welland Court	2.4	RE5	RE4 (1995)	RE2
Marlbank Brook	Trib DS Welland Court to Bushley Brook	4.0	RE3	RE3 (1995)	RE2
Ripple Brook	Bow Bridge to R. Severn	2.3	RE4	RE3 (1995)	RE2
River Chelt	M5 Culvert to FB near Becketts Farm	2.2	RE5	RE4 (2000)	RE4
River Chelt	FB near Becketts Farm to R. Severn	5.0	RE5	RE4 (2000)	RE4
Ashleworth Brook	Wick Ridge ST to R. Severn	3.0	RE4	RE3 (1995)	RE2
Leadon	US Evesbatch Pools to FB to Hill Farm	2.2	RE4	RE4 (1995)	RE2
Leadon	Ledbury STP to Siddington Farm	1.5	RE3	RE4 (1995)	RE3
Leadon	Siddington Farm to confluence with Preston Brook	4.0	RE3	RE4 (1995)	RE2
Preston Brook	FB at Laddin Farm to R. Leadon	6.0	RE5	RE5 (1995)	RE1
Kempley Brook	Whitlocks End to confluence with Preston Brook	5.0	RE4	RE4 (1995)	RE1
Red Brook	Confluence with Huntley Brook to R. Leadon	2.9	RE5	RE5 (1995)	RE2
Ley Brook	FB at Round Hill to R. Severn	5.0	RE4	RE2 (1998)	RE2

River	Stretch Description	Reach (km)	River Quality Objectives		
			CURRENT QUALITY	SHORT TERM OBJECTIVE	LONG TERM OBJECTIVE
River Frome Frome (Southern Arm)	Confluence with Slad Brook to Ryford	3.5	RE2	RE2 (1995)	RE1
	Ryford to Stanley Downton STP	2.7	RE2	RE2 (1995)	RE1
Slad Brook	Above Uplands to Stroudwater Canal	2.0	RE2	RE2 (1995)	RE1
Nailsworth Stream	Avening STP to Nailsworth	3.0	RE2	RE2 (1995)	RE1
Horsley Stream	Kingscote Wood to Nailsworth Stream	4.0	RE2	RE2 (1995)	RE1
Cinderford	Bilson Green Estate to FB Stockwell Green	1.9	RE4	RE4 (1995)	RE3
Birches Dingle	Source at the Birches to Cannop Brook	1.5	RE2	RE2 (1995)	RE1
Coaley Brook	Tickshill - Hydegate Bridge to River Cam	3.8	RE3	RE2 (1995)	RE1
Little Avon	Southwood Farm - B4060	2.8	RE3	RE2 (1997)	RE2
Little Avon	B4060 - Confluence with Ozleworth Brook	1.7	RE3	RE2 (1997)	RE2
Little Avon	Confluence with Doverte Brook - Hook Street (estuary)	1.4	RE3	RE2 (1997)	RE2
Ozleworth Brook	Nind Farm - Gatehouse				

CF Issue 2/3/4/5/6/7/9/10/11/12/13/14/17/18/21/24/28/32/34/35

## ISSUE 2 – EXTENSION OF DESIGNATED FISHERY REACHES

ACTIONS	RESPONSIBILITY								
	LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
Review designations under the EC Freshwater Fish Directive to ensure that designated stretches reflect fishery use and resolve mismatches between actual fishery status and water quality. NOTES 1&2	NRA		6	3	3				

### NOTES - ISSUE 2

1. Reworded.
  2. Designations proposed by the NRA require approval by the Secretary of State.
- CF Issue 1

## ISSUE 3 – PROTECTION OF WATER SUPPLIES FROM RIVER SEVERN AND GLOUCESTER-SHARPNESSE CANAL AND DESIGNATION AS WATER PROTECTION ZONE

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		COST (£K)								
1.	Feasibility study to consider designation of R. Severn and Gloucester -Sharpness Canal as Source Protection Zones	NRA	DoE BW	10	3	7				
2.	Install additional automatic water quality monitors at Kempsey and Slimbridge	NRA		100	---	---				
3.	Establish targeted programme of inspections of potentially polluting premises and act on deficiencies identified. NOTE 1	NRA	Industry Farmers	30			10	10	10	
4.	Initiate targeted publicity campaigns to mobilise pollution prevention effort in Agriculture and Industry. NOTE 1	NRA	Farmers Industry BW	20			10	5	5	
5.	Liaise with Planning Authorities and Developers to minimise pollution risk from development	NRA	LAs Developers STW	60 (estimate will be demand led)	12	12	12	12	12	Ongoing

### NOTES - ISSUE 3

1. Actions 3 and 4 will be dependent on the outcome of the feasibility study.  
 CF Issue 1/4/7/10/15/20/25

## ISSUE 4 – IMPACTS OF URBAN WASTEWATER TREATMENT DIRECTIVE AND DESIGNATION OF EUTROPHIC SENSITIVE AREAS

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		COST (£K)								
1.	Monitor Severn Trent Water plc implementation of agreed capital programme of specified timetable	NRA	STW	NRA = R	---	---	---	---	---	
2.	Review consents in line with agreed programme	NRA	STW	10	2	2	2	2	2	
3.	Gather data to enable decisions to be made on proposed Eutrophic Sensitive Areas	NRA		10	5	5				
4.	Carry out Eutrophication Project to assess impact and benefits of nutrient removal from sewage works in eutrophic sensitive areas	NRA		U NOTE 1	---	---	---			

### NOTES - ISSUE 4

1. Costs for Action 4 will depend on designation of Eutrophic Sensitive Areas after 1998.  
 CF Issue 1

## ISSUE 5 – THE IMPACT OF THE RIVER CHELT ON THE WATER QUALITY OF THE RIVER SEVERN

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/	1996/	1997/	1998/	1999/	FUTURE
				COST (£K)	1996	1997	1998	1999	2000	
1.	Liase with Severn Trent Water plc to define optimum schemes to upgrade quality in line with AMP 2 commitments	NRA	STW	STW = > 6,000 (cf. Issue 4)	----	----	----	----	----	
2.	Assess need for nutrient removal at Cheltenham STP during 1995/6 for future review of Eutrophic Sensitive Area designation for the River Severn and Gloucester-Sharpness Canal	NRA		4	2	2				

CF Issue 1/28

## ISSUE 6 – IMPACT OF INVESTMENTS AND IMPROVEMENTS AT NETHERIDGE SEWAGE TREATMENT PLANT (NOTE 1)

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/	1996/	1997/	1998/	1999/	FUTURE
				COST (£K)	1996	1997	1998	1999	2000	
1.	Monitor completion of new works and improvements in effluent quality	NRA	STW	6	2	2	2	----	----	
2.	Continue to monitor effect of improvements to estuarine water quality	NRA		15	3	3	3	3	3	
3.	Assess effects on migratory fish NOTE 2	NRA	Anglers Commercial Fishing	U	---	---	----	----	----	
4.	Extra investment in water quality monitoring at Minsterworth NOTE 3	NRA		20			20			

### NOTES - ISSUE 6

1. This issue has been renamed as it is primarily concerned with the impacts of Netheridge Sewage Treatment Plant.
2. This interfaces with Severn Estuary Catchment Management Plan.
3. Action added.

CF Issue 1



## ISSUE 7 – SEWAGE AND INDUSTRIAL DISCHARGES

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		COST (£K)								
1.	Recommend appropriate controls on new development in Ledbury and impose controls on Ledbury STP to minimise potential pollution	NRA	STW Developers Malvern Hills DC H&G CT	NRA= 3	1	1	1			
2.	NOTE 1									
3.	Assess need for nutrient removal at Coaley STP during 1995/6 for future review of Eutrophic Sensitive Area designation for the Gloucester-Sharpness Canal	NRA		2	1	1				
4.	NOTE 2									

### NOTES - ISSUE 7

1. Option 2 has been deleted as the next price fixing round falls outside of the plan period.
  2. Option 4 is an ongoing routine activity - See Land Use Statement LUT.
- CF Issue 1/9

## ISSUE 8 – THIS ISSUE HAS BEEN DELETED AS IT WILL BE COVERED IN THE RIVER SEVERN MIDDLE REACHES CMP AND THE WARWICKSHIRE AVON CMP

## ISSUE 9 – POLLUTION FROM INADEQUATE RURAL SEWERAGE

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		COST (£K)								
1.	Promote action by District Councils and others to provide first time sewerage	NRA	LAs (DCs) STW	10	2	2	2	2	2	
2.	Feasibility study by Stroud District Council at Claypits, Arlingham and Longney NOTE 2	Stroud DC		10	----	----				
3.	NOTE 1									
4.	Explore feasibility of alternative sewage treatment methods e.g. reed-beds	NRA	STW Developers DCs	R	----	----	----	----	----	

### NOTES - ISSUE 9

1. Option 2 is an ongoing routine activity - See Land use Statement LUT.
  2. Action has been added as a result of Consultation.
- CF Issue 7

## ISSUE 10 – THE IMPACT OF PESTICIDES ON WATER QUALITY

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		COST (£K)								
1.	Target farm visits and inspections. Prosecute polluters when found	NRA	Farmers ADAS STW	Cf. Issue 3 (3)	----	----	----	----	----	
2.	Continued monitoring of eels in the catchment for Dieldrin etc.	NRA	MAFF	2.5	0.5	0.5	0.5	0.5	0.5	

