EA MIDLANDS LEAPS - BOX 4

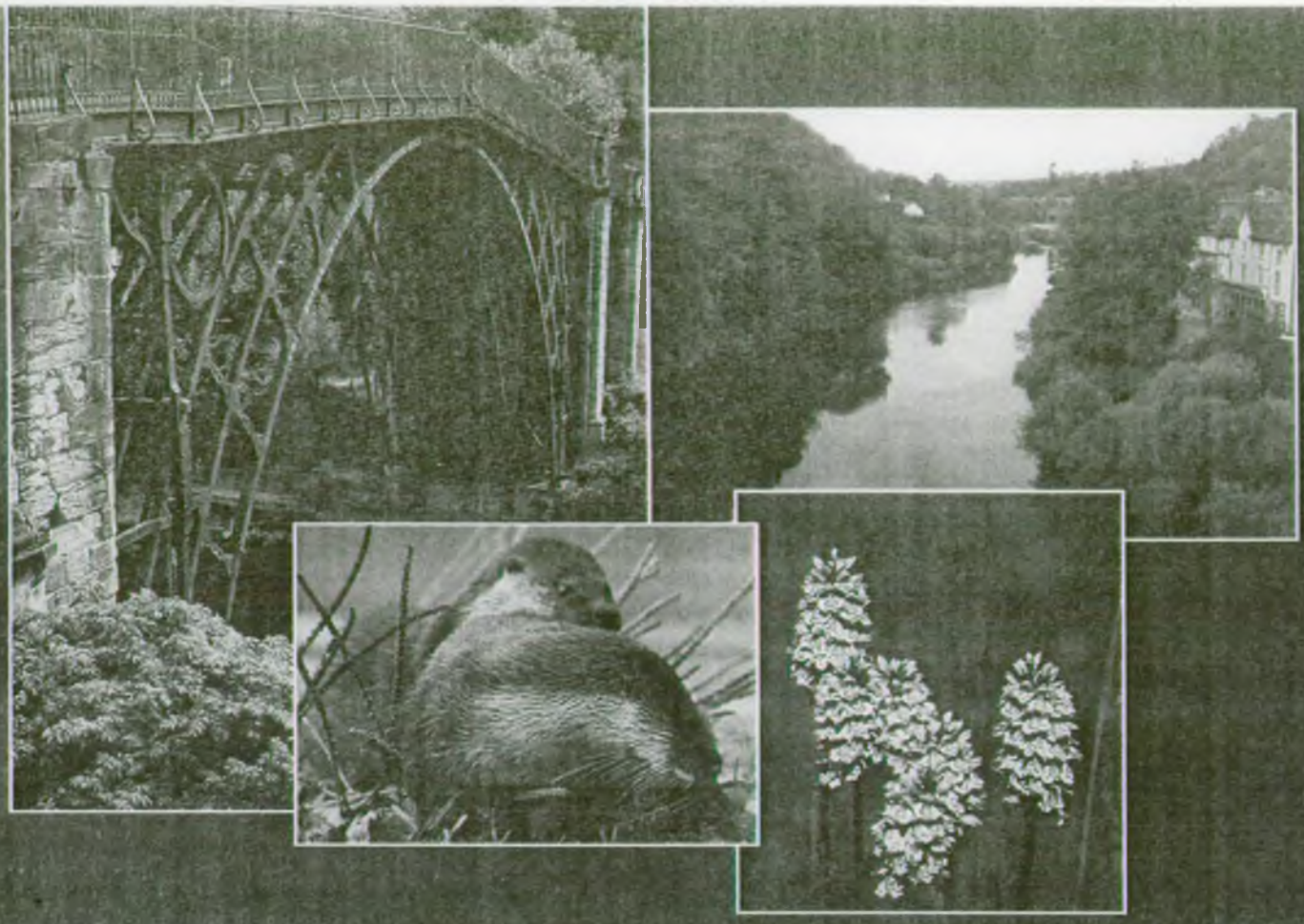
local environment agency plan

MIDDLE SEVERN

CONSULTATION REPORT

APRIL 1997

ENVIRONMENT AGENCY



"...England as it should be...
...Sweep of the Woodland down to the river...
...Wonderful..."
David Bellamy BBC Radio 2 July 1996.
Upstream of Bewdley on the River Severn

YOUR VIEWS~

This Consultation Report is about the Middle Severn Area. It is the Agency's first analysis of the status of the environment in this area

What do you think?

- *The Environment Agency welcomes your views on the future management of the area.*
- *Have all the important environmental issues been identified?*
- *Have all the options and solutions to issues been identified?*
- *Is the vision for the area your vision?*
- *Do you have any other information or ideas you would like to express?*

The consultation period is from May to July 1997. If you have any comments please write to:

Shelly Beckett, Environment Planner,
The Environment Agency
Hafren House
Welshpool Road
SHREWSBURY
Shropshire
SY3 8BB

Telephone: (01743) 272828
Fax: (01743) 272138

Comments are required by 25 July 1997
Further copies of this Report are available at the above address.

All comments received will be treated as public information unless you explicitly stated otherwise in your response.

(Photographs: Ironbridge, Telford. River Severn. Common Spotted Orchid. Otter.)

Infrastructure	
KEY	
Area Boundary	Motorway
Main River	Main Road
Ordinary Watercourse	Railway
Canal	County Boundary
Built up Area	District Boundary

ENVIRONMENT AGENCY

Middle Severn Key Details

General

Area	2,634km²

Administrative Details

County Councils & Unitary Authorities: % of Area

Shropshire CC	77%
Staffordshire CC	7%
Hereford & Worcester CC	16%
Wrexham County Borough	< 1%
Powys County - Montgomeryshire	< 1%

Population *(estimated from 1991 census)*

YEAR	POPULATION
1991	506,324
2001 *(predicted)*	552,834

Wildlife and Conservation

Sites of Special Scientific Interest	158
Prime Sites	887
Scheduled Ancient Monuments	621
Special Areas of Conservation	2

World Heritage Site:	Ironbridge Gorge
Area of Outstanding Natural Beauty	Shropshire Hills

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

Salmonid	98.4 km
Cyprinid - rivers	126.4 km
Cyprinid - canals	49.0 km

Water Resources and Flood Defence

Average Annual Rainfall	696mm
Length of Main River in Catchment	484km
Number of operational sluices/ pumping stations	3
Number of Licensed Abstractions (Surface Water and Groundwater)	1,756

Water Companies and Internal Drainage Boards

Severn Trent Water Ltd and South Staffordshire Water Company Ltd

Internal Drainage Boards:
Strine IDB and Rea IDB

Water Quality

Length of watercourse (km) in each component of the General Water Quality Assessment

GQA Grade (1995)	Chemistry	Biology
A GOOD	7.5	105.0
B	327.4	258.1
C FAIR	239.3	160.7
D	34.8	68.4
E POOR	29.2	14.4
F BAD		1.5

Consented Discharges to water
760 including:
364 sewage discharges and storm overflows
264 private sewage treatment plants and
132 industrial

Pollution Prevention and Control

	No
Landfill Sites (Inert)	
Landfill Sites (biodegradable)	
Waste Treatment Plants	4
Metal Recycling Station	
Household Waste Reclamation Sites	
Incinerators	1
Former Landfill Sites	
Transfer Stations	

Number of:	
Integrated Pollution Control Authorisations	12
Radioactive Substances Authorisations	4
Radioactive Substances Registrations	

FOREWORD

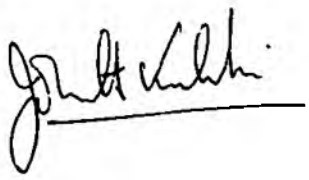
This is one of the Agency's new Local Environment Agency Plans (LEAPs). The Agency has set itself the aim of protecting and enhancing the whole environment through the promotion of sustainable development. One way of achieving this aim is through local environment planning and collaborative action with both the local community and other organisations.

The Middle Severn area is one of contrasts, lying between the West Midlands conurbation to the east and the rural borderlands to the west. It is known for its natural beauty and unspoilt countryside. It is a place that is valued by its local residents and visitors and is a source of recreation and enjoyment from the Wrekin Hill and the clean waters of the River Severn to the main towns and cities with their spires and associated cultural heritage.

Over time, however, development and land use changes have impacted on our local area leading to increased pressures being put on our natural resources, wildlife and habitat. It is our challenge to balance these demands and conflicts and manage the area in a sustainable way.

The LEAP process will establish a common vision for the Middle Severn area and provide a framework for protecting and improving our local environment. It will raise local environmental issues and through partnership will direct resources to where they are most needed.

The publication of this report marks the start of a three month period of consultation. Following the consultation period the Agency will produce a five year Action Plan. This will outline both the Agency's and other partners' actions within the area. Annual Reviews will report on the progress being made. The LEAP process is ongoing and your voice, your involvement and commitment is requested throughout.
I look forward to hearing from you,



Dr J H Kalicki
Upper Severn Area Manager
Midlands Region
Environment Agency

Acknowledgements

This report has been compiled by the Environment Agency with contributions from key organisations operating in the area. The Agency is particularly grateful to the County, City and District Councils for the information provided and to the Ministry of Agriculture, Fisheries and Food (MAFF) and the Land Use Planning Unit at Crewe for the provision of information on agriculture. Finally, a thank you to Anne Nicol for the pen and ink sketches.

Draft Vision for the Middle Severn Area

The Environment Agency's vision for the Middle Severn area is:

" to protect and enhance the natural resources and beauty of our local area, for all to enjoy".

The Middle Severn area lies mainly within the counties of Shropshire and Hereford & Worcester and covers an area of 2,634 square kilometres. It is an area renowned for its landscape, beauty and natural resources. Expectation is of a clean, unspoilt countryside with good quality rivers and plentiful water supplies. There are sites of high conservation value with rare flora and fauna. Soil types are suitable for farming. At the heart of the area is Ironbridge Gorge which is a designated World Heritage Site and recognised as the birthplace of industry.

One common thread through the locality is the River Severn providing good quality water and a recreational facility. The river's 120 kilometre journey within the plan area is through a rural, largely agricultural landscape. Historically, the river has acted as a focus for industry and settlement and urban centres like Shrewsbury, Bridgnorth, Bewdley, Stourport and Worcester lie on its banks. These centres, together with Bromsgrove, Droitwich and new expanding towns like Telford, are the work place and home of over 500,000 people. It is the diversity and natural beauty of this local environment that provides a constant variety for the visiting and resident population alike.

Over the years, agricultural practices have resulted in areas being degraded.
In addition increasing industrial, agricultural and domestic demands have resulted in a loss of wildlife and habitat, threats to our water resources and low flows in rivers.
The Agency's challenge is to protect and manage the natural resources within its environmental capacity and to work with others to realise the potential of the area.

To achieve this vision we will:

* Promote and work towards sustainable development.

* Educate and raise awareness of the environment and environmental issues.

* Protect and improve the landscape and conservation value of our environment.

* Manage our water resources in an environmentally sustainable way balancing abstraction with the needs of the water environment and its legitimate users.

* Protect and improve the quality of water in rivers and canals.

Some of these objectives have common goals, others may require a degree of compromise between differing demands on the resources of the area. To achieve our objectives we need to work in partnership with Local Authorities, industry, environmental groups and many other agencies and individuals who share the interests of the area. Together, through commitment and enthusiastic cooperation, we can ensure the shared vision of the Middle Severn area becomes reality.

CONTENTS

This report has been produced on Sylvancoat Recycled Paper and Board

APPENDICES

Maps

For copies of maps in colour please contact the LEAP's office
At The Environments Agency, Havren House, Shrewsbury.

Figures

Tables

PART 1 THE MANAGEMENT PLAN

Part 1 This first part of the Consultation Report is the Environment Agency's proposed management plan for the area. It is an introduction to the work and responsibilities of the Agency and the LEAP process. It explores the resources of the area, and aims to raise our awareness of the environmental issues associated with it. Human activities exert pressures on all aspects of the environment. The key to its protection is through planning the environment as a whole, and through partnership and integration. This plan provides an opportunity for public involvement so we can all have a say in what happens to our local environment.

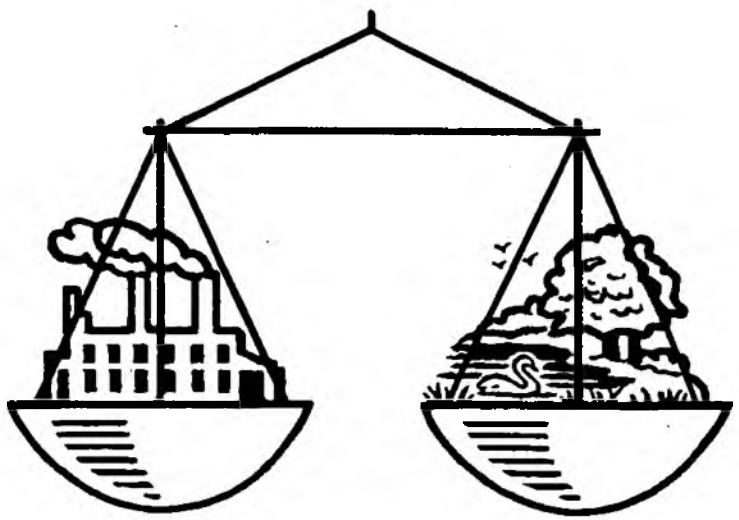
Part 1

* **Section 1 Introduction**
* **Section 2 The Local Environment**
* **Section 3 Issues and Options**
* **Section 4 Protection through Partnership**

Part 2 provides supporting information for the uses and activities of the area together with information about the current state of the area compared to national and local targets.

Section 1 Introduction

This section gives an introduction to the Environment Agency and describes the Loca 1 Environment Agency Planning process and the purpose of this consultation report. A short introduction to Sustainable Development and Biodiversity is also given.



1.0 Introduction

This is the first Local Environment Agency Plan (LEAP) for the Middle Severn area. The quality of our local environment and the way it is managed matters to all who live in and visit the area. To manage the environment as a whole and to achieve environmental improvements we need to work together. The Environment Agency is committed to the delivery of environmental improvement at the local level and through this plan we will work in collaboration and partnership with various organisations and individuals to achieve this aim.

1.1 The Environment Agency

The Environment Agency of England and Wales was formed on 1 April 1996 by the Environment Act 1995. It is an independent public body and has taken over the functions of previous, separate environmental regulators; The National Rivers Authority (NRA) who had responsibility for the water environment; Her Majesty's Inspectorate of Pollution (HMIP) who had responsibility for the largest and most complex industrial processes; and the Waste Regulation Authorities (WRA) of the County Councils who had responsibility for waste regulation. This merger provides a more comprehensive approach to the protection and management of our environment.

The Agency's aim is to protect and enhance the environment, thus contributing to the Government's overall commitment to sustainable development. We will do this by integrating environmental protection for land, air and water.

Pollution prevention and control, education and enforcement where necessary, will be key means in meeting this aim.

The Agency has eight regions in England and Wales, sub divided into twenty-six areas. The Midlands Region comprises four areas, each headed by a locally based area manager. Most of the Agency's work operates at an area level and this allows an integrated and local approach to managing the environment. Scotland and Northern Ireland are covered by their own environment organisations.

Figure 1 shows the Agency's eight regions.

The Agency's main roles are Pollution Prevention and Control, Water Resource Management, Flood Defence, Wildlife Conservation, Recreation and Navigation. The protection and management of the environment by the Agency is based on powers and duties provided by a number of different Acts which are brought together under the Environment Act 1995.

We protect the environment by issuing consents and licences for activities which have an environmental impact, for example, water abstraction, management and transport of waste, and waste water treatment and disposal. We also regulate the releases into the environment from some of the larger and potentially most polluting industries. This system of integrated pollution control (IPC) regulates releases to air, to controlled waters, to sewers, and wastes that may be sent for disposal.

The Environment Agency does not cover all aspects of environmental legislation and services to the general public. There are other statutory and non statutory bodies who have responsibility within the plan area. These agencies and organisations are further discussed in Section 4, Protection through Partnership.

The Local Authorities deal with statutory nuisance problems including noise and litter as well as air pollution arising from traffic, household areas and small businesses and industry. They also deal with contaminated land issues in liaison with the Agency and are responsible for land use planning with the Agency, among others, as statutory consultees. Environmental health issued are dealt with by Local Authorities.

More detail about the Agency's role and regulatory powers can be found throughout this document and in Appendices 1 and 3.

1.2 Local Environment Agency Plans (LEAPs)

For the Agency to fulfil its role and responsibilities it needs to manage the environment effectively, and to work in partnership with others. Local environment planning is an important tool in this process. The plans are non-statutory, integrated action plans based on local river catchments. They provide a focus for those concerned with the future of the local area. We are committed to producing LEAP Consultation Reports for all areas in England and Wales by December 1999.

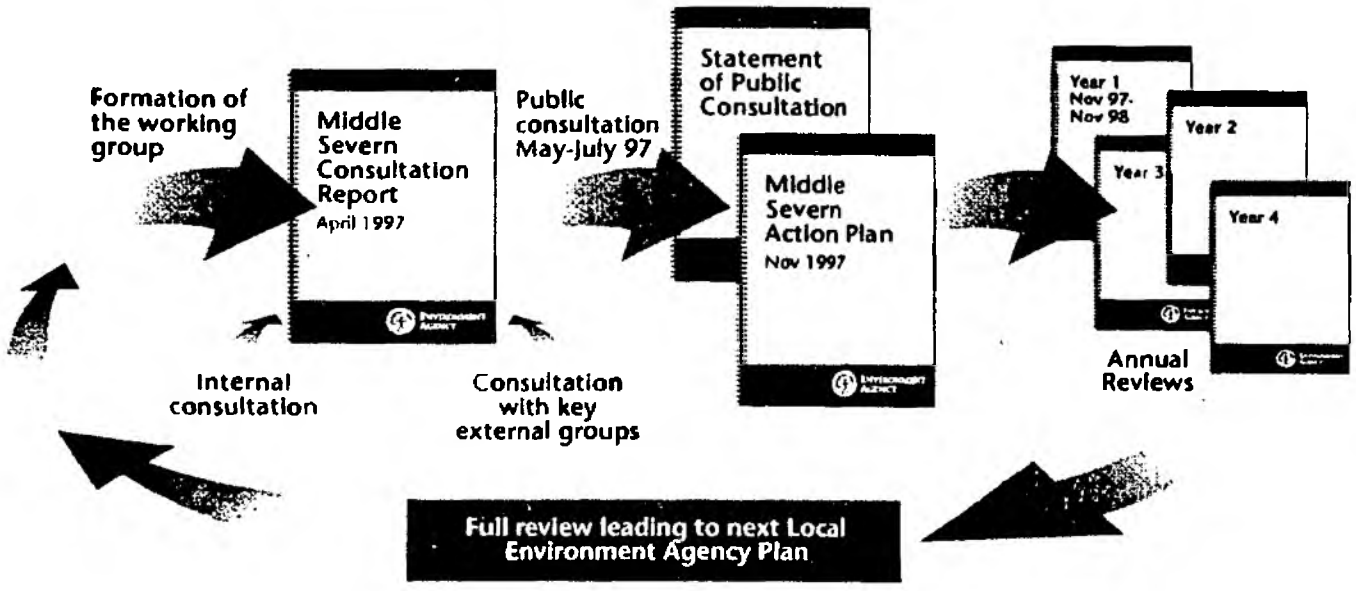
LEAPs will help contribute to the principle of sustainable development through integrated environmental management and improvement. They will also play a key role in:

* Promoting openness and accountability.
* Developing liaison and partnership with key groups.
* Educating the public on local environmental issues.
* Prioritising issues and establishing an action plan for managing and improving the local area over the next 5 years.

1.2.1 The Consultation Report

This document, the Consultation Report, is the first output from the LEAP process, and is not the final plan. To assist in the preparation of this report, an informal consultation exercise with a range of organisations and groups took place in September 1996. The results of this exercise are summarised in Appendix 6. An Action Plan will be produced in November 1997.

Figure 2 The LEAP process and the main outputs in the five year cycle



This report is divided into two parts, **Part I** is the main report, **Part II** provides additional, supporting information. Your comments and views will be particularly welcomed.

1.2.2 The Consultation Process

The purpose of this three months consultation process is to enable the Agency and all interested parties to liaise and reach a consensus about the management of the area.

We need your views
Comments are required by 25 July 1997

It is an opportunity to:

* Highlight the issues within the area
* Establish the existing quality of the area and the range of issues
* Work towards establishing and implementing a five year action plan

During the consultation period comments can be submitted in writing to us at the address given on the cover.

This document is, therefore, part of a process that will enable a shared vision to be developed, along with a strategy for the area's management. This will guide all Agency activities for the next five to ten years and will hopefully influence the activities of other key bodies.

The vision and its supporting strategies will be presented in the 'Action Plan', with a series of planned activities for the Agency and others to implement. The target date for producing the Action Plan is November 1997.

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

1.2.3 LEAPs and Other Plans

The Agency shares the regulation and management of the environment with others. Whilst LEAPs are the Environment Agency's plans, their content and development will reflect these shared responsibilities. LEAPs will compliment and integrate with other organisation's plans such as Local Waste Plans, Local Air Quality Management Plans, Local Development Plans and Local Agenda 21 Action Plans.

Where improvement works are required to overcome local issues, these may be the responsibility of other organisations or individuals. The achievement of some of the plan's objectives will depend upon the Town & Country Planning Policy of the County, Borough or District Councils. The Environment Agency is a statutory consultee in the formulation of such policy. This document should be a useful resource for Local Authorities in discharging this obligation.

In addition, the Agency can encourage and promote the means by which to achieve the targets set out in the Government's National Waste Strategy, but it has no powers to require businesses or the general public to reduce wastes or use more sustainable methods of waste management. However, by identifying and publishing these local issues and through education it may bring the necessary pressure to bring those involved to work towards their achievement.

Public participation in this Plan will increase awareness of environmental issues and it is hoped this will lead to involvement in, and a feeling of ownership of, our local environment.

The Agency Statutory Committees and Other Groups

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

The Midlands Region is served by three statutory committees:-

* **Regional Environmental Protection Advisory Committee (REPAC)**

* **Regional Flood Defence Committee (RFDC)**

* **Regional Fisheries Advisory Committee (RFAC)**

The Upper Severn Area of the Midlands region is also served by its own advisory, non statutory, **Area Environment Group**. Membership consists of local people who live and work in the area and who represent a range of interests. These include local Authorities, industry, agriculture, conservation, fishing, amenity and recreational interests. The group will advise the Agency on LEAPs, the importance of other local environment issues and on the delivery of local services. It acts as a link between the local community, the Agency and its statutory committees.

1.3 Sustainable Development

The most commonly used definition of sustainable development was provided in 1987 in the Brundtland Report *'Our Common Future'* as:

"..development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

This requires a full consideration of environmental, social and economic issues during the decision making process. Where the full effects of a particular proposal or policy are not known, then the 'precautionary principle' should be adopted until such a time as the potential impacts can be more clearly defined. The U.K. Government is firmly behind the principles of sustainable development and has published *"Sustainable Development - The UK Strategy"*. It goes further in Planning Policy Guidance Note 12 *"Development Plans and Regional Guidance"* (Department of the Environment (DOE) 1992) which states that:

"..the Government made clear its intentions to work towards ensuring that development and growth are sustainable".

The Environment Agency, in carrying out its role, is required to act in accordance with the Government's overall environmental strategy, the basis of which is the commitment to the goal of sustainable development. This is reflected in the Agency's principle aim as set out in the Environment Act 1995. (See Appendix 1). In November 1996 Ministers issued statutory guidance to the Agency on its contribution to sustainable development, and have underpinned the Agency's principal aim by setting it seven main objectives governing the manner in which it should carry out its functions, (see Appendix 1).

1.4 Biodiversity

The term 'biodiversity' is commonly used to describe the number, variability and variety of living organisms. The loss of biodiversity may take many forms but at its most fundamental and irreversible it involves the extinction of species. The Biodiversity Convention signed by the U.K. Government at the Rio 'Earth Summit' in 1992, seeks to ensure that the full range of animal and plant species are conserved. A national action plan for biodiversity was subsequently published in January 1994.

In pursuance of the Government's commitment to biodiversity conservation, the Agency has significant responsibilities regarding implementation of the UK Biodiversity Action Plan and will be developing targets for species and habitats of conservation concern.

These will relate to the targets for key wetland species and habitats as identified by the UK Biodiversity Action Plan, emphasising the contribution that the Midlands Region can make to national targets. A Biodiversity Steering Group, established under the action plan has identified 116 key species and 14 key habitats, many of them aquatic or wetland related.

We will be a 'contact point' (co-ordinating body) under the Action Plan for 12 species and for chalk river habitats. Although chalk rivers are not found in this area, relevant species in the plan area to which the Agency will pay particular attention are:

Water Vole
Otter
White-clawed Crayfish
Ribbon-leaved Water-plantain
Freshwater Pearl Mussel and Depressed River Mussel, where present.

Additionally, there are other water related species and habitats in the area which will require protection. These include:

Great crested Newt
Twaite Shad
Allis Shad (possibly present in catchment)
Marsh Fritillary
Desmoulin's Whorl Snail
Floating Water-plantain
Fens, Carr, Marsh and Reedbed habitats and Lowland Raised Bogs.

(See Section 3 **Issue 12** for further information)

All our operational and regulatory activities will take account of these species and habitats in fulfilment of our commitment to biodiversity. Additional work will be dependent on available resources and will involve collaborative work with other bodies, (see Section 4).

Section 2 The Local Environment

This section provides a general overview of the locality and describes the natural features and resources of the area. This is considered under the headings of land, air, water and wildlife and heritage.

2.0 Environment Overview
2.1 Land
2.2 Air
2.3 Water
2.4 Wildlife and Heritage

2.0 Environment Overview

The Middle Severn plan area lies mainly within the Counties of Shropshire and Hereford & Worcester. It also includes smaller parts of Staffordshire, Wrexham County Borough and Powys County and covers an area of 2,634 square kilometres. The area is valued for its rich natural beauty and areas of unspoilt countryside.

The area is one of contrasts with two distinct domains; the flatter landscape of the Shropshire Plain in the north and the more undulating, wooded Severn valley with its fast flowing brooks to the south the two areas being separated by the Ironbridge Gorge.

The area is also geologically varied ranging from the craggy scree hills of the Stiperstones to the isolated Wrekin Hill rising from the rolling plain below. The River Severn and its associated tributaries, the Perry, Tern, Worfe and Salwarpe offer good quality waters which support high class fisheries and a diversity of wildlife, including kingfishers, dippers, dragonflies, voles and otters. The rivers are valued for environmental, local amenity and recreational purposes.

Historically the River Severn has been important for settlement and as a transport route for industry. Wroxeter was once a major Roman City, with Shrewsbury and Worcester medieval centres and sites of monastic settlements. The plentiful supplies of water, coal, iron and lime essential in initiating the industrial revolution were all to be found in the Ironbridge Gorge. First came Darby's coal furnace at Coalbrookdale followed by the success of the porcelain pottery at Coalport in the eighteenth century. Today most of this early industry has vanished with only industrial ruins and museums remaining. Ironbridge Gorge was designated a World Heritage site in 1986. Telford, Shrewsbury and Bromsgrove are the modern day industrial and commercial locations providing a wide variety of manufacturing and industrial employment in this predominantly agricultural area. The city of Worcester is renowned for its china, porcelain and Worcestershire Sauce. Today these towns are bustling urban centres which contribute to the overall area population of 500,000.

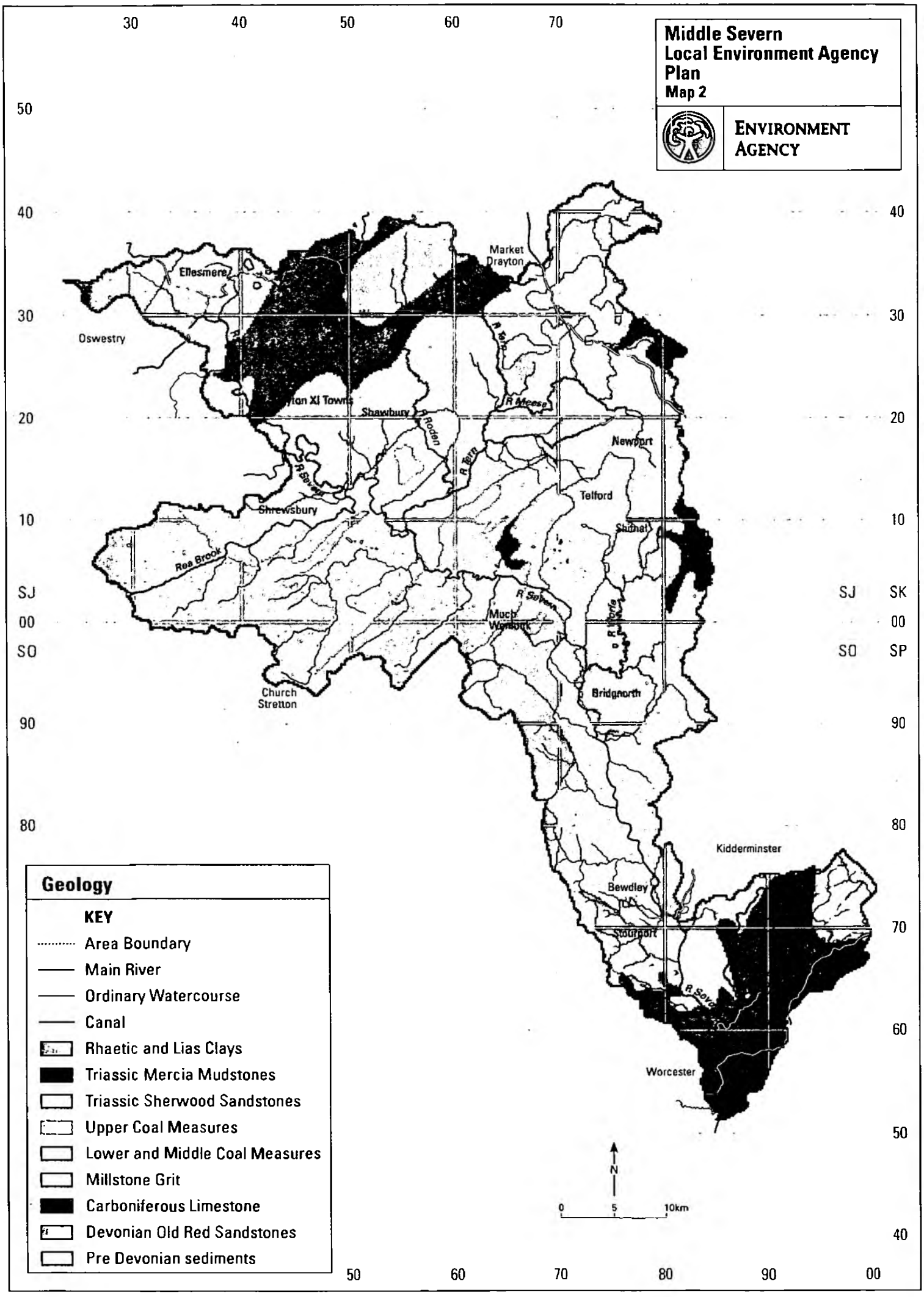
Over the years human and development pressures have impacted on the locality. Since the sixteenth century various areas have been the subject of land drainage and agricultural improvements. In addition some environmental management practices and engineering improvement works which were carried out over twenty years ago and were thought appropriate at the time for agricultural improvement and/or flood alleviation, have now been recognised for their shortcomings.

This has led to a loss and degradation of river corridorss and a decline in flora and fauna in areas *e.g.* near the Rivers Perry, Tern and Strine, whilst rivers like the Worfe have been subject to overabstraction which has resulted in unacceptably low flows. Urban development pressures have impacted on many towns including the expansion of Telford New Town which has had a major impact on land use within the area. Future pressure for increased housing development may also be an issue in rural areas. See Section 5 for further detail. These continuing development pressures and land use changes impact on our natural resources, transport routes, flood defences and also on the local residents and wildlife.

Middle Severn Local Environment Agency Plan

Map 2

ENVIRONMENT AGENCY



Geology

KEY

- Area Boundary
- Main River
- Ordinary Watercourse
- Canal
- Rhaetic and Lias Clays
- Triassic Mercia Mudstones
- Triassic Sherwood Sandstones
- Upper Coal Measures
- Lower and Middle Coal Measures
- Millstone Grit
- Carboniferous Limestone
- Devonian Old Red Sandstones
- Pre Devonian sediments

2.1 Land

2.1.1 Landscape and Geology

The plan area exhibits a high landscape quality and a varied geology. This is reflected in the conservation richness of the area and the contrasting topography which is described below.

No other area of comparable size throughout Britain displays such a variety of geology as that seen in the plan area. Map 2 shows the underlying solid geology for the area. Eleven out of the thirteen recognised periods of geological time, ranging from about 700 million years old to those formed in the last Ice Age, only a few thousand years ago, are present. This combination of different rock types is reflected in the great variety of scenery exhibited throughout the area.

The northern half of the area is dominated by the flat North Shropshire Plain comprising Permo-Triassic Sandstones and Mudstones, bounded to the south and west by Carboniferous Coal Measures. Upland areas around Pontesbury, Church Stretton and the prominent Caer Caradoc and Wrekin Hill area feature some of the oldest rocks known in Britain, comprising much altered Pre-Cambrian volcanic and sedimentary strata. Younger Ordovician and Silurian rocks form a succession of prominent ridges and valleys like the Stiperstone-Shelve area, locally important for lead ore and barytes deposits, and the limestone scarp of Wenlock Edge.

South of the North Shropshire Plain Carboniferous Coal Measures underlie much of Ironbridge and Telford. These coal and limestone deposits provided the raw materials that fuelled the beginnings of the Industrial Revolution. Little coal is mined in Shropshire today, but open cast mining still yields small quantities of coal and clay. South of Ironbridge the plan area narrows to a thin belt underlain for the most part by Carboniferous Upper, Middle and Lower Coal Measures (forming part of the Wyre Forest Coalfield). These are bounded by Devonian Old Red Sandstones of the Clee Hills to the west, and by Permian Sandstones to the east of Bridgnorth. The southern tip of the area sees the return of the Permo-Triassic Sandstones at Stourport-on-Severn. Further south they disappear beneath Triassic Mercia Mudstones underlying much of the Salwarpe catchment.

Ice Age deposits mantle much of the low lying areas and are responsible for many minor topographic features of high conservation interest such as the classic "kettle holes" of the Meres and peaty mosses such as Wem Moss and Whixall Moss. Commercially viable quantities of sand and gravel deposits support locally important mineral extractions.

Soil type is an important control on land use and vegetation cover. The area is primarily a lowland region with little land above 244 metres (AOD). A variety of soil types are found in the area and these include acid brown soils and surface water gleys in the northwest and leached brown soils, acid brown soils and some ferritic brown soils in the south east of the area. The widespread agriculture practices reflect the favourable soil types and climate in the area, (see Section 5.11). Further detail on habitat types and conservation areas are in Section 2.4.

2.1.2 Land Use

The rural nature of the area is reflected by the fact that only 5.3% of the area is urban as shown by satellite data (LANDSAT 1990). However, urban devlopment pressures have impacted on many towns and future needs for increased housing development may be an issue in rural areas.
See Section 5.1 for further detail.

Centres of population and industry give rise to waste which has to be managed. Whilst waste management facilities do not represent an important land use in terms of the total area they cover in the plan, in terms of potential environmental impact they are very significant unless suitably regulated. Most of the waste produced is disposed of in the area's 43 landfill sites. There is some import and export of waste from the area and at present there is sufficient landfill capacity to take the area's waste.
See Section 5.9 and 6.0.1

The main land use components are arable land and grassland. These land uses are found throughout the area. The Agricultural land use as seen on Map 14. Woodland accounts for 7.3% and fallow land 6.4%. Table 1 shows the Land Use Classification and percentages for each land use category.

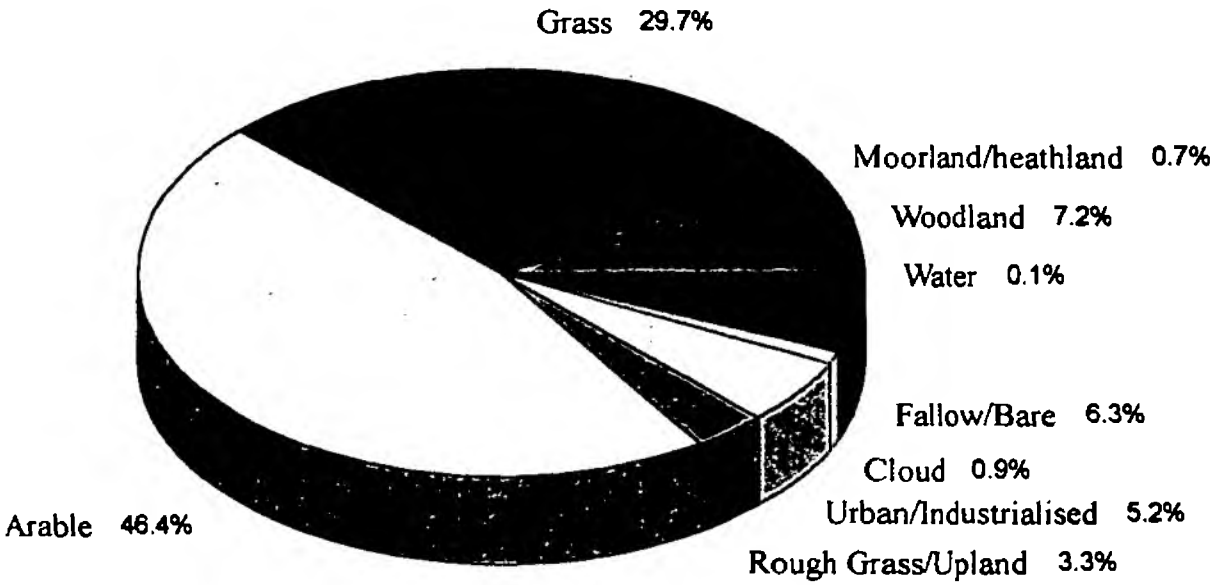
Table 1 Land use Classification

Class	Legend	Area %	Area km²
1	Arable	46.31	1219.82
2	Grass	29.64	780.86
3	Fallow/Bare	6.34	166.99
4	Woodland	7.25	191.03
5	Peat Bog	0.10	2.54
6	Moorland/Heather/ Bracken	0.72	19.08
7	Rough Grass/Upland pasture	3.30	86.98
8	Urban/Industrialised	5.29	139.44
9	Water	0.11	2.79
10	Cloud/Cloud shadow	0.94	24.73
Total of 10 classes		**100**	**2634**

(Source: LANDSAT 1990)

Agriculture is the most important land use in the area with dairy farms representing the single largest section of the industry with large increases in poultry farming seen over the last ten years (1985-1995), and to a lesser extent sheep and pig farming. Crop production accounts for 40% of the total agricultural land use in the area with cereals, primarily wheat and barley, accounting for 66% of this land use. Other crops grown include sugar beet and potatoes. Forestry within the catchment is particularly sparse, with the exception of the Wyre Forest near Bewdley. See Section 5.12.

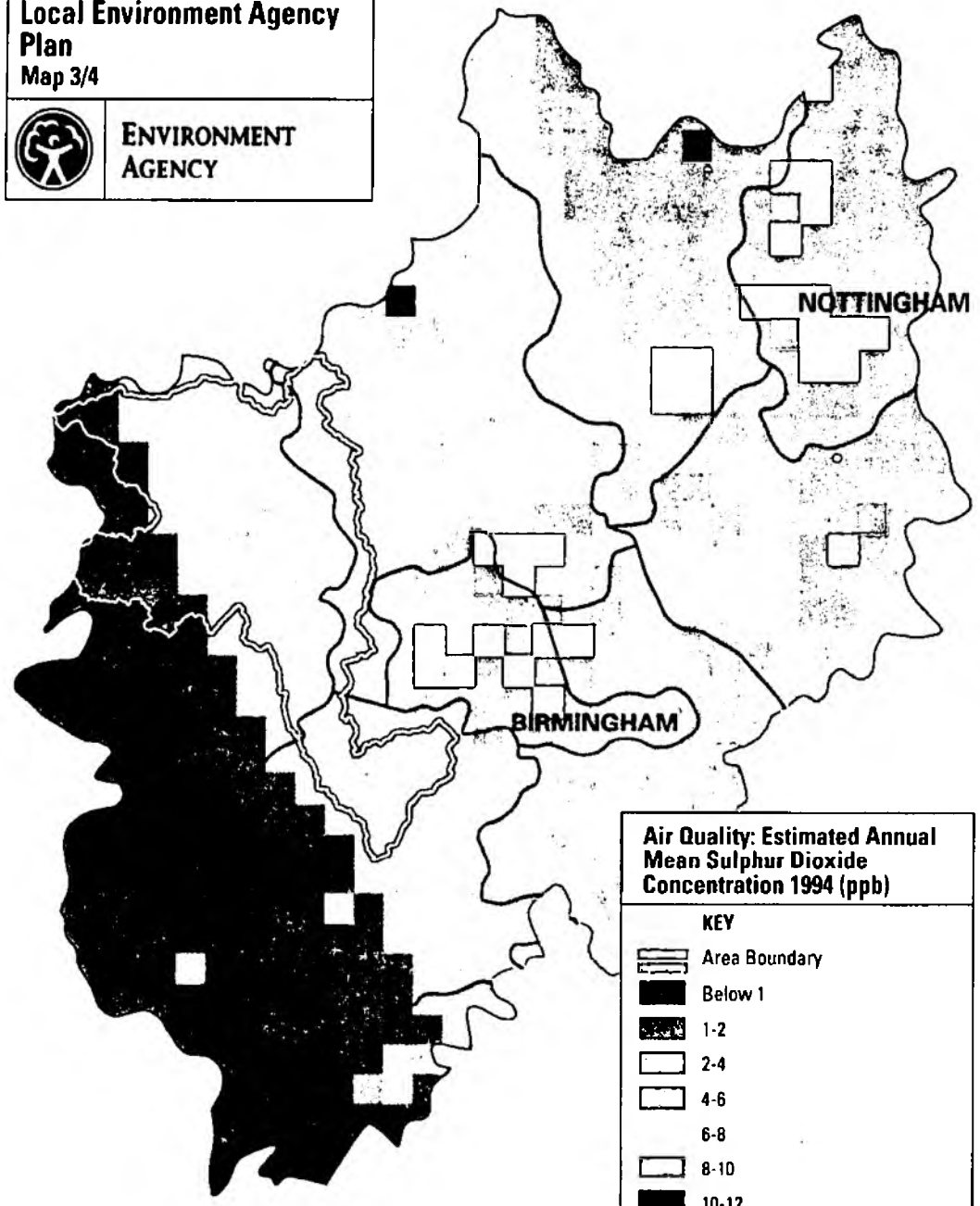
Figure 3 - Main land use in the Middle Severn area (LANDSAT data, 1990)



Agriculture has the potential to affect the environment in various ways, through discharges of organic waste, its demands on ground and surface waters and the useof fertilisers. Rivers like the Perry and Roden have suffered in the past from agricultural pollution, this is further considered in Sections 3 and 5.11.

Middle Severn
Local Environment Agency
Plan
Map 3/4

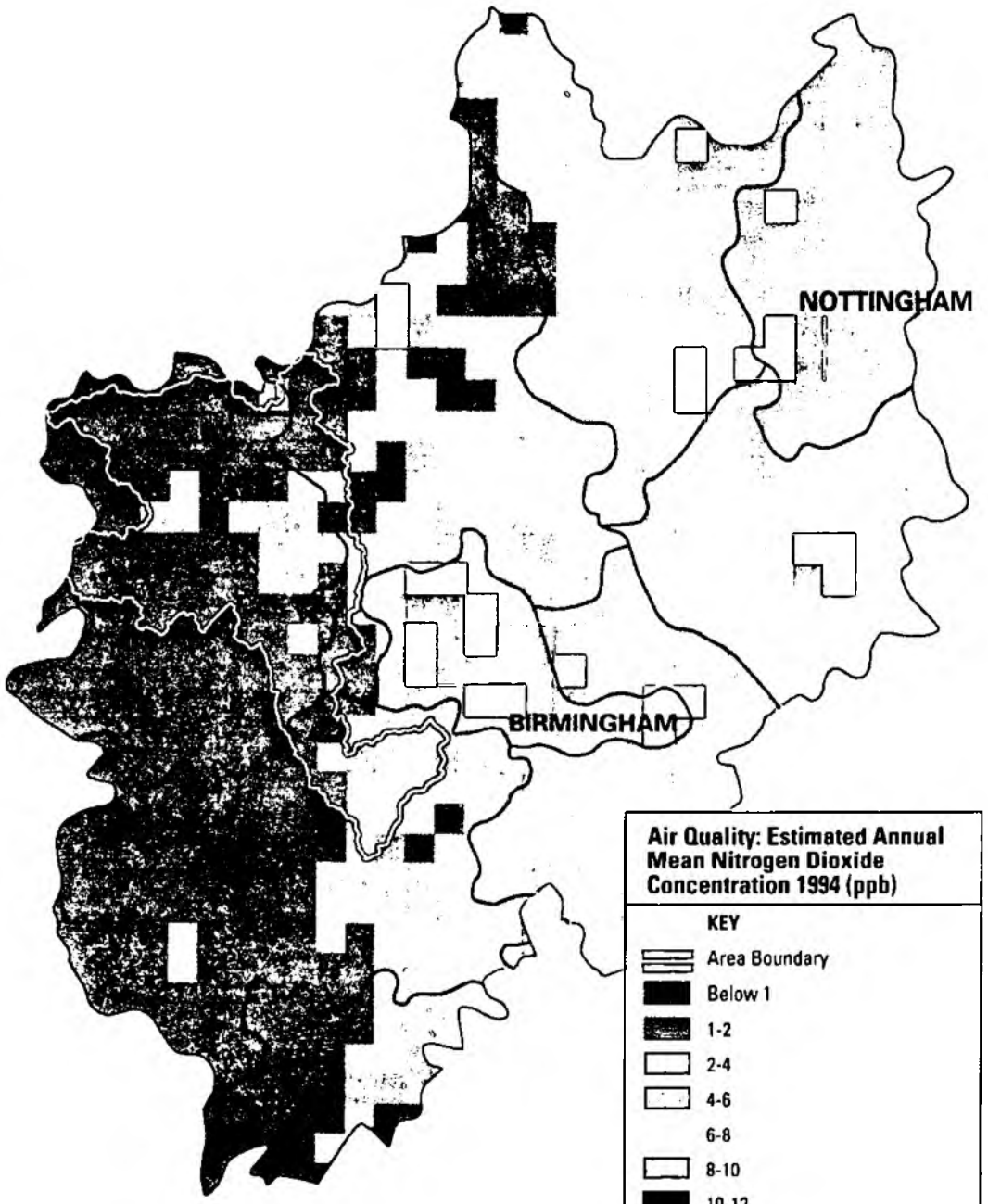
ENVIRONMENT AGENCY



Air Quality: Estimated Annual Mean Sulphur Dioxide Concentration 1994 (ppb)

KEY

- Area Boundary
- Below 1
- 1-2
- 2-4
- 4-6
- 6-8
- 8-10
- 10-12
- Above 12



Air Quality: Estimated Annual Mean Nitrogen Dioxide Concentration 1994 (ppb)

KEY

- Area Boundary
- Below 1
- 1-2
- 2-4
- 4-6
- 6-8
- 8-10
- 10-12
- Above 12

2.2 Air

The predominantly rural nature of the area with limited heavy industry is reflected in the good air quality. Air pollution may be in the form of gas, vapour or particulate matter. Its dispersion and dilution depends on meterological conditions. The impact of air polution may be local, especially with regard to odour and particulate matter, which will often settle on nearby land or water, or may be global, for example affecting the ozone layer or the concentration of 'greenhouse gases' such as carbon dioxide.

Emissions from industrial processes in the area are regulated to minimise their impact upon the environment. We have no regulatory control over air quality, but do contribute to the management of air pollution through the integrated pollution control (IPC) system. These IPC sites are listed in Table 4, Section 5.2.

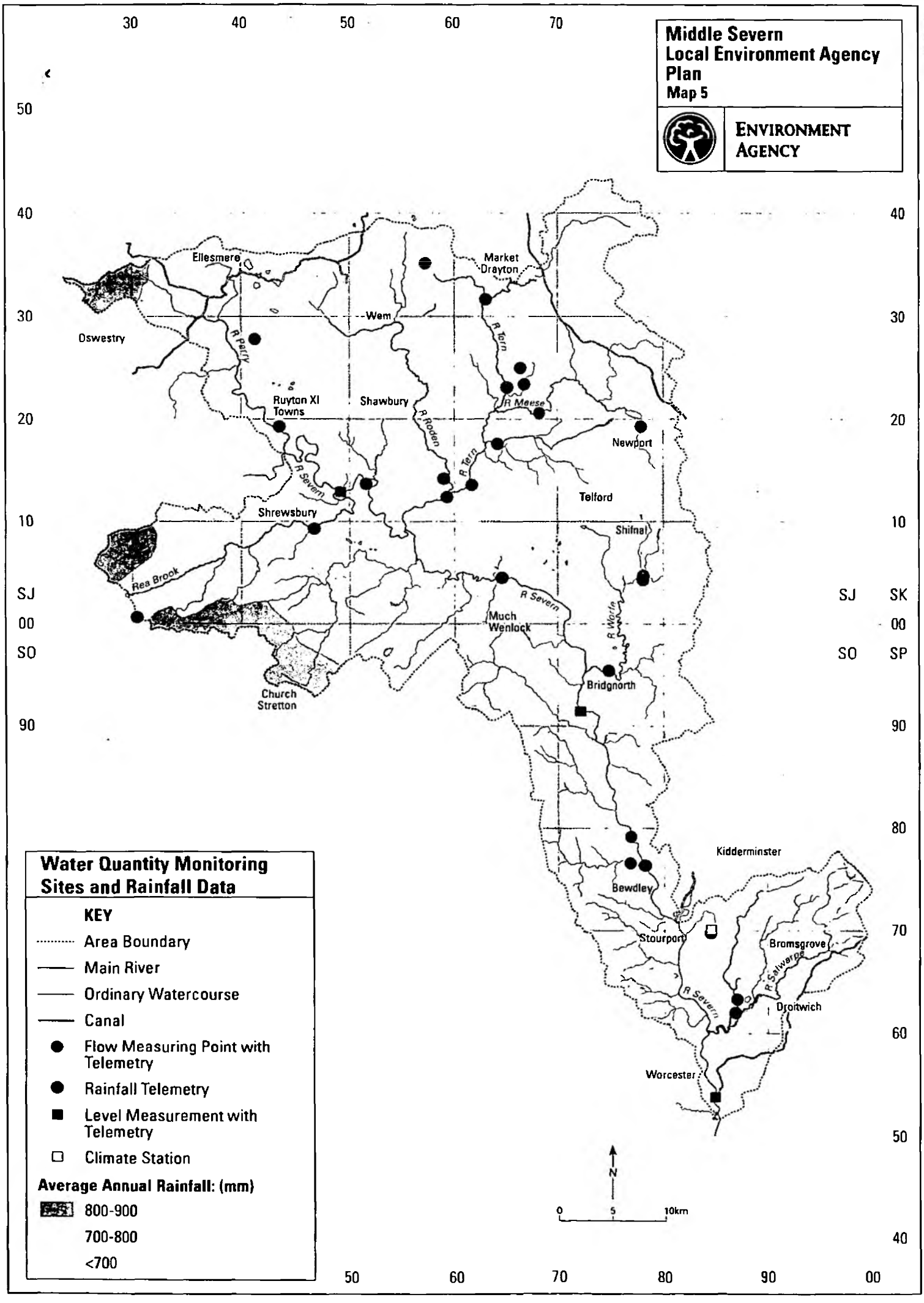
Maps 3 and 4 show levels of both sulphur dioxide and nitrogen dioxide across the Midlands Region. From the maps it is clear that the air quality in the area is generally good for those pollutants. Parts of Birmingham and the north-east of the Midlands Region show elevated levels of both nitrogen and sulphur oxides. Whilst it is unlikely that the IPC processes being operated in this area will have a significant impact on the air quality in these locations, sites where additional monitoring is to be carried out have been highlighted in Section 3 **Issues 4** and **16**. Where monitoring has been carried out in the plan area indications are that the standard for nitrogen dioxide is being met. Although the only result currently available for sulphur dioxide in the area is that for Worcester (and this is expressed as a monthly median), it indicates that the standard is also being met.

Indications have shown that episodes of high ozone concentrations at ground level can occur in the rural areas. These are caused by complex interactions between organic compounds and nitrogen dioxide in the presence of ultraviolet light. As these pollutants typically arise many miles from the sites of the ozone episodes action on a national level is necessary to reduce their occurrence. See Section 6.1 for further details on air quality and air emissions.

Table 2 The results of sulphur dioxide and nitrogen dioxide monitoring

Local Authority	SO_2 µg/m^3	NO_2 µg/m^3 Estimated 98%ile
Wrekin DC	No information available	64.82
Bridgnorth DC	No information available	71.02
Wyre Forest DC	No information available	89.56
Bromsgrove DC	No information available	80.82
Wychavon DC	No information available	49.70
Worcester CC	14.13 (Monthly median)	63.56

The existing European Union Air Quality Standard for nitrogen dioxide is 200µg/m^3 (expressed as the 98th percentile of hourly means) and for sulphur dioxide it is 120µg/m^3 (expressed as the median daily value).


Middle Severn
Local Environment Agency
Plan
Map 5
ENVIRONMENT AGENCY
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70
80
90
00
10
20
SJ
SK
SO
SP
Ellesmere
Market Drayton
Wem
Oswestry
R Perry
R Tern
Ruyton XI Towns
Shawbury
R Roden
R Meese
Newport
R Severn
Telford
Shrewsbury
Shifnal
Rea Brook
Much Wenlock
R Worfe
Bridgnorth
Church Stretton
Kidderminster
Bewdley
Stourport
Bromsgrove
R Salwarpe
Droitwich
Worcester
N
0
5
10km
Water Quantity Monitoring Sites and Rainfall Data
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Flow Measuring Point with Telemetry
Rainfall Telemetry
Level Measurement with Telemetry
Climate Station
Average Annual Rainfall: (mm)
800-900
700-800
<700

2.3 Water

2.3.1 Water Resources

Surface water

There are seven principal rivers in the Middle Severn area. The River Severn, and its tributaries the Perry, Tern, Worfe and Salwarpe, and the two large tributaries of the Tern - the Meese and the Roden. Surface water supplies are varied with the River Severn as the main resource of plentiful water, whilst other rivers like the Worfe are suffering from low flow problems. (See also Section 3 **Issue 10** and Sections 5.6 and 6.2.1)

Water is abstracted for agricultural, industrial and domestic use. There are major surface water abstractions for public supply from the River Severn itself at Shrewsbury, Hampton Loade and Trimpley. Ironbridge power station at Buildwas is also a major water abstraction site from the River Severn.

Average flow of the River Severn near Shrewsbury is 3700 Megalitres per day (Ml/d), increasing to 5350 Ml/d at Bewdley and 6000 Ml/d at Worcester. This flow is supported by releases from Llyn Clywedog and Lake Vyrnwy, whilst the Perry and Tern are supported at times by discharges from the Shropshire Groundwater Scheme (see 2.3.2 for further details).

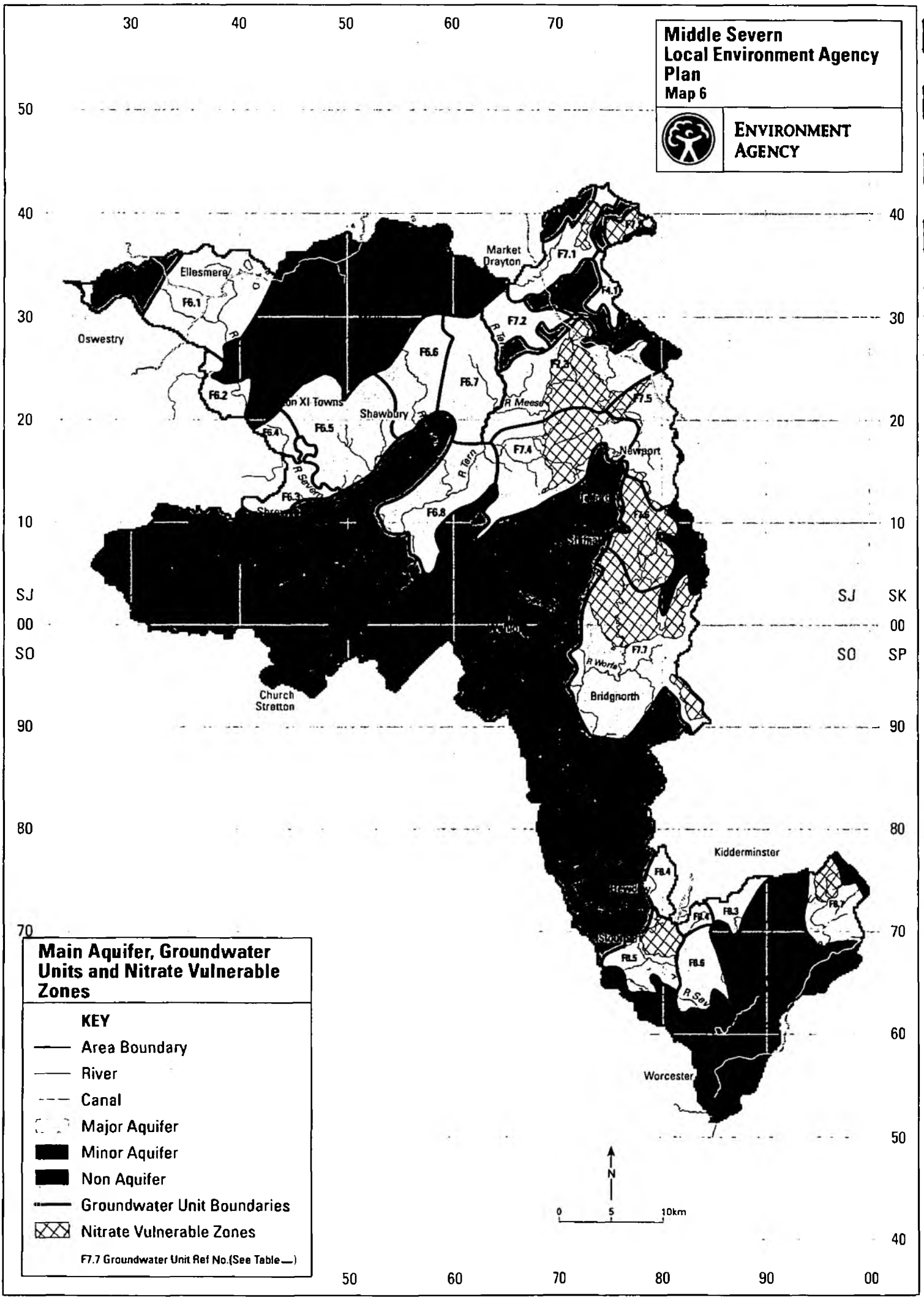
Due to low flow problems, some watercourses are now closed to further applications to abstract water during the summer. The Agency is encouraging an alternative option to abstract and store water during the winter months for irrigation use during the summer. Reduced charges for the water also reflect the environmental benefits of winter abstraction.

Rainfall in this predominantly lowland area is modest being less than 700 mm on average per annum. The highest totals, in excess of 750 mm are to be found in the hillier parts of the Oswestry, Telford, Market Drayton, Wyre Forest and Bromsgrove areas. Around Shrewsbury, Bridgnorth and Worcester rainfall is less than 700 mm per annum over large parts of these lowlands. Potential evaporation is around 500 mm per annum. Map 5 shows rainfall distribution.

Groundwater

Groundwater is pumped from the "Permo Triassic" sandstone aquifer in large quantities as well as from other minor aquifers. Groundwater is used for irrigation, public water supply and industry (all principally from the sandstone) and also general agriculture (often from minor aquifers). Owing to the rural nature of the area, many domestic properties rely on private supplies from wells and boreholes.

Certain areas of the catchment have falling groundwater levels and/or problems of low river flows during the summer, a consequence of licences of right being granted in the 1960's authorising overabstraction of groundwater. Such areas can either no longer support new abstractions or require compensation discharges to be made to nearby watercourses to alleviate the effects of the abstraction. The areas where water resources are under pressure are discussed in Section 3 **Issue 10.**


Middle Severn
Local Environment Agency
Plan
Map 6
ENVIRONMENT AGENCY
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90
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SJ
SK
SO
SP
Ellesmere
Oswestry
Market Drayton
Shawbury
Newport
Church Stretton
Bridgnorth
Kidderminster
Worcester
F6.1
F6.2
F6.3
F6.4
F6.5
F6.6
F6.7
F6.8
F7.1
F7.2
F7.3
F7.4
F7.5
F7.6
F7.7
F8.1
F8.2
F8.3
F8.4
F8.5
F8.6
R Tern
R Meese
R Severn
R Worfe
R Sev
N
0
5
10km
Main Aquifer, Groundwater Units and Nitrate Vulnerable Zones
KEY
Area Boundary
River
Canal
Major Aquifer
Minor Aquifer
Non Aquifer
Groundwater Unit Boundaries
Nitrate Vulnerable Zones
F7.7 Groundwater Unit Ref No.(See Table —)

The principal aquifers within the catchment are shown on Map 6. These comprise:

Major aquifer - 40 % of the area is underlain by the Permo-Triassic aquifer. It is highly permeable and a major groundwater resource which is used to supply large volumes of water for public supply. It is therefore very important to ensure groundwater quality is maintained and improved wherever possible.

Minor aquifer - 28% of the area is classified as minor aquifer. Carboniferous strata including the Coal Measures and Enville Beds outcrop at various locations throughout the catchment, near Telford and Coalbrookdale, northwest of Kidderminster, around Shrewsbury and Whitchurch and at the extreme western edge of the area near Oswestry. Silurian Shales with occasional limestones outcrop in two areas in the central area of the catchment around Much Wenlock at the western edge near Minsterley. Generally the limestone bands are used for small private water supply but where limestone bands are thick, these strata may support public supply abstractions, such as those near Much Wenlock.

The Devonian Old Red Sandstone Group is present in the southern part of the area. Groundwater flows principally through the sandstone beds and through fissures and joints within the rock, and is capable of supporting small private abstractions, but is not used for large public supply.

Superficial drift deposits consisting of alluvium, sand and gravel and terrace deposits are principally associated with river valleys. They may form locally important water sources and are normally in hydraulic continuity with the surface water system, providing baseflow to the rivers.

Non Aquifer - The youngest consolidated rocks in the area are the Lower Jurassic Mudstones occupying 32% of the area, which are present in the south around Worcester and Droitwich and in the north around Wem. A sequence of red clays have low permeabilities and are not a significant source of groundwater, being classed as a Non Aquifer in the *Environment Agency's Policy and Practice for the Protection of Groundwater,* 1992.

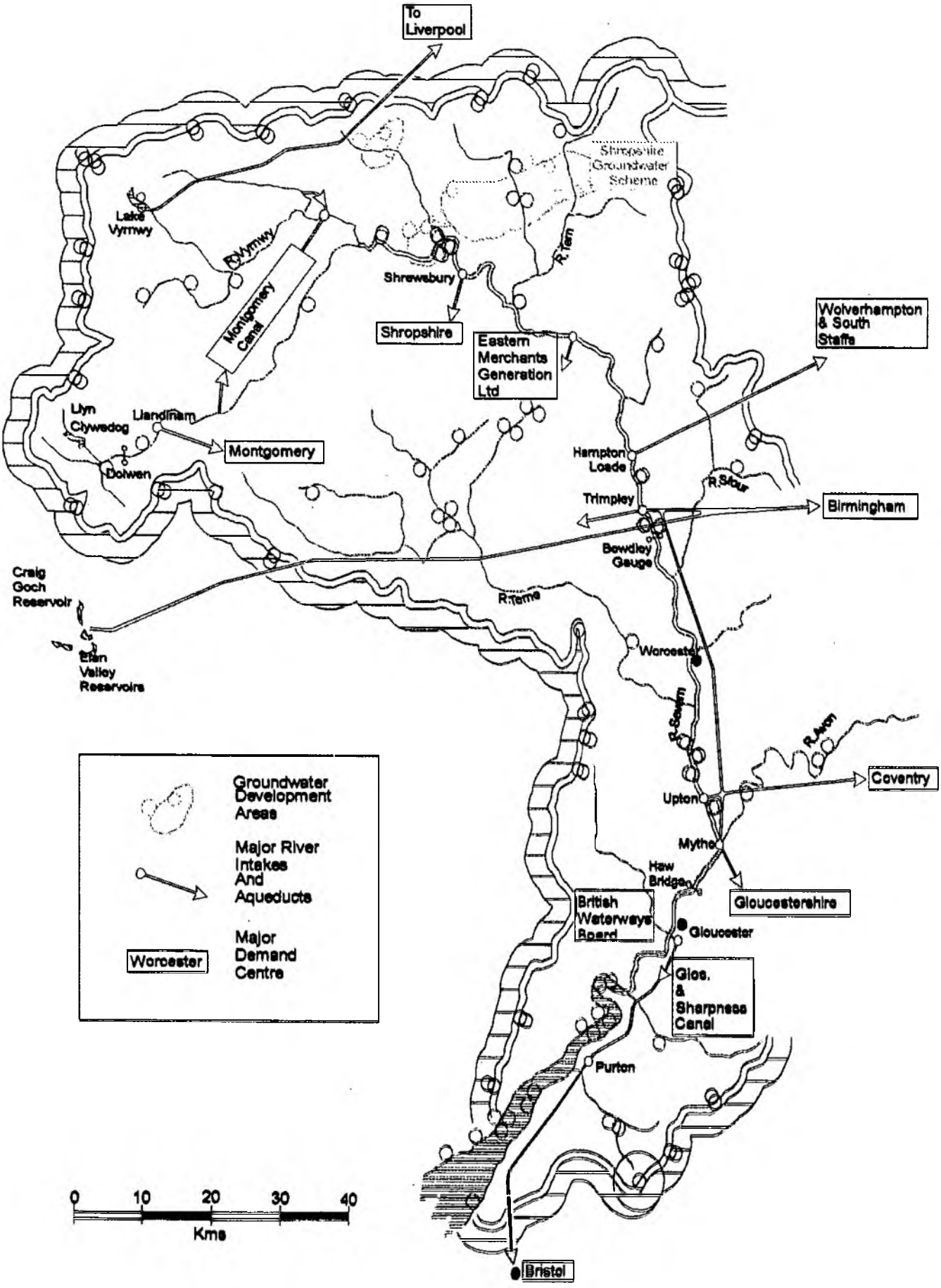
A small part of the area, south of Shrewsbury, from Minsterley round to Much Wenlock, lies within the area covered by 'The Severn River Authority (Exceptions from control) Order 1967' and as such no licence is needed from the Agency for any abstraction of water from boreholes/wells in that area.

2.3.2 Specific Schemes

River Severn Regulation System

The River Severn Regulation System is designed to meet the water resource demands of major abstractors on the river, while maintaining an acceptable flow for the purposes of fisheries, conservation, recreation and effluent dilution. See Figure 4.

Figure 4


To Liverpool
Shropshire Groundwater Scheme
Lake Vyrnwy
R.Vyrnwy
Montgomery Canal
Shrewsbury
R.Tern
Shropshire
Eastern Merchants Generation Ltd
Wolverhampton & South Staffs
Llyn Clywedog
Llandinam
Montgomery
Dolwen
Hampton Loade
R.Severn
Trimpley
Birmingham
Bewdley Gauge
Craig Goch Reservoir
Elan Valley Reservoirs
R.Teme
Worcester
R.Severn
R.Avon
Coventry
Upton
Groundwater Development Areas
Major River Intakes And Aqueducts
Major Demand Centre
Worcester
Mythe
New Bridge
British Waterways Board
Gloucestershire
Gloucester
Glos. & Sharpness Canal
Purton
0 10 20 30 40
Kms
Bristol

The principal storage components of this system are the full resource allocation from Llyn Clywedog, limited resources from Lake Vyrnwy, and from the Shropshire sandstone aquifer.The capacity of the surface storage reservoirs alone is insufficient to provide all of the water required for release to the river in exceptionally dry years such as 1976, 1984, 1989, 1995, 1996. (See Sections 5 and 6.2.1)

Shropshire Groundwater Scheme

The Shropshire Groundwater Scheme has been devised to supplement releases from Llyn Clywedog during periods of prolonged low flows. The scheme makes use of the large quantities of water stored naturally underground in the Permo-Triassic Sandstone formations underlying much of North Shropshire. See Map 10.

With the exception of a few boreholes the entire proposed eight phases of the Groundwater Scheme lie within the plan area. Each phase consists of a number of abstraction boreholes linked by underground pipelines to discharge points (outfalls) to the receiving watercourses of the Rivers Perry, Roden, Tern and Severn.

Phase 1 Tern was commissioned in 1984, and has been called upon under the drought conditions of 1984, 1989, 1995 and 1996. Phase 2 South Perry and Montford, commissioned in 1991/92 has only been called upon in 1995 and 1996 to contribute to regulation of the River Severn. Further water resource demands from the Severn catchment have justified construction of the Phase 3 Leaton area which began in 1993/94. It is scheduled for completion in 1997/98.

Stringent operating rules governing the use of the groundwater scheme and existing statutory environmental monitoring activities, linked with the management of the scheme, have shown no detrimental effects upon receiving watercourse quality, soil moisture availability or ground stability through the operation of either Phase 1 or 2. The scheme is recognised as being of strategic national importance to the future Water Resources Strategy of the Severn catchment. The speed of development of the remaining phases will be determined by future resource demands on the River Severn.

2.3.3 Water Quality

Generally the quality of the watercourses in the area is fairly good, as measured both by chemical and biological sampling methods. The 1995 General Quality Assessment for water quality covered 644 km of river in the area. 52% of these rivers are classed as being of 'good' quality with 42% as 'fair' quality with only a few reaches being of 'poor' quality. See Section 6.2.2 for more information.

The trend since the early 1990's has been a steady increase in the overall quality of watercourses in the area. The main factors in this have been the availability of grants until 1995, for farmers to carry out waste management system improvements, which led to many highly polluting discharges being stopped (See Section 3 **Issue 1**); the continuing programmes of investment by Severn Trent Water Ltd in sewerage and sewage works improvements (See Section 3 **Issue 9**) and finally an increased awareness of environmental responsibilities by those handling potentially polluting materials.

While many improvements have been made, some watercourses still fail to meet their quality targets and they will be the aim of future work of the Agency. (See Section 3 **Issue 9**).

The main pressures on the quality of the water environment in the area can be summarised as:

* Point source and diffuse pollution from the agricultural industry, both in terms of organic wastes and pesticides. (See Section 5.11 and Section 3 **Issue 1**).

* The increasing urbanisation of parts of the area, which leads to increased demand for sewage and to higher rates of polluted urban runoff (See Section 3 **Issues 2, 5,** and **16**).

* Threats from specific industrial sites storing hazardous materials on site (See Section 3 **Issues 3** and **16**).

The biological quality of the River Severn and its tributaries is generally good with 56% of watercourses achieving good biological community assessments. Diverse biological communities which include stoneflies, mayflies, caddisflies and dragonflies are found in many of the tributaries of the Severn, including the River Perry, the Rea Brook and the Dowles Brook. Of the remaining stretches, 35% are of fair biological quality and have less diverse communities indicating that water quality is not as good. 2.4% of watercourses are classified as of 'poor' biological quality, reflecting water quality problems. Aquatic communities in the River Worfe are slightly depleted as a result of reduced flows caused by overabstraction. See Section 3 **Issue 10**.

Further details on water quality objectives are given in Section 6.2.2.

Groundwater Quality

Natural groundwater within the area is of a high standard, suitable for drinking without the treatment that surface waters require, although nitrate concentrations in some areas are rising due to widespread agricultural activities. The Environment Agency has an involvement with two schemes designed to combat the problem of rising levels of nitrate in groundwater where these are predominantly caused by agriculture. The Agency is not responsible for either scheme but it has assisted in their implementation by collating the necessary water quality data and by defining those areas, called Nitrate Vulnerable Zones (NVZ) and Nitrate Sensitive Areas (NSA). This includes both surface and groundwaters where these meet the Government criteria for designation. See Section 6.2 for further information on NVZs and NSAs.

The purpose of the NVZs and NSAs is to protect the affected area and to establish action programmes to reduce nitrate levels. (See Section 3 **Issue 1**)

In the area covered by the plan, there are NVZs at Wildmoor, Astley, Tom Hill, Shifnal, Telford, Swynnerton (part of) and NSAs at Wildmoor, Tom Hill, Wellings (in Swynnerton NVZ) Sherrifhales (in Telford NVZ) Grindleforge (in Shifnal NVZ). These areas are shown on Map 6.
Locally other forms of pollution associated with industrial, commercial and waste operations have occurred. Where these are a problem they have been highlighted as an issue. (See Section 3 **Issue 3**)

2.3.4 Flood defence

Flooding History

Within the plan area certain localities are at risk from flooding. Shrewsbury was originally built on high ground on the inside of a narrow necked loop in the River Severn. Development over the years has encroached onto the floodplain, resulting in extensive areas at risk from flooding. Historically, the River Severn has flooded property in the floodplain on many occasions. In Shrewsbury, the highest recorded flood occurred in 1795, when flood water reached about 2 metres deep in the Frankwell area. There was also major flooding in 1672, 1770, 1852, 1869, 1881, 1946 and 1947. In recent times, flood water of at least 1 metre depth has occurred in property in Shrewsbury in 1960, 1964, 1965 and 1968. At present, there are approximately 400 residential and commercial properties at risk from flooding, along with the major transport routes through the town.