CF Issue 1

## ISSUE 11 – FARM POLLUTION INCLUDING THE EFFECTS OF AMMONIA AND NITRATE

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		COST (£K)								
1.	Maintain targeted farm inspections (including Effluent Management Plans) and identify remedial action needed	NRA ADAS	Farmers	Cf. Issue 3 (3)	----	----	----	----	----	
2.	Serve Notices under 1991 Farm Waste Regulations to secure remedial action	NRA	Farmers	2.5	0.5	0.5	0.5	0.5	0.5	
3.	Prosecute identified polluters	NRA		R	----	----	----	----	----	Ongoing
4.	Monitor effectiveness of Nitrate Vulnerable Zones in reducing nitrate in local watercourses and groundwater	NRA MAFF	STW	2	1	1				Study & Review

CF Issue 1/3

## ISSUE 12 – POLLUTION RISKS FROM CONTAMINATED LAND

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		COST (£K)								
1.	Impose planning conditions and secure associated Section 106 obligations on redevelopment of affected sites	NRA	Developers LAs	R	----	----	----	----	----	Ongoing
2.	Encourage engineering and waste management solutions	NRA	WRA HMIP Land- Owners Developers	R	----	----	----	----	----	Ongoing
3.	NOTE 1									
4.	Extend database of information on existing contaminated land sites	NRA	LAs WRAs	2.5	0.5	0.5	0.5	0.5	0.5	Ongoing
5.	Recommend environmental assessment and scope of study on significant planning applications concerning contaminated land	NRA	LAs Developers	U	----	----	----	----	----	Ongoing
6.	Implement water quality survey of rhines around Severnside	NRA		22.4	----	----				

### NOTES - ISSUE 12

1. Option 3 has been deleted owing to merger of WRAs with NRA within the forthcoming Environment Agency.  
CF Issue 27

## ISSUE 13 – POLLUTION FROM MINING AND QUARRYING IN THE FOREST OF DEAN

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		COST (£K)								
1.	Enforce legislation for discharges to controlled waters, including underground waters, where justified by available evidence	NRA	WRAs Mining Companies Forestry Enterprise Land- owners	R	----	----	----	----	----	Ongoing
2.	Liaise with companies to secure improved pollution prevention measures	NRA FE		CF. Issue 3 (3)	----	----	----	----	----	
3.	Assess possibility of remedial measures to the riverbed habitat, including removal of iron-contaminated substrate	NRA	Mine Owners	U	----	----				
4.	Support the clean up of pollution threat from illegal waste dumping in mine shafts at Sling. NOTE 1	Deputy Gaveller Land- Owner	NRA LAs	U	----	----				

### NOTES - ISSUE 13

1. Action added.  
CF Issue 3

## ISSUE 14 – WATER CONTACT SPORTS AND RELEVANT WATER QUALITY STANDARDS

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
1.	Education on problems of contact sports in relation to water quality	LAs (public Health)	Sports Council Recreational Groups (e.g. Canoe Union)	R	----	----	----	----	----	Ongoing
2.	Identify Water Quality standards for contact sports	NRA	GHT	NOTE 1						

### NOTES - ISSUE 14

1. National NRA initiative.  
CF Issue 1

## ISSUE 15 – IMPACTS OF MARINAS AND OIL POLLUTION FROM BOATS

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
	Monitor impact of boat standards regarding oil storage and implementation of Waterways Act 1995. NOTE 1	NRA BW GHT		2.5	0.5	0.5	0.5	0.5	0.5	Ongoing

### NOTES - ISSUE 15

1. Options in Consultation Report have been superseded by the above owing to implementation of the Act. Boat standards became mandatory as of 16 January 1995. This Act applies to non-tidal waters (coastal and estuary waters come under MARPOL regulations).  
CF Issue 28/31/34

## ISSUE 16 – RIVER LITTER

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
1.	Better security at industrial sites to prevent vandalism	Site Owner		U	----	----	----	----	----	
2.	Educate and organise preventative action: a) site specific	NRA LAs Tidy Britain Group	Police Local Groups BW	U	----	----	----	----	----	
	b) set up catchment forum to address problem. NOTE 1			R	----					
3.	Change in legislation to clarify responsibilities	NRA	LAs	R	----	----	----	----	----	

### NOTES - ISSUE 16

1. Action 2.b) added as a result of the consultation process.  
CF Issue 17/28/31

## ISSUE 17 – SEASONAL EFFECTS OF BLUE-GREEN ALGAE (NOTE 1)

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		COST (£K)								
1.	Continue to monitor all reported occurrences and notify interested parties when reportable levels found	NRA	Land-owners LAs BW	10	2	2	2	2	2	

### NOTES - ISSUE 17

1. Issue has been broadened as a result of consultation.

CF Issue 14

## ISSUE 18 – POLLUTION RISKS ASSOCIATED WITH HEMPSTED TIP GLOUCESTER

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		COST (£K)								
1.	Use powers under Water Resources Act 1991 to enforce pollution control and preventative measures	NRA	Site Owner	5	1	1	1	1	1	
2.	Liaise with the Waste Regulation Authority on appropriate Licence conditions to minimise potential pollution	NRA	WRA	R	----	----				

CF Issue 25/27

**ISSUE 19 – IMPACTS OF LARGE INDUSTRIAL PLANT. THIS ISSUE WILL BE COVERED IN THE SEVERN ESTUARY CATCHMENT MANAGEMENT PLAN.**

## ISSUE 20 – MAINTENANCE OF FLOWS IN THE SEVERN FOR ABSTRACTION TO THE GLOUCESTER- SHARPNESS CANAL AND OTHER ENVIRONMENTAL USES

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
					COST (£K)					
1.	Review of operation of Llyn Clywedog and Shropshire Groundwater to provide required flows at Gloucester NOTE 1	NRA	BW	30			----			
2.	Feasibility study of options to include: a) The use of Gloucester Sharpness Canal to store water for use during periods when pumping at Gloucester is restricted b) Bankside storage equivalent to 5 days of the Purton abstraction and options for transfer from the River Frome c) River storage in the River Severn by adjustment of weirs at either Maisemore, Llanthony, Upper Lode or a tidal exclusion barrier below Lower Parting	NRA	BW Bristol Water LA	30	-----	----				
		NRA	LA							
		NRA	GHT H&G CT LA							
3.	NOTE 2									
4.	NOTE 3									
5.	NOTE 4									
6.	Installation of new flow monitoring site at Deerhurst	NRA		214	----					
7.	Identification of flows required to protect migratory fish. NOTE 5	NRA		30	----	----				
8.	Calibration of Estuary Model	NRA		20	10	10				
9.	Investigate relationship of river levels to conservation meadow SSSIs. NOTE 6	NRA		20			----			

### NOTES - ISSUE 20

1. Review of operations is subject to a public enquiry.  
CF. River Severn Upper Reaches Catchment Management Plan Action Plan, October 1995 - Issues 6 & 10
2. Option 3 has been incorporated into 2 as 2b)
3. Option 4 has been deleted as it is not feasible within this 5 year plan.
4. Option 5 has been incorporated into Action 2.
5. This action is also included in Issue 33.
6. Action 8 & 9 added.
- CF Issues 1/21/22

## ISSUE 21 – POTENTIAL EFFECTS OF A SEVERN-THAMES TRANSFER SCHEME

ACTIONS	RESPONSIBILITY		TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
	LEAD	OTHER							
1. Appraisal of planning implications of the scheme for Severn. NOTE 1	NRA LAs	BW	20		----				
2. Investigations into Biology and Chemistry of Severn to assess impact on Thames	NRA		R		----	----			
3. Promote best use of water resources NOTE 2	NRA LAs GAP		20		----				

### NOTES - ISSUE 21

- This to include all aspects such as archaeological, conservation etc.
- Links with local Agenda 21 initiatives Global Action Plan (GAP) - water savings. May also include specific NRA projects to promote and educate on water savings and approval of best available technologies.

Cf. Issues 20/22

## ISSUE 22 – IMPACT OF LOW FLOWS IN THE LEADON, FOREST OF DEAN, FROME AND CAM/LITTLE AVON

ACTIONS	RESPONSIBILITY		TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
	LEAD	OTHER							
1. LEADON (GLYNCH BROOK) a) Provide compensation borehole b) Reduce licensed quantity in unit c) Provide new flow measurement capacity to Glynch Brook NOTE 1	NRA STW NRA STW		35		----				
2. FOREST OF DEAN a) Provide new flow measurement on River Lyd possibly in association with a hydropower scheme b) NOTE 2	NRA		U			----	----		
3. FROME a) NOTE 3 b) Investigation into perceived low flows in upper Frome. c) Operating agreement with landowners to control flows to Canal and River	NRA NRA Land-owners	BW CCT	NRA = 25 NRA = 30				----		
4. LITTLE AVON a) Conduct seasonal flow monitoring investigations and compare with historical records: fish farm gauging and appraisal of historical data b) Ensure all licence abstractions operate within specified conditions c) Conduct aerial surveys to check for non-licensed abstractors	NRA NRA NRA		5 R 1		----	----	----	----	Ongoing

### NOTES - ISSUE 22

- Actions depend upon effective action by STW as the major abstractor.
- Option from the Consultation Report has been removed as planning permission for the open cast site has been refused since publication.
- NRA have not received direct support - option deleted.