It is a commonly held belief locally that the construction of the reservoir at Clywedog has alleviated the flooding problem in Shrewsbury as there have been no major floods since it started impounding water. This view is incorrect, Clywedog has no measurable impact on flooding in Shrewsbury, there have simply just not been the weather conditions to cause major flooding since its construction.

Downstream, a small part of Ironbridge and properties in the towns of Bridgnorth, Bewdley and Stourport are at risk from flooding.

Further downstream on the Severn, the city of Worcester straddles the river. Over the years there has been a progressive encroachment of development on to the floodplain, which has only been curtailed and prevented in more recent times. Like Shrewsbury, these areas of development, including up to 150 properties and several roads, have been regularly flooded. Flooding also occurs at the county cricket ground and racecourse, which both adjoin the river. The highest flood events in Worcester in the period of record since 1672, have been in 1770 and 1947, the levels attained along with those of lesser events are marked on a wall at the Watergate of Worcester Cathedral. See Section 3 **Issue 22** for more detail.

Flood Warning

For areas where there are no flood defence and which may be at risk from flooding, the Agency flood warning scheme is in operation. Our telemetry network monitors rainfall and river levels, 24 hours a day throughout the year. Through the area of this plan, the River Severn is split into five flood warning reaches. When there is a risk that flooding could occur, flood warnings will be issued for the area affected. See Sections 5.7, 6.2.3 and Appendix 3 for further information.

2.4 Wildlife, Heritage and Recreation

2.4.1 Wildlife

The Middle Severn area is diverse, containing many different types of habitat which in turn support an abundant and varied flora and fauna. The conservation richness of the area is reflected in Map 16. Many of the sites of conservation interest have a river or wetland component.

Fauna associated with aquatic habitats in this area include otters, mink, kingfishers, dippers, sand martins and grey wagtails. Of the native British freshwater fish nearly all the species including the rare twaite and allis shads are present. Barbel, chub, dace and roach are the dominant fish in the Middle Severn. Salmon pass through the catchment on their migration to spawning areas further upstream and wild brown trout are present in a number of the tributary streams. Invertebrates are well represented, including the nationally rare Desmoulin's whorl snail, club-tailed dragonfly and the raft spider. The diverse flora found in the area reflects the geological variation and includes the nationally scarce species, floating water plantain and ribbon-leaved water plantain.

Agricultural intensification and loss of wetland habitats have led to reductions in biodiversity in some parts of the area. Wading birds such as lapwing, curlew and snipe have shown a particular decline as a result. Water voles have also suffered a severe decline in numbers in recent years, probably through loss of habitat and predation by mink (See Section 3 **Issue 12** and Sections 5 and 6 for more information)

2.4.2 Heritage

The River Severn has been of historical importance for settlement throughout the ages. Ironbridge Gorge, centred on the River Severn, was designated as the first UK World Heritage Site in 1986. It is recognised as the birthplace of the industrial revolution and is a major tourist attraction of international importance.

The area is dominated by agricultural landscapes, but there are a number of large estates and numerous historic parks and gardens *e.g.* Aqualate, Attingham, Dudmaston.

Remaining wetland areas in the catchment are potentially important archaeological sites as they retain environmental deposits and waterlogged objects are usually well preserved. The Strine Levels, north of Wellington, show signs of prehistoric settlement linked to the wet and inhospitable nature of this terrain before it was subject to extensive agricultural improvement and drainage.

The River Severn has a long history of commercial exploitation of its fishery resources, most particularly for salmon and eels. Remains of historic fish weirs exist at a number of sites along the river, associated with islands and bylets constructed for early navigation. Remains of eel traps also exist at various weirs in the area. Coracle fishing, netting and trapping of fish were methods in common usage in the past, but almost none remains today. Commercial exploitation is now restricted primarily to fish farming operations.

2.4.3 Recreation and Navigation

One of the delights of the area is the peace and quiet of the countryside and its natural beauty. This, together with its close proximity to the large conurbations of the West Midlands, means it is a popular tourist area attracting large numbers of walkers, watersports enthusiasts, bird watchers and holiday makers. Care is required to balance the pressures associated with this high level of recreational use and the need to preserve the quality of the environment on which this depends.

The Severn Way footpath, promoted by the Agency, is a popular walkers route, as are the Jack Mytton and Silkin Ways. Ellesmere is very popular for informal recreation as are many of the pools in Telford, which include some disabled fishing facilities. These are also provided at Albrighton Moat but are generally scarce throughout the area. A new 'Wheely' boat to facilitate disabled people has recently been provided by the Agency at Ellesmere.

Angling is a popular pastime, with the Middle Severn being renowned for good quality mixed fishing, particularly for barbel, chub and roach. Salmon fishing is available in the River Severn, primarily below weirs such as those at Diglis, Holt Fleet and Shrewsbury. There are many stillwater coarse and trout fisheries, including major day-ticket waters at Moorlands near Kidderminster and Woodlands near Ombersley. Canal fishing is also available, most notably on the Shropshire Union Canal and the Birmingham/Worcester Canal. See Sections 5.13 and 6.3.1 for more detail.

The River Severn is used extensively for boating activities, but with larger craft mostly restricted to the lower reaches of the river downstream of Bewdley. Canoeing and rowing are widely enjoyed throughout the river. Although there is scope for further water-based use of the river, this will have to be carefully considered in terms of environmental impact and potential conflicts with existing users.

Section 3 Issues and Options

This section of the plan details specific environmental issues in the area.

The issues have been identified by:

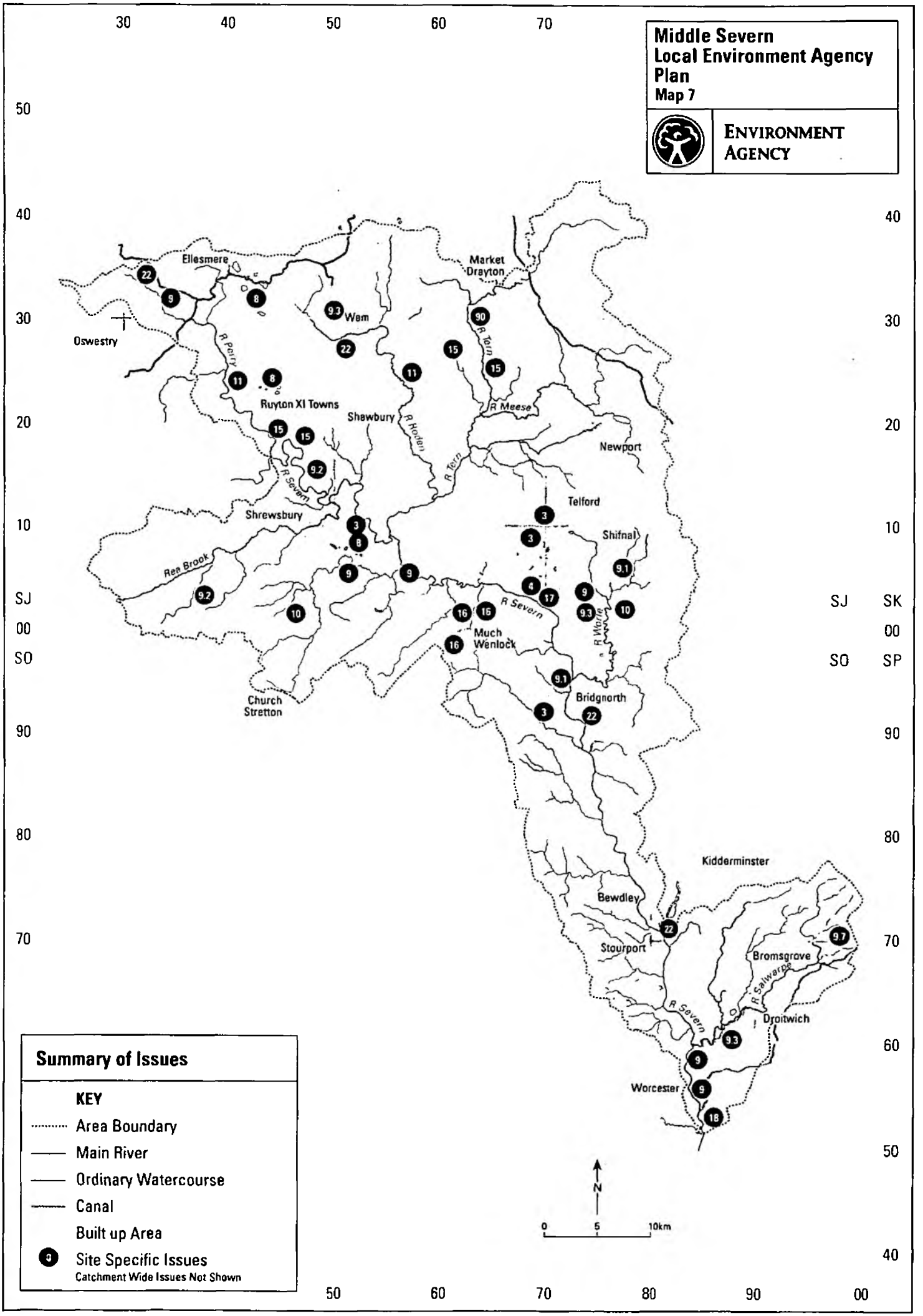
* Using the local knowledge of the Agency staff.

* Informal consultation with a range of organisations and interested groups.

* Comparing the current state of the area (Section 6) with national and regional targets.

Your views and comments on the issues and options are requested, together with any new ideas and suggestions.

The options presented are the initial views of the Upper Severn Area, Midlands Region, of the Agency and do not constitute policy statements. They are intended to facilitate improvements to the local environment for the benefit of all users. Their implementation will require the co-operation and commitment of many organisations and individuals.


Middle Severn
Local Environment Agency
Plan
Map 7
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Oswestry
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Market Drayton
Ruyton XI Towns
Shawbury
Newport
Telford
Shrewsbury
Shifnal
Rea Brook
Much Wenlock
Church Stretton
Bridgnorth
Kidderminster
Bewdley
Stourport
Bromsgrove
Droitwich
Worcester
R Severn
R Perry
R Tern
R Meese
R Roden
R Worfe
R Salwarpe
N
0
5
10km
Summary of Issues
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Built up Area
Site Specific Issues
Catchment Wide Issues Not Shown

3.0 The Local Issues

The issues identified are not in priority order but are presented in associated issue groups under four main categories. Some issues are site specific (See Map 7) whilst others can affect many parts of the area.

3.1 Land Use and Development impacts on the environment *Issues 1-6*

Issue 1	Agricultural Pollution and the Land Spreading of Controlled Waste
Issue 2:	The Disposal of Sewage in Rural Areas
Issue 3:	The Impact of Contaminated Sites
Issue 4:	Monitoring of Ironbridge Power Station Air Emissions
Issue 5:	The Impact of Urban Pollution and Development
Issue 6:	Caravan site Development in the Floodplain

3.2 Losses affecting our environment *Issues 7-10*

Issue 7:	Decline in Eel Fisheries
Issue 8:	Degradation of Wetland and Riverine Habitats
Issue 9:	Failure to Comply with Water Quality Objectives and EC Standards
Issue 10:	Impacts of Water Abstraction

3.3 Protection and improvement of our environment *Issues 11 - 18*

Issue 11:	Protection of Existing High Quality Riverine and Other Wetland Habitats
Issue 12:	Protection of Biodiversity
Issue 13:	Protection of Existing Fisheries
Issue 14:	Protection of High Quality Water Resources
Issue 15:	Water Temperature impact of Shropshire Groundwater Scheme
Issue 16:	Threats to the Farley Brook, Much Wenlock
Issue 17:	Stability in the Ironbridge Gorge Area.
Issue 18:	Flood Alleviation Schemes

3.4 Opportunities for sustainable development *Issues 19-22*

Issue 19:	Opportunities for Amenity, Recreation and Navigation
Issue 20:	The Management of Industrial and Commercial Waste
Issue 21:	River Severn Control Rules
Issue 22:	Flood Plain Management.

Abbreviation used:

ADAS	Agriculture Development Advisory Service
AMP	Asset Management Plan
Env Agency	Environment Agency
GIA	Grant in Aid
MAFF	Ministry of Agriculture, Fisheries and Food
Shrops CC	Shropshire County Council
STW Ltd	Severn Trent Water Ltd

3.1 Land Use and Development impacts on the environment

Issues 1 to 6 look at the interaction between land use and development and its impact on the environment.

Issue 1: Agricultural Pollution and the Land Spreading of controlled Waste

Background

Agriculture has the potential to adversely affect groundwaters used for drinking water supply. Fertilisers for crop production and organic wastes from livestock farms can result in nitrates being leached into aquifers to levels above the 50mg/l limit for human consumption. In the plan area there is concern over the rising nitrate levels in some parts. The Agency is involved, in conjunction with MAFF, ADAS and Severn Trent Water Ltd, in the monitoring and assessment of the Nitrate Sensitive Areas at Tom Hill, The Wellings and Wildmoor. These pilot scheme areas were set up in 1990 around public water supply boreholes affected by rising levels of nitrates in local aquifers. The schemes aim to reduce the amount of nitrate-rich fertilisers and wastes applied to agricultural land and therefore reduce the levels of nitrates leaching into the groundwater below. Work in this area will be increased in the near future with the introduction of a number of Nitrate Vulnerable Zones in the Telford, Shifnal and Wildmoor areas. See Section 5.11 and 6.2.2 for more information.

Organic wastes from some of the industries in the area are applied to agricultural land where the application will result in benefit to the land. These wastes are often of high strength and are highly polluting in the event of being allowed to enter a watercourse. The main producers of such wastes in the area include milk processing plants, other food processors and carpet manufacturers. Due to the pollution potential of this activity strict regulation is necessary. We will therefore inspect landspreading activities as a priority to ensure there is no risk of pollution.

ISSUE NO: 1	Agricultural pollution and the land spreading of controlled waste		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Inspect landspreading activities as a priority Provide advice to industry, contractors and farmers on best practice	Env Agency Industrialists Contractors STW Ltd. Farmers	Better monitoring of processes Reduced pollution risk	Manpower resources
Monitor and report water quality effects of measures taken in NSAs and NVZs in the area	Env Agency MAFF Farmers	Possible reduction in groundwater nitrates	Restrictions on farmers

Issue 2: The Disposal of Sewage in Rural Areas

Background

Recent additions to the Water Industry Act 1991 provide a new way in which first time sewerage schemes can be financed in addition to the requisitioning of schemes by Local Authorities. Local Councils, groups or individuals can apply for schemes in their area and should the situation meet various economic and environmental criteria, the cost of the scheme would be spread across all of the water company's customers. As a result it is possible that a greater number of schemes will be introduced and it is important that the Agency is involved in helping to prioritise future investment programmes. Investigative work and close liaison with Local Authorities will be required in order to seek the best way forward in dealing with problem areas.

Settlements within the area known to have pollution or environmental health problems caused by inadequate sewerage are: Condover (part), Maer Village, Weston-under-Redcastle, Montford Bridge (part), Whixall, Mytton, Forton Heath, Shrawardine, Habberley, Plealey, Knowlesands, Oldbury, Monkwood Green, Dunhampstead, Salwarpe, Brockton, Bunningale, Norton, Ironbridge (small area), Heathton, Astley (near Stourport), Waters Upton (part), Grimley and Boningale.

In addition to the above problem areas, the villages of Vennington and Lyneal are served by public village drainage systems, which receive septic tank discharges from a number of properties and discharge into local watercourses. The Agency is liaising with Severn Trent Water Ltd to seek improvements to these systems. Hartlebury is one settlement which has pollution problems from both septic tanks and from sewerage system overflows and the Agency is to press the Local Authority and Severn Trent Water Ltd for improvements to be made.

ISSUE NO: 2	The disposal of sewage in rural areas		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Establish the impact of inadequate rural sewerage facilities within the area (See Issue 9)	Env Agency Local Authority STW Ltd	Improvements in local environments	Cost of improvement schemes. Manpower resources. Lack of information on problem areas
Seek improvements to village drainage systems in Vennington and Lyneal	STW Ltd Env Agency	Local environmental improvements	Cost - may require AMP3 investment
Press for sewerage improvements at Hartlebury	Env Agency STW Ltd LA Local Authority	Environmental improvements	Cost-may require AMP3 investment

Issue 3: The Impact of Contaminated Sites

Background

The Environment Agency is aware of a variety of potentially contaminated sites within the area. These include closed landfills, old gasworks sites and a wide range of industrial sites, many of which are located in environmentally sensitive locations, near rivers or on aquifers. Sites which have been identified in the area are:

Betton Abbots Landfill

The site primarily accepts domestic waste from the Shrewsbury and Atcham area. Routine monitoring of the groundwater has highlighted an area of the site which requires further investigation. It has been agreed with the operator to carry out works, over and above the routine monitoring to identify the cause of the problem.

Overley Hill, Telford

This is the former Cox Chemicals site at Overley Hill which has a long and complex history. A major fire on 22 February 1993 destroyed most of the site, which today produces agrochemicals. Monitoring boreholes around and on site indicate contamination of the groundwater and soil samples also show contamination. Further work is needed to assess the impact of the groundwater contamination and the need for the removal of contaminated soils.

In addition there are sites at Bridgnorth and Telford that have associated contaminated groundwater. The Bridgnorth site has significant oil contamination of the groundwater which is to be remediated in the near future as the next step in a phased site investigation and remediation programme that has been agreed with the Agency.

The Telford site had organic solvent contamination of the perched groundwater associated with former, unlicensed landfill activities. The waste and therefore the source of the contamination has been removed and only a final phase of the investigation remains to be completed. The company has worked closely with the Agency and its predecessors to resolve the problem.

ISSUE NO: 3	The impact of contaminated sites		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Investigate the potential for pollution from Betton Abbots landfill site	Shropshire Waste Management/ Env Agency	Identification of any sources of pollution	
Investigate the risk of pollution from Overley Hill, Telford	Agropharm/ Env Agency	Identify any remedial actions to alleviate pollution of groundwater	
Continue groundwater remediation, at the Bridgnorth Site, to Agency satisfaction	Owners Env Agency	Hydrocarbon pollution is removed from the aquifer	Cost Technical limitation
Investigate the source and impact of pollution at the Telford site	Owners Env Agency	Identification of any remedial actions to alleviate the ground-water pollution	

Issue 4: Monitoring of Ironbridge Power Station Air Emissions

Background

Ironbridge is a coal-fired Power Station and generates approximately 1 to 2 % of the electricity supplied in England and Wales. The site is capable of burning about 400 tonnes of coal an hour and may discharge up to 105 ktonnes of sulphur dioxide and 32.5 ktonnes of oxides of nitrogen per year, although actual discharges are currently less than 40% of these limits.

Its potential for pollution of the air is very large, although due to the design and operation of the process, the major impact is unlikely to be on local air quality. Recently the site has been issued with a programme spanning the next decade, requiring significant reduction in oxides of both sulphur and nitrogen. The effect that these improvements have on air quality will be assessed from monitoring the concentration of pollutants in the ambient air.

A requirement is also imposed on the power station, to carry out investigations into assessing the effect of meteorological conditions on their discharges, and their impact on local air quality.

ISSUE NO: 4	Monitoring of Ironbridge Power Station air emissions		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Undertake dispersion modelling to estimate concentration of pollutants in air	Eastern Merchants Generation Ltd / Env Agency	Increased knowledge of impact of power station on air quality	Need cooperation of relevant local authorities
Measure the concentration of pollutants in air local to station	As above	Identification of any problems with air quality local to the station	Need cooperation of relevant local authorities. Local authorities may lie outside the plan area
Identify the main areas where emissions have greatest impact and measure the concentration of pollutants	As above	Information on where the station is having greatest impact and measure this impact	As above

Issue 5: The Impact of Urban Pollution and Development

Background

Despite the largely rural nature of the area there are problems due to urban development which has resulted in local environmental problems. Areas of concern include foul water infrastructure and industrial developments.

Foul Water Infrastructure

One of the roles of the Environment Agency is to direct investment by the water companies to improve its foul water infrastructure, by monitoring and reporting on the quality of discharges being made and the effects upon the receiving waters.

By prioritising the problem areas, the Agency ensures that the money available for investment is spent where it will be of most environmental benefit and that the costs of projects are not disproportionate to the improvements made.
One of the areas in which improvements are to be sought are combined sewer overflows (CSOs), which occur as a result of combined sewerage systems filling with rainwater during storm events and overflowing to local watercourses.

Overflows in Shrewsbury, Worcester and Highley have led to a significant amount of public complaints and it is anticipated that problem discharges will be entered onto future investment programmes.

One site that has caused public concern is the outfall from Rushmoor sewage treatment works (STW) to the River Tern. While the samples of final effluent taken at the STW are of good quality and meet the requirements of the discharge consent, a grey discolouration is visible in the river at the point of discharge. It is thought that the problem is purely aesthetic, possibly caused by algal growths in the discharge pipe sloughing off into the treated effluent. An investigation into the cause of the discharge is to be carried out by Severn Trent Water Ltd and the Environment Agency to assess the impact.

Industrial estates

A large part of the industry remaining in the area is characterised by small or medium sized industrial estates, often located on the outskirts of towns. These sites can cause pollution problems to local watercourses either through direct discharges of polluting effluents or through contaminated rainwater runoff. Groundwater pollution can also occur due to leaking pipes or poor waste management methods.

The Battlefield Brook and its tributaries in Shrewsbury, are contaminated by a combination of direct discharges and rainfall-related pollution. The brook runs underneath an industrial estate and inspections of units on the estate will be carried out within one year to determine and minimise the sources of pollution.

Another problem on the Battlefield Brook which also occurs on the Ketley Brook in Telford, is urban debris and litter. These two brooks are ordinary watercourses the responsibility for which lies with the Local Authority. The visual effects of the debris is made worse by the lack of maintenance of the brook. This results in trees growing in or falling into the watercourse, which then collect polythene bags and other unsightly litter. This urban debris can cause blockages, which will increase the risk of flooding, and is visually unpleasant.

A further problem related to an industrial estate is the contamination with oil of the Honeymans Brook in Droitwich via surface water sewers. The Agency is to monitor the success of measures already taken to prevent pollution occurring and will require Severn Trent Water Ltd to investigate the remaining sources of pollution.

ISSUE NO: 5	The impact of urban pollution and development		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Ensure that unsatisfactory combined sewer overflows are included in future improvement programmes	STW Ltd Env Agency	Improvement in water quality and aesthetics	Competition with other AMP3 priorities
Investigate the cause and effects of the discoloured discharge from Rushmoor STW	STW Ltd Env Agency	Assess any impact. Prevent problem from occurring	Assessment of cause may prove difficult
Target inspections of industrial units draining to the Battlefield Brook, Shrewsbury	Env Agency STW Ltd Industrialists	Improve quality of the brook. Reduce pollution incidents	Manpower resource Costs of improvements
Maintain ordinary watercourses to an acceptable standard *e.g.* Ketley and Battlefield Brooks	Local Authority	Visual amenity improved, risk of blockages and flooding reduced,	Cost of maintenance
Raise pubic awareness of urban debris and litter	Keep Tidy Britain group and Local Authorities	Less urban debris produced. Improvement in water quality and aesthetics	
Monitor improvements to drainage and investigate remaining sources of pollution from industrial units on the Honeyman's Brook, Droitwich	Env Agency STW Ltd Industrialists	Direct any further work required	

Issue 6: Caravan Site Development in the Floodplain

Background

The scenic beauty of the Severn Valley from Shrewsbury to Worcester means that there is an ever present pressure for tourist facilities to grow, and caravan sites both tourist and static are an important part of such facilities. Riverside sites are often seen as an idyllic setting and the potential flood risk is not seriously considered. Caravan sites in flood risk areas create two main problems.

Firstly the risk of damage to caravans, and even loss of life, by flooding and the risk of floating items being washed downstream and lodging on bridges in turn posing a flood risk.

Secondly, experience has shown an inevitable development progression from touring caravans to static caravans to mobile homes to permanent residential development, with attendant pressure to increase the period of occupancy into the flood season. Particular areas for concern are sites in the vicinity of Bridgnorth, Bewdley and Stourport on the River Severn.

The adoption of specific policies, by the relevant planning authorities for the control of development and caravan sites in the flood plain of the River Severn, is the best way to preserve the main natural function of the floodplain.

ISSUE NO: 6	Caravan site development in the floodplain		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Press for policies to be included in Local Plans to protect floodplain from caravan site development	Env Agency Local Planning Authorities	New caravan sites do not flood, existing problems not aggravated 3Minimises risk to people and property Alleviation of existing flooding	Limitation of developable land

3.2. Losses affecting our Environment

Issues 7 to 10 consider the decline in species and habitat quality that has occurred within the area.

Issue 7: Decline in Eel Fisheries

Background

Eel stocks have declined in rivers throughout Europe in recent years, and the River Severn is no exception in this respect. Restocking with elvers (young eels) has been carried out in past years by the former National Rivers Authority and its predecessor organisation in order to help redress this problem. As costs of elvers are presently prohibitive, the Agency is proposing an alternative strategy through the opportunistic construction of inexpensive elver passes on weirs and other structures, which will enhance the upstream passage of these small fish. This will enable eels to more readily spread throughout the available feeding areas and thereby maximise the potential for their survival and production.

ISSUE NO: 7	Decline in eel fisheries		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Construct elver passes on navigation weirs along the River Severn	Env Agency	Improved access of eels to feeding areas upstream, increased eel production in the catchment	Weir owner permissions

Issue 8: Degradation of Wetland and Riverine Habitats

Background

Agricultural improvements have resulted in the destruction of numerous wetlands and wetland habitats within the area, *eg.* Perry and Strine levels, whilst remnant wetlands continue to be degraded by similar activities. Once common wading birds, such as curlew, lapwing and snipe, have declined at an alarming rate in parallel with such agricultural improvement. Action is required both to prevent damage to, or loss of, remnant habitats and populations of such species, and to create new and improve existing wetland habitats. Agri-environment incentive schemes should be promoted and the Agency's Severn Valley Wetland Project should be extended. Additionally, the lack of interest by landowners in the recent trial Water Fringe Habitat Incentive Scheme around Berrington Pool, Crosemere, Fenemere and Betton Pool is cause for concern.

The West Midlands Meres and Mosses are amongst the most important habitat features within the plan area. Many are designated under the RAMSAR convention and some are candidate Special Areas of Conservation (SACs). Detrimental changes have occurred as a result of agricultural use of catchments, population growth and recreational use. English Nature have proposed a new management strategy for protection of the Meres and Mosses which the Agency will support.

Current Agency river engineering practices now address the environmental concern associated with such operations. There is, however, a considerable legacy of works carried out when environmental considerations were given a lower priority. Significant environmental degradation of river channels occurred as a result in a number of watercourses in the catchment. The main examples occur in the intensively farmed areas of North Shropshire, especially in the River Perry and River Tern catchments. Considerable work has been undertaken in recent years by the Agency to increase both instream and riparian habitat diversity in these rivers. This work will be continued by the Agency with the aim of improving biodiversity and the sustainability of river channel maintenance operations.

ISSUE NO: 8	Degradation of wetland and riverine habitats		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Identify opportunities and implement Severn Valley Wetland strategy including Venus Pool and Chelmarsh	Env Agency Local Authorities English Nature Wildlife Trusts	Improvements to wetland habitats and associated biodiversity	Landowner permissions
Develop and implement management strategy for Shropshire Meres and Mosses (eg Wem Moss, Brown Moss)	English Nature Landowners Env Agency	Safeguard and improve nationally important wildlife resource	Landowner co-operation
Carry out habitat rehabilitation work on degraded rivers, including the R.Perry and R.Tern	Env Agency	Improved instream and riparian habitats, increased fish stocks and biodiversity	Limitations on river management for land drainage purposes
Create 'Buffer Strips' on degraded rivers by fencing in conjunction with above works, and encourage their creation along watercourses where arable farming takes place	Env Agency MAFF	Reduced sedimentation and nutrient enrichment of water courses. Development of wildlife corridor	Agricultural subsidies Landowner permissions

Issue 9: Failure to Comply with Water Quality Objectives and EC Standards

Background

While the majority of the watercourses within the area comply with EC Directives and their Rivers Ecosystem (RE) targets (See section 6.2.2 for more detail) some problem areas do exist which require work by the Agency. An assessment of river quality data for the 3 years 1994 - 96 has shown 3 general categories into which the quality objective failures fall:-

i) Failures Requiring Investigation by the Environment Agency
ii) Failures Involving Sewage Treatment Works
iii) Failures to meet EC Directives

i) Failures Requiring Investigation by the Environment Agency

In instances where a watercourse does not meet its long term Rivers Ecosystem (RE) Classification target, the Agency has assigned a medium term objective for the period of the plan which reflects the quality of water which can be assured during this time. Failures caused by unknown sources will be investigated to attempt to ensure long term targets are met.

River Severn at Cressage and at Bevere

The long term target for the whole of the River Severn in the area is 'good' quality. At two points the river achieves only 'fair' quality. It is thought that the cause of this failure may be naturally occurring algae, which can raise the biochemical oxygen demand (BOD) of samples, particularly during the summer months.

River Perry, Gobowen

The long term target for the Perry at this point is 'good', but the data indicates it would meet only 'fair' under the classification system. It is thought that runoff from the land spreading of agricultural wastes may be the cause and a survey of the farms above Gobowen is proposed to remedy this problem.

Stoke Brook, Stoke-on-Tern

The brook at this location meets only 'fair' standard, below its long term target of 'good'. A polluting source from an industrial premises on this stretch was found and eliminated in June 1996 and the Agency will monitor to ensure that the anticipated water quality improvements follow.

River Worfe, Stableford

This river has a long term target of 'good' quality throughout its length but fails to achieve it at Stableford, achieving only 'fair' quality due to slightly elevated BOD levels. The cause is as yet unknown and work to establish this will be carried out.

Barbourne Brook, Worcester

The Barbourne Brook fails to meet its objective at any of the 4 sampling points on the watercourse. Upstream of Perdiswell the target is 'good' and the brook achieves only 'fair' quality at these sites. The cause has been found to be discharges from agricultural premises and a number of farms in the catchment have carried out improvement work in recent years. The Agency will monitor the quality of this section of the brook and will carry out more investigational work should the quality still prove to be below the desired standard.

In addition the brook is culverted through a former landfill, at Perdiswell where leachate from the site is entering the watercourse. Attempts have already been made by Worcester City Council to prevent leachate from gaining access to the brook, but as yet these have not been successful. Work to enable leachate to be pumped to a foul sewer for treatment is in progress and it is hoped that Agency monitoring will show the quality of the Barbourne Brook to improve as a result. Such work should result in the achievement of the long term objective of 'good'.

Cound Brook, All Reaches

The Cound Brook is the only lowland watercourse in the area with a long term target of RE1 (very good). Instances of organic pollution have been identified that result in this target not being achieved at the moment. The Agency is to analyse current and historical data with a view to targeting any work required in the catchment.

ISSUE NO: 9.1	Failures requiring investigation by the Agency		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
River Severn,Cressage and Bevere: Assess reason for failure to meet quality target	Env Agency	Achievement of target	Difficulty in assessing influence of algae
River Perry, Gobowen: Target farm inspections	Env Agency Farmers	Improve quality of river	Manpower resources
Stoke Brook, Stoke-on-Tern: Monitor to ensure anticipated improvements in quality occur	Env Agency	Achievement of RE target	
River Worfe, Stableford: Investigate quality target failure	Env Agency	Improve quality of river	Manpower resources
Barbourne Brook, Worcester: i) Assess need for farm inspections upstream of Blackpole ii) Continue leachate extraction from landfill iii) Continue water quality monitoring	Env Agency Farmers Worcester City Council Env Agency	Improve water quality Improve water quality	Manpower resources Engineering difficulties
Cound Brook. Assess work required to achieve quality target	Env Agency	Assess work to improve quality	Manpower resources

ii) Failures Involving Sewage Treatment Works (STWs)

Compliance with effluent consent conditions at the sewage treatment works (STWs) owned by Severn Trent Water Ltd is generally very good in the area.

However, in some cases the quality cohditions historically imposed on the discharges are not sufficient to enable the receiving watercourses to achieve current targets. In these cases the Agency generally seeks to ensure the STWs concerned are programmed for investment in future water company plans.

Wesley Brook, Shifnal

This brook fails to meet its objective due to the influence of Shifnal STW which results in the watercourse not meeting its BOD target. Further development in the town could exacerbate this problem and the Agency is to assess the need for future investment at the works.

River Tern, Buntingsdale Bridge

The River Tern fails to meet its long term objective at this point due to combined sewer overflows at Market Drayton STW and at Fiveways Pumping Station, Market Drayton. The Agency is to assess the individual effects of these discharges with a view to improvements being carried out in future investment programmes.

In addition to the above, a number of STWs exist which, while currently performing within the limits of their consents in terms of effluent quality and volume, would actually result in the failure of the receiving watercourses to meet quality targets should the STWs perform at the limits of their consents. In these cases the medium-term targets for the rivers concerned are lower than current water quality and are lower than the long term since the quality of the water cannot be guaranteed during the period of the plan.

River Salwarpe Catchment, Bromsgrove

Bromsgrove STW could reduce the quality of the Sugar Brook to 'poor' should it discharge at the limits of its consent, which in turn would reduce the quality of the upper two reaches of the River Salwarpe at Stoke Prior and Upton Warren to below their long term targets. We aim to ensure that Bromsgrove STW is included in future investment plans to safeguard water quality and ensure long term targets are met.

The Hen Brook is affected by the discharge from the Polymerlatex site and the long term objective of 'fair' quality reflects the intention to seek tighter consent conditions on the discharge when a review of the site is undertaken under IPC legislation.

Lakehouse Dingle, Hampton Loade

The discharge from Alveley STW may cause the brook to exceed the long term objective should it discharge at its consent limits. The Agency will assess the situation to determine future investment needs.

ISSUE NO: 9.2	Failures involving Sewage Treatment Works		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Wesley Brook, Shifnal STW: Asses what improvements are necessary	STW Ltd Env Agency Local Planning Authority	Improved water quality	Competition with other AMP3 priorities
River Tern, Market Drayton. Assess effects of sewer overflows and seek improvements	Env Agency STW Ltd	Improved water quality	Competition with other AMP3 priorities
River Salwarpe catchment	Env Agency STW Ltd	Improvement in river quality to meet and maintain quality targets	
i)Implement planned improvements to Droitwich and Stoke Prior STWs	Env Agency STW Ltd LPA	As above	
ii)Seek improvements to Bromsgrove and Stoke Prior STWs	Env Agency Industrialists	As above	Competition with other AMP3 priorities
iii) Seek to tighten discharge consent limits at a Bromsgrove industrial site	Env Agency STW Ltd	As above	Cost to industry
Lakehouse Dingle, Hampton Loade: Assess need for future investment at Alveley STW		Maintain target quality	Competition with other AMP3 priorities

iii) Failure to Meet EC Directive Standards

River Severn, Shelton

This site intermittently breaches the 1 microgramme/litre limit for cadmium under the Dangerous Substances Directive. However, samples taken at the same time at the nearby Shelton Water Treatment Works do not give similar results and investigations by the Agency into the discrepancy have as yet failed to establish a reason for the results.

Further work is to be carried out to attempt to resolve this anomaly. In addition, one-off failures to meet standards for phenols and oils occurred during 1995. Monitoring will continue at the site and any problems will be investigated.

River Severn, Hampton Loade

On one occasion during 1995 this point exceeded the Surface Water Abstraction Directive limit for oil. The cause is unknown and monitoring of the site will continue.

Minsterley Brook, Minsterley

This brook is affected by the legacy of the lead mining industry which was prominent in the locality. Although a large land reclamation scheme has recently been completed, the brook is still contaminated by polluted groundwater discharging from adits. As a result the brook fails to meet EC Dangerous Substances Directive standards for cadmium and zinc. Work is to be carried out by the Agency and Shropshire County Council to assess the polluting inputs with a view to prioritising any future investment in the Minsterley Brook catchment. Despite the metals problem, the brook is of good quality and supports a salmonid fishery and the Agency is to give a derogation for metals to allow it to keep its RE2 (good) objective (See below).

ISSUE NO: 9.3	Failure to meet EC Directive Standards		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
River Severn, Shrewsbury: Investigate cause of exceedance of EC limit for cadmium	Env Agency	Achievement of quality target	Interpretation and investigation of sample results difficult.
Monitor Directive failures at sites	Env Agency	Protect potable water supplies	
Assess impact of inputs from adits to Minsterley Brook	Env Agency	Prioritisation for future investment	Cost and manpower implications

iv) Review of long term objectives

The original quality targets set for surface waters were based upon data collected in the late 1970s. River Quality Objectives were drawn up using the National Water Council (NWC) classification system and generally these have been translated into the equivalent RE targets. However in some cases water quality data was insufficient to accurately set quality targets, sometimes resulting in targets too stringent for the watercourses concerned.

In these cases the Agency is revising the objectives for these brooks to represent realistic targets which, if maintained, will still protect the watercourses. See Section 6.2.2 for further information

Soulton Brook, Wem

Regrade from 'good' to 'fair' due to the sluggish nature of the brook, which results in low oxygen levels during the summer.