CF Issue 20/21

## ISSUE 23 – SEVERN EXEMPT AREA ORDER

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
				COST (£K)						
1.	NRA to review policy of exempt area to support proposals for legislative changes NOTE 1	NRA		R			----			

### NOTES - ISSUE 23

1. Cf. River Severn Upper Reaches Catchment Management Plan Action Plan, October 1995 - Issue 14.

## ISSUE 24 – LOCAL ISSUES RELATING TO FISH FARMS

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
				COST (£K)						
1.	Review of flow management practices - consents and field visits in Little Avon Catchment	NRA		1		----				
2.	Chemical & Biological survey upstream & downstream of fish farms to determine any change in water quality. Sites for Action: Ozleworth Brook NOTE 1	NRA		3	----	----				

### NOTES - ISSUE 24

1. Samples taken for General Quality Assessment - reappraisal of monitoring programme to take place in 1996/97 following 1995/96 assessment. £3K = £1K for handling and analysis of biological data; £1K for a desk study review of chemical data; £1K for a desk study review of biological data.
- CF Issue 1/22/32



## ISSUE 25 – MAJOR FLOODING FROM THE RIVER SEVERN AND CHELT

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		COST (£K)								
1.	Complete investigation of possible flood alleviation works at a) Upton-upon-Severn and b) Kempsey	NRA	GHT	20 U	----					
2.	Investigate flood alleviation proposals for Gloucester	NRA	LAs GHT	U	----					
3.	Complete Severn Tidal Defences Improvement Scheme in accordance with NRA capital works programme agreed by Regional Flood Defence Committee NOTE 1	NRA		15017	----	----	----	----	----	Ongoing
4.	Complete designation of Chelt through Cheltenham as "main river"	NRA	LAs MAFF	R	----	----				
5.	Develop flood alleviation scheme on River Chelt through Cheltenham. NOTE 2	NRA	Chelten- ham B C	517	66 (8)	5	438			
6.	Protection of rhine system NOTE 3	SGIDB		R	----	----	----	----	----	Ongoing
7.	Protection of available storage capacity for flood waters in tide-lock conditions. NOTE 3	SGDIB		R	----	----	----	----	----	Ongoing

### NOTES - ISSUE 25

1. Cost shown is planned expenditure. May vary depending on results of feasibility study. Only includes current and proposed schemes, not schemes completed prior to 1995.
2. Study is currently at the feasibility stage. Spend in previous years= £8,000. Costs may vary depending on results of feasibility study.
3. Moved from Issue 36.
4. Ongoing maintenance of defences and outfalls is also undertaken.

CF Issue 26/27

## ISSUE 26 – FLOOD WARNING

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		COST (£K)								
1.	Complete improvement of existing flood warning scheme	NRA		R						
2.	Investing etc. in extension of flood warning scheme to areas not currently covered	NRA		R		----	----			
3.	Develop new tidal flood warning scheme for estuary	NRA		U	----	----				
4.	Revise dissemination system to take into account changing role of police in flood warning	NRA	Police	U	----	----				

CF Issue 25

## ISSUE 27 – FLOODPLAIN MANAGEMENT

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
					COST (£K)	1996	1997	1998	1999	2000
1.	Accurate definition of the floodplain for River Frome NOTE 1	NRA		118	---					
2.	Promotion of Buffer Zones particularly in areas of arable farming. Leadon, Ell Brook, Swilgate, Normans Brook, lower reaches of Cam, Chelt and Frome	NRA	FWAG	U	---	---	---	---	---	
	a) Identify framework for action	NRA		U	---	---				
	b) Demonstration Project at Royal Agricultural Showground, Stoneleigh	NRA	RASE	12	---					
	c) Develop strategy for individual river corridors	NRA	MAFF CoCo, NFU FWAG, EN Wildlife Trusts	U	---	---				
3.	Promote Managed Retreat	NRA	Landowners							
	a) Conclude management agreement with Berkeley Estate	MAFF Berkeley Estate	Co Co EN	R	---					
	b) Identify other potential sites	NRA	IDBs		---	---				
	c) Implement where possible									
4.	Restore Floodplain Landscape	NRA		R	---	---	---	---	---	
	a) Identify pressured habitats and locations e.g. saltmarsh, wet grassland, reedbed	NRA	MAFF EN IDBs	U	---	---				
	b) Identify sites where Floodplain Landscape can be reinstated e.g. planting and drainage guidance and maintenance	NRA	MAFF Landowners En, CCs	U	---	---				
	c) Increase awareness of the character and value of Floodplain Landscape, e.g. leaflet/publication	NRA	CCs, LAs CPRE	U			---	---		
	d) Implement landscape reinstatement projects on FP reaches of Cam, Frome, Chelt. NOTE 2	NRA	Landowners LAs	U					---	
5.	Investigate removal of redundant structures at Gloucester. (CF Issue 25.2)		Gloucs City & County Councils, BR Landowners	U	---					

### NOTES - ISSUE 27

This issue has been substantially changed as a result of consultation.

1. River Chelt floodplain mapping project not within scope of 5 year Plan.
2. Option 4 has been reworded.

CF Issue 28/29/37

## ISSUE 28 – REHABILITATION OF RIVER CORRIDORS (NOTE 1)

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		COST (£K)								
1	Develop terms of reference in the following areas: Landscape/Visual Quality a) Plan Landscape Appraisal programme b) Implement c) Consult with all relevant agencies and authorities, e.g. CC, LAs, FA to establish guidelines and policy relating to rehabilitation	NRA	LAs Conservation Groups Interested parties BW, FA FWAG	NRA=50 NOTE 2	----	----	----	----	----	
2	Habitat Value a) Carry out survey required additionally to River Corridor Survey b) Consult with expert bodies c) Devise habitat rehabilitation strategy	NRA	EN CC Wildlife Groups LAs	U  R  R	----	----	----	----	----	
3	Uses & Access a) Survey and baseline data b) Set up User Forum and consult c) Develop recreational strategy	NRA NRA NRA NRA	BW  User Groups	R+U R+U  R	----	----	----	----	----	
4	Cultural, historic and archaeological features a) Investigate and appraise main river (Severn Estuary Archaeological Study) ii) Formulate collaborative strategy	NRA	County Archaeologist B&GAS EH	R	----	----	----	----	----	

## CONT'D ISSUE 28 – REHABILITATION OF RIVER CORRIDORS (NOTE 1)

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		COST (£K)								
<b>5</b>	<p>Channel Geomorphology and Hydrology (a) Urban (b) Rural</p> <p>i) Identify those reaches most in need of improvement (a &amp; b) ii) Define strategy for recreating natural/improved channel (a &amp; b) ii) Identify potential sites for de-culverting (a) iv) Promote collaboration to open up urban river corridors, Cheltenham, Stroud, Gloucester (a)</p>	NRA	MAFF, CCs EN LAs Local Interest Groups Land- owners			----	----			
<b>6</b>	<p>River Rehabilitation Strategy(Synthesis of Actions 1-5) a) Analytical Study of data collected. b) Pilot Scheme and Programme. c) Produce strategy for phased rehabilitation.</p>	NRA	As above	U	----	----				

### NOTES - ISSUE 28

1. This issue has been developed as a result of consultation.
2. £50,000 total costs represents costs over the 5 year period. Yearly allocations to be reported at each Annual Review.
3. Action added as a result of consultation.

CF Issue 27/29/31

## ISSUE 29 – COMPETING REQUIREMENTS OF RIVER ENGINEERING AND OTHER USES (NOTE 1)

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/ COST (£K)	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
1.	Investigate the major sources of potential conflict	NRA								
	a) Nature Conservation: pressure on habitats.	NRA								
	Projects:									
	i) Saltmarsh Monitoring		EN Wildlife Trusts	U	---	---				
	ii) Breeding Wader Survey	NRA	RSPB	3	---					
	b) Landscape: Landscape Appraisal programme (Commencing with Chelt, Frame, Cam)	NRA		U	---	---	---	---	---	
c) Cultural Heritage (Severn Estuary Archaeological Study)	NRA	LAs Archae- ologists & Trusts	U	---	---					
d) Recreation and Access: Seek opportunities to incorporate recreational facilities	NRA	User Groups Sports Council	U	---	---	---	---	---		
e) Consult with expert bodies, local groups and landowners (Three monthly meeting with EN)	NRA	EN MAFF LAs Landowners	U	---	---					
2	Baseline data and accessibility of data									
	a) Survey as required additionally	NRA	BW	U	---	---	---	---	---	
	b) Continue to update and develop Severn Estuary Study database	NRA		25	5	5	5	5	5	
3	Evaluate data and consultation									
	a) Produce Best Practice Guidelines for Operational Works *Service level Agreements and Regional Guidelines also appl.	NRA		R	---	---	---	---	---	
	b) Develop Design Criteria to allow compromise between efficient flood water conveyance and natural structure of channel: Cam, Frame, Leaddon	NRA	LAs Land- owners	U	---	---	---	---	---	
4	Public Interest Consultation via Environmental Statements (where appropriate) /Press releases/notice boards/etc.	NRA	All	R	---	---	---	---	---	---
5	Promote better liaison between NRA and all interested parties	NRA	All	U	---	---	---	---	---	---

Notes - Issue 29 This issue has been developed as a result of consultation.

**ISSUE 30 HAS BEEN DELETED AND AMALGAMATED INTO ISSUES 29 AND 31.**

**ISSUE 31 – DEVELOPMENT OF RECREATIONAL ACCESS**

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/	1996/	1997/	1998/	1999/	FUTURE
				COST (£K)	1996	1997	1998	1999	2000	
1	Collaborative projects within Tewkesbury, Upton and other potential sites e.g.	NRA	BW Land-owners	U	----	----	----	----	----	
	Hereford and Worcester CC Millennium Bid "H2000" NOTE 1	H&W CC		U	----	----				
2	Continuation of Severn Way Project NOTE 2	NRA	BW Land-owners	R	----	----				
3	Investigation of potential riverside cycle tracks	Sports Council	NRA	U	----	----				
4	Analysis of recreational use and development of nodal points with facilities such as parking, interpretation, etc.	BW LAs NRA Police		R	----	----	----	----	----	
5	Promote access to or along all rivers within catchment where appropriate and where opportunities arise	NRA BW	Land-owners	R	----	----	----	----	----	
	a) Increased availability, where practical, for disabled access	NRA BW		R	----	----	----	----	----	
	b) Additional 6 mooring sites between Worcester and Gloucester	BW		U	----	----				
6	Liaise with FA to examine the role of water in recreational aspects of the Forest of Dean. NOTE 4	FA		U	----	----	----	----	----	
7	Revision of Avon Users Handbook to include Lower Severn	NRA	Sports Council		----	----				

**NOTES - ISSUE 31**

1. Project added during consultation process.
  2. CF. Issue 16, River Severn Upper Reaches CMP Action Plan, June 1995.
  3. This issue has been deleted owing to lack of support.
  4. Action 6 has been added as a result of consultation.
- CF Issue 28/29

## ISSUE 32 – PROTECTION OF VULNERABLE SPECIES (NOTE 1)

	ACTIONS	RESPONSIBILITY		TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		LEAD	OTHER							
1	SHAD a) Preparation and adoption of Shad Conservation Strategy to include e.g identification and protection of spawning habitat, provision and assessment of use of fish passes b) Advise anglers on best practices for catch and return to reduce Shad deaths as a result of accidental catches NOTE 1	NRA	EN	5		----				
		NRA	S&T	U	----	----				
2	CRAYFISH a) Identify rivers in catchment where crayfish farms should be refused b) Liaise with MAFF to formulate agreed policy for introductions of crayfish under Wildlife & Countryside Act. NOTE 2	NRA MAFF NRA		1 R		----	----			
3	BROWN TROUT a) As above for Shad	NRA EN		5		----				
4	OTTER Development of otter habitats via the Severn Otter Project (CF Issue 29)	NRA Worcs Wildlife Trust BW	Others	65 (NRA): 25 (Other Partners)	18	18	18	18	18	

### NOTES - ISSUE 32

1. Changed as a result of consultation.
  2. Actions reworded from options in Consultation Report.
- CF Issue 29

## ISSUE 33 – THE MANAGEMENT OF THE SALMON AND ELVER FISHERIES (NOTE 1)

	ACTIONS	RESPONSIBILITY		TOTAL	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		LEAD	OTHER							
1	ELVERS NOTE 2									
2	Increased patrol work and prosecution of boat owners contravening the navigation legislation	BW		U	----	----	----	----	----	Ongoing
3	Provision of eel & elver passes on weirs and sluices in the catchment: Upper Lode Weir	NRA		5	----					
4	NOTE 2									
1	SALMON Prepare Salmon Management Plan in liaison with NRA Upper Severn Area and other NRA Regions (Re: Severn Estuary CMP)	NRA		2	----	----				
2	Cf. Issue 20(7)	NRA		30	----	----				

### NOTES - ISSUE 33

- 1 Both salmon and elvers now considered in this issue as a result of consultation.
  - 2 Option in CMP is an ongoing activity - not included here as a specific action. For details of activity see Section 1.3.
- CF Issue 27

## ISSUE 34 – CANAL RESTORATION

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/	1996/	1997/	1998/	1999/	FUTURE
				COST (£K)	1996	1997	1998	1999	2000	
1	FROME Restoration of Cotswold Canals. NOTE 1	CCT	BW NRA GCC MOD	4604	----	----	----	----	----	
2	Review of status of old connections and use of existing channels	NRA		25				----		
3	Appraisal of the impact of increased recreational use on nature conservation/ hydropower. NOTE 2	CCT	NRA EN  BW Wildlife Trusts Land- owners	U	----	----	----	----	----	
	THAMES & SEVERN CANAL NOTE 3	CCT								
1	HEREFORDSHIRE & GLOUCESTERSHIRE CANAL Restoration	H&G	CT	U	----	----	----	----	----	Ongoing
2	Investigate use of river channels. NOTE 4	GHT								

### NOTES - ISSUE 34

1. Funding sources - Gloucs. County Council; Land Reclamation Grant; NRA; BW; Ministry of Defence; CCT
  2. Action 3. added as a result of consultation.
  3. Option in Consultation Report no longer viable.
  4. Use of River Severn for navigation downstream of Maisemore Weir is under GHT jurisdiction.
- CF Issue 15/31/35

## ISSUE 35 – HYDROPOWER DEVELOPMENT

ACTIONS		RESPONSIBILITY								
		LEAD	OTHER	TOTAL	1995/	1996/	1997/	1998/	1999/	FUTURE
				COST (£K)	1996	1997	1998	1999	2000	
1	RIVER CAM Protect flows and resources in the River Cam via operating agreements with hydropower users and millowners NOTE 1	NRA		U			----			
2	RIVER FROME Appraisal of 14 potential hydropower sites NOTE 2	NRA		U	----	----				
3	Implement hydropower scheme at 1 site in catchment. Implement 3 further sites	HA	NRA	U U		----	----	----	----	
4	Feasibility of hydropower to be considered for all capital schemes	NRA		U	----	----	----	----	----	

### NOTES - ISSUE 35

1. Will depend upon the cooperation of the abstractor in ensuring that the hydropower site does not cause deleterious effects on the river.
  2. Action has been generated as a result of consultation.
- CF Issue 1/16/20/22/27/29/32/34



## ISSUE 36 – THIS HAS BEEN REPLACED BY THE LAND USE STATEMENT IN SECTION 4

### ISSUE 37 – WATER LEVEL MANAGEMENT PLANS (WLMP)

	ACTIONS	RESPONSIBILITY			1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	FUTURE
		LEAD	OTHER	TOTAL						
				COST (£K)						
1	Produce WLMPs: programme as agreed:									
	a) Chaceley Meadows	NRA	EN	R	----	----				
	b) Coombe Hill Canal		Landowners			----				
	c) Old River Severn				----	----				
	d) Severn Ham				----	----				
	e) Upton Ham				----	----				
	f) Walmore Cammon	West Glos IDB	EN Land- owners		----	----				
	j) Upper Severn Estuary	South			----	----				
	NOTE 1	Glos IDB								
2	NOTE 2									
3	NOTE 3									

#### NOTES - ISSUE 37

1. List has been agreed with EN during consultation period.
2. The "Do Nothing" Option has been deleted in view of 1.
3. Option now forms part of 1.

CF Issue 27

## 6. FUTURE REVIEW AND MONITORING PROGRAMME

The NRA will be jointly responsible, with other identified organisations and individuals, for implementing this Action Plan. Progress will be monitored and reported annually by the NRA to all the key partners and other interested parties. The first Annual Review will be due at the end of November 1996. The period between major revisions will normally be five years.

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

- Examine the need to update the Catchment Management Plan in the light of changes in the catchment.
- Compare actual progress with planned progress, and explain the reasons for any changes to the content or timing of individual actions.
- Report on other matters, including any legislative and classification scheme changes, affecting the Catchment Management Plan.
- Roll forward the detailed actions.

## APPENDIX 1: NOTE ON NEW RIVER WATER QUALITY SCHEMES

Two new schemes for the reporting and management of river water quality were introduced in 1994. The new schemes will replace the National Water Council (NWC) Scheme, which was first introduced in the late 1970s. In May 1994, the River Ecosystem (RE) use of the Statutory Water Quality Objectives (WQOs) was introduced by *The Surface Waters (River Ecosystem) (Classification) Regulations 1994*. At the same time the NRA introduced the General Quality Assessment (GQA) Scheme.

WQOs will be used for long term planning and target setting for the use of the river. The GQA classification will be used to make periodic assessment of overall water quality in order to monitor both geographical trends and trends over time.

Until WQOs are formally established by legal notice served by the Secretary of State (and therefore exist on a statutory basis), they will be applied on a non-statutory basis through translation of River Quality Objective (RQOs) from NWC classes to appropriate RE classes with target dates. These new non-statutory RQOs will form the basis from which to develop WQOs.

Five uses have been proposed for rivers under the WQO scheme, of which the River Ecosystem (RE) use is the first to have been introduced. The five uses include; River Ecosystem (general river health); Special Ecosystem (for example SSSI); Abstraction for Potable Supply; Agricultural/Industrial Abstraction; and Watersports.

Five Classes have been established for the RE use:

Class RE1:	Water of very good quality (suitable for all fish species).
Class RE2:	Water of good quality (suitable for all fish species).
Class RE3:	Water of fair quality (suitable for high class coarse fish populations).
Class RE4:	Water of fair quality (suitable for coarse fish populations).
Class RE5:	Water of poor quality (which is likely to limit coarse fish populations).
Unclassified:	Water of bad quality (in which fish are unlikely to be present), or insufficient data available by which to classify water quality.

The introduction of WQOs will require full public consultation, and the timetable will be set by the Government. CMPs will provide the framework within which the NRA can implement the new system, and we will use the Annual Review as well as other approaches to inform you of progress on this matter.

## APPENDIX 2A: LIST OF ORGANISATIONS AND INDIVIDUALS RESPONDING TO THE REPORT

The following organisations and individuals sent in written responses or queries to the Consultation Report. The NRA gratefully acknowledges all comments received.