Mad Brook, Culvert Outfall, Haldane

The accessible sampling point on this section of brook is directly below the outfall from an extensive surface water sewer (SWS) system. Such systems receive road and other urban runoff and the water discharging would not be expected to meet the RE2 (good) target. A downgrading to fair is proposed. The brook at this point actually fails to meet the proposed objective and the Agency will investigate the cause of the elevated biochemical oxygen demand (BOD) found at this point.

Elmbridge Brook, Droitwich

The Elmbridge Brook is a small watercourse which drains a rural catchment. It is considered that 'good' quality is an unrealistic target and the watercourse objective be revised to 'fair'.

Derogations

A number of stretches of watercourse fail to meet their objectives due to naturally occurring background levels of some contaminants. Where this is the case the Agency intends to give derogations for the failing chemicals, allowing the otherwise good quality watercourses to meet their targets, for example: River Meese, whole length. Derogation for BOD in the river which arises as a result of algae-rich water entering from the Aqualate Mere overflow.

ISSUE NO 9.4	Revised quality targets and derogations		
Watercourse	**Current Position**	**Proposed Change**	**Reason**
Soulton Brook	Quality target RE2 (good)	To RE3 (fair)	Current objective unrealistic
Mad Brook, Haldane	Quality target RE2 (good)	To RE4 (fair)	Current objective unrealistic
Elmbridge Brook, Droitwich	Quality target RE2 (good)	To RE3 (fair)	Current objective unrealistic
River Meese	Fails objective due to algal matter	Derogate for effects of algae	Retain quality target for river.

Issue 10: Impacts of Water Abstraction

Background

Overabstraction of surface water and groundwater can result in the depletion of stream flows and have a detrimental effect on wetland areas. Low flow problems exist on the Rivers Worfe, Perry, Meese and the Cound Brook through direct surface and groundwater abstraction. These catchments have been closed to new summer abstraction licences. A study is being undertaken on the Cound Brook to establish the relationship between reduction in flows and loss of habitat and the effect on native trout populations. Water quality and the aquatic habitat can be adversely affected as a result.

Where overabstraction of groundwater has occurred, the Agency has already taken steps to prevent the situation from worsening by defining areas having no further resources available for licensing, as listed in Section 6.2.1 Table 13. Specific locations affected by overabstraction which we are targeting include the area underlain by the sandstone of the Cosford and Worfield groundwater units and also the area underlain by the Kidderminster, Stourbridge Wombourne and Bromsgrove groundwater units. In other groundwater units, the potential impact on surface water features is assessed when considering new abstraction proposals and can result in the need for compensation releases and/or the licence being issued subject to a time limit.

River Worfe

In this catchment overabstraction of groundwater for public water supply has reduced the ability of aquifers to sustain stream flows during dry spells. Such abstraction was authorised by historic "licences of right" issued during the 1960s, without adequate consideration of whether this was environmentally sustainable.

As the catchment's streams are heavily used for crop irrigation as well as for impounded amenity lakes, this results in inadequate summer flows in much of the northern part of the catchment and also downstream of some major irrigators in the area.

A strategy for tackling this unacceptable inheritance combines a long term programme to persuade the local water company to reduce its reliance on these underground aquifers with shorter term ameliorative measures which redistribute water at times of maximum environmental stress.

Cound Brook

A temporary gauging station has been constructed on the Cound Brook at Cound Stank to facilitate flow data collection over a representative period. These data will be used in a modelling exercise to simulate different flow regimes and thus determine an acceptable minimum flow for control of future winter abstractions. It will also enable the Agency to decide whether to close the watercourse permanently to new summer abstractions.

Agriculture (spray irrigation) from surface waters

Summer abstraction licences can be considered subject to conditions that restrict or prohibit abstraction during low flow periods. These conditions often have to be enforced early in the summer in a dry year. For these reasons there is a severe problem in meeting summer demands for water by farmers. The agricultural community need to consider winter abstraction and storage in such circumstances. Although licences for winter abstraction are also considered subject to prescribed flows to protect the environment, they are both cheaper and inherently more reliable than summer licences and once the reservoir is full, a guaranteed quantity of water is available for summer irrigation. Such reservoirs enhance the capital value of the farm and also provide a conservation and amenity opportunity.

ISSUE NO: 10	Impacts of water abstraction		
OPTIONS	**Responsibility**	**Benefits**	**Constraints**
Modelling of groundwater units *e.g.* Cosford,Worfield and Bromsgrove	Env Agency	Stop baseflow depletion. Allows target cut-back areas to be defined	Model limitations
Move groundwater abstraction points away from sensitive areas through AMP 3 e.g. Uckington PWS borehole	Water Undertakers Env Agency	Reduce local effects caused through abstraction	Cost of revocation and providing alternative source Seen as a temporary measure only
Encourage conjunctive use of local sources within Worfe catchment to reduce seasonal over abstraction of surface water for spray irrigation	Env Agency	Reduces effect of abstractions at critical periods	Cost of moving sources
Encourage winter abstraction and storage *e.g.* R Worfe, Perry, Cound, other smaller brooks	Abstractors encouraged by Env Agency MAFF/ADAS	Reduces impact of surface water abstraction Financial incentive on charges	Seen as long term investment which requires commitment
Install new gauging station on Cound Brook	Env Agency	More control on abstraction and less environmental impact	

3.3. Protection and Improvement of our Environment

Issues 11 to 18 address the needs of the natural environment; the habitat, flora and fauna. Due to development pressures and land use changes many of our natural resources are being put at risk.

Issue 11: Protection of Existing High Quality Riverine and Other Wetland Habitats

Background

Sites of conservation importance

The area contains numerous water-related Sites of Special Scientific Interest (SSSI) and non-statutory Wildlife Sites.

Aqualate Mere SSSI is also a National Nature Reserve (NNR) and 24 of the SSSIs in the Shropshire Meres and Mosses assemblage are part of a RAMSAR site designated because of the international importance of its plant and animal communities. Fenns & Whixhall Moss and Clarepool Moss are also potential Special Areas of Conservation (SACs).

These sites are potentially at risk from agricultural improvements, land drainage, river engineering works, overabstraction of groundwater and surface water sources, and from inappropriate recreational use. Protection will be given through the use of the Agency's regulatory powers and encouragement will be given to winter abstraction to reduce pressure on summer resources.

Water level management plans (WLMPs) will also be implemented at agreed locations. These plans are seen as means by which water level requirements for a range of activities (*e.g.* agriculture, flood defence, conservation) can be balanced and integrated. English Nature (EN) has identified Aqualate Mere (high priority), Fernhill Pastures, River Perry (low priority), Marton Pool (high priority) and Rue Wood Pastures, River Roden (low priority) as sites within the catchment where WLMPs involving the Agency as the operating authority are required. Other sites are also present in the area where we are not the operating authority.

Invasive plants

Invasive alien plants such as Japanese Knotweed, Giant Hogweed and Himalayan Balsam are present in many parts of the area. Once well established, these plants pose a significant threat to native flora by dominating riparian habitats. In addition, the sap of Giant Hogweed can pose a significant health risk to human beings. The Agency will seek to control these weeds when carrying out its routine works, but will also undertake specific action to reduce Giant Hogweed infestation.

Additional EC Fisheries Designations

Many of the watercourses in the area are designated as Cyprinid or Salmonid Fisheries under EC Directive (78/659/EEC), reflecting their high water quality status and providing an additional level of protection in this respect. Other rivers in the catchment, often of an equally high water quality, are not designated and do not enjoy this extra protection. We will therefore seek to achieve such designation where appropriate. Likely candidates are Sheinton Brook, Cound Brook, Mor Brook, Borle Brook, Coal Brook, Minsterley Brook, and Claverley Brook.

ISSUE NO: 11	Protection of existing high quality riverine and other wetland habitats		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Prepare Water Level Management Plans for Aqualate Mere, Fernhill Pastures, Marton Pool and Rue Wood Pastures	Env Agency English Nature	Protection of water dependent sites of conservation interest	Limitations on river management practices
Reduce spread and extent of Giant Hogweed in catchment	Env Agency Local Authorities	Protection of native riparian flora. Reduction of health risk associated with this plant	
Seek additional EC fisheries designations on Sheinton, Cound, Mor, Borle, Coal, Minsterley and Claverley Brooks	Env Agency	Improved level of protection for existing fish stocks	

The Old River Bed SSSI at Shrewsbury may be at risk from the proposed Shrewsbury north west relief road. Currently this road development is unlikely to take place during the plan 5 year period, but if brought forward, the Agency will aim to ensure the long term security of the SSSI by seeking appropriate environmental protection measures in the design and construction stages of the works. Other road schemes, such as the proposed Hodnet bypass, which could impact on important wetland sites, will need similar consideration.

Issue 12: Protection of Biodiversity

Background

In pursuance of the Government's commitment to biodiversity conservation, the Agency will be developing targets for species and habitats of conservation concern. These will relate to the targets for key wetland species as identified in the UK Biodiversity Action Plan. We will be the "contact point" for a number of such water-related species and habitats, some of which are detailed below.

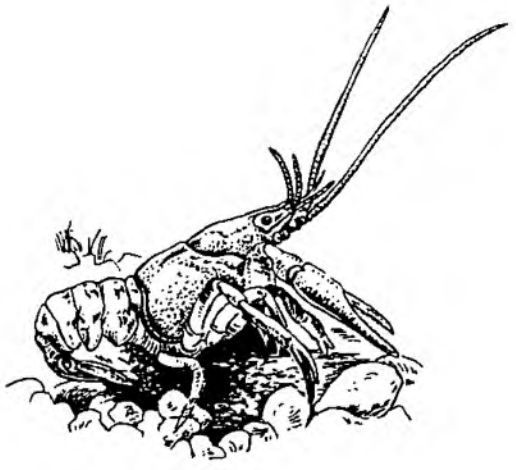
A variety of rare and threatened species and habitats exist in this area, including species notified under Annex II of the European Habitats Directive. We will aim to protect these species, along with the habitats upon which they are dependent.

Mammals

Otters are present in many parts of the catchment and both their numbers and distribution have increased in recent years. Distribution may be restricted around the River Stour confluence, however, as a result of water quality problems. Measures should be taken both to protect existing populations and to encourage their further expansion. Provisions for achieving these aims will be incorporated in all appropriate Agency works.

Water Voles are present throughout the catchment but, in common with many parts of the country, their numbers have significantly declined in recent years. Loss of habitat, predation by mink, pollution and poisoning are all thought to be contributory factors in this decline. There is a need to determine the current status of water vole populations in the area, take action to prevent any further decline and to reverse this trend if possible.

Invertebrates -The native British crayfish is a protected species under the Wildlife and Countryside Act 1981. Crayfish populations are under serious threat of extinction on a national scale. The threat arises principally from the farming of non-native signal crayfish that carry a disease, "crayfish plague", which is invariably fatal to the native species. Once the disease gets into a watercourse the entire population of native crayfish in the river is often eradicated. Within the area, this is known to have occurred in the Dowles Brook. Controls on the introduction of signal crayfish are exercised by MAFF. In order to protect native crayfish, consideration should be given to dissuading potential stockings of alien crayfish species into those parts of the catchment where they are not currently present.



White-clawed Crayfish

MAFF have recently declined to include the River Severn catchment as a 'no go' area for the introduction of alien crayfish species. Reconsideration of this decision may be appropriate on a sub-catchment basis where native species still exist.

The club tailed dragonfly is of particular interest along the River Severn as this area is a national stronghold for this species, although its distribution is patchy. Navigation, riverside grazing, availability of flood plain scrub, dredging and water quality can adversely effect this species and our regulatory powers will be used to help protect it.

Shad and other fish species

Twaite shad, and possibly the extremely rare Allis shad, enter the River Severn to spawn. Diglis Weir at Worcester presently appears to limit the upstream passage of shad to potential spawning areas further upstream, although it is possible that access may occasionally occur via the lock system adjacent to the weir. Their existing distribution and abundance should be protected.

In addition to shad, salmon, bullhead and lamprey are also notified under Annex II of the European Habitats Directive. These species occur within the catchment and require protection.

Trees

The native Black Poplar (*Populus nigra betulifolia*) is one of our rarest native trees, with only 2,500 left in the UK, of which 150 are female.

This magnificent wetland tree had an early demise when neolithic man destroyed floodplain forests. Very little genetic diversity remains and the existing population comprises only mature trees. In order to increase the range and abundance of these trees, there is a need for a careful and sensitive replanting programme.

Alders are a common tree species along many rivers in the area. Alder tree disease (Phytophthora) has appeared in the area in recent years and its potential impact is of great concern. If alders were lost for all or part of the catchment this would have serious consequences for the ecology of rivers and some of the meres, as well as for bank stability. The extent and possible impact of this disease should be investigated and assessed.

Birds

The UK Biodiversity Action Plan identifies many birds of concern in the local context, including the skylark. The Shropshire Biodiversity Challenge have extended local concerns to include barn owls and wading birds, such as lapwing and snipe. The Agency is proposing a number of initiatives which will benefit wading birds (see **Issue 8**) and will also be undertaking a nest box scheme on the River Perry to boost barn owl populations in that area.

ISSUE NO: 12	Protection of Biodiversity		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraint**
Determine the present distribution and status of: water vole, crayfish, freshwater pearl mussel and depressed river mussel, and develop targets for the protection of these species	Env Agency English Nature Wildlife Trusts	Protection of sensitive species	Reliability of survey methodology
Investigate status of shad and opportunities for extension of breeding range	Env Agency	Protection and enhancement of shad populations	
Assess the distribution of alder disease to support Forestry Authority studies	Env Agency	Baseline information to assist Forestry Authority studies into causes and treatment of disease	
Determine the distribution, types and scope for regeneration of black poplars	Env Agency English Nature, Forestry Authority Local Authorities	Protection of Black Poplar trees in catchment	
Implement barn owl nest box scheme on River Perry	Env Agency Hawk & Owl Trust	Increase of Barn Owl populations in degraded habitat	

Issue 13: Protection of Existing Fisheries

Background

The middle reaches of the River Severn provide some of the best coarse fisheries in the country. Fishing for barbel, chub and roach is especially renowned. Bream also provide good sport, especially downstream of Worcester, and virtually all native species of British coarse fish exist in the river. The middle reaches are also an important migratory route for salmon to their main spawning areas in the upper reaches of the river system. Good salmon fisheries exist especially at weirs such as Diglis, Holt, Lincomb and Shrewsbury.

Preservation and protection of these high quality resources is one of the most important fisheries issues in this area.

(i) High quality coarse fish

Protection will be afforded primarily through the use of the Agency's regulatory powers in protecting the quality of the existing river habitat, but additional actions may be required in the following areas:

Illegal removal of fish - reports have been received of thefts of fish, especially barbel, from the river, taken on rod and line. The fish are then believed to be sold on and stocked into other waters. Such practices may cause significant damage to fish stocks, particularly the loss of specimen sized fish. Fishery owners and lessees have redress in law under the Theft Act 1986 to deal with this problem, but current Fisheries Byelaws preclude the Agency from taking action, other than in relation to the subsequent stocking out of such fish which requires Agency consent. A review of byelaws may be appropriate to help deal with this matter

Imbalances in fish populations - anglers have reported very large numbers of pike, a predatory species, in parts of the River Severn, which they consider may be damaging other fish stocks. Zander, an alien species has also appeared in increasing numbers below Worcester, giving rise to similar concerns. The Agency will investigate this alleged problem and consider remedial measures if appropriate.

ISSUE NO: 13 (i)	Protection of high quality coarse fisheries		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Review Fisheries Byelaws to control fish removals from watercourses	Env Agency MAFF	Reduction or prevention of illegal coarse fish removals	
Assess impacts of pike and zander on other fish stocks in the middle reaches of the River Severn and reduce predator biomass where appropriate	Env Agency Angling Clubs Fishery owners	Protection of fish stocks and quality of angling	Possible adverse impacts on predator/prey relationships

In addition to the above actions, the Agency will through its routine work have regard to:

Effects of flow variations on angling - existing licences for water abstraction from the River Severn at Hampton Loade and Trimpley allow for diurnal (night and day) variations in draw-off rates to take advantage of lower cost off-peak electricity charges for pumping.

This can result in significant variations in river flow and levels, which in turn can impact on angling success There are some provisions in existing licences and agreements to mitigate this effect. However, further steps may need to be taken to reduce this impact under the most critical flow conditions.

Maintenance of river flows - flows in the River Severn are topped up during the summer months from regulating reservoirs in the upper reaches (Clywedog and Vyrnwy) and from the Shropshire Groundwater Scheme in order to maintain a specified flow at Bewdley. The operating rules for achieving this objective are currently under review. See **Issue 21** for further information.

The Agency will take full account of fisheries requirements in the middle reaches of the river and its tributaries in reviewing the River Severn flow operating rules.

(ii) Game Fish

In addition to protection of habitats and fish populations through the Agency's regulatory and fishery law enforcement powers, the following measures could help to improve declining stocks:

Salmon

Protection of salmon in vulnerable areas - areas around Diglis and Lincomb weirs where salmon are particularly vulnerable to illegal fishing methods have been fenced off to prevent public access. Fencing at further locations may also be required in order to reduce poaching problems. Similarly, byelaw restrictions on fishing near to weirs currently exist at certain locations and these byelaws should be reviewed for possible application at other problem sites.

Salmon Passes - the construction of new fish passes at Diglis, Holt and Lincomb Weirs could assist the passage of salmon towards their spawning grounds upstream. Salmon passes on the Cound Brook (Cound Mill), River Tern (Walcot Sluices) and River Perry (Mytton Mill) could open up new spawning areas.

Protection of multi-sea-winter stocks - national and international concern exists regarding the decline of the multi-sea-winter component of salmon stocks. Consideration may be needed to regulate fishing methods through byelaw changes in order to protect these valuable fish in the River Severn catchment area.

Monitoring - after almost 20 years of operation the Shrewsbury salmon counter has recently been decommissioned following severe damage through natural causes and vandalism. Refurbishment would re-establish the facility to monitor salmon movements upstream.

Native Brown Trout

Some important native brown trout populations exist in rivers in the catchment area, including the Cound Brook, River Worfe (and tributaries), Upper Tern, Dowles Brook, Mor Brook and Borle Brook. Such populations are a nationally threatened resource, particularly in lowland rivers. In addition to protection of habitats through the Agency's regulatory powers, the following action should be considered:

Stocking policies - control of fish stocking is exercised through the Agency's Section 30 consenting procedures. Stocking of hatchery reared trout may adversely impact on the genetic integrity of local native fish stocks. **The Agency will review its S30 policies for trout** giving particular consideration to discouraging any stocking of trout into pristine situations and to restricting stocking in rivers elsewhere to brown trout only, preferably of local origin and of a size compatible with wild fish.

ISSUE NO: 13 (ii)	Protection of Game Fisheries		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Maintain and improve security provisions at vulnerable locations near weirs on the River Severn	Env Agency	Protection of salmon from illegal fishing methods	Restrictions on access at weirs
Seek funding and plan for future installation of salmon passes on weirs at Diglis, Holt, Lincomb, Cound Mill and Walcot Sluices	Env Agency MAFF	Improved access for salmon to upstream spawning and nursery areas	Costs and reductions in GIA for salmon work
Review byelaws and voluntary restrictions on salmon fishing methods	Env Agency MAFF	Protection of valuable declining multi-sea-winter stock component	Restrictions on fishing opportunities
Seek funding and re-establishment of Shrewsbury salmon counter	Env Agency MAFF	Data to assist long term management of River Severn salmon stocks	Costs and reductions in GIA for salmon work

Low flow problems - Certain water courses in the area suffer from low flow problems which have an adverse impact on native brown trout populations. Further details on low flow problems are given in **Issue 10**.

Issue 14: Protection of High Quality Water Resources

Background

The safeguarding of water quality is fundamental to the management of the water resources within the area. The River Severn and its tributaries are extensively used for drinking water supply, agricultural and industrial abstraction and for a wide range of water based leisure activities. In addition, many communities in the area are supplied with drinking water from groundwater sources.

All of these activities depend on the water being of high quality and the Environment Agency is committed to maintaining and where necessary improving the quality of all water resources in the catchment.

The Agency has an ongoing programme of pollution prevention inspections of major installations within river and borehole catchments. Borehole protection zones currently being drawn up for potable supply boreholes, will enable the Agency to target better pollution prevention visits to these areas. All of the public water supply boreholes within the catchment will be surveyed within 2 years. The philosophy of the Agency is simple: prevention is better than cure.

To provide further protection for the potable water intakes on the River Severn, an assessment will be made as to the benefits of installing automatic water quality monitoring equipment at key points on the catchment. The equipment would be capable of detecting certain types of pollutants and would alert the Agency's 24-hour control room in the event of an incident occurring, allowing for a rapid response by Pollution Control staff and for warnings to be passed to downstream abstractors.

Sections of the wool processing industry are to move to Telford in the near future. Effluents containing pesticides are produced by the industry, being present on wool as a result of the sheep dipping process and from the mothproofing of the finished products. The Agency is to work closely with Severn Trent Water Ltd and the wool processing industry to prevent pesticides entering the River Severn and strict new consent limits for pesticides will be introduced at Coalport sewage treatment works.

ISSUE NO:14	Protection of high quality water resources		
OPTIONS	**Responsibility**	**Benefits**	**Constraints**
Undertake programme of pollution prevention site inspections in catchment and around water supply boreholes	Env Agency Industry Farmers	Protection of existing uses of waters	Limited powers to enforce measures at all sites
Assess the possibility of installing pollution monitoring equipment at points in the catchment	Env Agency	Better detection and response to pollution incidents	Limited range of pollutants detected. Cost
Ensure that pesticides from the wool industry in Telford do not affect the River Severn	Env Agency STW Ltd. Wool Processing Industry	Protection of existing river uses.	

Issue 15: Water Temperature Impact of Shropshire Groundwater Scheme on the Aquatic Habitat

Background

Operational pumping of the Shropshire Groundwater Scheme boreholes helps to regulate flows in the River Severn and the smaller tributaries, the Perry and Tern. Current statutory environmental monitoring activities include soil moisture, groundwater and water quality monitoring. Invertebrate and spot water temperature samples are also taken. No impact has yet been observed on the aquatic habitat in terms of quality or invertebrate numbers or distribution.

However, concern has been raised as to what degree of impact, if any, the cooler groundwater (temperature 9-11°C) has upon the aquatic habitat and its associated species, with average summer water temperatures of between 12 and 20°C.

More detailed temperature profiling studies are therefore required, to quantify the degree and extent to which ambient river temperature is lowered by the discharge of cooler groundwater, and what effect this may have on the fish or invertebrates immediately downstream of the outfalls.

For further information on the Shropshire Groundwater Scheme see Section 2.3.2 and Section 6.2.1.

ISSUE NO: 15	Water temperature impact of Shropshire Groundwater Scheme on the aquatic habitat		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Investigate the extent and impact of temperature changes in receiving watercourses	Env Agency	Protection of fish and invertebrate fauna	Limitations in operational options of scheme

Issue 16: Threats to the Farley Brook, Much Wenlock

Background

Farley Oil Terminal is situated within the hillside above Farley Brook. It houses several vast underground tanks containing liquid waste. Concern has been expressed for a number of year, that the waste could escape should the tanks corrode. The site owners in conjunction with Shropshire County Council are having the waste removed from the tanks and the Agency is to monitor its removal and proper disposal of the waste.

Liquid Landowner Fertiliser is also situated over the Farley Brook which runs under the site in a culvert and is of concern for two reasons:

1. Large amounts of liquid ammonia are stored on the premises as part of their manufacturing process. Concern has been expressed at the occasional elevated ammonia levels in the brook. Additional monitoring will be carried out and improvements made if necessary.

2. Air quality. A number of complaints have been received about air quality in the vicinity. In response to this, additional monitoring of the air will be carried out to see what impact the site may be having on the local air quality.

Much Wenlock sewage treatment works (STW) discharges into the upper reaches of the brook. The sewage overflow at the STW often overflows prematurely and may suffer from a large amount of infiltration water to the sewerage system. A proposal for further housing development in the town could exacerbate the problems and the Agency is to ensure that Severn Trent Water Ltd carry out a thorough analysis of flow patterns in the system and carry out improvement work if necessary.

In addition the Water Company has installed pumps capable of abstracting more water than has been abstracted in the past from its borehole at Much Wenlock. This could reduce the base flows in the Farley Brook which are needed to provide adequate dilution for the sewage treatment plant discharge. The Agency will ensure that a hydrogeological study is undertaken to assess the affects of increasing the abstraction from the borehole. The results of this study will be used in conjunction with the sewerage surveys to ensure the Farley Brook is protected from any adverse effect. Since the area is exempt from licensing control, operating agreements will be sought with Severn Trent Water Ltd.

ISSUE NO: 16	Threats to the Farley Brook, Much Wenlock		
OPTIONS	**Responsibility**	**Benefits**	**Constraints**
Monitor the disposal of liquid waste stored on industrial site	Shrops. CC Env Agency Site Owners	Ensure safe disposal of material	
Assess current and future flows from Much Wenlock STW and their impact on the brook	STW Ltd. Env Agency Local Planning Authority	Integration of development with sewerage improvements	STW not in current AMP programme
Assess the effects of increasing abstraction from Much Wenlock borehole	Env Agency STW Ltd	Protection of brook flow and quality No licensing provisions	Hydrological predictions difficult

Issue 17: Stability in the Ironbridge Gorge Area

Background

At the end of the Ice Age, the River Severn formed Ironbridge Gorge. The existing steep slopes of the gorge are not at their final angle of repose and are therefore unstable. Consequently there are extensive areas of landslip of natural origin marked on geology maps. Mining has added to the problem in certain areas. The industrial heritage of the gorge has also exacerbated the problem with much of the river bank made of tipped material, particularly in the Jackfields area. The instability of the river bank could lead to large quantities of material slipping into the river, which would increase the risk of flooding.

Shropshire County Council, as highway authority, commissioned a report in the 1980s on Lloyds and Jackfields. This recommended further investigation of the geology, land slips and past mine workings.

There is an Inter-Agency Group, of which the Agency and Shropshire County Council are members, which has the role of co-ordinating policies and the management of the Ironbridge World Heritage site. This group has identified the stability of the gorge as a major issue.

ISSUE NO: 17	Stability in the Ironbridge Gorge Area		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Investigate further study situation	Inter- Agency group	Better understanding of the problem. Solution may be determined	Cost of study
Pursue solution	Inter- Agency group	Gorge becomes more stable, risks to rivers and roads reduced	Cost of works and possible adverse environmental effects

Issue 18: Flood Alleviation Schemes

Background

Within the area there are numerous flooding problems, which have been identified in Table 18 Section 6.2.2. However, at very few of these locations will it be technically, economically and environmentally feasible to construct a flood alleviation scheme to improve the situation. In some areas, it may be feasible to construct a scheme, but the Agency will listen to public opinion, if they do not want one. If flood alleviation schemes are not possible, then it is even more important to control further development in these flood risk areas, to ensure that existing flooding problems both there and elsewhere are not made worse.

A potential flood alleviation scheme for Shrewsbury has now been removed from the Agency's long term plan of capital schemes, due to lack of Local Authority and public support. Similarly at Bewdley, the majority of people consulted supported a "do nothing" approach.

In the Diglis area of Worcester, residents suffer fairly frequent flooding and the Agency is continuing to gather information on high flow levels in order to further evaluate the viability of a potential flood alleviation scheme.

ISSUE NO: 18	Flood alleviation schemes		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Evaluate flood alleviation scheme for the Diglis area of Worcester	Env Agency	Potential for alleviation of flooding problem	High river level data required Costs of the works are currently assessed to be higher than the benefits.

3.4. Opportunities for sustainable development

Issues 19 to 22 focus on development and management of our environmental resources and the potential for further development opportunities.

Issue 19: Opportunities for Amenity, Recreation and Navigation

Background

The middle reaches of the River Severn are extensively used for recreational activities, including various types of boating, angling and riverside walking. There is scope for further recreational developments, although care is needed to avoid conflict between different user groups and to take appropriate account of potential environmental impacts.

Riverside access

A long-distance riverside footpath, the Severn Way, has recently been completed through the middle Severn catchment. There is now a need to promote and market this facility and to encourage the development of further walks to link in with it.

Under-utilisation of river assets in some urban areas

There is a perceived under-utilisation of river facilities in Shrewsbury and to a lesser extent at Worcester. Hereford & Worcester County Council and Worcester City Council are actively promoting increased use of the river environment, but a recent joint bid with British Waterways for millennium funding has unfortunately failed. Part of the bid, the Quayside project, may be pursued again in the near future. Shrewsbury & Atcham Borough Council and other local groups have also expressed an interest in developing river assets through the town.

The Sports Council, together with Worcester Rowing Club, is seeking to establish a regional rowing centre at Pitchcroft, Worcester for training, competition and coaching purposes.

Lack of facilities for disabled people

Although facilities do exist in some areas for disabled visitors, *eg* Ellesmere and Telford Town Pools, there is considerable scope for agencies to work collaboratively in promoting and developing further provisions along rivers, canals, stillwaters and wetlands in the area.

Proposals for increased navigation on the River Severn

The Severn Navigation Restoration Trust (SNRT) has been set up in recent years with the stated aim of establishing more extensive navigation on the River Severn from Stourport upstream, ultimately to Pool Quay near Welshpool. SNRT have proposed that this could be achieved by the construction of a number of weirs and locks at appropriate intervals along the river to maintain a minimum water depth for cruising boats. There has been some initial debate but no firm detail have been submitted regarding these proposals. Significant concerns have been expressed on conservation impacts, changes to river regimes and possible conflicts with existing river users. SNRT claim, however, that such a scheme would boost the local economy through increased tourism, leisure activities and job creation. Any formal proposals to proceed with the Trust's aims would require legislative authorisation and would need to satisfactorily address the environmental issues associated with the river character and the river use changes which would occur.

Droitwich Canal restoration

Wychavon District Council have plans to restore navigation on the Droitwich Canal from its junction with the River Severn to its existing connection with the Worcester/Birmingham Canal. Much of the canal is currently derelict, lengths are dry and built over, and most of the locks are inoperative. Some restoration work has already been undertaken by the Droitwich Canal Trust but further extensive reconstruction work is required to meet the Council's aims.

ISSUE NO: 19	Opportunities for amenity, recreation and navigation		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Implement marketing and promotion strategy for the Severn Way footpath	Local Authorities Env Agency	Increased use of facility. Economic 'spin offs'	
Seek opportunities for increased recreational and amenity use of rivers in urban areas (*e.g.* Worcester and Shrewsbury)	Env Agency Local Authorities	Increased public access and enjoyment of river environments	Possible impacts on environ-mental interests and conflicts with existing users
Develop regional rowing centre on R.Severn at Worcester	Sports Council Worcester Rowing Club	Training, competition and coaching facility	as above
Seek opportunities for better access to and use of watercourses by disabled persons (*e.g.* Upton Warren and Telford Town Lakes)	Env Agency Local Authorities Sports Council	Improved facilities for disabled users	
Undertake River Habitat Surveys of middle reaches of the River Severn	Env Agency	Improved information on river conservation value and potential impact of navigation proposals	Conflicts of interests between different user groups
Develop an Agency Navigation Strategy for the River Severn	Env Agency British Water-ways	Protection of interests of all river users	Funding Acquisition of land
Restore the Droitwich Canal navigation	Wychavon DC Hereford and Worcester CC	Navigation link between Birmingham & Worcester Canal and the River Severn	Cost impacts on possible environmental interests
Update and reprint the River Severn canoe guide	Env Agency British Canoe Union	Public awareness of available facilities and safety issues	

Issue 20: The Management of Industrial and Commercial Wastes

Background

Waste is often given low priority by companies who do not quantify how much waste is being produced, from which process(es) and why. Waste management by companies has tended to concentrate on how to handle waste once it has been produced. Waste minimisation is a method of reducing or eliminating wastes at source or finding ways to re-use unavoidable wastes. It is the best way the environmental impact of waste can be reduced and has the added benefit of reducing a company's production and disposal costs.

Waste minimisation can be achieved by industry through the design of processes and the selection of raw materials which produce less initial waste or a waste which is less environmentally damaging; by using less packaging and by considering the environmental impact of the product and its packaging and its potential for post consumer recycling. Opportunities for waste minimisation may occur at all stages in the development, production, marketing and use of products.

Recent legislation aims to ensure that some of the environmental costs of waste production and disposal are borne directly by the producers of that waste. For example wastes sent to landfill for disposal are now subject to a tax; fees have been introduced for the movement of special *(i.e.* hazardous) wastes and from 1998 companies above certain thresholds will be required to recover and recycle a certain proportion of packaging waste. Increasing costs will make waste minimisation, re-use and recycling more attractive waste management options to companies.

However there are barriers which prevent companies from starting a waste minimisation programme; these barriers can be cultural, technical or in the case of small to medium sized companies may be due to a lack of staff resource or expertise. In order to overcome these barriers a local Waste Minimisation Group for businesses was set up in Hereford & Worcester to provide companies with assistance in undertaking a waste minimisation programme (see Section 4.2.2 for further details).

ISSUE NO: 20	The management of Industrial and Commercial Wastes		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Expand the Waste Minimisation Initiative to cover the plan area	Env Agency and partners	Reduced commercial and industrial waste arisings, increased environmental awareness	Process of culture change within companies is a slow process. Resources

Issue 21: River Severn Control Rules

Background

Rules for regulating the flow of the River Severn were first established in the Clywedog Reservoir Joint Authority Act of 1963 which authorised construction of Clywedog reservoir, the flows to be maintained in the River Severn and in Afon Clywedog downstream of the dam, maximum winter water levels within the reservoir (for flood retention purposes) and, lastly, increased abstractions from the river for public water supply and power generation.

The rules were updated in 1979/1980 following operational experience during the 1975/6 drought. The updates took account of the need for an increased maintained flow at the Bewdley control point, the use of a water bank for compensation water from Lake Vyrnwy and the authorisation of the Shropshire Groundwater Scheme to support future development of the River Severn water resources system. Further operational experience during the droughts of 1984, 1989, 1990, 1995 and 1996 has enabled procedural refinements to be introduced so that increases in operating efficiency can be made.

A review of the adequacy of the current rules to meet present and future needs has been underway by the former NRA and later the Agency during the period 1990 to date. The review has identified several alternative ways of managing river flows in the future and these alternatives have been modelled on computer to predict the impact of various options on storage and river conditions.

A list of options is being drawn up to form the basis for external consultation. The options will take account of the local needs in the upper reaches and the requirement for fresh water input to the estuary. The long term framework will incorporate provisions to take account of short term changes in the river environment.

ISSUE NO: 21	River Severn Control Rules		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Review and reassess Control Rules.	Env Agency	Potential for: i) increased operational efficiency provided by local control points in the upper and lower catchment. ii) habitat improvement iii) Opportunity to review the scope and use of the river.	i)Residual flow required to the estuary; to maintain abstracted water quality at Gloucester and to enable the passage of migratory fish. ii) flow requirements for effluent dilution and water abstraction. iii) change in legal statute may be required

Issue 22: Floodplain Management

Background

Parts of Shrewsbury, Ironbridge, Bridgnorth and Bewdley, and the City of Worcester are at risk of flooding from the River Severn and there is pressure to further develop the floodplain. An example is the proposed theatre at Frankwell Quay, Shrewsbury. There are also other areas where pressure to develop land within the floodplain is present, particularly on the River Perry at Gobowen, the River Roden at Wem, the River Severn at Bridgnorth, and the River Severn at Stourport. The Agency has the objective to ensure that development should not take place which has an unacceptable risk of flooding and that the development should not create or exacerbate flooding elsewhere.

The Agency published in March 1997 the document *"Policy and Practice for the Protection of Floodplains"*. It reinforces and compliments current Government guidance on flood risk issues in relation to development planning. It contains guidance for Local Authorities on policies to adopt in local plans for the protection of floodplains. We will actively encourage the adoption of these policies.

An example of a forward looking approach by a planning authority, is the *"Policy for the Control of Development Within the Floodplain of the River Severn"*, produced by Worcester City Council, in association with the former National Rivers Authority. This policy was approved and adopted on 8th September 1992 as part of the Worcester City Local Plan, and central to its operation is the concept of long term strategic withdrawal from the floodplain, in areas of existing or previously existing floodplain flow. The Environment Agency wishes to build on the success of this policy and to encourage other planning authorities to introduce similar strategic withdrawal policies elsewhere.

ISSUE NO: 22	Floodplain management		
OPTIONS/ACTIONS	**Responsibility**	**Benefits**	**Constraints**
Press for the policies in the Agency document *"Policy and practice for the Protection of floodplains"* to be included in Local Plans to protect floodplain from development.	Env Agency Local Planning Authority	New properties do not flood, existing problems not aggravated. Minimises risk to people and property	Limitation of developable land
Persuade Local Authorities that long term strategic withdrawal from the flood plain is the only sustainable option.	Env Agency Local Planning Authority Riparian Owners	Alleviation of existing flooding. The floodplain can be used for recreation, wildlife and amenity	Policy can only be applied when the opportunity arises. Costs of relocation. Riverside frontage is attractive to landowners

Section 4 Protection through Partnership

This Section highlights the need to work together, if we are to make any lasting environmental improvements to the Middle Severn area. As all aspects of the environment interrelate we must seek to manage the environment as a whole. This can be achieved through partnerships.

4.0 Introduction
4.1 Land Use Planning
4.2 Partnerships with other groups
4.3 Education

4.0 Introduction

Our natural environment is complex. Even where we do have a good understanding of a particular element of the environment, what is often much less clear is how it interacts with all other aspects of the local, regional, national and global environment. It is becoming clear that even local environmental impacts can have knock on effects on other parts of the environment. It is this kind of understanding that led to the Rio Earth Summit in 1992, the adoption of Sustainable Development principles and the commitment to manage the environment in an integrated way through partnership, (see Section 1.3).

Partnerships will enable the key objectives and the long term vision of the plan to be realised; they will provide local accountability as well as the financial need to pool limited resources. This plan discusses a number of issues, which to progress will involve the joint action of a number of organisations and individuals within the Agency. These include the relevant Local Authorities, Water Utility Companies, English Nature, MAFF, Countryside Commission, Landowners, Commercial Companies, River User Groups and Conservation Groups.

The Agency is well placed to influence many of the activities affecting the environment through legislation. However, achieving environmental improvement often depends on co-operation between the Agency and others. The 1990 Government White Paper *"This Common Inheritance"* recognised the need for such co-operation when discussing the overlapping responsibilities of Local Planning Authorities and environmental enforcement agencies. Subsequent international agreements and Government guidance have further established this process.

4.1 Land Use Planning

4.1.1 Planning Liaison

Town and Country Planning undertaken by Local Planning Authorities (LPAs) is the usual means for determining changes in land use. This is carried out through development plans and the implementation of development control by the LPAs. As planning decisions can have a significant impact on the environment, it is important that the Agency contributes to the process where appropriate.

A considerable range of statutory and non-statutory planning consultations are received by the Agency from LPAs, enabling the relevant planning committee to consider the Agency's views in determining the application. Guidance regarding the applications the Agency would wish to see is contained in the former NRA's publications *"Planning Liaison with Local Planning Authorities"* (NRA November 1993) and *"Planning Liaison with Local Authorities"* (HMIP August 1995). Additional information including Waste Regulation criteria was also disseminated to the LPAs via letters and seminars in Spring 1996. This guidance has recently been updated as a single Agency publication, *"Environment Agency Liaison with Local Authorities"* (March 1997).

4.1.2 Local Planning Guidance

Development plans are particularly important as they set the framework for development into the future and are a key matter in determination of planning applications. As a statutory consultee in the development plan process, we welcome the opportunity this offers to join the LPAs in promoting sustainable development. To provide a guide to LPAs on what water environment protection policies should be included in development plans and why they are important, the former NRA published *"Guidance Notes for Local Planning Authorities on the Methods of Protecting the Water Environment Through Development Plans"* (NRA January 1994). A replacement publication containing additional guidance to reflect the Agency's air and waste responsibilities is programmed.

LEAPs, in addition to providing a vision for the future, set out problems, issues and actions within the plan area, providing an important source of information to LPAs. This is recognised in RPG 11 *"Regional Planning Guidance for the West Midlands"* (Government Office for the West Midlands September 1995), which indicates that LEAPs (as successors to Catchment Management Plans) should also be taken into consideration by LPAs when preparing Development Plans. Similarly, the Agency considers Development Plans and liaises with LPAs when preparing LEAPs. Section 5.1 Table 3 shows the current status of Local Development Plans in the area.

4.1.3 Planning Guidance Issue Statements

The following statements relate to issues raised in the LEAP (Section 3) and to other areas of concern which will also require support of our Local Planning Authorities to seek a solution. It is hoped that comments will be received from the Local Authorities during the consultation stage, so that guidance policy statements can be agreed with them. These will then be incorporated into the Action Plan.

Issue Statement	Relevant Example	Specific Policy
MS/LUS 1 The Agency will encourage all local authorities to adopt a precautionary approach to development which might affect the environment in this high quality area. The environmental effects of development should be considered so as to minimise adverse impacts and maximise potential benefits. In particular, opportunities should be taken to encourage developers and others to include environmental enhancements, *e.g.* integration of existing watercourses and wetland habitats, as part of development wherever appropriate.	Carmichael Works redevelopment, Worcester Shrewsbury North-West Relief Road Pools at Loynton Fishery	RPG11 paras 3.1, 3.4 & 12.1 Shropshire County Structure Plan Policy 2/15 North Shropshire Local Plan Policy D.21
MS/LUS 2 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. Many smaller villages and some larger settlements in the area have inadequate sewerage facilities or no sewerage provision at all. In the case of proposals producing effluent/waste, it should be established that there is an adequate means of disposal.	Development Sites in Much Wenlock Infill proposals in Allscott Intensive Livestock Units	Hereford and Worcester Structure Plan Policies CTC.9 & A.5 Wrekin Local Plan Policy EH2
MS/LUS 3 Full account needs to be taken of the availability of water resources and provision of water supplies in considering the location and extent of significant new developments. The key issues are quantity, location, and source (*i.e.* surface water or groundwater) of abstractions and the need to maintain aquifer recharge. There is a limited availability of water resources to support surface water abstractions during the summer, and groundwater resources are generally very limited in the west. Measures to maintain aquifer recharge and minimise waste through leakage control and demand management are supported. The Water Companies are encouraged to meet current and increased demands in an environmentally sustainable manner.	Area excluded from Green Belt to the east of Shifnal Urbanisation to north of Telford Development in areas relying on abstractions from Category A Groundwater Units as shown in Table 13	RPG11 paras 12.18, 12.19 & 12.20 Shropshire Structure Plan Policy 2/1 Bromsgrove District Local Plan Policy ES4 Wrekin Local Plan Policy NR4
MS/LUS 4 The conservation, fisheries, landscape, heritage/archaeological and recreational value of watercourse corridors needs to be protected and enhanced. This includes protection under conservation legislation such as designation of AONBs, ESAs, SSSIs, SAMs etc, and guidelines such as those produced by the Forestry Authority. It also involves prevention of soil erosion by inappropriate riverside land use and the consideration of increased flood risk. The value of buffer zones and sensitive riparian management is recognised.	Ironbridge Gorge Wesley Brook through Shifnal River Tern at Maer River Salwarp at Droitwich	RPG11 para 12.22. Staffordshire Structure Plan Policy 87 Bridgnorth Local Plan Policy D3

Issue Statement	Relevant Example	Specific Policy
MS/LUS 5 The flood plains of rivers and watercourses in the catchment need safeguarding from encroachment by development. The River Severn and its tributaries are naturally prone to regular flooding. Where appropriate, changes in land use leading to a reduction in life and property at risk of flood will be sought, also benefitting wetland restoration by relaxing current levels of flood protection. Additionally it must be ensured that development does not exacerbate flooding elsewhere from the effects of the additional rate of runoff. To address this problem, use of source control will be encouraged.	Rugby Club site, Droitwich Frankwell Opportunity Area, Shrewsbury Barbourne Water Treatment Works Redevelopment, Worcester	RPG11 para 12.24 North Shropshire Local Plan Policy D.4 Worcester City Local Plan Policies NE15, NE16, NE17 & NE18
MS/LUS 6 The management of contaminated land sites is raised as an issue in the LEAP. There are a number of ex-industrial, waste disposal and old mine working sites where pollution problems occur, or have potential to occur. The management of waste disposal sites must give due care to the protection of the environment from pollution in their construction, operation and aftercare. This would involve the management of runoff, leachate and air born litter. Proposals for restoration of worked-out mineral sites can present opportunities for environmental enhancement, including features of historic interest, and should be encouraged.	Gasworks Site, Shrewsbury Granville Waste Disposal Site, Telford Snailbeach Lead Mines Ex-Dairy Site, Ellesmere	PPG23 Sections 4 & 5 and Annex 10 Shropshire Structure Plan Policies 2/99, 1/102, 2/104 & 2/106 Wyre Forest District Local Plan Policy EP.6
MS/LUS 8 To promote a pattern of development and use which is more sustainable opportunities for recycling, waste minimisation and energy conservation must be promoted. Examples such as aggregate re-use, reclaiming of base materials in production processes, facilities enabling recycling of materials and promotion of energy saving construction and production process would reduce demand on primary resources, waste disposal facilities, landfill, etc.	Use of recycled aggregates in road and general construction Provision of recycling facilities in appropriate locations	Staffordshire Structure Plan Policy 148 Wrekin Local Plan Policies NR3 & NR6

4.2 Partnerships with other groups

There are a number of joint initiatives with Local Authorities and other groups that have already been undertaken or are in progress. Examples are highlighted below.

4.2.1 Local Agenda 21

Sustainable development was given added impetus when the UK and other governments signed up to Agenda 21 at the United Nations Conference on Environment and Development held in Rio de Janeiro, 1992. This is an environmental action plan for the next century, which recognises the central role of local authorities, the value of partnerships and the Local Community in achieving sustainable development. This is also highlighted in the Agency's guidance on Sustainable Development (November 1996).

One of the most progressive things about Agenda 21 is that it recognises that action by National Governments alone is not enough and that all groups - civic, community, business and industrial have to be involved to bring about change. Thus, local authorities were to have undertaken a consultative process with their population and achieved a Local Agenda 21 for their community by 1996. This has been done in Hereford & Worcester - a Local Agenda 21 Action Plan has been drawn-up, and working groups have been established to implement the actions identified. The same process is underway in Shropshire, with Wrekin District in particular being well advanced in developing their District Environmental Strategy. This involves some 200 individuals, groups and organisations, including the Agency, participating in their programme. As members of these working groups, we will advise, provide information and facilitate action where practical.

4.2.2 Hereford and Worcester Waste Minimisation Group:

An initiative of partnership between the County Council, Hereford & Worcester Business Link, Beacon Waste Ltd and Hyder PLC, the Hereford & Worcester Waste Minimisation Group was set up for local businesses in February 1996 to encourage waste minimisation and good environmental management practice. The role of the County Council in the Group has now been taken over by the Agency.

The Group's main aim is to reduce the environmental impact of local businesses by:

* Promoting the efficient use of resources.

* Demonstrating the benefits of waste minimisation.

* Achieving reductions in waste arisings of the participating companies.

* Disseminating locally the results achieved through the Group.

* Encouraging companies to develop their own environmental policies.

The Group has a membership of 44 companies including small, medium and large companies in both the manufacturing and commercial sectors. The emphasis of the Group is on 'helping companies to help themselves'. Regular meetings are held at which training in waste minimisation methodology is provided and guest speakers give presentations on specific subjects such as recycling, energy and environmental legislation. The meetings also provide an opportunity for companies to exchange ideas and information between themselves. For background as to why the Group was set-up see Section 3 **Issue 20**.

4.2.3 Oil Care Campaign

Waste oil can cause pollution to land and water through soil contamination and leaching into groundwater or rivers. In an effort to promote best practices for oil disposal, the Agency has funded a variety of campaigns to encourage people to take their waste oil to designated centres for recycling or proper disposal. Within the plan area the district authorities have been proactive in providing oil banks for the safe disposal of waste oil. We are also working with Shell to ensure that distributors are aware of the problems that leakage from petrol stations can cause.

4.2.4 Shropshire Biodiversity Group

This group was set up by Shropshire County Council as a county-wide response to the UK Biodiversity Strategy (see Section 1.4). The working group includes the Agency, Local Authorities, English Nature, Shropshire Wildlife Trust and voluntary bodies whose aim to conserve and enhance biological diversity in the county in order to contribute to overall global biodiversity. They have set objectives and targets for individual species within their action plan 'Biodiversity Challenge'. The Agency is committed to this challenge.

4.2.5 Other Conservation and Recreation Collaborative Projects

Some of the projects currently being undertaken in the area are shown below:

* Severn Way footpath.

* Severn Valley Wetlands Project: Venus Pool and other proposed wetland conservation areas (Brown Mss and Colemere).

* Black Poplar Trees.

* Facilities for disabled anglers exist at Homer Lake and Dandy Pools - Telford.

* Facilities for disabled visitors - Shropshire (Albrighton Moat)

* Ironbridge Visitor Centre Refurbishment Project.

These projects are joint ventures by a number of organisations which include: Countryside Commission, English Nature, Wildlife trusts, Shropshire Ornithological Society, Forestry Commission, Bees and Trees Charity, Sports Council and Local Authorities.

Other areas of work that are dependent on a partnership approach include:

* Landscape and Cultural Heritage.

As many of the designations applied to landscape, historical or archaeological sites are non-statutory, the Agency has to work in partnership with Local Authorities, Countryside Commission, Countryside Council of Wales (CCW), English Heritage and Cadw to protect them.

It is important that the Agency is aware that many archaeological and historical sites and remains are at risk because they are undiscovered. The Agency's conservation staff are aware of the need to take advice from the archaeological community in understanding it's own works and in and granting consents for works.

4.3 Education

The Environment Agency sees education as an important part of its work. In many cases a lack of information and awareness is one of the factors which leads to environmental damage or neglect whether it be accidental or deliberate. There is a need for a greater level of educational involvement by the Agency and a need to raise awareness of environmental issues. The Agency has recently published its education strategy "Green Shoots" which considers environmental education into the next century.

Our goals are to:

* Build positive partnerships through consultation, joint ventures and sponsorship.

* Help educate young people through teaching aids and other initiatives.

* Improve understanding of environmental issues, through links with education, work placements and an awards scheme.

* Work with industry and produce marketing campaigns to promote prevention of pollution rather than its remediation.

* Foster public awareness of environmental issues to encourage responsibility for the environment and its challenges.

* Build on established and create new international relationships to further sustainable development.

The production of this LEAP and the summary leaflet that goes with it is one step towards increasing the accessibility of information about the local environment. However more needs to be done to raise awareness of the existence and importance of issues facing our local environment. We all have a role to play in making this happen.

PART II SUPPORTING INFORMATION

Part 2 of this report gives the reader information on the activities and uses which impact on the local environment. The current status of the area is compared with the targets and objectives. This is how some of the Issues in section 3 were raised.

Part 2

* **Section 5 Uses and Activities**
* **Section 6 State of the Environment**
* **Appendices**

Section 5 Uses, Activities and Pressures

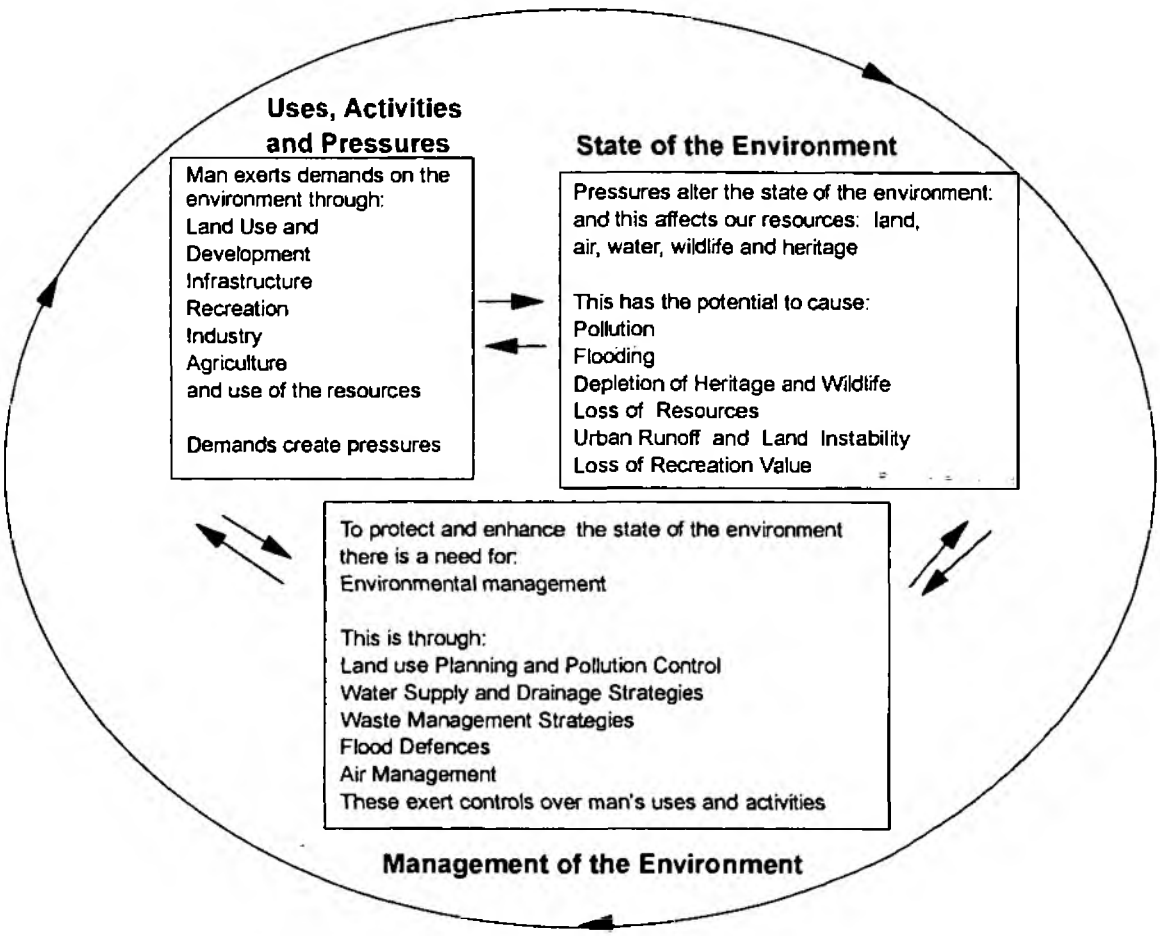
This section details the uses of and activities in the area. A general description of the nature of the Agency's responsibility is given followed by the local perspective.

National and European legislation impacts on the environment and on the activities of the Agency. Appendix 4 lists the legislation that has the greatest impact.

5.0 Introduction

Human activities exert pressures on the environment and change its state in terms of its quality and its stocks of natural resources. If we are to make good management decisions about the environment we need information on the uses and activities that are carried out in the area. This will enable us to consider the pressures that these activities exert on our natural resources.

Figure 5 Environment management



5.1 Development and Infrastructure

General

Development, be it new building works, changes in land use, development of unications and the construction of new roads, sewers and other services can have a major impact on the environment. Whilst the Agency has a responsibility to protect the environment, to achieve this aim it must work closely with Local Planning Authorities (LPAs).

An important objective of this LEAP is to provide LPAs with a clear picture of the Agency's responsibilities and policies towards development in this area, so that those interests can be taken into account by LPAs in Development Plans. The Agency has recently published *"The Environment Agency liaison with Local Authorities"*. It has been developed to cover our new duties and to include development plan consultations and planning applications, together with other planning related matters where the Agency can help and work jointly with the LPAs. The former NRA, produced a series of Guidance notes for LPAs that outline methods of protecting the water environment through development plans..

Local perspective

The counties of Shropshire, Hereford and Worcester account for 92% of the plan. The Map on the inside front cover shows the administrative boundaries and main infrastructure within the area.

The principal urban areas are Telford, Shrewsbury, Worcester, Bromsgrove and Droitwich. Shrewsbury is a major centre for employment, commerce and tourism. Telford is a new town and the major industrial centre of the county of Shropshire. It has seen a rapid growth in industrial development in recent years and this is still continuing at a reduced rate. The City of Worcester has a high proportion of employees within the commercial sector as well as a range of industries including china, porcelain, food and packaging. Many new industries have been attracted to the Bromsgrove area and Droitwich.

In rural areas industry is related to agriculture with processes such as milling, milk processing, meat curing, poultry, fruit processing and agricultural engineering providing employment in many of the smaller towns. The employment structure within both Shropshire and Hereford & Worcester is biased towards the service sector. The 1991 Census of Employment showed 65.4% of the total workforce in Hereford & Worcester to be employed in the service sector and 62% in Shropshire. The counties also have a high dependence on the manufacturing sector, 28% in Shropshire and 25.5% in Hereford & Worcester compared to 21% nationally.

The number of manufacturing jobs has increased significantly in Shropshire in recent years, yet in Hereford & Worcester there has been a decrease following a regional and national trend.

Around 15% of the plan area now benefits from designation by the European Commission as eligible for Objective 2 and 5b assistance. This status results in EC sources being available to overcome problems facing urban regeneration, the rural economy and to assist development. Within the Marches, resources will be targeted towards economic and business development and diversification, tourism, farm-related development, local communities and the environment. An objective of these programmes is to ensure all measures assisted respect the principles of sustainable development.

Current structure plans for Hereford & Worcester and Shropshire envisage around 30,000 new homes in the Middle Severn Area within Hereford & Worcester county and around 30,000 new homes in this part of Shropshire. The recent Government Consultation document *"Where shall we live"* (November 1996), highlights the potential problems of accommodating our need for new housing. It indicates that the West Midlands as a whole will need 367 000 new households by 2016.

The best location for this new development is likely to be a matter for debate and the Agency wants to make sure that new development does not worsen existing pressure points, or risk creating more problems where existing infrastructure is limited and possibly in other towns where infrastructure is near capacity (*e.g.* Newport).

The plan area has major transport corridors associated with the M54/A5 road and rail corridor in the north and with the M5 and routes to the West Midlands to the south. Trunk routes such as the A49 and A41 also carry much heavy traffic through the area.

Table 3 Current Status of the Local Authority Development Plans in the area.

Local Authority	Percentage of Plan Area	Population Estimated in Plan area	Development Plans and Current Status
Shropshire County Council	76.7	327 408	Shropshire County Structure Plan 1989 - 2006 operative January 1993. Review commenced, Public Consultation Draft due Spring 1997. Shropshire Minerals Local Plan - Deposit Draft April 1996, Public Inquiry due June 1997. Shropshire Waste Local Plan - Consultation draft due 1997.
North Shropshire District Council	20.2	41 470	North Shropshire Local Plan 1991 - 2001 adopted August 1996.
Bridgnorth District Council	19.8	45 404	Bridgnorth District Local Plan adopted September 1994. Review commenced.
Shrewsbury & Atcham Borough Council	19.6	89 372	Shrewsbury and Atcham Rural Area Local Plan adopted June 1992. Shrewsbury and Atcham Borough Local Plan - Consultation Draft February 1995, Deposit Draft due Summer 1997, Public Inquiry due 1998.
The Wrekin District Council	11.3	139 516	Wrekin Local Plan Deposit Draft February 1996, Public Inquiry February 1997.
South Shropshire District Council	3.0	4 158	South Shropshire Local Plan adopted October 1994. Review commenced, Consultation Draft due Spring 1997.
Oswestry Borough Council	2.9	7 578	Oswestry Rural Area Local Plan adopted 1991. Oswestry Borough Local Plan - Deposit Draft May 1996, Public Inquiry April 1997.
Hereford & Worcester County Council	15.7	167 524	Hereford and Worcester County Structure Plan 1986 - 2001, Second Alteration operative March 1993, Review commenced, having regard to LG Reorganisation. County Minerals Local Plan - Deposit Draft September 1991, Inspector's report from second Public Inquiry August 1996, adoption due April 1997. Waste Local Plan commenced, having regard to LG Reorganisation.
Wychavon District Council	5.4	31 815	Wychavon District Local Plan - Deposit Draft 1992, Modifications following Inspector's Report November 1995, Second Public Inquiry due early 1997.
Wyre Forest District Council	3.9	20 322	Wyre Forest District Local Plan adopted May 1996.
Bromsgrove District Council	2.7	44 359	Bromsgrove District Local Plan - Deposit Draft November 1993, Inspector's report following Public Inquiry February 1997.

Local Authority	Percentage of Plan Area	Population Estimated in Plan Area	Development Plans and Current Status
Malvern Hills District Council	2.5	4 325	Malvern Hills District Local Plan - Deposit Draft June 1994, Inspector's report following Public Inquiry September 1996.
Worcester City Council	1.0	66 623	Worcester City Local Plan - Deposit Draft September 1994, Inspector's report following Public Inquiry September 1996.
Leominster District Council	<1	80	Leominster District Local Plan - Deposit Draft February 1996, Public Inquiry April 1997.
Staffordshire County Council	6.9	10 783	Replacement Staffordshire Structure Plan 1986 - 2001 operative April 1991, review commenced. Staffordshire Aggregates Local Plan, proposed adoption Draft October 1995. Staffordshire Minerals Local Plan, consultation process commenced. Staffordshire Waste local Plan - Consultation Draft due spring 1997.
Stafford Borough Council	3.0	2 990	Stafford Borough Local Plan - Deposit Draft 1993, Public Inquiry concluded August 1995, Inspector's Report due January 1997.
Newcastle Borough Council	2.1	4 390	Newcastle-under-Lyme Borough Local Plan adopted May 1995.
South Staffordshire District Council	1.7	3 403	South Staffordshire District Local Plan adopted December 1996.
Wrexham County Borough	<1	299	Clwyd County Council Structure Plan (1986 - 2006) Second Alteration Deposit Draft April; 1995, Proposed Changes January 1996. Wrexham Maelor Local Plan adopted February 1996. Work commenced on Unitary Plan.
Powys County - Montgomeryshire	<1	220	Powys County Structure Plan (Replacement,1991-2006) adopted February 1996. Powys Minerals Local Plan adopted March 1995. Montgomeryshire Local Plan (including waste policies) - Deposit Draft October 1995, Public Local Inquiry September 1996.

5.2 HeavyIndustry

General

Industrial processes regulated under the Environmental Protection Act 1990 are regulated either by the Agency or by the relevant Local Authority. In general the Agency is responsible for regulating those processes having the greatest potential to cause pollution.

Local Perspective

There are 12 sites having authorisations under the Environmental Protection Act 1990 operating a range of processes from combustion to aluminium recovery to chemical manufacture. Some sites have more than one authorisation reflecting the fact that more than one authorised process is operated. Some of the companies operating these processes include British Sugar, PolymerLatex and Eastern Merchant Generation Ltd.

All companies operating authorised processes undertake specific programmes of work to improve the way in which the process is operated; the overall objective of this is to reduce both the potential and the actual emissions from the process to all media. Such improvement programmes are agreed between the Agency and the company, and very often the cost of completing work needed to achieve the required improvement is very high. In view of this, much of the work is scrutinised by both the Agency and the company in order to estimate the cost of the work in relation to the environmental benefit that will be gained from it.

Table 4 and Map 13 show the companies that operate processes regulated under Integrated Pollution Control (IPC) in the LEAP area. Also shown are the main pollutants discharged from the processes. Each of these companies has undergone its own improvement programme many of which have required the company to calculate the concentrations in the air of substances, emitted from the process, using complex computer models.

Table 4 IPC sites in the Middle Severn Area

Company	Type of Process(es) Operated	Pollutants Discharged
Dussek Cambell Ltd, Market Drayton, Shropshire	Manufacture polymers	Air:- volatile organic compounds
British Sugar, Alscott, Telford, Shropshire	Sulphur burner & Lime Kiln	Air:- sulphur dioxide, dust, carbon monoxide
Agropharm, Overley, Telford, Shropshire	Manufacture pesticides	Air:- volatile organic compounds
Ricoh (UK) Products Ltd, Telford, Shropshire	Manufacture photosensitive drums for use in photocopiers	Air:- volatile organic compounds, metals
Macdermid GB Ltd, Telford, Shropshire	Dilution of hyrdrochloric acid	Air:- hydrogen chloride
Telford Extrusions Ltd, Telford, Shropshire	Manufacture of U-PVC for use in window profiles	Air:- dust, metals, volatile organic compounds Sewer:- cadmium, metals
Eastern Merchant Generation Plc, Ironbridge Power Station, Shropshire	Coal-fired Power Station	Air:- sulphur and nitrogen oxides, dust, hydrogen chloride Water:- cooling water
Landowner Liquid Fertilisers Ltd, Much Wenlock, Shropshire	Manufacture fertilisers	Air:- ammonia Water:- ammoniacal nitrogen
Lawson Mardon Star Ltd, Bridgnorth, Shropshire	Recovery of Aluminium	Air:- sulphur and nitrogen oxides, hydrogen fluoride, hydrogen chloride, volatile organic compounds, heavy metals, carbon monoxide, dioxins
Orcol Fuels Ltd, Stourport, Hereford & Worcester	Recovery of lubricating oil	Air:- volatile organic compounds, sulphur and nitrogen oxides, dust, amines Sewer:- 1,2 Dichloroethane, cadmium, PCBs, hexachlorobenzene, hexachlorobutadiene
Polymerlatex, Bromsgrove, Hereford & Worcester	Manufacture Latex	Air:- volatile organic compounds, sulphur and nitrogen oxides, dust, carbon monoxide Water:- mercury, aluminium, ammonia
Baxenden Chemicals Ltd, Droitwich, Hereford & Worcester	Manufacture polyesters, polyurethanes & surfactants	Air:- volatile organic compounds, amines, sulphur dioxide

In the case of all of the above companies limits have been set for emissions of pollutants to both air and water. Monitoring has to be undertaken by the company, as well as the Agency, to check that the concentrations emitted are within the limits. Any exceedance of these limits does not necessarily lead to a prosecution; instead, the Agency works with the company in order to identify and resolve the problems.

The monitoring done by the companies can be used to establish the quantity of pollutants discharged both to air and water from these IPC processes. The table below shows the amount of the main pollutants emitted to air during 1995 from the processes operated by the companies given above.

Table 5 Main Air Pollutants from IPC Sites

Pollutor	Quantity (tonnes)
Volatile Organic Compounds	140
Oxides of Sulphur	4.56×10^4
Oxides of Nitrogen	1.55×10^4
Dust	670

By far the largest contribution made to the quantity of dust and oxides of sulphur and nitrogen is from the power station at Ironbridge. In view of this, one of the issues raised within this LEAP is to quantify the effect that this process has on the air quality.(section 3 **Issue 4)**

5.3 Power Generation and Renewable Energy

General

The United Kingdom uses the fossil fuels coal, oil and natural gas as sources of energy for the production of power. Those processes capable of achieving a rated thermal input of 50 mega watts (MW) or more are regulated by the Environment Agency. The principal environmental impact from the combustion of fossil fuels is that of releases of gases to the atmosphere. Such releases into the atmosphere affect the quality of the air both locally and globally. The burning of coal is estimated to contribute about 34% of the carbon dioxide released into the atmosphere each year by the U.K., the vast majority via power stations. The burning of gas is estimated to account for some 24%. Burning fossil fuels also releases other gases into the atmosphere, particularly sulphur dioxide and oxides of nitrogen; dust can also be released.

An essential part of the Government's environmental strategy is the reduction of emissions produced as a result of burning fossil fuels. The Government's policy is to encourage the exploitation and development of renewable energy sources wherever they have prospects of being economically attractive and environmentally acceptable. The Agency is keen to support this policy through the application of its powers and duties.

Renewable energy sources include water (hydropower, wave and tidal), wind solar and geothermal power and energy derived from waste treatment. Some renewable energy sources, such as hydropower have been commercially exploited for some time, and others such as wind power are becoming widespread. Information about planning aspects of renewable energy is available in the *Planning Policy Guidance Note on Renewable Energy* (PPG 22) issued by the Department of the Environment and the Welsh Office.

Local Perspective

The Area has at Ironbridge a 1000 MW coal-fired power station, which was commissioned in 1970 and can burn about 400 tonnes of coal an hour. Of the processes regulated by the Agency in the area, it is by far the largest emitter of pollutants into the atmosphere. It is interesting to note that, for power stations, the impact on the quality of the air is usually greatest some way from the station. This is confirmed in Maps 3 and 4 as shown in Section 2.2, where it is seen that the levels of sulphur dioxide and oxides of nitrogen in the air within the area are relatively small.

There are no known examples of hydro or wind power schemes in the plan area.

5.4 Storage, Use And Disposal of Radioactive Materials

General

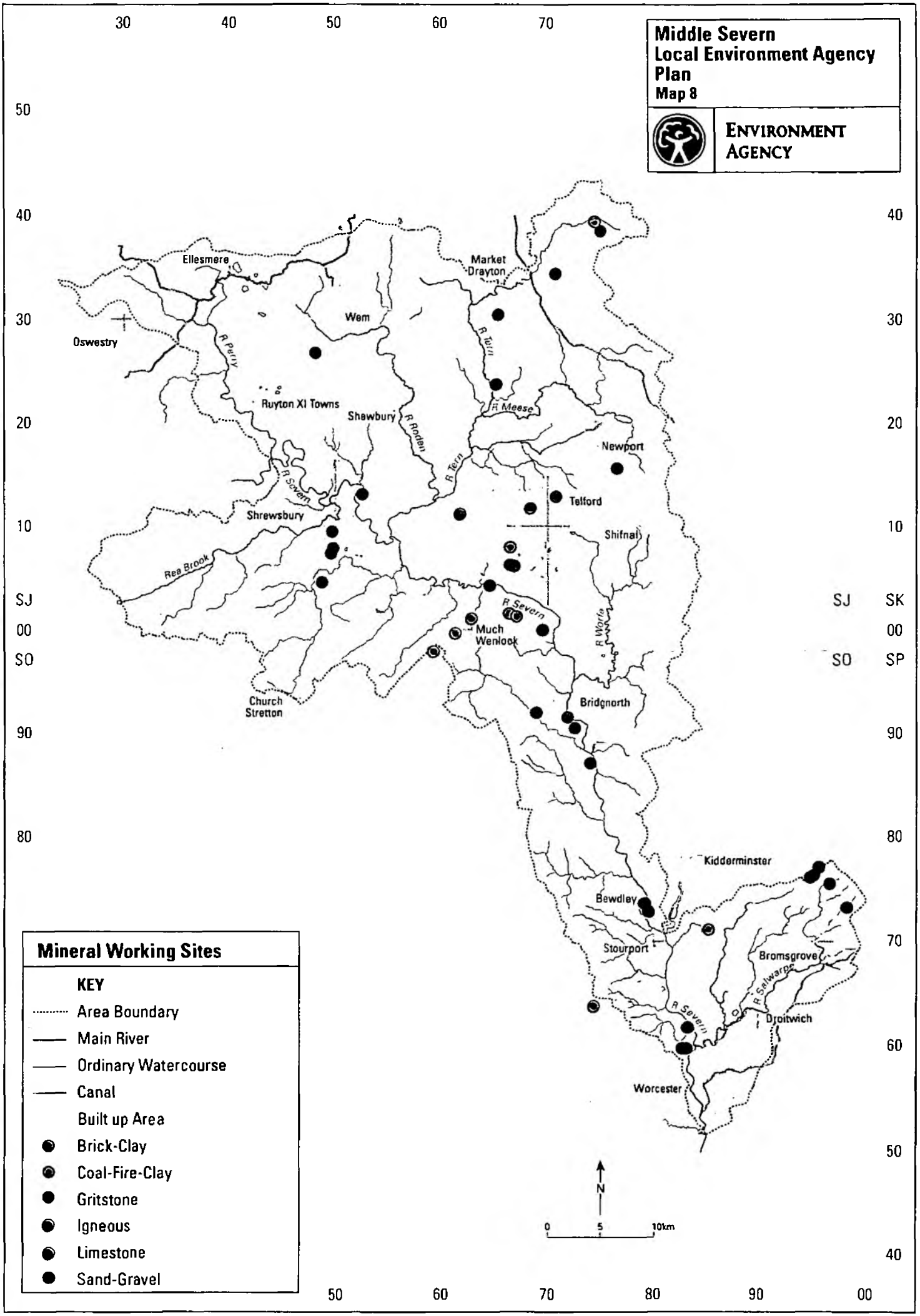
The Radioactive Substances Act 1993 provides for controls to be exercised over the use and keeping of radioactive materials and the accumulation and disposal of radioactive wastes. The Environment Agency is responsible for administration and enforcement of the Act in England and Wales. This takes the form of registrations and authorisations; the former being required for keeping radioactive material and the latter for accumulating and disposing of radioactive waste.

The types of devices employing radioactive materials and, therefore, requiring a registration include density gauges, thickness gauges, level detectors *etc.* Further, hospitals require registrations for the use of some radionuclides in treatments such as radiotherapy. If at any stage a radioactive material becomes waste then an authorisation is needed for disposal of the material. Nuclear sites are also regulated by the Environment Agency and require authorisations to dispose of radioactive waste.

Local Perspective

The area has 4 sites authorised under the Radioactive Substances Act 1993, including three hospitals and an establishment owned by the Ministry of Defence. Such sites discharge radioactive waste to sewer, controlled waters and air, but the vast majority of the waste is exported from the plan area.

The incinerators also require an authorisation under the Radioactive Substances Act as well as the Environmental Protection Act. The disposal of radioactive waste is therefore regulated by the Environment Agency at all stages along its disposal route.