ADAS  
Alderley Trout Ltd  
Avon County Council Planning Officer  
Avon County Waste Regulation Officer  
Avon Wildlife Trust  
M Aylard  
Aylburton Parish Council  
Berkeley Estate  
Birmingham Anglers Association  
Bredon School  
Bristol City Council  
Bristol & Gloucestershire Archaeological Society  
British Waterways  
Brookthorpe-with-Whaddon Parish Council  
Cainscross Parish Council  
R J Chandler  
Charfield Parish Council  
Coaley Parish Council  
Coberley Parish Council  
Cotswold Canals Trust  
Council for the Protection of Rural England  
Country Landowners Association  
K C Davies  
DuPont (UK) Ltd  
Elmore Parish Council  
English Heritage  
English Nature  
Farming & Wildlife Advisory Group  
Forest of Dean District Council Planning & Leisure Services  
Forestry Authority  
Forestry Enterprise  
Fretherne with Saul Parish Council  
Friends of the Earth Gloucester Branch  
Friends of the Earth South West Region  
Gloucestershire Cave Rescue Group  
Gloucestershire County Archaeologist  
Gloucestershire County Council Chief Planning Officer  
Gloucester City Council Planning & Technical Services Dept  
Gloucestershire Fire & Rescue  
Gloucester Harbour Trustees  
Gloucester United Anglers Association  
Gloucestershire Wildlife Trust  
Heart of England Tourist Board  
O B Hepworth Chartered Surveyors  
Hereford & Worcester County Council County Archaeologist Service  
Herefordshire & Gloucestershire Canal Trust  
Herefordshire Nature Trust  
HydroAction  
Inland Waterways Association  
J Jones  
Kingscote Parish Council  
Kingswood Parish Council  
Ledbury Town Council  
C Lutz  
Ministry of Agriculture Fisheries and Food  
Malvern Action Group  
R J Marklow  
R J Moreland  
Much Marcle Parish Council  
National Association of Boat Owners  
National Association of Water Power Users  
National Farmers Union  
M Neville  
Newnham-on-Severn Parish Council  
North avon District Council Planning Officer  
North avon Bridleways Group  
Norton Parish Council  
Pilning & Severn Beach Parish Council  
Royal Society for the Protection of Birds  
Rural Development Commission  
Salmon & Trout Association  
Severn Area Rescue Association  
Severn Fisheries Consultative Council  
Severn Navigation Restoration Trust  
Severn Trent Water plc  
Shurdington Parish Council  
South Gloucestershire Internal Drainage Board  
Sports Council Midlands & South West Regions  
Stroud District Council Planning Officer  
Stroud District Council Housing & Environmental Services  
Stroud District Council Planning, Leisure and Tourism  
The Clean Rivers Trust  
The House Builders Federation  
The Wildfowl & Wetlands Trust  
Water Power Engineering  
Wessex Water plc  
Westbury-on-Severn Parish Council  
West Gloucestershire Internal Drainage Board  
Wiltshire County Council  
Worcestershire Wildlife Trust

## APPENDIX 2B RESPONSE TO COMMENTS RECEIVED

CONSULTEE	COMMENTS	RESPONSE/REFERENCE IN ACTION PLAN
ADAS	<p>Noted activities by ADAS on</p> <p>a) research into pesticide application (experimental farms)</p> <p>b) free pollution audit service to farmers</p> <p>c) Completion of Effluent Management Plan for farms in the Leaddon Catchment.</p>	<p>Meeting convened.</p> <p>Actions added to Issue 10 (3,4,&amp;5).</p>
Alderley Trout Ltd	<p>Detailed response to the issues on low flows on the Cam/Little Avon and local issues relating to fish farms in the Little Avon catchment.</p> <p>Queried present water quality classification on stretch below Nind.</p> <p>Noted threat of mink on otter re-introduction.</p>	<p>Issues 22 &amp; 24</p> <p>Issue 1.</p> <p>Issue 32.</p>
Avon County Council	<p>Cited the direct relevance of the CMP to the County Structure Plan and the document "Our Sustainable Future", in particular strategies SP61 &amp; 62.</p> <p>Interest noted in Issues 1,7,9,11,14,15,16,27,28,29,30,31,32,35,37 and in particular 4,19,22,26.</p> <p>Queried decision on Avonmouth as "Area of High Natural Dispersion".</p> <p>Pressed for stronger action on river litter.</p> <p>Need reference to the Jubilee Way in "Catchment Description".</p>	<p>Land use Statements LU2 and LU9.</p> <p>Noted.</p> <p>Deferred to the Severn Estuary CMP (1996).</p> <p>Action added to Issue 16: 2(b).</p> <p>Added to Section 3.2.8 in Action Plan.</p>
Avon Wildlife Trust	<p>Major aims should be sustainable water use, biodiversity targets and sensitive land management.</p> <p>Expressed concern about contaminated land/waste disposal problems in Avonmouth and its effects on Rhine/wetland ecology. Wanted better inter-agency co-operation on rare species protection.</p> <p>Supported aims to restore floodplain (river corridor, buffer zones etc.).</p>	<p>Land Use Statement LU6.</p> <p>Land Use Statement LU3; Issue 32.</p> <p>Issues 27,28 and 29.</p>
Michael Ayland	<p>Proposes removal of Llanthony and Maisemore weirs and replacing them with a single structure downstream of Lower Parting. Suggested construction of a still water channel through Stroudwater navigation between Dudbridge and Foundry Lock to take overflow and facilitate navigation at times of low flow. Promotion of the River Cam for navigation.</p> <p>NRA should not force residents into acceptance of tidal flood defence schemes if practical alternatives exist.</p>	<p>Issue 20.</p>
Aylburton Parish Council	<p>Congratulated the authority on a thorough and comprehensive report.</p>	<p>Noted.</p>

CONSULTEE	COMMENTS	RESPONSE/REFERENCE IN ACTION PLAN
The Berkeley Estate	Queried why the Berkeley Estate was the only site in relation to managed retreat.	Comments followed up & Actions for Issue 27(3) reworded.
Birmingham Anglers Association	Supported plan. Asked if "Avon Users Handbook" would be repeated for Severn.	User Handbook to be extended to Avon & Lower Severn at next reprint.
Bristol City Council	<p>Noted interrelationship between Severn Estuary Coastal Cell and Flood Defence activities. Value of the inter-tidal zone and River Severn margin for archaeology. Leaving the issue of discharges to the Estuary to the Severn Estuary CMP may cause confusion.</p> <p>Sought further collaboration on future development plans and questioned role of Water Level Management Plans in relation to CMPs and Development Plans.</p>	<p>Noted. Issue 28. Noted.</p> <p>Issue 37 clarified. Land Use Statement LU6.</p>
The Bristol & Gloucestershire Archaeological Society.	Felt that archaeological issues had not been adequately addressed. Stressed importance of consulting County Sites and Monuments Records and listed building and conservation area data before civil engineering or building work undertaken. Underwater and river bed archaeology should be investigated.	Meeting convened. Action added to Issue 28.
British Waterways	<p>Supports designation of the River Severn and Gloucester-Sharpness Canal as Water Protection Zone. Recognition should be given for BW role in flood control. Elver fishermen becoming a problem within the navigation from Haw Bridge to Gloucester. More moorings and improved slipway access required.</p>	<p>Issue 2. Noted. Issue 33. Meeting convened. Action added to Issue 31: 5(b).</p>
Cainscross Parish Council	<p>Expressed support for restoration of the Stroudwater Canal and development of hydropower. Welcomed NRA aims to seek adequate rural sewerage systems and sought support for a scheme of reed bed filtration.</p>	<p>Issues 9 and 34. Land Use Statement LU1</p>
R Chandler	<p>Noted low river levels in the Leadon, Preston Brook and Kempley Brook. Supported idea of tidal barrier at Lower Parting.</p>	Issue 20.
Charfield Parish Council	Raised a query on water quality on the Ozleworth Brook and frequency of testing at these sites.	Reply to query sent 23 August 1995.

CONSULTEE	COMMENTS	RESPONSE/REFERENCE IN ACTION PLAN
Coaley Parish Council	No specific comments.	Noted.
Coberley Parish Council	No specific comment on the Plan but expressed concern that costs of improvements usually borne by water company consumers and not shareholders.	Noted.
Cotswold Canals Trust	Expressed disappointment that the NRA was not more pro-active towards restoration proposals.	Issue 34 reworded to incorporate plans of the Canal Trusts in a more proactive way.
Country Landowners Association	Commented on each issue: Need to improve water quality; problem of mink and predators; welcomed liaison with NRA on pesticides and farm pollution; stressed importance of education of the public on river litter and contact sports; against Severn Thames Transfer scheme; expressed concern over erosion and effect of flooding on agricultural land; NRA should encourage Government to provide adequate grants for buffer zones; concerned about problems arising from canal restoration schemes.	All issues -noted.
Council for the Protection of Rural England	Asked that the Vision Statement include "will sustain and where possible enhance the landscape of the catchment area." Also concerned about rural sewerage problems.	Wording added to vision statement.
K C Davies	On Issue 22 suggested construction of small lake to enhance environment and link in picnic area near Ledbury.	Noted.
DuPont (UK) Ltd	Supported CMP and noted their programme for improvements in their discharges.	Noted.
Elmore Parish Council	Would like to see the principle of the "polluter pays" restated in vision statement. Concern about lack of regulation of powered boats below Llanthony Weir and problems relating to Severn Bore spectators parking.	Liaison between NRA and BW in the CMP process. Re: Issue 31.
English Nature	Commented on each issue separately.  Vision should place sustainability as central goal.  Noted their designation of different "landscape units".  Suggested cross-referencing of issues.	Incorporated into Land Use Statement. Area for further liaison on methodology. Suggestion incorporated into Activity Tables.