Middle Severn
Local Environment Agency
Plan
Map 8
ENVIRONMENT AGENCY
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SJ
SO
SK
SP
Ellesmere
Market Drayton
Wem
Oswestry
R Perry
R Tern
Ruyton XI Towns
Shawbury
R Roden
R Meese
Newport
R Severn
Telford
Shrewsbury
Shifnal
Rea Brook
R Worfe
Much Wenlock
Church Stretton
Bridgnorth
Kidderminster
Bewdley
Stourport
Bromsgrove
R Salwarpe
Droitwich
Worcester
N
0
5
10km
Mineral Working Sites
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Built up Area
Brick-Clay
Coal-Fire-Clay
Gritstone
Igneous
Limestone
Sand-Gravel

5.5 Mineral Working

General

Areas of current or former mineral workings pose a threat to the environment by exposing, at times, toxic spoil or veins of potentially toxic minerals to the weathering process. As a result, run-off and discharges from quarries and mines can contain toxic and suspended material that are harmful to aquatic life. Discharges from active sites are subject to normal discharge consent procedures. Discharges from abandoned mines are not adequately controlled by law and may cause severe problems.

The exploitation of minerals can impact on water resources by altering groundwater flows and hence streamflows. Groundwater quality may be affected by reducing the amount of material available above the water table, that would act as a natural filter to pollutants. Summer spring flows can be reduced as a result of the loss of water storage capacity of the mineral that has been removed. Reclamation with impermeable material will increase run-off and reduce the recharge of groundwaters, whilst the use of mineral extraction sites for landfill waste disposal uses can also pose a significant threat to groundwater quality.

Gravel extraction may take place from the river channel or flood plain and is controlled by planning law. It may also require a land drainage consent from the Agency. If extraction works are not properly managed, the river channel can be seriously damaged.

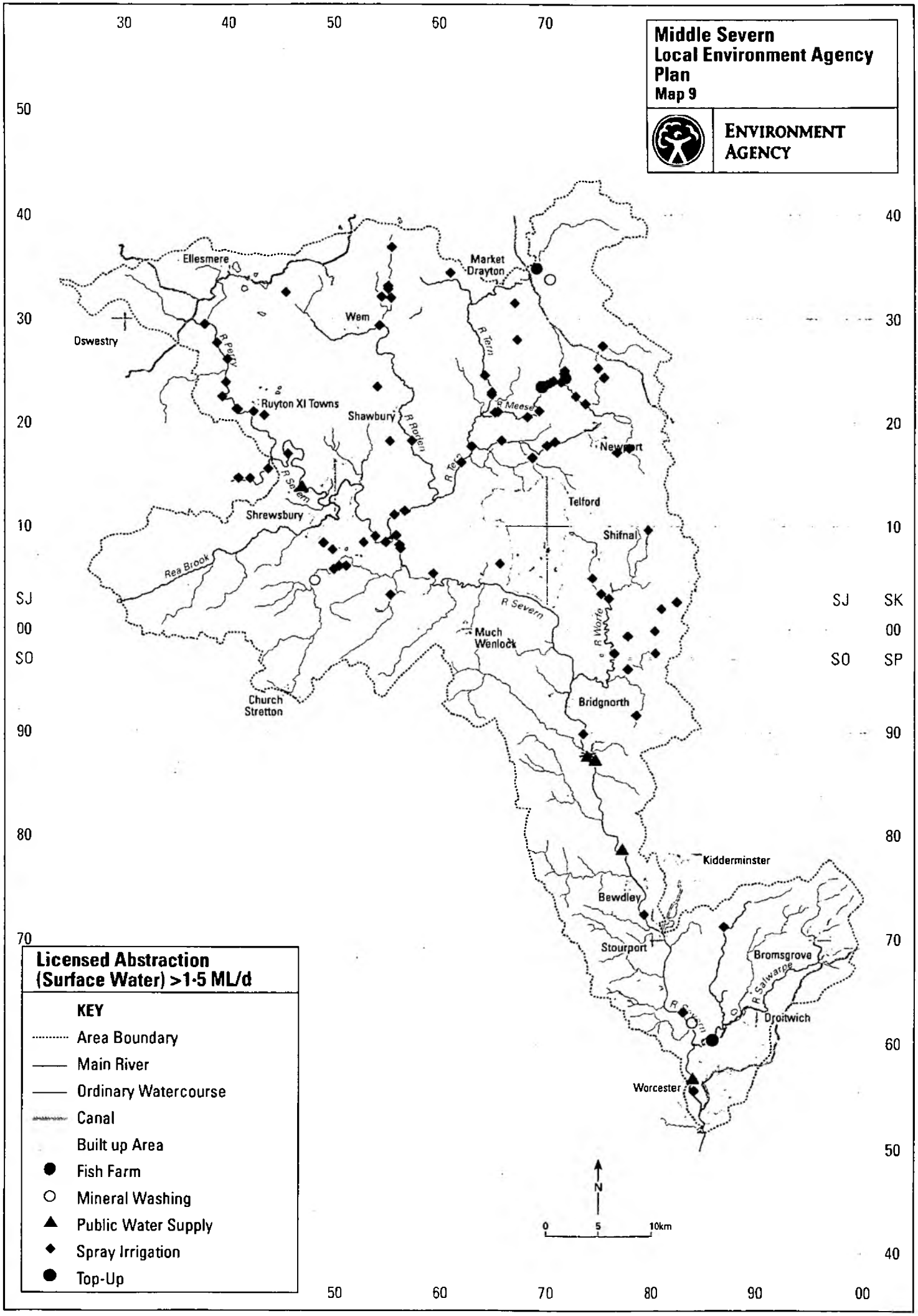
All mineral workings are subject to general planning controls. The Agency is a consultee on such applications, and seeks to have final planning consent conditions which control operations satisfactorily.

Operators have a duty to serve notice on the Agency detailing any dewatering activities proposed. We can issue a Conservation Notice under Section 30 (i) of the Water resources Act 1991, if it is felt any dewatering activity associated with the winning of the mineral is causing derogation to a protected source and/or the aquatic environment.

Local perspective

A variety of minerals have been worked throughout the area. The aggregates industry (sands, gravels and roadstone) is currently the most active. Mineral workings tend to coincide with the more attractive areas of countryside such as Wenlock Edge and the hills to the west of Oswestry resulting in conflict between conservation and commercial interests.

Map 8 shows the location of both active and closed quarries in the area.


Middle Severn
Local Environment Agency
Plan
Map 9
ENVIRONMENT AGENCY
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Ellesmere
Oswestry
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Market Drayton
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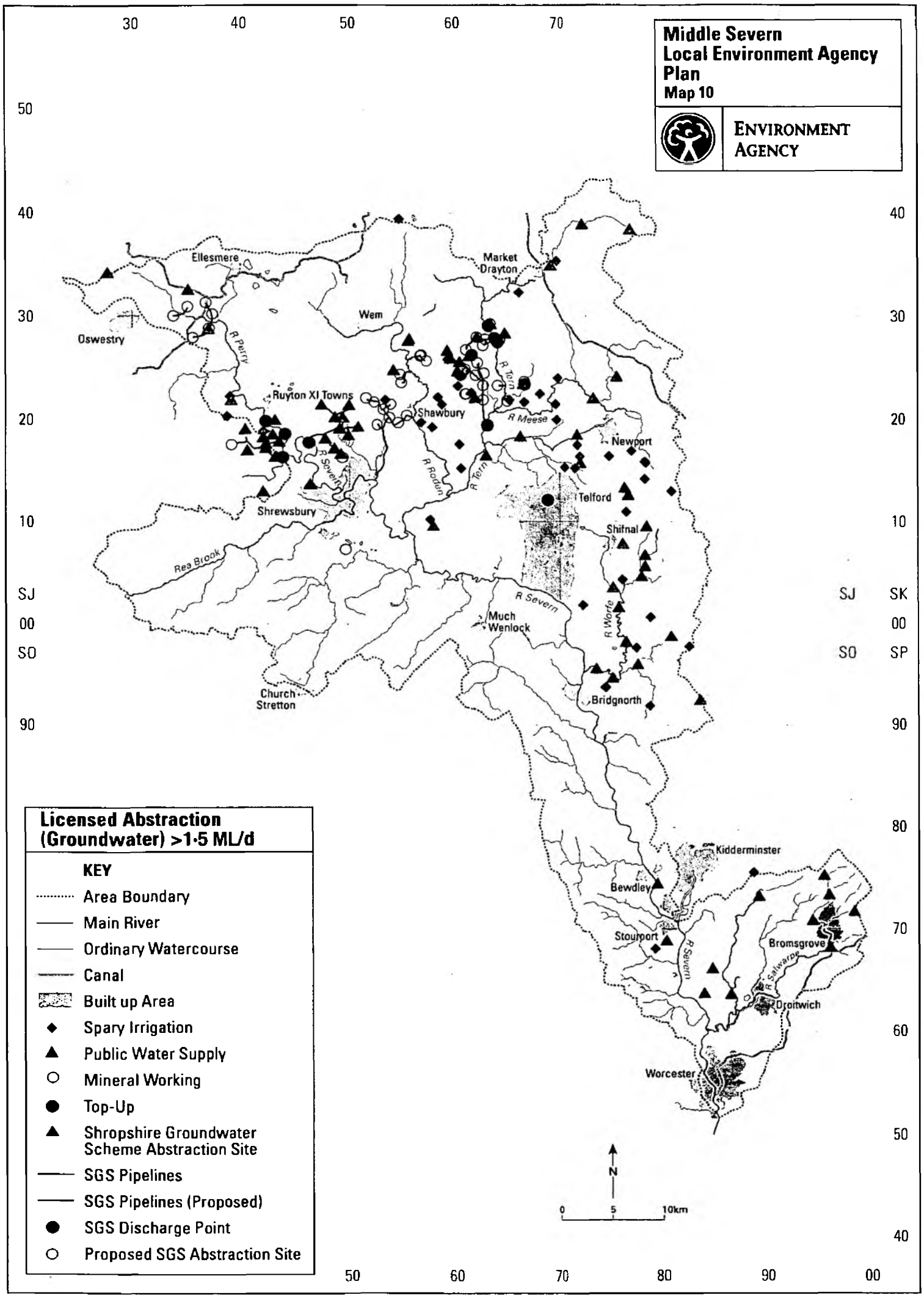
Shawbury
Newport
Telford
Shrewsbury
Shifnal
Rea Brook
Much Wenlock
Church Stretton
Bridgnorth
Kidderminster
Bewdley
Stourport
Bromsgrove
Droitwich
Worcester
R Severn
R Tern
R Meese
R Roden
R Perry
R Worfe
R Salwarpe
N
0
5
10km
Licensed Abstraction
(Surface Water) >1·5 ML/d
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Built up Area
Fish Farm
Mineral Washing
Public Water Supply
Spray Irrigation
Top-Up


Middle Severn
Local Environment Agency
Plan
Map 10
ENVIRONMENT AGENCY
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SJ
SK
SO
SP
Ellesmere
Market Drayton
Wem
Oswestry
R Perry
Ruyton XI Towns
Shawbury
R Tern
R Meese
Newport
R Severn
R Roden
Shrewsbury
Telford
Shifnal
Rea Brook
R Worfe
Much Wenlock
Church Stretton
Bridgnorth
Kidderminster
Bewdley
Stourport
R Severn
Bromsgrove
R Salwarpe
Droitwich
Worcester
N
0
5
10km
Licensed Abstraction (Groundwater) >1·5 ML/d
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Built up Area
Spary Irrigation
Public Water Supply
Mineral Working
Top-Up
Shropshire Groundwater Scheme Abstraction Site
SGS Pipelines
SGS Pipelines (Proposed)
SGS Discharge Point
Proposed SGS Abstraction Site

5.6 Water Resources and Abstraction

General

The removal of water from streams, rivers or groundwater by man is termed abstraction. Abstractions are controlled by licences granted under The Water Resources Act 1991. The abstraction licensing process ensures that the Agency can manage water resources so as to ensure that the right balance is struck between the needs of abstractors and the environment. Exemptions from the requirement for a licence include most types of water supplies to a single household, and small (less than 20 cubic metres a day) general agricultural uses from surface water (excluding spray irrigation).

There are a number of other specific types of abstraction (eg firefighting) which are exempt from the need for a licence.

All abstraction licences specify maximum volumes that the licence holder may take, and many contain conditions to protect the environment and other abstractors. The exceptions are licences granted as "Licences of Right" in 1965, or "Licences of Entitlement" in 1990, where the legislation did not permit the former National Rivers Authority (NRA) and its predecessors to restrict pre-existing abstractions. In considering applications for new licences, the Agency must ensure that there is no derogation of existing abstractors without their agreement, and that the aquatic environment and associated habitats are properly safeguarded. The Agency does not guarantee that the authorised volume will be available, nor that water will be fit for the purpose for which it will be used.

These uses include the supply of water from ground and surface sources for public supply and for industrial, agricultural, amenity, hydropower, water transfer and fish farming with just over half (56 %) coming from groundwater. Private supplies are generally derived from springs, wells and boreholes, their quality is monitored by the Environmental Health department of the Local Authority. The Agency does have a duty to protect water quality and specifies protection zones around groundwater sources to seek control over certain potentially polluting activities. The *Policy and Practice for Protection of Groundwater* forms the basis for the Agency's activities.

Problems can occur when surface water is abstracted for spray irrigation as there is a large percentage loss through evaporation. This problem is compounded in the summer months when spray irrigation demands are at their highest as flows are generally at their lowest at this time of year. To minimise the impact on the water resources and to protect existing rights, abstraction restrictions are put into operation, when natural river flow falls below a certain threshold. Winter storage reservoirs are encouraged where practical and are the only option to obtain reliable supplies of water for irrigation. Fish farming can severely affect a watercourse by diverting a large proportion of the flow through the farm, leaving the natural river reduced in flow (albeit, often for only a short stretch). The requirement for an adequate residual flow can restrict the viability of a fish farm.

Local Perspective

The majority (68.4 %) of water licensed to be abstracted is for public water supply to areas around Shrewsbury, Telford, Bridgnorth, Bewdley and parts of the West Midlands conurbation. Groundwater abstraction takes place from a number of boreholes distributed throughout the area and is important on a local perspective. Surface water abstractions take place at Shelton, Hampton Loade and Trimpley from the River Severn. The total groundwater abstraction for public water supply amounts to 122,782 megalitres per annum (Ml/a) and that from surface water; 95,582 megalitres per annum.

Table 6 Summary of Licensed Abstraction in the area

Type of abstraction	Groundwater Abstraction		Surface Water Abstraction	
	Ml/annum	% by volume	Ml/annum	% by volume
Public supply	122 782	86	120 494	56.5
Other	19 900	14	92 632	43.5
Total	142 682	100	213 126	100

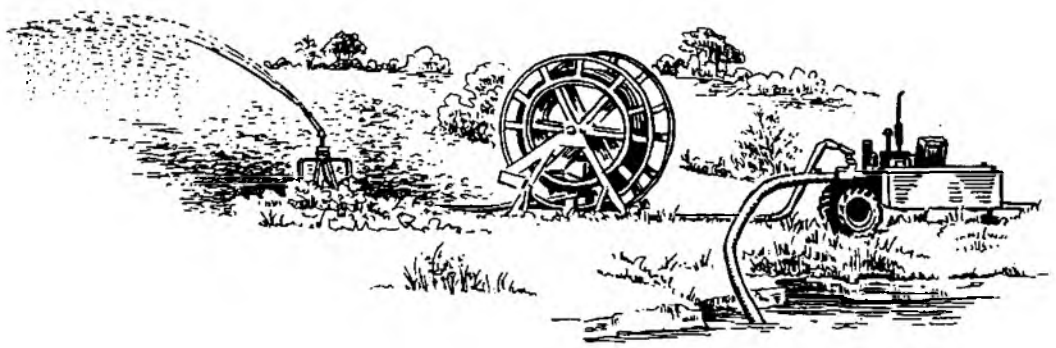
Abstractions for other uses such as agriculture, spray irrigation and circulation through amenity pools are relatively small, amounting to 19,900 Ml/a from groundwater and slightly more significantly 92,632 Ml/a from surface water.

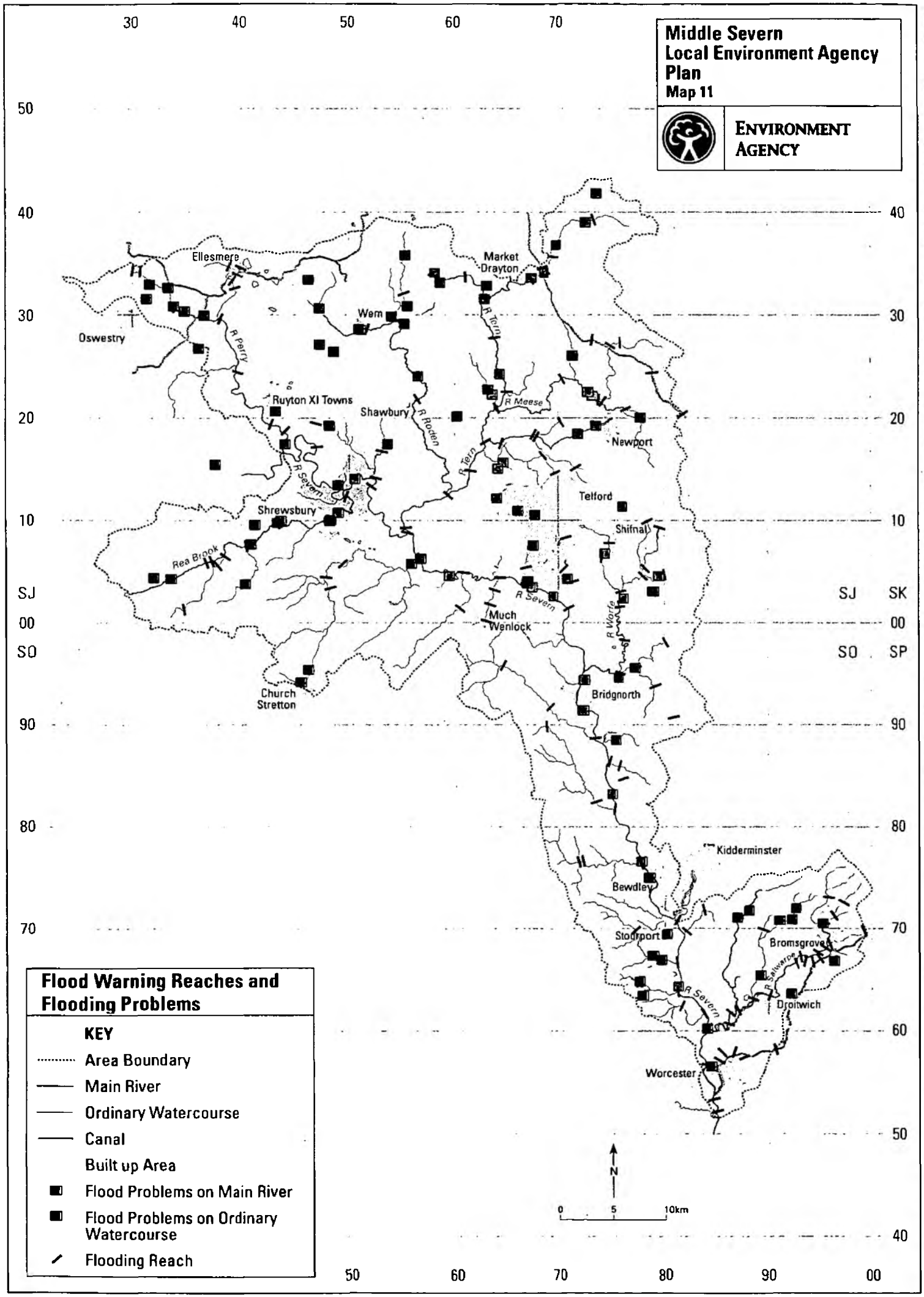
Many surface water licences and also an increasing number of groundwater licences are restricted according to flows in watercourses. These restrictions are based on prescribed flows thresholds set by the Agency at its own gauging stations or on flows measured by local weirs. Such restrictions are designed to protect existing water users and the environment. Details of licences that are restricted according to flows at Agency gauging stations are given in Section 6.2.1.

Many of the watercourses are now subject to such restrictive conditions that further summer abstraction is not feasible. These include the River Perry, River Meese, Coley Brook, River Worfe and tributaries associated with these watercourses. The only viable option to obtain water for irrigation in these areas is to abstract during the winter and store the water for subsequent use in the summer. The Agency encourages adoption of this technique, but again, to protect the environment even winter abstractions are subject to restriction conditions.

There are areas around Brockton, Minsterley, Worthen, Snailbeach, Woolstaston, Church Preen, Harley, Sheinton, Much Wenlock, Monkhopton and Morville which are exempt from the licensing requirement for abstractions from groundwater (wells and boreholes), regardless of use.

Maps 9 and 10 show the larger surface and groundwater abstractions in the area.




Middle Severn
Local Environment Agency
Plan
Map 11
ENVIRONMENT AGENCY
Ellesmere
Oswestry
Wem
Market Drayton
R Perry
R Tern
R Meese
Ruyton XI Towns
Shawbury
R Roden
Newport
R Severn
Telford
Shrewsbury
Shifnal
Rea Brook
R Severn
R Worfe
Much Wenlock
Church Stretton
Bridgnorth
Kidderminster
Bewdley
Stourport
Bromsgrove
R Severn
R Salwarpe
Droitwich
Worcester
SJ
SK
SO
SP
30
40
50
60
70
80
90
00
10
20
N
0
5
10km
Flood Warning Reaches and Flooding Problems
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Built up Area
Flood Problems on Main River
Flood Problems on Ordinary Watercourse
Flooding Reach

5.7 Flood Water Conveyance and Storage

General

The Nature of Flooding

The river network carries surplus water from land to the sea as part of the natural water cycle. Rivers and watercourses can only cope with a certain maximum flow and when this is exceeded flooding occurs. Flooding can be caused by prolonged rainfall, thunderstorms or rapid snowmelt. The peak flow of a flood is measured and expressed in terms of the frequency at which that flow is statistically likely to recur, for example 1 in 10 years or 10% chance in any one year.

Individual watercourses will respond differently to the same rainfall conditions due to variations in catchment areas and land use. For example, an urbanised catchment with a high proportion of paved surfaces and drains will have rivers whose levels respond relatively quickly to rainfall. The more open countryside of a rural catchment will often allow more of the rain to soak into the ground and thus slow down run-off, so river levels will rise less rapidly but remain at the higher level longer.

Localised flooding may also occur where watercourses become blocked at particular points such as under bridges or in culverts. Often debris gathering at these points includes garden waste and other rubbish which has been deposited on river banks, and this can be a major problem in urban areas. Flooding can also occur where surface water drains are unable to discharge into swollen watercourses, or further back in the surface water drainage system where their capacity is exceeded.

When watercourses flood, water flows into the floodplain. These natural floodplains (which are as much a part of the river system as the channel which carries normal flows) provide extra capacity for the storage and passing downstream of flood water. This capacity is reduced if significant areas of floodplain have been raised, embanked, or built upon. This loss of storage volume can lead to higher river levels elsewhere and for this reason it is not possible (or desirable) to alleviate flooding in all areas. The priority for flood alleviation lies in urban areas, as undeveloped floodplains should be allowed to play their natural role as the continuity between the river and its floodplain as an essential part of the water cycle.

In respect of flood defence, the Environment Agency has a supervisory role over all matters relating to watercourses. A key aim of the Agency is to provide effective protection for people and property against flooding from rivers and to provide adequate arrangements for flood forecasting and warning. The Agency achieves this key aim through the three activities of Regulation, Operations, Flood Defence Improvements and Flood Warning. These activities are detailed in Appendix 3.

The Control of Surface Water Run-off

Surface water run-off from development must be controlled in situations where there is a possibility of an adverse impact on the water environment caused by increased rates and volumes of run-off. Increasing development results in a much wider proportion of rainfall 'running off' rather than soaking into the ground and this prevents the recharge of groundwater resources.

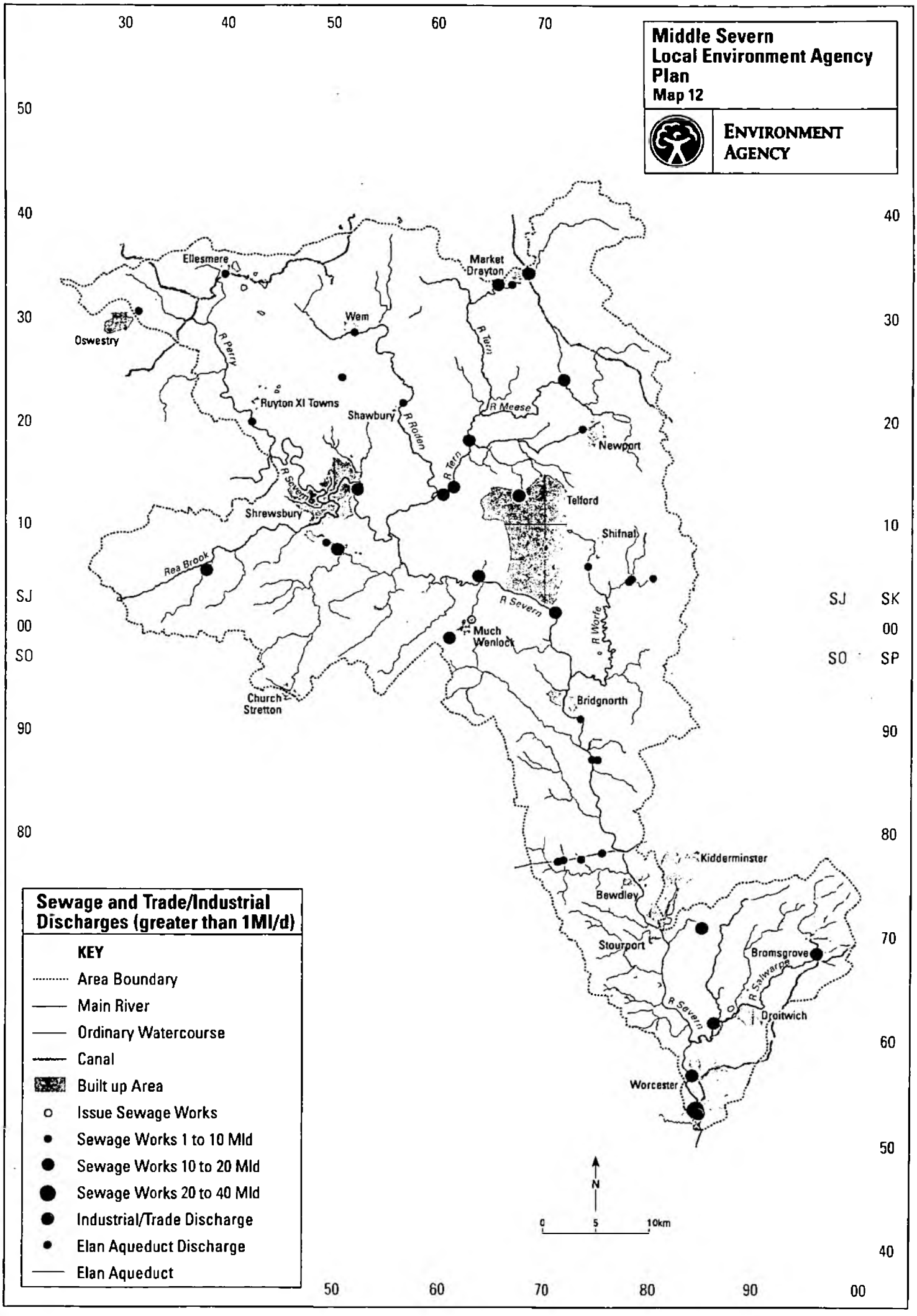
Local Perspective

In the north western area of this plan, extensive drainage works to improve agriculture have been carried out, causing the water courses to become artificial drainage channels.

There are several towns (Shrewsbury, Ironbridge, Bridgnorth and Stourport) and the City of Worcester, where historically development has encroached into the floodplain and as a result, parts of them suffer regular flooding.

None of these towns have flood defences as either they have not proved feasible for either economical or environmental reasons or they have not been accepted by the public. As these towns/city do not have defences, the Flood Warning Scheme is in operation for the River Severn, to allow those affected to take action to lessen the damages when floods occur. The Agency is responsible for both issuing and disseminating the warnings. It works in partnership with the relevant Local Authorities and the Flood Wardens pass the warnings on. Map 11 shows the warning reaches.

Run-off may require retardation through use of soakaways, balancing or off-site works. Particular areas of concern include Shrewsbury (Rad, Rea and Bagley Brooks, Telford (Ketley, Newdale Coal and Wem Brooks), Newport (Albrighton Brook, Strine and tribs), Ellesmere (poorly served by S.W. sewerage and inadequate culverting resulting in the need for the majority of development to be balanced), Shifnal (Wesley Brook), Bromsgrove (Battlefield and Spadesbourne Brook), Worcester (Barbourne Brook), Droitwich (Hadley and Elmbridge Brooks and the River Salwarpe in places). See section 6.2.3 for further information.


Middle Severn
Local Environment Agency
Plan
Map 12
ENVIRONMENT AGENCY
Ellesmere
Oswestry
Wem
Market Drayton
R Perry
R Tern
Ruyton XI Towns
Shawbury
R Roden
R Meese
Newport
R Severn
R Tern
Telford
Shrewsbury
Shifnal
Rea Brook
R Severn
R Worfe
Much Wenlock
Church Stretton
Bridgnorth
Kidderminster
Bewdley
Stourport
Bromsgrove
R Salwarpe
R Severn
Droitwich
Worcester
N
0
5
10km
Sewage and Trade/Industrial Discharges (greater than 1Ml/d)
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Built up Area
Issue Sewage Works
Sewage Works 1 to 10 Mld
Sewage Works 10 to 20 Mld
Sewage Works 20 to 40 Mld
Industrial/Trade Discharge
Elan Aqueduct Discharge
Elan Aqueduct

5.8 Sewage and Industrial Effluent Disposal

General

As towns grow and develop continued investment to improve sewerage systems and sewage treatment is required to ensure that discharges to rivers are well within the capacity of the river to receive them without damage to the aquatic environment. All discharges of sewage and industrial effluent generally require the consent or Authorisation of the Environment Agency. Such consents set limits on both the quality and the volume of effluent which can be discharged and are set according to two factors:

* The quality and quantity of the water at the point of discharge, ensuring that the effluent does not cause significant deterioration in watercourse quality.

* The downstream uses of the receiving waters, ensuring that the discharge does not compromise such uses and does not breach relevant water quality standards. See also Section 3 **Issue 9**.

Local Perspective

Sewage Disposal

There are a total of 760 consented discharges within the Middle Severn catchment, of which 364 are sewage discharges or sewerage system overflows owned by Severn Trent Water Ltd and 264 are sewage discharges from privately owned sewage treatment plants. The remaining 132 discharges are treated effluents from a variety of industrial sites in the catchment. Map 12 shows the larger sewage and industrial discharges in the area.

The largest sewage discharges are from Shrewsbury's Monkmoor sewage treatment works (STW), which has a maximum consented discharge of 25 megalitres/day (Ml/d), from Worcester STW (24 Ml/d),Rushmoor (Telford) STW (18.9 Ml/d) and Coalport STW (15 Ml/d), all at dry weather flows. Compliance with consent conditions at the Severn Trent Water, STWs is generally very good although in some cases further investment work is required to improve or maintain the quality of the receiving rivers (see **Issue 9**).

Most of the large public sewerage systems have storm water overflows which operate either at or prior to the works during heavy rainfall. The majority of these overflows operate without causing nuisance, although those situated in areas of high public amenity, such as Worcester and Shrewsbury, do give rise to some complaint (see **Issue 5**).

All of the major population centres in the catchment are served by public sewerage systems and sewage treatment works. Outside the sewered areas most of properties dispose of sewage into the ground via septic tanks and soakaway systems. The volumes involved are generally small (less than 5 cubic metres/day) and are not formally controlled by the Environment Agency. Larger discharges, particularly those in sensitive locations as regards to groundwater quality may be controlled by use of a Prohibition Notice under the Water Resources Act 1991.

The majority of problems are caused by poor ground conditions, either because of soil with a high clay content or due to high water tables, both of which prevent effluent from the tank from soaking away effectively. This has frequently led to illegal connections being made from the tank directly into watercourses. Other problems can be caused by poor construction of tanks or soakaways or by a lack of maintenance of the facilities. The problems associated with small privately owned sewage treatment plants tends to be due to a lack of adequate maintenance, although poor plant design has also been a factor.

The ideal solution to sewage disposal problems in rural communities is for mains sewerage schemes to be provided with treatment at a water company sewage treatment works (STW). However, such schemes are expensive and the costs of the schemes have in the past fallen on the householders involved and the local District or Borough Council. As a consequence, few village sewerage schemes have been installed in the area in recent years. However, recent legislation has changed the way such schemes are financed (see **Issue 2**).

Trade Effluent Disposal

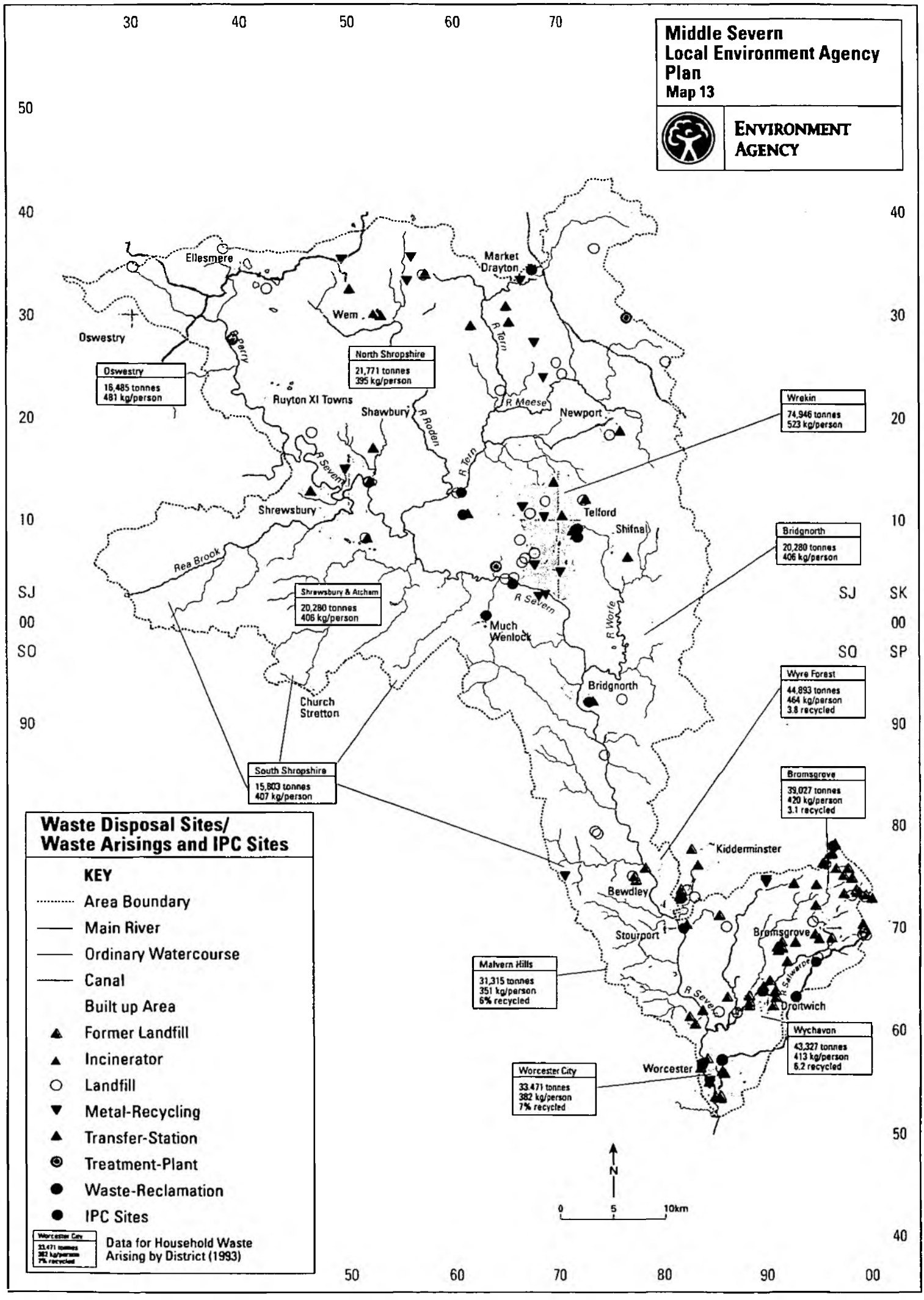
The majority of the industrial discharges in the Middle Severn area are not of sufficient size to present any threat to the receiving waters. The largest is the British Sugar Corporation site at Allscott, Telford, with a consented maximum discharge of 3.2 Mld. The treatment system at this site uses a large lagoon system, the final parts of which are designated a SSSI on account of the bird population it supports. Other significant industrial discharges exist at Dairy Crest, Crudgington (2.5 Mld), GKN Sankey, Telford (1.5 Ml) and a new discharge of 2.5 Mld is planned at Müller & Co. at Market Drayton

Following a major pollution incident in 1994 which seriously disrupted water supplies to the Worcester area the former National Rivers Authority embarked on a formal programme of assessing the risk to potable water abstractions from all major installations in the Upper Severn catchment. This survey is being continued by the Environment Agency, with further advice given to industrialists and farmers on pollution prevention matters. It is also hoped that new pollution prevention powers under the Environment Act 1995 will enable the Agency to enforce improvement work at sites thought to pose a significant threat to the aquatic environment (see **Issue 16**).

Middle Severn Local Environment Agency Plan

Map 13

ENVIRONMENT AGENCY



Waste Disposal Sites/ Waste Arisings and IPC Sites

KEY

- Area Boundary
- Main River
- Ordinary Watercourse
- Canal
- Built up Area
- Former Landfill
- Incinerator
- Landfill
- Metal-Recycling
- Transfer-Station
- Treatment-Plant
- Waste-Reclamation
- IPC Sites

Worcester City
33,471 tonnes
382 kg/person
7% recycled

Data for Household Waste Arising by District (1993)

5.9 Waste Management

General

Waste management includes the reuse, recovery, treatment and disposal of waste. If not properly controlled waste management sites can have an adverse environmental impact. The location of waste management facilities is decided through the land use planning system by the Local Planning Authorities under the Town and Country Planning Act 1990. But it is the role of the Environment Agency to regulate such sites. With the exception of certain exempt facilities which must be registered with the Agency, sites keeping, treating, disposing or depositing controlled wastes must be licensed by the Agency. Controlled waste consists of household, industrial and commercial waste.

The objectives of licensing are to prevent harm to human health, pollution of the environment and serious detriment to the amenities of the locality.

Prior to 1 April 1996, the Local Authorities responsible for the waste regulation function each produced County Waste Management Plans. The Waste Management Plans consider the requirements for and the availability of waste management facilities in the area (*i.e.* County) they cover.

Local Perspective

Waste Management Facilities

There are 99 licensed waste management facilities within the area, the number of each type is shown in Table 7 and there are a further 55 closed landfill sites. Map 13 shows the locations of licensed sites within the plan area.

Table 7 Licensed Waste Management Facilities

Type of Facility	No of Sites End March 1996
Landfills	
- Biodegradable	14
- Inert	29
Transfer Station	28
Household waste reclamation sites	10
Metal recycling sites	18

In 1995-96 approximately 1.2 million tonnes of waste was disposed of to landfills within the plan area. Some of this will represent wastes imported into the plan area for treatment or disposal. Likewise some waste produced within the area will go beyond the boundary for treatment or disposal.

Exempt Activities

Certain activities are exempt from the requirement for a waste management licence. The exemptions mainly cover reuse and recovery operations with the aim of encouraging such operations by reducing the legislative burden on them. At the end of March 1996, there were a total of 520 registered exemptions within the Counties of Hereford & Worcester and Shropshire. These exemptions include the temporary storage of wastes which are to be recycled (*e.g.* paper, cardboard, plastic), the recycling of scrap plastic polythene and the use of waste soil for land reclamation or construction purposes.

Land Application of Wastes

The spreading of sewage sludge and industrial wastes on land is a well established method of recycling nutrients to land. Farmers have recognised the benefits of applying animal manures, which contain organic matter and essential minerals to agricultural land for centuries, provided they do not contain contaminants. Some controlled wastes in liquid or sludge form have similar beneficial effects.

The advantage of landspreading to the waste disposal contractor is principally one of cost in that land application is cheaper than disposal at a landfill site. The advantage to the landowner is one of obtaining a cheap source or fertilising material. Conversely, the main disadvantages are that spreading is seasonal to some extent and industries reliant on this disposal route must have contingency plans devised as there will be occasions when weather conditions are totally unsuitable to allow landspreading activities; and water pollution incidents from this activity are increasing in contrast to other agricultural incidents which are falling.

During 1993/94, approximately 28,600 tonnes of industrial wastes and 11,000 tonnes of sewage sludge were applied to land in Hereford & Worcester and 66,000 tonnes and 11,500 tonnes in Shropshire (excluding septic tank waste). The industrial wastes landspread mainly comprised wastes from the food processing industries.

Land application of wastes is likely to increase over the next few years due to increasing disposal costs. Consequently effective regulation by the Agency is necessary to ensure that any spreading is for the purpose of benefit to agriculture and not merely a disposal operation, and that it is carried out without harming the environment.

Unauthorised Deposits

Waste management facilities require a waste management licence and the facility must be operated in accordance with the licence conditions. It is an offence to keep, treat or deposit waste without a waste management licence. However, illegal activities are not uncommon and take the form of flytipping waste, operating a site without a licence or not complying with licence conditions. The Agency relies to a large extent on members of the public to report such illegal activities or incidents.

5.10 Contaminated Land

General

The Middle Severn area has a history of industrial usage stretching back to the start of the industrial revolution. Whilst providing the area with an industrial heritage it also leaves a less desirable legacy, contaminated land. More recent land use developments have also resulted in areas of land being contaminated. This contamination can remain in the ground until the site is redeveloped, (see **Issue 3**). Past industrial practices were often subject to fewer controls than they are today, consequently land contamination has occurred through a mixture of accidental spillage and casual disposal during the normal operation of the factory or plant.

The Environment Act 1995 lays out the responsibilities and powers the various authorities will have in dealing with contaminated land. Local Authorities will be empowered with drawing up formal strategies for identifying contaminated land in their areas, once guidance is issued in 1997. Having identified such areas of land, councils can serve "Remediation Notices" on the current owners requiring further investigation, monitoring and clean up measures if there is a risk to public health and the environment. The Agency's powers relate to "special sites" which have the greatest potential to cause harm. This enables the Agency to serve a "Works Notice" requiring landowners to prevent and mitigate the pollution of the land and both surface and groundwater. This will allow a proactive approach to be adopted in preventing further pollution.

Planning legislation also provides a route for addressing contaminated land issues. As part of the Environment Agency response to planning applications, we will request that site investigation is undertaken prior to redevelopment and that remedial works are undertaken if they are required. Various techniques are available for the clean up of contaminated land. Traditionally, excavation of contaminated material and disposal to a licensed landfill site has been the most commonly chosen method of remediation. The removal of any contaminated materials from a site should only be undertaken by a licensed carrier who follows a 'Duty of Care' under the Environmental Protection Act (EPA) 1990.

Where land is not subject to planning application, but is known to be contaminated and is having an impact on the quality of controlled waters, the Agency will encourage the polluter/owner to undertake remedial works.

Where pollution has occurred, the Agency encourages operators to inform the Agency, so that agreed remedial action can be taken, based on the environmental risk at the site. Where operators do not inform the Agency and subsequently pollution of controlled waters is detected, prosecution under Section 85 of the Water Resources Act 1991 will be considered.

Contaminated land reclamation schemes for mineral working sites may cause renewed, or even exacerbate existing problems, as unweathered toxic materials are exposed or fine solids run off into watercourses. Such schemes may require consultation with the Agency, and any discharges consented and monitored.

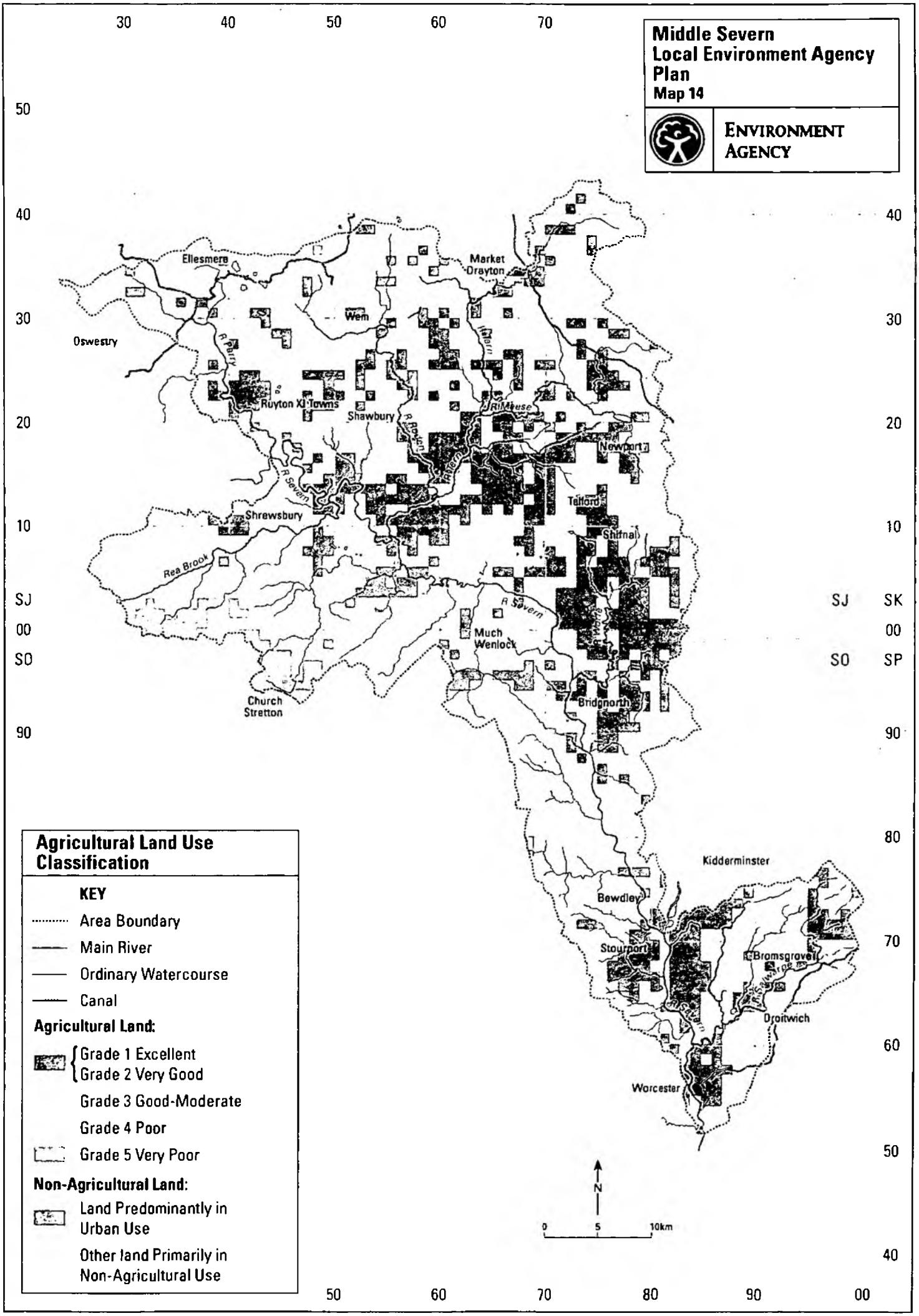
Existing contaminated land sites offer, once suitably remediated, an opportunity for redevelopment. It is often preferable to redevelop the most sensitive sites with less contaminating end uses which pose a lower threat of pollution to water resources. In many circumstances, however, the Agency would prefer to see existing industrial land stay as industrial rather than see alternative expansion onto uncontaminated green field sites. The Agency would comment on each proposal on a site by site basis.

Local Perspective

Contaminated sites within the area include closed landfills, old gasworks sites and a wide range of industrial sites, many of which are located in environmentally sensitive locations such as near rivers or on aquifers.

Examples of contaminated sites currently being redeveloped include Shrewsbury gasworks and Diglis Industrial Estate in Worcester, both adjacent to the River Severn, Industrial Estates around Shifnal and Overley Hill and Telford, both near public water supply boreholes (PWS). To ensure environmental protection these areas were subject to negotiation during the planning/consultation stage as part of the statutory process. This may involve a request that suitable site investigations are undertaken prior to redevelopment and that remedial action is undertaken should the site investigation indicate it will be required.

We are aware of a number of service stations within the area which have leaked petroleum and diesel fuels into groundwater beneath the site. Expensive remedial treatments are already underway to clean the aquifer. Where spillage has occurred, we encourage operators to inform us, so that agreed remedial action can be taken, based on the environmental risk at the site. Where operators do not inform the Agency and subsequently pollution of controlled waters is detected, prosecution under Section 85 of the Water Resources Act 1991 will be considered. Where land is not subject to planning application, but is known to be contaminated and is having a deleterious impact on the quality of controlled waters, the Agency will encourage the polluter/owner to undertake remedial works.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Shifnal
Rea Brook
Much Wenlock
Church Stretton
Bridgnorth
Kidderminster
Bewdley
Stourport
Bromsgrove
River Salwarpe
Droitwich
Worcester
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Agricultural Land Use Classification
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Agricultural Land:
Grade 1 Excellent
Grade 2 Very Good
Grade 3 Good-Moderate
Grade 4 Poor
Grade 5 Very Poor
Non-Agricultural Land:
Land Predominantly in Urban Use
Other land Primarily in Non-Agricultural Use

5.11 Agriculture

General

During recent decades agricultural practices in the United Kingdom have changed markedly in comparison with the early and middle parts of the century. New technologies and greater consumer demand has lead to the industry becoming increasingly mechanised and intensified which in turn has resulted in increasing pressures on the environment.

In the dairy industry straw based barns have given way to large parlours, producing vast quantities of animal slurry, while silage, with its highly polluting liquor, has replaced hay as the major cattle fodder. In arable farming traditional pest control methods have been succeeded by the widespread use of pesticides and herbicides, presenting new hazards to the environment.

Given the above, and the fact that over 80% of the land in England and Wales is used for agriculture, it is of little surprise that the industry can have a major impact on the environment. However, increased environmental awareness, both by government bodies and by the farming community itself, has led to better pollution prevention practices and to significant improvements in river quality in many areas.

Legislation, grants and the increased availability of specialist advice have all been important factors in reducing the impact of farming on the environment and the Environment Agency, in conjunction with MAFF and ADAS, will continue to play a central role in this process. Examples of the work of the Agency includes:

* Responsibility for enforcing the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991, which set down minimum standards for the design and construction of agricultural storage systems. In addition the Agency has a duty to regulate the abstraction of water for agricultural use.

* Carrying out a programme of farm visits both to identify sources of pollution and to offer advice to farmers, and work closely with farming groups and organisations.

* Promotion of initiatives such as MAFF's Codes of Good Agricultural Practice for the Protection of Water, Soil, Air and also Farm Waste Management Plans.

Local Perspective

Large parts of the plan area are rural in nature and agriculture forms the economic base for these regions. The area receives slightly less rainfall than the average for England and has a climate favourable for agriculture. Much of the land in the catchment is of a good quality and supports a variety of agricultural uses as shown by Table 8, data supplied by MAFF.

Map 14 shows the Agricultural land Use Classification (MAFF) for the area. (See Appendix 5)

Table 8 Holdings by EC Farm Type, MAFF data 1995

Cereals	329
General Cropping	530
Horticulture	169
Pigs & Poultry	115
Dairy	1042
Cattle & Sheep	1425
Mixed	465
Other Types	968
Total No. Holdings	5043

The number of holdings has shown a steady decrease since 1985, when the total was 5268 holdings. During this period dairy holdings have decreased by 309 farms, whereas beef cattle and sheep farms have increased by 156 holdings.

Dairy farms represent the single largest section of the industry within the area, although MAFF data shows a decline of 12% (over 14,000 dairy cattle) in herd numbers between 1985 and 1995. During the same period, beef herd cattle have risen by over 90%, but overall total cattle numbers have declined by about 60,000 (16.9%).

By the 1980s many of the streams and rivers draining land dedicated to intensive dairy production were badly affected by discharges of organic wastes from farms. Work carried out by the former NRA, coupled with financial incentives under the MAFF Farm and Conservation Grant Scheme, resulted in many farmers carrying out improvement work to prevent the polluting discharges. A large number of new waste collection systems were constructed to comply with the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991, are designed to ensure the quality of such structures.

As a consequence of this work the quality of many small watercourses, such as tributaries of the Rivers Perry and Roden, has improved markedly during the early 1990s and the number of agricultural pollution incidents in the catchment, particularly those of a serious nature, has fallen. Some problem areas still remain and as the grant scheme has now ended (apart from within Nitrate Vulnerable Zones) little effluent system improvement work is now undertaken on farms.

Of particular note here is the new umbilical system of spreading slurries, becoming common in the north west part of the catchment. This system has the capacity to dispose of large volumes of waste onto fields in a short period of time and has been the cause of several pollution incidents. The Agency is seeking to educate the users of such systems as to employ good working practices to minimise the risk of pollution.

While cattle numbers in the area have decreased in recent years, other sections of the livestock industry have expanded markedly. The number of sheep and lambs farmed has risen by 27% between 1985 and 1995 to a total of around 645,000, while the most spectacular increase over the period has been in the poultry industry, which has seen an increase of 165% in total fowls to a number in excess of 4,130,000 birds. The pig section of the industry has also expanded by 6% from 1985-1995 to a total of around 183,000 pigs.

Crop production in the catchment has decreased slightly during the period 1985-1995, but still represents 40% of the total agricultural land use in the area, with 107,290 ha. devoted to this section of the industry. Cereal production accounts for 66% of the land in crop production, with wheat and barley predominant. Of the other crops grown, sugar beet and potato production are also significant.

The widespread production of crops in a catchment of a river used to supply large amounts of drinking water could potentially cause water quality problems. The Agency monitors the Severn and its tributaries regularly for the presence of herbicides and pesticides used in intensive crop production and maintains regular contact with farming groups to advise on pollution prevention matters.

Grants provided by the Government through MAFF farm diversification schemes have seen the farm woodland in the catchment increase by 29% to 1,369ha and by 1995 10,700ha were devoted to set aside, a scheme introduced since the previous census in 1990. However, the agricultural employment census for the area shows a steady reduction in the workforce since 1985, a trend likely to continue although diversification into new opportunities such as tourism and alternative livestock production is likely to occur.

5.12 Forestry

General

The Agency recognises that well managed forestry in appropriate areas can have minimal impacts on water and can benefit the overall environment. However, in certain circumstances conversion of land to forest and subsequent activities can have serious impacts on the water environment. Aims of the Agency are:

* To ensure that forest activities do not cause pollution of surface and groundwaters, increase acidification or affect existing users and uses of water below forested areas.

* To secure improved Agency links with Local Authorities on Structure and Local Plans, particularly in relation to Indicative Forest Strategies

* To secure improved links with the Forest Authority and forest owners and managers to recommend that forest management complies with Forest Authority Guidelines and that liaison with the Agency takes place where ever necessary.

* To protect and enhance the conservation value of the water environment and associated land in connection with all forestry developments.

* To ensure that forest activities do not create or exacerbate flooding problems.

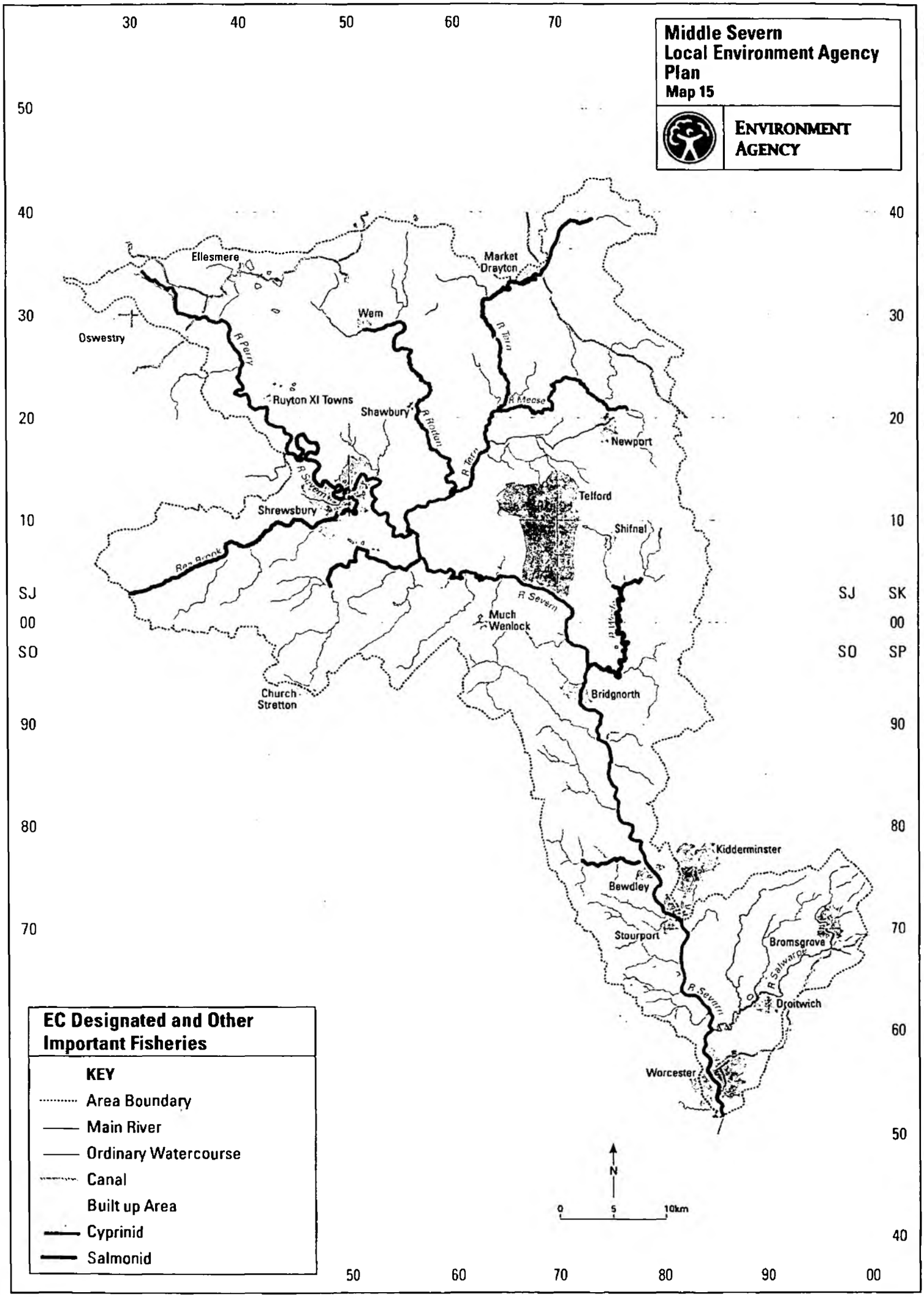
Local Perspective

Forest cover within the catchment is little more than half the UK average. With the exception of the Wyre Forest at Bewdley this cover is mainly in small, scattered pockets set within an agricultural context.

The area upstream of Bewdley broadly coincides with the Northern Plain and South Eastern Plateau Management Plan Areas of the Shropshire County Council *'Indicative Trees, Woodland and Forestry Strategy'* currently being produced. It is anticipated that this strategy will promote a doubling of forest cover in the catchment during the first half of the next century.

The Agency would actively encourage such a use in Nitrate Sensitive Areas, Nitrate Vulnerable Zones and Public Supply Source Protection Zones as a means of reducing agricultural nitrate inputs to sensitive groundwaters, provided that groundwater recharge was not affected by factors such as dense coniferous cover. In addition, intense tree cover in river corridors can lead to flooding problems and would be of particular concern in relation to the River Severn itself.

Forest cover in the area below Bewdley is sparse and little is known of any strategic proposals by County Councils to encourage forest development.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Droitwich
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EC Designated and Other Important Fisheries
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Built up Area
Cyprinid
Salmonid

5.13 Conservation - Wildlife and Heritage and Recreation

5.13.1 Fisheries

General

The Agency has duties to maintain, improve and develop fisheries. Fish populations are affected by quality and quantity of water as well as by the availability of suitable physical habitat features. Fish are therefore important indicators of the overall health of the river. The Agency is committed to the maintenance of breeding populations of salmonid and cyprinid fish, including the safeguarding of migration between the river and sea.

The Agency has formal responsibilities for angling and issues rod licences which are a legal requirement for fishing for any freshwater fish.

Local Perspective

The whole of the River Severn through this catchment is an EC designated Cyprinid Fishery (EC Directive 78/659/EEC) as are several of the tributary streams, some of which are also EC designated Salmonid Fisheries. Map 15 shows the location of these and other important fisheries. Map 18 shows the main angling waters in the catchment. The Agency operates publicly available fisheries at Atcham, Coalport and Market Drayton.

Coarse fish

Upstream of Bewdley, the Severn is a typical example of the 'barbel zone' of large Western European river systems (Huet 1959) having a moderate gradient, moderate flow, alternating rapids and quieter waters, supporting a characteristic flowing water fish fauna dominated by species such as barbel and chub. Barbel, one of the most important angling species, is not indigenous to the river but was introduced by the Severn River Board in the 1950s and has thrived ever since. Downstream of Worcester, the Severn becomes deeper and slower flowing and characteristic of Huet's 'bream zone'.

The middle reaches of the River Severn provide some of the best coarse fishing in the country, particularly for barbel, chub, dace and roach. Fishing on much of this length of the river is controlled by the Birmingham Anglers Association, one of the largest angling clubs in England, but numerous other smaller angling clubs have waters on the river and extensive day-ticket fishing is also available. Anglers travel from all over the country to fish the river, with many major competitions throughout the fishing season.

Tributary rivers such as the Tern and Perry contain moderate quality mixed coarse fisheries and the lower reaches of the Mor Brook, Borle Brook, Dowles Brook and River Salwarpe are popular with coarse anglers during winter periods when the River Severn is high or in flood.

Canal fisheries include parts of the Shropshire Union Canal, the Worcester/ Birmingham Canal and, to a lesser extent, the Droitwich and Newport Canals. In general, these canals support fair quality fisheries for carp, roach, gudgeon, bream and other species which favour such habitats. Fishing in the canals is very popular and mostly controlled by local angling clubs, many of whom offer day ticket facilities.

There are also numerous stillwater fisheries, both large and small, ranging from semi-natural lakes (*e.g.* the Shropshire Meres) to heavily stocked commercially operated day-ticket waters (*eg* Moorlands and Woodlands Fisheries). The latter category have become extremely popular in recent years, attracting large numbers of anglers and producing excellent catches of fish. Carp are the main species in these day-ticket fisheries, whereas more natural and balanced fish populations are found elsewhere.

Grayling is not a common species in this plan area, occurring mostly as a result of introductions by the Environment Agency's predecessors. They are currently found in the Rivers Tern, Perry, Worfe and Rea Brook.

Eels, once very abundant in most rivers, have declined in recent times. Similar declines have occurred throughout the British and European range of this species.

Salmon

Salmon use the Severn in this area primarily as a migratory route on their way to spawning grounds further upstream. However, some spawning does take place in the shallow, gravel areas downstream of Shrewsbury and between Bridgnorth and Kidderminster. Limited spawning also occurs in some of the tributaries, *e.g.* the Dowles, Borle, Cound and Rea Brooks and in the Rivers Worfe and Perry.

Salmon fishing is concentrated particularly below the navigation weirs where salmon tend to congregate whilst awaiting suitable flows to ascend these obstacles in their upstream migration. Most notable is Diglis Weir, where in excess of 20% of the total river catch of salmon is taken in some years. Holt, Larford and Shrewsbury Weirs also provide some good salmon fishing. Away from the weirs, localised salmon holding areas include, Hampstall, Blackstone, Coalport, Leighton, Cressage, Atcham, Monkmoor and the Isle.

Trout

Some important native brown trout populations exist in rivers in this catchment area, including the Cound Brook, River Worfe (and tributaries), upper Tern, Dowles Brook, Mor Brook and Borle Brook. Such populations are a nationally threatened resource, particularly in lowland rivers.

Trout fishing is primarily for stocked rainbow trout in the numerous stillwater put-and-take fisheries which exist in the catchment such as Patshull, Cound, Shatterford, Pool Hall and Astbury Falls. There are also many smaller pools, some open to the public others controlled by private syndicates. Trout fishing is also available on some of the tributary streams including the River Worfe, Cound Brook, Rea Brook and the upper reaches of the River Tern. Native brown trout stocks in these rivers are commonly supplemented with hatchery reared fish in order to boost catches.

Shad

Twaite Shad, and possibly the extremely rare Allis Shad, enter the River Severn to spawn. Diglis Weir, on the River Severn at Worcester, presently appears to limit the upstream passage of shad to potential spawning areas further upstream, although it is possible that access may occasionally occur via the lock system adjacent to the weir.

Commercial Fisheries

The main commercial fisheries activity in the area is trout farming and coarse fish dealing. Trout farms for both the table market and restocking trade exist at Tern Fisheries (Market Drayton) and Astbury Falls (Bridgnorth) both of which also rear some carp. A number of major coarse fish dealers are based in the catchment, selling a wide range of fish to fishery owners and angling clubs for restocking purposes. Some small scale commercial eel fishing also takes place occasionally in the catchment (*e.g.* at Aqualate Mere). There is one registered crayfish farm in the LEAP area, situated in the River Tern catchment.

5.13.2 Conservation - Flora and Fauna

General

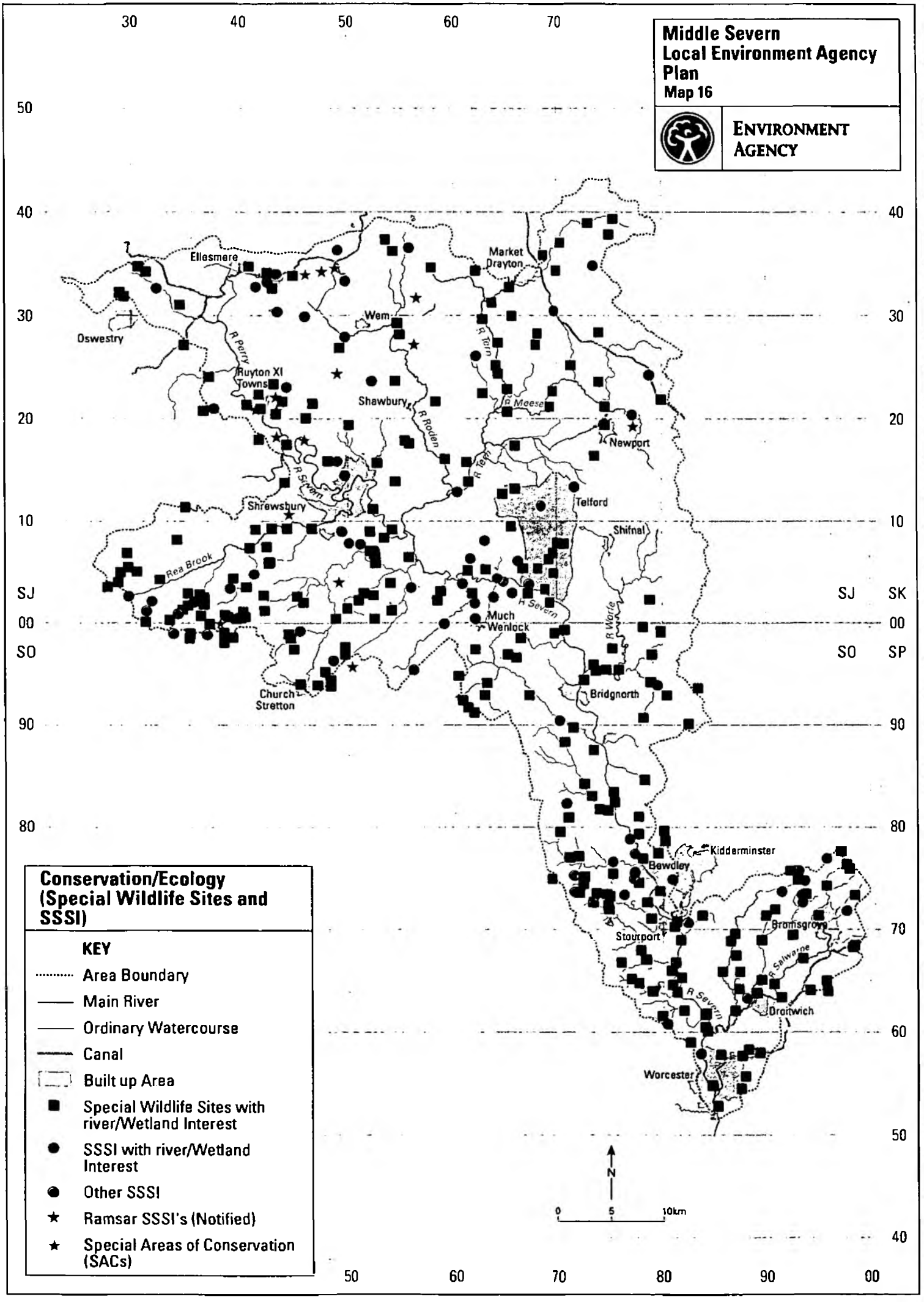
The Agency, whilst carrying out its functions or dealing with proposals by others, has a duty to promote and further the conservation of flora and fauna.

This use deals with:

* The protection and, where appropriate, enhancement of flora and fauna which may be entirely or only partially dependent on the water environment.

* The protection of areas formally designated as being of particularly high conservation value, including National Nature Reserves and Sites of Special Scientific Interest (SSSIs).

* The protection of sites which, although valuable in ecological terms, are not formally protected, eg other nature reserves and Prime Sites for Nature Conservation.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R Severn
Droitwich
Worcester
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10km
Conservation/Ecology
(Special Wildlife Sites and SSSI)
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Built up Area
Special Wildlife Sites with river/Wetland Interest
SSSI with river/Wetland Interest
Other SSSI
Ramsar SSSI's (Notified)
Special Areas of Conservation (SACs)

Local Perspective

Conservation sites

The principal nature conservation sites in thearea are shown on Map 16.

There are 158 designated Sites of Special Scientific Interest (SSSIs) of which 94 are associated with watercourses or wetlands. A large section of the Ironbridge Gorge is a SSSI and the Buildwas section of the river is a geological SSSI. The Wyre Forest SSSI is an extensive tract of semi-natural woodland centred on Dowles Brook, a tributary of the River Severn. An unusual habitat found within the catchment is inland saltmarsh at Upton Warren which formed by subsidence associated with historic brine extraction. There are also 628 water-related Special Wildlife Sites which are of county importance for nature conservation. The River Severn is a Special Wildlife Site throughout the catchment. Although there are high numbers of water-related conservation sites in the catchment there has also been a considerable loss of sites and damage to others (also see Section 3 **Issue 8**).

The meres and mosses of the Clwyd/Shropshire/Cheshire/Staffordshire plain form an important series of open water (meres) and peatlands (mosses). They have developed in hollows in the glacial drift left by receding ice sheets which formerly covered the plain. The meres range in depth from 1-27 metres and vary between 1-70 hectares in size. Although the majority are naturally nutrient rich (eutrophic), the water chemistry is very variable and reflects the differences in the surrounding drift deposits. Their associated fringing habitats (eg reed swamp, fen, carr and damp pasture), add to their conservation value. Habitat succession has led to some basins being infilled with peat and the resultant bogs and mires are the 'mosses'. There are also examples of 'schwingmoor' - quaking bogs.

Sixteen SSSIs including Berrington Pool, Bomere and Shomere Pools, Brown Moss, Marton Pool, Fenemere, White Mere, and Clarepool Moss in this catchment are of sufficient international importance to be designated as a RAMSAR site.
They are particularly good examples of natural or near natural wetlands, characteristic of a biogeographical region, with associated rare plant species and invertebrate assemblages (also see **Issue 11**). Aqualate Mere, Sweat Mere and Crose Mere, Fenns & Whixall, Bettisfield, Wem and Cadney Mosses, Morton Pool and Pasture, Cole Mere, Ossmere, Brownheath Moss and Hencott Pool are to be included in a future extension of this designation.

Clarepool Moss and the Fenns/Whixall complex, which is one of the largest remaining blocks of lowland raised bog in England, are also candidate Special Areas of Conservation (SACs).

A two kilometre length of the disused Newport Canal is a very good locality for aquatic plants including four species of pondweeds and frog-bit. It also supports a range of submerged and broad-leaved plant communities, a continuous narrow fringe of marginal swamp and some areas of extensive fen. A short length of the Montgomery Canal within this catchment has been subject to restoration, with some damage to wildlife interests despite mitigation measures. The Tyrley cutting on the Shropshire Union Canal is an important geological site.

Mammals

Despite a national decline of the otter population in the 1960s and 1970s, the Upper Severn catchment remained a stronghold for the species from which they extended their range into this catchment. Mink are also widespread within the catchment and often regarded as a pest species. Attempts to control mink by hunting may adversely affect otters which are particularly susceptible to disturbance. The water vole is a species of conservation concern within the area. It shows a rather localised distribution in the Midlands Region but populations are smaller within the Upper Severn area, the species having undergone a 70% decline in Shropshire. It has disappeared altogether from many areas. The distribution and presence of bats along watercourses in the area is not well known, but because of good water quality and excellent tree cover (*e.g.* Ironbridge Gorge and River Worfe) it is likely that a range of species is present.

Birds

A number of locally and nationally important bird species associated with rivers exist within the catchment, most notably kingfishers. Eroding cliffs on river meanders support many sand martin colonies whilst smaller rivers and brooks, such as the River Worfe and Dowles Brook, support dippers and grey wagtails.