CONSULTEE	COMMENTS	RESPONSE/REFERENCE IN ACTION PLAN
English Heritage	Welcomed NRA commitment to protecting sites of landscape importance and archaeological, architectural and historical interest. Noted that activities around as well as designation of river sites (e.g. flood defence and canal restoration) can impact on the historic fabric.	Issue 28.
Farming & Wildlife Advisory Group	Noted problems to farm animals and machinery from litter washed onto floodplain. Endorsed development of remuneration benefits of buffer zones and stewardship schemes - FWAG has an advisory role. Noted need to increase awareness of need for licensing and responsible management of non-native crayfish. Expressed concern about disturbance to otters from mink hunting. Canal restoration must not have adverse effects on wildlife habitats. Issue 28 - FWAG has advisory role on habitat value of river landscape. Questioned apparent downgrading of certain stretches of Dimore and Cannap Brook in their RE Objectives as shown in Table 13.	Issue 16. Issue 27. FWAG added to Action 2 as responsible body. Issue 32. Issue 32. Issue 34. FWAG added to list of responsible bodies in 28 (i). Issue discussed at consultation meeting.
Forest of Dean District Council	Welcomed river engineering and resultant structures design as an issue. Identified mining & quarrying, low flows, nitrates and phosphates, pesticides, farm pollution and canal restoration as issues relevant to the forest area.	Noted - Issue 13, 22, 34.
Forestry Authority	Disappointed with lack of coverage of woodland issues.	Meeting convened. Actions incorporated into Issue 28.
Forestry Enterprise	Concern with vision statement regarding control of mining activities in the Forest of Dean.	Meeting convened to discuss this and other issues (e.g. 28). Actions incorporated into Issues 13 and 28.
Fretherne with Saul Parish Council	Supported designation of Water Protection Zone, Eutrophic Sensitive Areas, and improvement at Hayden Works. Called for stricter legislation for pollution control on boats, stricter pollution control along the River Frome, need for greater local awareness of problems relating to blue-green algae. Development of recreational access should include consideration of impact on residents in rural areas. Increased use of Stroudwater Canal could lead to lowering of water levels in the River Frome. Supported expansion of flood warning scheme to the estuary.	Issues 3, 5, 6, 7, 15, 17, 26, 31, 34.
Friends of the Earth (Gloucester Branch)	Would like to see improvements in water quality targeted at Class C & D watercourses and investigation of all pollution incidents included in list of aims. Industrial premises should be inspected regularly and polluters prosecuted. Public should be informed of areas of inferior water quality where contact water sports are not advisable. New developments should be monitored for compliance with pollution prevention measures.	Issue 1.  Issue 7. Issue 14.  Land Use statements (replacing Issue 36).

CONSULTEE	COMMENTS	RESPONSE/REFERENCE IN ACTION PLAN
Friends of the Earth (South West Region)	As above. Would like to see more NRA reports like CMPs and data made available to the public to raise awareness of NRA's functions, aims and limitations.	Activity Tables and descriptions of NRA ongoing activities reworked to clarify these aspects.
Gloucestershire Cave Rescue Group	Group requested details of pollution problems in Mitcheldean area. Expressed willingness to undertake collection of samples from caves and mines in the area.	Issue 13. Correspondence sent clarifying situation as understood by NRA.
Gloucester City Council	Queried some RE Objectives. Noted riparian responsibility for river litter. Concerned that leisure potential of canals ignored. BW should be identified as responsible party - Issues 29 -31. Suggested closer co-operation on flood warning plans and river corridor strategies. Issue of problems arising from urban run-off should be addressed.	Issues 1 & 16 Noted and amended - Issues 29-31.  Issues 26, 27, and 28.
Gloucestershire County Archaeologist	Concern over low profile of archaeology in the report in general and in certain issues in particular. Archaeology surveys should be carried out.	Meeting convened.  Actions added to Issue 28.
Gloucester Harbour Trustees	Noted effect of tidal exclusion on control of upstream movement of pollutants. Navigation aids on bankside must not be adversely affected by shoreline land drainage works. Any reinstatement of navigation on the Severn for the Herefordshire & Gloucestershire Canal falls within GHT jurisdiction. Expressed importance of cross-referencing this CMP with the Severn Estuary CMP and Severn Estuary Strategy.	Issue 20. Noted.  Issue 34. (Note 3 added).  Noted.
Gloucester United Anglers	Concerned that the issue of cormorant predation on fish had been removed.  Not adequate access on the west bank of the Severn from Mythe Bridge to Gloucester. Concerned at effects of reservoir releases on river temperatures.  Concerned about effects of Severn-Thames Transfer on river ecology. Wished to participate in feasibility study	Issue being addressed nationally. Issue 31 (5). Issue 21(1) Cf. River Severn Upper Reaches CMP. Issue 21
Gloucestershire County Chief Fire Officer	No comment on Plan.	



CONSULTEE	COMMENTS	RESPONSE/REFERENCE IN ACTION PLAN
Gloucestershire County Council Chief Planner	<p>Not enough emphasis on importance of river corridors as Strategic Wildlife Corridors. Various suggested re-wordings in vision statement and text.</p> <p>Concern expressed about the lack of urgency to improve sewage and industrial discharges. Noted the lack of evidence for direct pollution from coal and iron ore mining in the Forest of Dean.</p> <p>Detailed comments on Issues 7, 13, 18, 25, 27, 28, 29, 30,31, 34, 35, 36.</p> <p>Support for hydropower noted merits of setting up User forum/interest group.</p> <p>Suggested a site at Ebley Mill should not present problems.</p>	<p>Noted.</p> <p>Noted. Issue 35.</p>
Gloucestershire Wildlife Trust	<p>Highlighted low flows, wet grasslands, floodplain restoration, buffer zones and river corridor rehabilitation, canal restoration, species conservation and sustainability of particular interest.</p>	<p>Issues 22, 27, 28, 32, 34 and Land Use statements LU6 U7</p>
Heart of England Tourist Board	<p>Welcomed comments and actions under Uses and Access on Issue 28. BW 1991 strategy was not mentioned.</p> <p>Although Forest of Dean is important other areas in the catchment are equally /more important re:tourism.</p>	<p>Issue 28.</p> <p>Overview section.</p>
O B Hepworth	<p>Expressed concerns over flood protection of agricultural land and erosion of the estuary North Shore.</p>	<p>Issues 25 &amp; 27.</p> <p>Specific concerns addressed in correspondence.</p>
Hereford & Worcester County Archaeologist	<p>Noted inconsistencies between Lower &amp; Upper Severn CMPs.</p> <p>Changes in groundwater levels can affect archaeological remains.</p> <p>Archaeologists need to be consulted on flood alleviation works.</p> <p>Noted that the most accessible archaeological sites are also a recreational resource.</p>	<p>Actions added to Issue 28.</p> <p>Noted.</p> <p>Noted - Issues 27 &amp; 28.</p> <p>Noted - Issue 31.</p>
Herefordshire & Gloucestershire Canal Trust	<p>Welcomed support for the restoration of the canal. Felt that the report did not reflect the thorough assessment work that the trust was carrying out prior to any physical works.</p>	<p>Issue 34.</p>
Herefordshire Nature Trust	<p>Commented on Issues 1, 2, 4, 7, 9, 11, 22, 23, 27, 29, 30, 31, 32.</p> <p>Further options for Issues 22 &amp; 23 forwarded.</p> <p>Issue 32 - all species protected by law should be considered.</p>	<p>Actions rewarded /reappraised as appropriate.</p> <p>Some actions proposed incorporated into Section 1.3 on NRA Routine Works.</p> <p>Issue 32.</p>

CONSULTEE	COMMENTS	RESPONSE/REFERENCE IN ACTION PLAN
Hydro Action	Suggested change to wording of Vision Statement on hydropower. Felt that NRA support for hydropower had too many provisions. Asked for more NRA assistance in developing hydropower in the Catchment.	Reworded. Issue 35 - actions added.
Inland Waterways Association	Felt that the CMP looked negatively on canal restoration and that it incorrectly identified it as conflicting with conservation. Questioned the future of Lydney Canal.	Issue 34.
J Jones	Concerned that alternative water treatment methods are unfairly considered as a viable option by the water companies. Also noted alternative methods to solve rural sewerage problems.	Issue 9.
Kingscote Parish Council	Suggested increasing width of River Severn in the upper reaches to help control flooding and a levy on tarmac and concrete to pay for flood prevention as a result of increased run-off.	Suggestions forwarded to NRA Upper Severn Area.
Kingswood Parish Council	Expressed concern over low flows on Ozleworth Brook; possible link between fish farms and poor water quality; sewage overflow onto agricultural land and private properties.	Issues 9, 22, 24.
Ledbury Town Council	No specific comments. Welcomed proposals.	Noted.
C Lutz	Proposed more consideration of alternative water conservation technologies. In favour of metering.	Issue 21 (3).
MAFF	Issue 11 MAFF provide free advice to farmers on farm pollution. Prefer term "managed setback" to "managed retreat". Shoreline management plan for Upper Severn Estuary should be included as an additional issue.  Not in favour of managed retreat for high grade agricultural land if it leads to downgrading.	Issue 11. Issue 27. Shoreline Management Plan will be considered in Estuary CMP. Issue 27.
R K Marklow	Concerned about the effects of irrigation on low flows in the Leadon particularly over abstraction from those with Licences of Right.	Issues 22, 23.
Much Marcle Parish Council	Issue 9 - Queried origin of concerns in the Much Marcle Parish regarding rural sewerage provision and consequent NRA actions.	Queries responded to in correspondence.

CONSULTEE	COMMENTS	RESPONSE/REFERENCE IN ACTION PLAN
National Association of Boat Owners	Requested all river users be consulted before designation of Water Protection Zone. Issue 15 - British Waterways has announced introduction of Boat Safety Scheme which will require containment of spilled oil within engine compartment. Problems of river litter included cut vegetation and felled trees. Urgent revisions to River Severn control rules are needed in view of low flows. Would like to see introduction of flood warning scheme for the benefit of boats on River Severn. Establishment of User Forum required. Provision of additional moorings and sanitary disposal facilities should be encouraged. Noted potential damage by mink to unattended craft.	Issues 3, 15, 16, 26, 30.
National Association of Water Power Users	Questioned why new hydropower licences cannot be issued on the River Cam as they return water to the river with only small loss and similarly, why abstraction licences for this use should be subject to derogation and time limit.	Query responded to in correspondence.
National Farmers Union	Offered assistance in educating farmers on the issues of Water Protection Zones, pesticides and farm pollution.	Issues 3, 10, 11. Further liaison within CMP process and ongoing activities.
M Neville	As a riparian owner, opposed restoration of Thames & Severn Canal. Noted that pesticides in fish (eels) would be passed on to otters in their diet and challenged statement that Ryeford Ponds, the Canal and the lake at Bakers Mill provide good coarse fishing.	Issues 10, 34. Noted.
Newnham-on-Severn Parish Council	Supported Plan but questioned cost of consultation exercise. Disappointed that there were no proposals for sewage treatment works at Newnham. Also felt that serious polluters should be brought to court.	Issues 7, 8.
North avon District Council	Noted value of Parish Council consultation. NRA should seek support of landowners and business in a survey of rhines and a plan of action. Supported development of flood warning scheme, conservation enhancement and restoration of estuarine habitats should be a priority re: international designation. Severn Way footpath and opportunities for visitor facilities at Aust noted. Expressed concern over litter problem.	Agreed.  Issue 26. cf. Severn Estuary CMP and LU 7 & 8. Issue 31 and LU7. Action added - Issue 16 (2).
North avon Bridleways Group	Would like sea wall between Aust and Hill to be accessible for recreational use by horseriders and cyclists.	Noted.
Norton Parish Council	Navigation of River Severn between Worcester and Gloucester should be maintained. Concerned about flooding and pollution at Inchmore Bridge and felt that proper car parking at Wainlodes should be provided.	Issues 25, 31.

CONSULTEE	COMMENTS	RESPONSE/REFERENCE IN ACTION PLAN
Pilning & Severn Beach Parish Council	Expressed support for CMP but noted constraints on NRA on funds available. Also pressed for further statutory powers to control pollution. Were keen to see the benefits from implementation of actions addressing Issues 28, 32, and 33 but in the context of pollution control.	Issues 7, 9, 15, 16, 19, 36.
RSPB	Key issue = sustainability - objectives, targets and indicators. Biodiversity, nature conservation.  Breeding Wader Survey of Lower Severn Catchment noted. Wished to see higher priority given to Water Level Management Plans.	Noted - Vision Statement and Land Use Statements. Action added to Issue 29. Actions added to Issue 37.
Rural Development Commission	Pointed out that Ledbury Parish is within the EU Objective 5b designated area which may attract financial assistance for infrastructure projects.	Noted.
Salmon & Trout Association	Welcomed NRA effort in reducing pollution of the rivers but urged tougher action against industrial polluters. Felt that salmon should be included under the section of Rare and Threatened Species. Wish to see more EC fisheries designations.	Actions added - Issues 32 & 20(7).
Severn Area Rescue Association	Suggested inclusion of new section relating to safety and bylaws covering the navigable river.	Under jurisdiction of Gloucester Harbour Trustees. Other comments CF. forthcoming Severn Estuary CMP.
Severn Fisheries Consultative Council	Would like to see more parking facilities for anglers and were supportive of User Groups. Upgrading the quality of discharges should be major target for support of fisheries use.  Supported production of a "Users Handbook" as with Warwickshire Avon.  Wish to see NRA having greater control over weirs at Maisemore and Llanthony.	Noted - Issue 31. Noted - Issues 1, 2, 4, 5, 6, 7, 19. Handbook to be produced (Action added) )CF. Warwickshire Avon CMP. Noted.
Severn Navigation Restoration Trust	CMP did not give enough information on future water requirements by the water companies.  Boat pollution is not a major issue. Issue 8 - requirements should be covered by Environmental Assessment.  Issue 20 - Review of Severn Control Rules - requested their participation.	Ongoing negotiations within the CMP period. Issue 15. Agreed - no further actions identified. Issue addressed in River Severn Upper Reaches CMP. Issue 20.

CONSULTEE	COMMENTS	RESPONSE/REFERENCE IN ACTION PLAN
Severn Trent Water plc	Meeting convened to discuss issues.	Issues 1-9 discussed and reworded to account for business plans and comments.
Shurdington Parish Council	Queried omission of power stations from Plan; cost as a constraint in seemingly essential actions; decision making roles of NRA and local authorities where inadequate rural sewerage problems existed. Concerns over effects of pollutants on drinking water and risks to health.	Inclusion in Land use Statement - LU3. Issue 3.
South Gloucestershire IDB	Do not agree to Managed Retreat on Coastal defences in light of committed expenditure agreements and forthcoming Water Level Management Plans.	Issues 27 and 37.
Sports Council	Issue 8 - Concerns that rowing activities would be disrupted by extensions to navigations in the West Midlands. Issue 13 cf. Letter by Gloucestershire Caving Group (copied to Sports Council). Issue 14 - Sports Council support identification of water quality standards if used in an advisory capacity. Issues 28, 29, 30, 31 - Actions supported. Issue 34 - restoration would bring new opportunities. Issue 35 - urged that any cost benefit analysis of hydropower take into account impacts on recreation.	Noted CF. - River Severn Upper Reaches CMP. Noted. Noted.  Noted. Noted. Noted.
Stroud District Council	Supported Source Protection Zone but noted other recreational and commercial uses of Gloucester-Sharpness Canal as also important. Noted development/planning implications of Urban Wastewater Treatment Directive. Supported actions to mitigate river litter. Issue 20 Local Authority liaison needed on development implications of any new water storage facilities. Issue 20 Option 4 - must not reduce commercial viability of Docks.  Urged close liaison on flood and coastal defences and with Estuary Coastal Cell Study and Severn Estuary Strategic Study.  Brief comments also on Issues 29, 34, 35, 36. Issue 25 - NRA must take into account the views of local residents when constructing flood defences.  Seeking support of NRA in lobbying for extra government funding for provision of first time rural sewers.	Issue 3.  Issue 4.  Issue 26. Action (2)(b) added. Issue 20 (2). Option 4 deleted from Action Plan. CF. - forthcoming Severn Estuary CMP. Issues 25 & 27 modified. Noted. Issues 25 & 26.  Action added to Issue 9 as a result of consultation.

CONSULTEE	COMMENTS	RESPONSE/REFERENCE IN ACTION PLAN
The Clean Rivers Trust	Wish to see mining contamination problems in the Forest of Dean opened for public debate to increase chance of funding. Offered support on any initiative on rural sewerage problems.	Issue 13. Issue 8.
The House Builders Federation	Figures quoted in the Plan were only provisional and distribution of future housing has not been formally considered. The environmental requirement that there should be no detriment to wildlife as a result of development should take into account the balance between both needs. Not enough in Plan to address urban run-off problems. Expressed concern that development control was the only option noted in issue 7 to improve discharges.	Noted - comments to be followed up via NRA Planning Liaison contacts with HBF during course of the CMP
The Wildfowl & Wetlands Trust	Noted value of using biodiversity targets in CMPs. Co-ordinate targets for this Plan with the forthcoming Severn Estuary CMP re: Species suitable.  Issues 1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 26, 27, 28, 35, 3 - options supported.  Issue 8 - concerns over extension of navigation if it impacts on the conservation value of the Severn. Issues 20 & 21 concern over conservation implications of options for storage. Issue 24 - concerns over impacts of fish farms. Issue 25 - wished to see more investigation of soft engineering options and wetland creation as alternatives to hard flood defences. Support NRA policy to protect floodplain from development. Issue 28 offered support and participation in river corridor rehabilitation. Issue 34 - Support for canal restoration but reservation on conservation implications. Issue 35 - WLMPs important in meeting biodiversity targets and sustainable use of wetlands.	WWT included in "responsibility" column of Activity Tables as appropriate. Support noted for options in issues and concerns where expressed. Noted.
Water Power Engineering	Suggested that the NRA should regard hydropower as a 'benefit' rather than a nuisance. Pointed out advantages of hydropower such as: keeping water in river for other uses, helping control and maintenance of river system, providing extra buffering capacity and potential for sediment recycling and monitoring by existence of mill ponds.	Issue 35.
Wessex Water plc	Advised the company were implementing a programme of improvements to unsatisfactory overflows subject to AMP2 constraints.	Issue 4.
Westbury-on-Severn Parish Council	Concerns about consequences of increased area of floodplain as a result of managed retreat or lack of maintenance of defences. Supported flood warning system.	Issues 25, 27. Issue 26.

CONSULTEE	COMMENTS	RESPONSE/REFERENCE IN ACTION PLAN
Wiltshire County Council	Interested in issues interfacing with Upper Thames CMP viz. Issues 21 & 34. Concerns over lowered water tables.	Interests noted. Liaison between Severn-Trent and Thames NRA Regions to ensure compatibility between Lower Severn & Upper Thames CMPs. Issue 34 Option 2 removed.
Worcestershire Wildlife Trust	Option to use gravel dewatering for canal water no longer an option in the Wiltshire Minerals Local Plan.  Report provides comprehensive view of issues within the catchment. Routine analysis of fish tissue should include PCB's and heavy metals. Consideration given to relaxing flood defence standards where land use change alter priorities. Pro-active river channel restoration can lead to reduced maintenance costs. Harmonisation between policies and finances of MAFF, DOE and NRA may provide better remuneration and incentive schemes. Noted River Severn Otter Project as collaborative Project.	Issue 12 (2). Issues 27 & 29.  Issue 28.  Action - Issue 32.

Notes:

Catchment plans are public documents but it was not made clear in the Consultation Report that the content of all written responses would be publicised in this statement. A clarifying letter has been sent to all respondents and no objections were received.

## APPENDIX 2C ADDENDUM TO CONSULTATION REPORT

SECTION	PAGE	ERROR/OMISSION	RAISED BY
2.1	9	"Main urban areas" - Tewkesbury, Cam and Dursley not included.	Gloucestershire County Council
2.1	15 & 17	Gloucester Harbour Trustees are the Competent Harbour Authority for the tidal Severn downstream of Maisemore & Llanthony weirs.	Gloucester Harbour Trustees
2.2	17	Administrative Details - "Gloucester County Council" should read "Gloucestershire County Council"	Gloucestershire County Council
2.2	17	No mention of Bristol City Council.	Bristol City Council
2.2	18	Reference should be made to the Ramsar designation and potential designation of the Severn Estuary as a Special Protection Area and/or Special Area for Conservation.	Bristol City Council
3.1	26	Statement that there is no bankside storage at Purton is incorrect - Bristol Water has storage at Purton and the Canal itself also provides further buffer storage.	British Waterways
3.2	28	Table 2 - Inclusion of Wootton-under-Edge not correct.	Wessex Water
3.1	29	Issue 4 should acknowledge navigation authority or landowner under "responsibility".	British Waterways/ Gloucester City Council
3.2	33	Population of Avonmouth sewage works greater than 650,000? (Checked -these are Wessex Waters published figures)	Bristol City Council
3.2	36	Issue 10 - 0.1 µg/l standard for pesticides under the Drinking Water Directive is for <u>individual</u> pesticides	Ministry of Agriculture Fisheries & Food
3.2	39	Identification of few selected contaminated land sites may give false impression - true scale of problem needs a complete survey and register of contaminated land. Reference to Environmental Assessment not clear (Re: Regulations).	Bristol City Council
3.2	39	Landfill site at Britannia Zinc has been licensed since 1978 therefore not "very recently". Cadmium levels have been described by the NRA prior to this CMP as " <u>significant</u> " not " <u>high</u> ".	Avon County Council



SECTION	PAGE	ERROR/OMISSION	RAISED BY
3.2	39	Coal mining schemes referred to are for opencast coal extraction. There are none currently approved.	Forest of Dean District Council
3.2	39	Issue 13 - Reference to "Drift Mines" inappropriate, sites referred to in this context are where applications for opencast coal working have been made.	Gloucestershire County Council
3.2	42	"Hempsted" not "Hempstead".	Gloucestershire County Council
3.2	48	Issue 27 does not mention IDBs	Country Landowners Association
3.2	48	No mention of woodlands under the issue of floodplain management.	Forestry Authority
3.2	51	Issue 31 - landowners have interests in recreation.	Country Landowners Association
3.2	52	Issue 32 - Salmon & Elvers should be included as threatened species?	Country Landowners Association/Salmon & Trout Association
3.2	52	Issue 32 - The British Crayfish is protected under the Wildlife & Countryside Act 1981 in respect of taking and sale.	Ministry of Agriculture Fisheries & Food
3.2	53	Issue 32 - Both Allis & Twaite Shad are listed at Annex II of the EC Habitats Directive and are thus protected by the Conservation (Natural Habitats etc.) Regulations 1994 from being killed or taken in certain ways. The Wildlife & Countryside Act 1981 protects Allis Shad from being intentionally killed, injured or taken.	Ministry of Agriculture Fisheries & Food
3.2	54	Issue 33 - British Waterways has no navigation authority on the Severn below Gloucester.	Elmore Parish Council
3.2/3.3	54, 55 & 85	"Severn-Thames Canal" should read "Thames and Severn Canal".	Inland Waterways Association
3.2	55	Stroudwater Canal is under the management of the Company of the Proprietor of the Stroudwater Navigation, not the Cotswolds Canal Trust.	Inland Waterways Association
3.2	59	Issue 37 - does not mention landowners.	Country Landowners Association

SECTION	PAGE	ERROR/OMISSION	RAISED BY
3.3	64,65	Abbreviation of Eutrophic Sensitive Areas to "ESA" may be confused with MAFFs "Environmentally Sensitive Area"(ESA) designation.	Ministry of Agriculture Fisheries & Food
3.3	79	Management agreements for "Managed Retreat" at Slimbridge with the Berkeley Estate have not yet been finalised - statement misleading.	The Berkeley Estate
3.3	85	Issue 34 - "Herefordshire & Gloucestershire Navigation Trust" should read "Herefordshire & Gloucestershire Canal Trust".	Herefordshire & Gloucestershire Canal Trust /Inland Waterways Association
4.1	91&92	"Cheltenham South West Distribution Road" should read "Cheltenham South West Distributor Road"; "Gloucester Southern Radial Road" should read "Gloucester South West Bypass"; "Brockwoth Bypass to the Elmbridge Roundabout" should read "Brockworth Bypass to Elmbridge Court Roundabout"; "Cheltenham Inner Ring Road" should read "Cheltenham Extended Inner Relief Road".	Gloucestershire County Council
4.1	92	Cam & Dursley Station opened in May 1994, Ashchurch Station will re-open in 1996.	Gloucestershire County Council
4.1	94	County Council's Waste Disposal Plan was adopted in 1990 not 1989.	Avon County Council
4.1	94	No mention of Bristol City Council.	Bristol City Council
4.2	101	Water Resources Act Section 26 does not only apply to British Waterways.	British Waterways
4.3	104	Reference to "Wind" turbines incorrect.	Gloucestershire County Council/National Association of Water Power Users
4.5	109	Last line should read "Wye Valley AONB".	The Heart of England Tourist Board
4.6	114	"Gloucestershire & Herefordshire Canal" should read "Herefordshire & Gloucestershire Canal".	Herefordshire & Gloucestershire Canal Trust /Inland Waterways Association
4.6	115	Severn Way passes through Gloucestershire and Avon for 57 miles not 50. Continuation is being developed to Pill on the River Avon.	Avon County Council

SECTION	PAGE	ERROR/OMISSION	RAISED BY
4.9	122	Principal material mined in the Forest of Dean is Limestone. No opencast coal working (actual or proposed).	Gloucestershire County Council
4.9		Map 14 does not accurately reflect extent of mineral working in Gloucestershire.	Gloucestershire County Council
4.10		Map 15 - some landfill sites shown not known by the Council; Gloucester Incinerator shown has closed down. BSE incinerator at Piffs Elm, Cheltenham not shown. Transfer not correct.	
4.12	129	Paragraph on forestry needed.	Forestry Authority
5.1	140	Table 13 - Whaddon Brook not included.	Gloucester City Council
5.3	151	No mention of woodlands.	Forestry Authority
General		Not enough attention to archaeology.	Gloucestershire County Council/Hereford & Worcester County Council

## APPENDIX 3: GLOSSARY

Abstraction	The removal of water from any source, either permanently or temporarily.
Abstraction Licence	An authorisation granted by the NRA to allow the removal of water from a source of supply.
Algae	Plants, floating or attached, which occur in still and flowing water.
Ammonia	A chemical compound found in water often as a result of pollution by sewage effluents. It is widely used to determine water quality.
AMP2	Asset management plan 2 – A document describing proposed investment (capital) by the water industry as agreed by OFWAT, the Government and the water companies.
AOD	Above Ordnance Datum.
AONB	Area of Outstanding Natural Beauty.
Aquifer	A porous water-bearing underground layer of rock, sand or gravel capable of holding significant quantities of water.
CLA	Country Landowners Association.
Cyprinid Fish	Coarse fish belonging to the carp family, like roach, dace and bream.
EC Directive	A type of legislation issued by the European Union which is binding on Member States in terms of the results to be achieved but which leaves to Member States the choice of methods.
Effluent	Liquid waste from industrial, agricultural or sewage plant.
EH	English Heritage.
Eutrophication	The biological effects of an increase in plant nutrients - nitrates and phosphates.
Floodplain	Land adjacent to a watercourse that is subject to flooding.
GQA	General Quality Assessment (water quality).
Groundwater	Water which flows or is stored below the surface of the land (in aquifers).

## APPENDIX 3: GLOSSARY

Habitat	The locality or environment in which a plant or animal species lives.
HBF	House Builders Federation
IDB	Internal Drainage Board
Landfill	Site used for waste disposal into or onto land.
Leachate	Liquid emanating from solid matter.
Main River	The watercourses shown on the statutory 'Main River maps' held by NRA and MAFF. The NRA has permissive powers to carry out works of maintenance and improvements on these rivers.
Ml/d	Megalitres per day.
Ramsar	Name of the place in Israel where an international convention agreed that members (including the NRA) would designate wetland sites of national or international importance.
Residual Flow	The flow remaining in a watercourse after abstractions have taken place.
Rhine	Small drainage channels.
River Corridor	A term which describes a stretch of river, its banks and a varying amount of adjacent land that is affected by the presence of the river.
Salmonid Fish	Game fish of the salmon family, for example, trout and salmon.
SAM	Scheduled Ancient Monuments. the key sites nationally for archaeology, designated by the Secretary of State for National Heritage, through English Heritage and CADW. Statutory; designated under the Ancient Monuments and Archaeological Areas Act 1979.
SSSIs	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.
STP	Sewage Treatment Plant.
Surface Water	Water which flows or is stored on the surface of the land.
Sustainable Development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

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