Wading birds however, (lapwing, curlew and snipe) have shown dramatic declines through loss of wetland habitats primarily because of continued agricultural intensification. Lapwing and snipe populations have declined to such a level that they are now being considered a candidate Red Data Book species. Their distribution is now confined to the agricultural areas of the North East of the catchment. The barn owl is a nationally important species again in decline.

Discarded fishing tackle continues to be a problem for swans at certain locations especially at Bewdley and to a lesser extent at Worcester. Significant publicity has been given to the problems posed by hooks, fishing line and, historically, lead weights. To prevent further unnecessary suffering it is important that anglers remove unwanted tackle from the river bank. Plans to increase the number of boat moorings on the river at Worcester are of concern to the swan sanctuary in the city. Oily discharges from boats have been linked with health problems in swan populations and it is important that any new moorings are sited well downstream of the sanctuary.

Flora

Given the geological variation within the catchment, there is an accompanying diversity of vegetation. There are nationally scarce species present within the catchment, of which several are associated with water or wetlands. These include the following which are found on the Meres and Mosses - six-stamened waterwort (*Elatine hexandra*), needle spike-rush (*Elocharis acicularis*), cowbane (*Cicuta virosa*), marsh fern (*Thelypteris palustris*) and elongated sedge (*Carex elongata*). Floating water plantain (*Luronium natans*), which is typically found in clear, nutrient-poor water is only recorded at two sites in the catchment, the pools at Brown Moss and parts of the Montgomery Canal. To protect populations during the restoration of the Montgomery Canal navigation, sediments containing the plant were transferred to Aston locks.

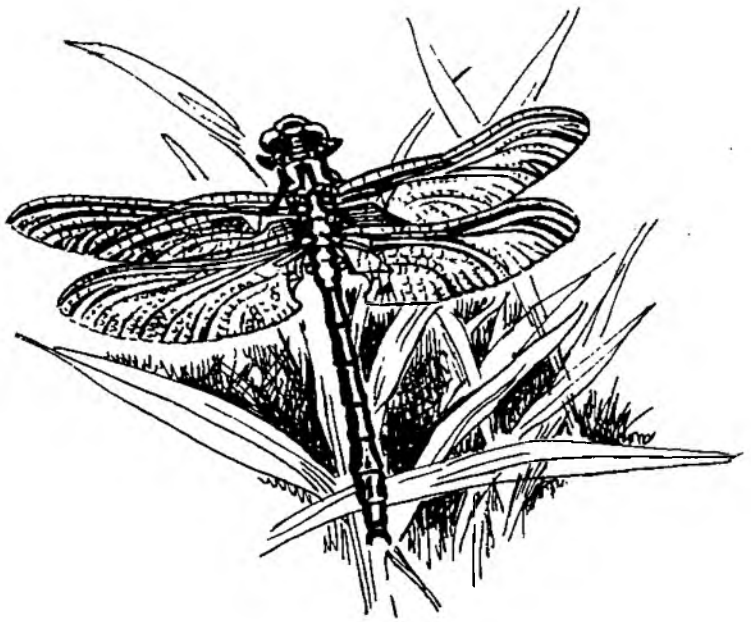
The Ribbon-leaved water plantain (*Alisma gramineum*) was first discovered at Westwood Great Pool and is only known from three other sites in Britain. Both floating water plantain and ribbon-leaved water plantain are target plant species under the national biodiversity action plan for which the Agency will have particular responsibilities.

Ribbon-leaved Water-plantain

Invertebrates

Most rivers and brooks in the catchment support a diverse and abundant invertebrate fauna. Three invertebrate species endangered in Britain and found at the Meres and Mosses are the caddis fly *Hagenella clathrata*, the fly *Limnophila fasciata* and spider *Cararita limnea*. Other Red Data Book species present are the beetles *Lathrobium rufipenne* and *Donacia aquatica*, flies *Prionocera pubescens* and *Gonomyia abbreviata* and spider *Sitticus floricola*. The Raft Spider (*Dolomedes fimbriata*) is a locally important species found in the Fenns & Whixall Moss.

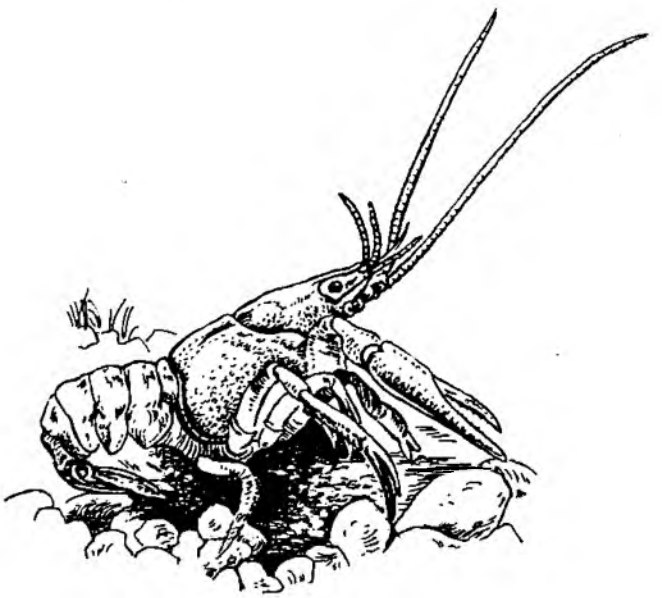
The Club-tailed Dragonfly (*Gomphus vulgatissimus*) is a species of conservation concern within the catchment. It is thought to be in decline nationally and restricted to rivers that remain in their natural state. The River Severn however, is an important stronghold. The Golden-ringed Dragonfly (*Cordulegaster boltonii*)is a relatively scarce species preferring heathland or stony streams, with recent records being confined to the Wyre Forest within the catchment. The Yellow-winged Darter (*Sypetrum flaveolum*) was only recorded within the catchment in 1995 including at Westwood Great Pool. The Beautiful Demoiselle (*Calopteryx virgo*) is associated with all the minor western tributaries of the Severn, (Dowles, Gladder and Dick Brooks), and is also found on the Hadley and Bow Brooks.



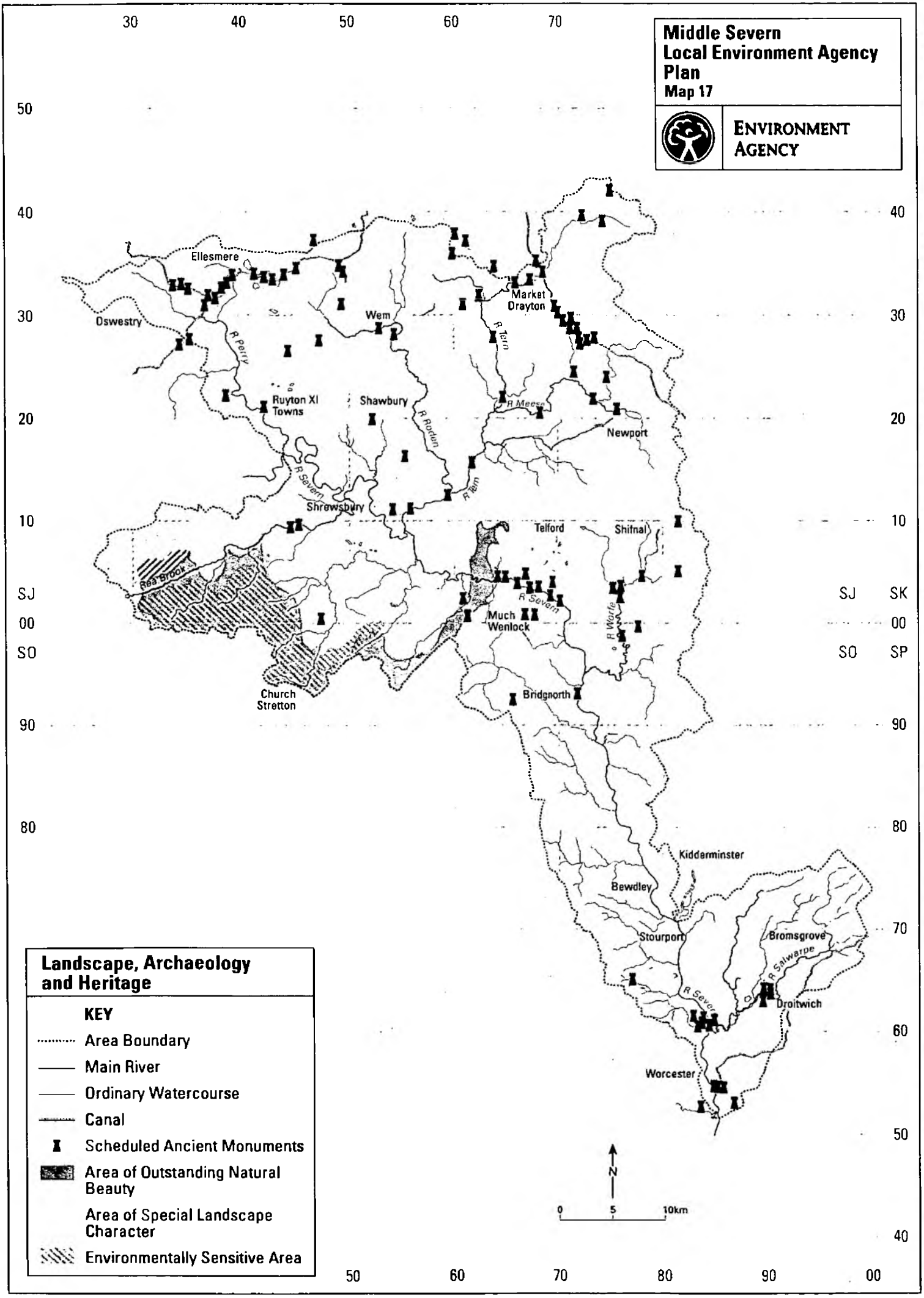
Club-tailed Dragonfly

The Freshwater Pearl Mussel (*Margaritifera margaritifera*), an internationally important species, is thought to be present at a number of locations within the catchment but survey work will be required to confirm this. The rare Desmoulin's whorl snail (*Vertigo moulinsiana*), a further Biodiversity Action Plan target species, is present at Sweat Mere SSSI.

The White-Clawed Crayfish (*Anstropotamobius pallipes*) is an internationally endangered species due to the impacts of crayfish plague. Populations within the catchment are not well recorded but there are known strongholds on the rivers Tern, Roden and Meese. Isolated populations in pools are particularly important.



White-clawed Crayfish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Landscape, Archaeology
and Heritage
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Scheduled Ancient Monuments
Area of Outstanding Natural
Beauty
Area of Special Landscape
Character
Environmentally Sensitive Area

5.14 Conservation - Landscape , Archaeology and Heritage

General

The Agency has a duty to conserve and enhance landscape, archaeological, architectural and historic features which are affected by the operations it consents and licences, or by its own operations.

This use deals with the protection of areas:

* Formally designated as being of value, *e.g.* National Parks, Areas of Outstanding Natural Beauty (AONBs), Scheduled Ancient Monuments, Listed Buildings, Conservation Areas and Environmentally Sensitive Areas (ESAs).

* Sites which, although valuable in landscape, archaeological or historical terms are not formally protected, *e.g.* sites identified on County Sites and Monuments Records.

Local Perspective

Landscape character

Shropshire, which covers the majority of this catchment, is world famous for its diverse range of geological features with eleven out of the thirteen geological time periods being represented. This, and the effects of glaciation, have led to a very diverse landscape. The major contrast is between the flat landscape of the north of the catchment characterised by the meres and mosses, Ironbridge Gorge and the steep wood-covered Severn valley, and the extensive semi-natural woodland with fast flowing brooks in the Wyre Forest. The Wrekin rises from the flat Shropshire plain and its isolated position makes it instantly recognisable from far distances. Part of the Shropshire Hills Area of Outstanding Natural Beauty falls within this catchment, together with Areas of Special Landscape Character, *e.g.* the North Shropshire Meres, Strine Levels and the contrasting valleys of the River Severn and River Worfe.

The Middle Severn is a classic example of a river in its middle or transfer zone, characterised by the channel being bordered by a wide floodplain. As a result of glaciation the river broke through and formed a gorge at Ironbridge then continued to drop through steep sided, often wooded slopes before reaching open floodplain at Worcester. Many of the tributaries lower down the river are small fast flowing stony brooks more characteristic of upland rivers, running as they do through the Wyre Forest. The meres and mosses are important remnants of glaciation.

Ironbridge Gorge

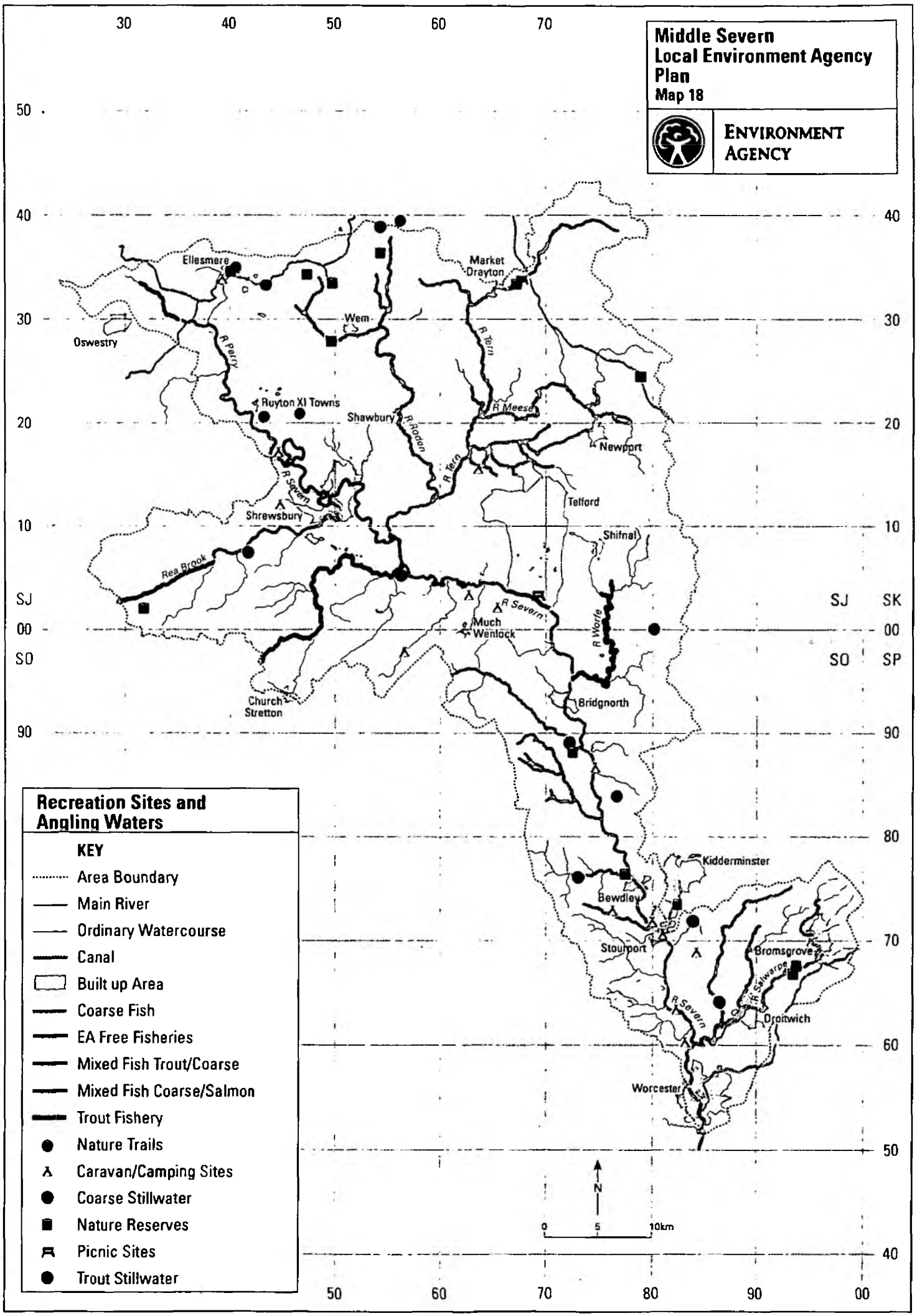
Ironbridge Gorge was designated as the first UK World Heritage Site in 1986. It is one of the few industrial sites recognised by UNESCO as being of 'outstanding universal significance'. Along 4 kilometres of the river corridor there is a concentration of industrial and accompanying social remains all of which bear witness to the emergence of global industrialisation. This was initiated by Abraham Darby's first furnace at Coalbrookdale.

The expansion of the coalfields and abundance of charcoal provided by the riverside woodlands enabled the very rapid industrialisation that took place. There are a total of 7 Scheduled Ancient Monuments, and 406 Listed Buildings associated with the site. The extensive semi-natural woodlands on the sides of the gorge are of ecological and landscape importance.

Cultural Heritage

The Severn valley had become significantly settled by the Neolithic period with cultivation of hill slopes and construction of hill forts during the Iron Age. The river was also important for Roman invasion, navigation and occupation with a large site at Worcester and a major city at Wroxeter. The river valleys continued as a focus for settlement, with Bridgnorth being a fortified settlement by the 9th century, the Severn navigable by quite large craft as far as Bewdley, and the later development of ports up to Ironbridge. The river as a trade route was vital for the industrialisation that took place, but navigation was mostly confined to a short period of the year when river conditions were suitable, usually for about 8 weeks in the autumn. This encouraged the development of the railway but industrial activity in the area gradually declined. Worcester and Shrewsbury were important as medieval towns and monastic settlements, with the river playing an important part in their development.

Wetlands in the catchment are of known and potential archaeological importance. Three bog bodies were discovered from Fenns & Whixall Moss in the last century and dug-out canoes have been found on Baggy Moor and at Marton Pool. A variety of Bronze Age artifacts and a hoard of Roman coins have also been recovered. There is a range of evidence showing that areas such as Baggy Moor and the Weald Moors have been exploited from prehistoric times and the subject of drainage as early as the 16th century. The wetlands of north Shropshire have recently been surveyed as part of the large scale North West Wetlands survey. Of particular interest were burn mounds recorded around the fringes of wetland areas in the Baggy Moor and Weald Moor areas, appearing on the surface of the fields as dense scatters of burnt stone. Their function is uncertain but it is thought that they were Bronze Age cooking places, perhaps with a ritual element. Deposits of alluvium and paleo-channels found in the floodplain are also potential archaeological sites, being important as deposits for environmental remains.


Middle Severn
Local Environment Agency
Plan
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Ellesmere
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Market Drayton
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Shawbury
R Roden
Newport
R Severn
Shrewsbury
Telford
Shifnal
Rea Brook
R Worfe
Much Wenlock
Church Stretton
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Recreation Sites and Angling Waters
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Area Boundary
Main River
Ordinary Watercourse
Canal
Built up Area
Coarse Fish
EA Free Fisheries
Mixed Fish Trout/Coarse
Mixed Fish Coarse/Salmon
Trout Fishery
Nature Trails
Caravan/Camping Sites
Coarse Stillwater
Nature Reserves
Picnic Sites
Trout Stillwater

5.15 Recreation, Amenity and Navigation

General

The Environment Agency has a duty under the Environment Act 1995 to promote the use of waters and land for recreational purposes. The Agency has very few landholdings in this catchment and works therefore in partnership with other organisations on other peoples land. Where it does own or lease land, the Agency ensures that such land is made available for recreational purposes, and that the needs of the disabled are taken into account.

This section includes watersports such as canoeing, but excludes angling which is dealt with separately in Section 5.13. Also included are recreational activities that are principally land based but occur within the proximity of the river corridor or wetlands, such as walking and birdwatching. The main areas of concern are access, public safety and the general aesthetic acceptability of the water environment.

The Agency does not encourage swimming in rivers and lakes because of the risk of drowning and the possibility of swimmers catching water borne diseases.

Local Perspective

Access and Informal Recreation

Riverside parks and picnic sites exist both in urban and rural areas along the Severn. However, facilities are limited on many other watercourses because of the rural, agricultural nature of the catchment.

The Severn Way, a footpath being promoted by the Agency in partnership with local authorities, has been created along the Severn valley from Melverley to Gloucester. Resources permitting, the route will be completed to the source during 1997. However, leaflets and promotional material will not be available until the whole route has been completed and a marketing and promotion strategy is developed.

Being close to the West Midlands conurbation, the River Severn is a very popular area for both caravanning and camping. Sites exist at numerous locations including Hampton Loade, Stourport, Holt Fleet and Gladder Brook. The natural beauty and relative tranquility of the area also attracts many visitors. Visitors to Arley and Worcester are still able to cross the river by means of local ferries.

Navigation and Boating

Navigation and rights of navigation vary within the catchment, with different conditions applying to the Severn, the canals and tributaries of the Severn. A free right of navigation based on common law is believed to exist on the Severn from Pool Quay to the Gladder Brook confluence at Stourport on Severn.

This common law right was given statutory backing in 1430 before the Statute of Law Revision Act removed it in 1948. Further legal investigations may be necessary to confirm the continuation of the common law right after 1948.

Below Stourport, British Waterways is the navigation authority as successor to the Severn Commissioners. It is also the navigation authority for the canals in the catchment. The Severn Navigation Restoration Trust is proposing more extensive use of the River Severn upstream of Stourport for navigation (see **Issue 19**). The Agency has no direct navigation responsibilities in the area. There are no known rights of navigation on other waters in this catchment area.

Canoeing takes place extensively in the catchment and relationships between canoeists and other river users are generally good. Rowing is also a popular activity, particularly in towns along the Severn, with rowing clubs established in the major towns. Raft races are also popular during the Summer months. Of particular note is the annual raft regatta organised by the Bridgnorth Lions Club. The annual coracle regatta at Ironbridge is a further notable local event held in the summer on the Severn.

Facilities for jet skiing and motorised watersports are almost non-existent within the catchment with the only facility being Priorslee Lake at Telford which is owned by Severn Trent Water plc and managed by the Priorslee Lake Water Sports Association. Although jet skiing occasionally takes place on the River Severn, most notably at Shrewsbury, complaints are often received by the Agency and the Local Authority regarding the noise and speed of such craft.

Section 6 State of the Environment

This section explains the area's targets and assesses the current state of the area for compliance. This process helps to identify shortfalls, which is how some of the issues, described in Part 1 Section 3, were identified.

6.0 Land

- 6.0.1 Waste Management
- 6.0.2 Integrated Pollution Control

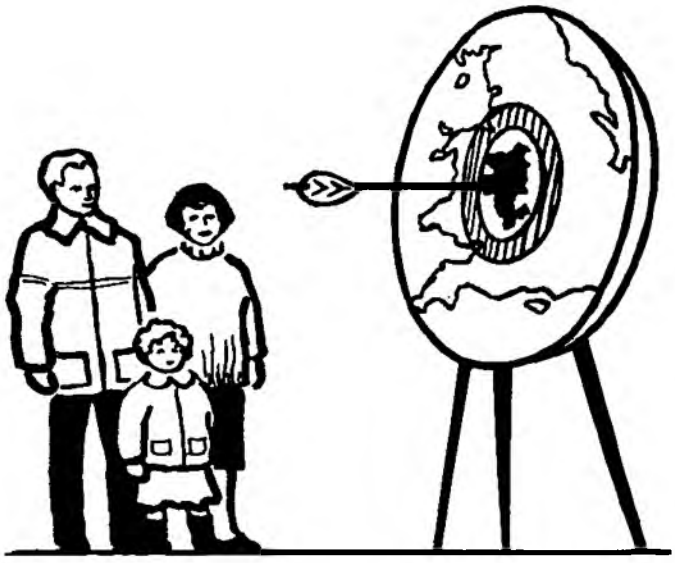
6.1 Air Air Emissions

6.2 Water

- 6.2.1 Water Resources
- 6.2.2 Water Quality
- 6.2.3 Flood defence

6.3 Wildlife and Amenity

- 6.3.1 Fisheries
- 6.3.2 Conservation (including wildlife landscape and archaeological interest)
- 6.3.3 Recreation



6.0 Land

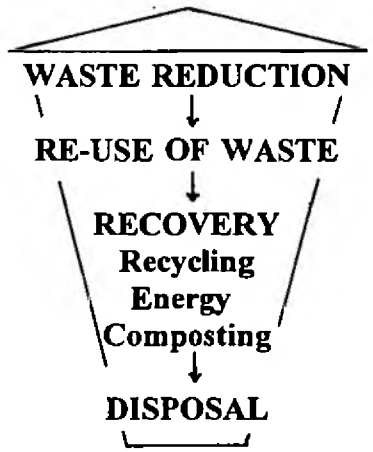
6.0.1 Waste Management

The Agency's principal aim is

* To regulate the treatment, keeping movement and disposal of controlled waste so as to prevent pollution of the environment or harm to human health, in a manner which is proportionate to the threat posed. We will do this through regulation and education.

* To work towards the targets in the Government's strategy for the management of waste.

The Department of the Environment's White Paper on waste 'Making Waste Work' sets out the Government's strategy for the management of waste. The strategy is based on the waste management hierarchy:



The aim is to move our waste management practices up the hierarchy that is to reduce waste wherever possible and where this is not possible to make the best use of the waste produced. However, there will be occasions where disposal is the only option or the most sustainable option.

Targets

The strategy includes both general targets and targets relating to particular waste streams. The targets which we will play a major role in achieving, and which we endorse as targets for the area are:

- To stabilise the production of household waste at its 1995 level.
- To reduce the proportion of controlled waste going to landfill by 10% over the next 10 years; and to make a further similar reduction in the following 10 years.
- To recycle 25% of household waste by the year 2000.
- 75% of companies with more than 200 employees to have published environmental policies covering waste issues by the end of 1999.
- 50% of companies with more than 200 employees to have management systems in place to give effect to their environmental policies by the end of 1999.

To work towards achieving more sustainable waste management practices and the targets in the Government's strategy, a balance needs to be reached between effective regulation, education and promotion of the waste management hierarchy.

Effective regulation means using the resources available to achieve the best results. Regulation is essential to ensure the highest level of environmental protection. But regulation also needs to be effective and this means adopting a proportional approach. In other words taking action which is proportionate to the risks involved and the benefits to be obtained and not allowing regulation to serve as an end itself. For example, this approach is adopted when investigating unauthorised activities; an activity that has caused or is likely to cause pollution will result in enforcement action. However, where there is no risk of pollution we will ensure those responsible remedy the situation but will not necessarily take further action.

Bearing this proportional approach in mind, we have identified landspreading as a priority for the area which requires strict regulation (see **Issue 1**). This method of waste management has the potential to cause serious pollution if not properly managed and controlled. In addition the quantity of wastes landspread is likely to increase over the next few years due to increasing landfill costs.

Educating the public, commerce and industry is carried out by way of leaflets and guidance, visits to companies, seminars and involvement with business clubs. This can include guidance on compliance with legislation as well as on waste minimisation and wider environmental issues (see Section 3 **Issue 20**).

State of the area

Waste Arisings

The facts and statistics in this section are derived from the Waste Management Plans produced by each of the former Waste Regulation Authorities within the Middle Severn area. Whilst the location of waste management sites can be determined to fall either within or outside of the area, some information cannot be dissected in that way and is only available on a District or County basis, for example waste arising statistics. The Agency will soon be undertaking a National Waste Survey to obtain up-to-date information on the amount of waste being produced both at a local and national level. The Survey will be structured in such a way that data can be readily aggregated and disaggregated. The outcome of this work will be published separately to Local Environment Agency Plans.

Household Waste

Map 13 shows the household waste arisings in each District within the area during 1993-94.

Most of this waste, over 90%, was disposed of to landfill. Approximately 5% in Shropshire and Hereford & Worcester was collected for recycling and the remainder in Hereford & Worcester was incinerated. The level recycled by both Counties is typical of the national average but there is still some way to go to meet the Government's 25% target by the year 2000. The potential for increasing the amount of household waste recycled by the Districts will depend on a number of factors including finding suitable sites for collection banks, finding suitable outlets (markets) for the materials collected and public participation.

Material such as paper, glass, cans and textiles are collected for recycling via bring banks provided by the District Council, by various voluntary groups, local charities and by the household waste reclamation sites provided by the County Council. Household waste reclamation sites also provide facilities for scrap metals, used engine oil, unwanted household chemicals and CFCs. The extent to which different household items can be recycled depends to a large extent on their degree of contamination, for example, plastics are not currently collected by the Districts because of the difficulty of separating out the different types of plastic and because many items contain more than one plastic type and mixed plastics are difficult to process and have a relatively low value.

As the major component of household waste is putrescible matter there is considerable scope for composting and Hereford & Worcester County Council and some of the Districts have been responsible for setting up home composting schemes. Furthermore, Beacon Waste Ltd has started collecting garden waste from household waste collection sites in Hereford & Worcester and is composting it at its landfill site in Pershore.

Commercial and Industrial Wastes

Commercial and industrial wastes arise in liquid, solid and sludge form. The types of waste and the quantity produced by any one District or area is a function of both the type of industry and commerce carried out in that District and the degree of industrialisation.

Table 9 Industrial and Commercial Waste Arisings in 1993/94

County	Industrial Tonnes	Commercial Tonnes
Hereford & Worcester	533,000	330,500
Shropshire	1,124,070	367,040

In Shropshire, 47% of industrial waste was produced in the Shrewsbury and Atcham district. The largest proportion of this comprised wastes from food and animal processing industries. In particular the dairy industry in the preparation of milk, milk products and industries engaged in the production of meat and animal by-products. The production of such wastes reflects the agricultural nature of this part of the county. These types of industries produced a much greater volume of waste per employee than any other manufacturing sector.

39% of Shropshire's total industrial waste arisings were produced in the Wrekin district. Telford is the major industrial centre of the County, virtually half of all manufacturing businesses are located in this area, encompassing a wide variety of industrial processes. Industry within Wrekin district produced a wider range of wastes within each industry type although the largest proportion of waste produced in Wrekin district originated from the food processing industries.

Approximately 50%, of industrial and commercial wastes are reused or recovered in some way within the Counties. Reused wastes include wood, animal and food waste, waste oils and solvents.

Wood is mainly used as a secondary raw material for the production of chipboard. Animal and food wastes are used as secondary raw material for the production of animal foods or soaps. Waste engine oils are cleaned and reused or they may be blended and used as secondary fuels. Solvent wastes are filtered and re used.

Materials recycled include scrap metal which arises as offcuts, swarf and filings from the metals and engineering industries as well as from commercial activities such as transport, garages and wholesalers; paper, arising predominantly from the printing sector; cardboard from the distribution sector and plastics and rubber mainly from plastics products manufacture and from the metal manufacturing sector.

Animal and food wastes, which arise mainly from the food and drink processing industries, are also recovered by landspreading.

Whilst all wastes can become hazardous if not handled and managed correctly, some wastes are recognised as requiring particular precautions and therefore have to be handled in accordance with certain procedures. Such wastes are termed special wastes and include flammable and toxic substances. A total of 14,599 tonnes of special waste was generated in Hereford & Worcester during 1993 and 5,457 tonnes in Shropshire during 1994-95. The largest single waste type in both Counties was inorganic acids produced mainly by the metals, chemicals and engineering sectors. Toxic metal compounds represented the next largest special waste type comprising mainly sludges from the same sectors.

Clinical Wastes

It is estimated that in Shropshire a total of 1,385 tonnes of clinical waste and Hereford & Worcester a total of 1,508 tonnes are generated annually. In Hereford & Worcester the annual arisings of clinical waste has decreased over the last 10 years.

Construction and Demolition Wastes

Construction and demolition wastes include brickwork, masonry, pipework, timber, rubble and other materials associated with building and demolition. The quantities of these wastes are greatly increased by the inclusion of soils and subsoils which are often generated as a result of preparatory works prior to development. The inclusion of such large quantities of soil within this group of wastes often results in demolition waste being defined as inert. However, construction waste is rarely inert, often containing wood and platerboard. In addition, soils excavated during the preparation and development of a site range from clean soils from, for example, a greenfield site to heavily contaminated soils from the development of contaminated land.

The quantity of construction and demolition wastes arising in the Counties is difficult to estimate due to the variable nature of construction projects and because large quantities are used as infill on construction sites.

It is estimated that in Shropshire 572,200 tonnes and in Hereford & Worcester 692,000 tonnes of construction and demolition wastes were deposited at landfill sites within the Counties during 1993.

Construction and demolition wastes have potential for recycling: wood, glass,metal and plastic are all recyclable. Concrete, road scalpings and brick waste have the potential for use as secondary road aggregates and soils may be used in the reclamation of land. The recycling and reuse of these materials can make a significant contribution to the rate of extraction of minerals and aggregates. It is not known what proportion of construction and demolition waste arisings in the Counties are recycled.

Nationally it is estimated that 63% of construction and demolition wastes is recycled: the majority (30%) to low level uses such as on or near to the site from which they arose for filling site roads and improving soft areas or in landfill engineering and a smaller amount (4%) to secondary aggregate (Humphreys & Partners 1994). Whether a waste is reused, recycled or disposed of depends largely on the cost to the construction or demolition contractor.

Current and Future Capacity at Waste Management Facilities

Landfill Sites

In order to assist in predicting future requirements for landfill an assessment of remaining and future void capacity is essential. A survey carried out during 1994 estimated sufficient landfill capacity within Shropshire until 2000 and within Hereford & Worcester until 2001. These dates are based on rates of input during 1994. The actual remaining life of any one landfill will be dependent on a number of factors including:

- Number of sites competing.
- Operating limits set by the licence.
- The quantity of waste requiring disposal.

With regard to the quantity of waste for disposal, as waste minimisation, reuse and recycling initiatives become established the quantity of waste requiring disposal should decrease. Indeed it is recognised that the current level of landfilling is not sustainable in the long term and there is a finite amount of void space available. However, no matter how well developed alternative options for managing waste become some waste will always require landfilling.

Treatment Facilities

The catchment area has a total of four treatment facilities. There is one facility for the recycling of waste oil at Stourport. A site based in Ironbridge for the treatment of pulverised fuel ash, a site based at Bagley Marsh for effluent treatment and a sewage treatment plant which provides facilities for gully emptyings and a limited range of difficult wastes at Monkmoor.

6.0.2 Integrated Pollution Control (IPC)

The Agency's duty in authorising a process is:

* To ensure that certain objectives are met including that the best available techniques not entailing excessive cost (BATNEEC) are used to prevent, or minimise, the release of prescribed substances to land, air or water.

* To ensure the best practicable environmental option (BPEO) is used where the releases from the processes could be more than one of the environmental media; land, air or water. This will aim to ensure that the overall impact on the environment is minimised.

IPC is applied to the largest, technically complex and potentially most polluting industrial processes in the Area

Targets

Virtually all the regulated processes under the Environmental Protection Act 1990 (EPA) have ongoing improvement programmes. It is through these that the Agency promotes a site specific strategy for reducing the impact, or potential impact, of the process on the environment. Information concerning these processes is available from the Agency's public register. In addition there is an annual Chemical Release Inventory for all IPC sites.

State of the area

Within the plan area there are 12 regulated processes. These have been described in Section 5.2. All sites have their own improvement programmes, which they are currently implementing. Two sites of particular interest to the plan are raised as issues in Section 3, **Issues 16 and 4.** The Agency collects data on air emissions to assess the impact on air quality from its IPC sites. We are not responsible for the regulation of air quality in itself as this falls to local authorities, who have wider powers in this respect.

Radioactive substances

Targets

The Agency seeks to minimise radioactive releases to the environment. This is done by applying a criterion that releases shall be as low as reasonably achievable and ensuring that the best practicable means are implemented to achieve this. A committed dose methodology is used for assessing the risk to man. This may include bioaccumulation i.e the build up of toxins, heavy metals or radioactive substances in vegetation and lower down the human food chain. Liaison with MAFF is maintained for the largest sites.

State of the area

The use of radioactive substances in the area comprise a small number of industrial users. These users are registered or authorised by the Agency and there have been no incidents or breaches of their conditions.

6.1 Air

Air Emissions

The Agency collects data on air emissions to assess the impact on the environment of the emissions to air from its IPC sites. We are not responsible for the regulation of air quality per se as this falls to Local Authorities, who have wider powers in this respect.

Targets

The Government launched its National Air Quality Strategy in August 1996. This sets out a new set of eight air quality standards which are to be complied with by 2005. The duty for managing air quality improvements is clearly laid upon Local Authorities and discussions are taking place between the parties as to how these improvements are to be achieved.

The Environment Agency will be assisting local authorities in the development of their action plans to control air quality. Further information on these plans can be obtained from the Environmental Health Departments in the Local Authorities listed in Table 3.

State of the area

As part of the Government's National Air Quality Strategy every Local Authority has to review present air quality, and compare this with standards and objectives laid out in the strategy. As part of this requirement the Local Authorities are also required to provide information on air quality. See section 2.2 Table 2. The table shows the results of monitoring sulphur dioxide and nitrogen dioxide in the air at sites within those Local Authorities lying predominantly in the area.

The existing European Union Air Quality Standard for nitrogen dioxide is 200µg/m^3 (expressed as the 98th percentile) and for sulphur dioxide it is 120µg/m^3 (expressed as the median daily value). As a comparison to these EU Air Quality Standards the table below shows the proposed objectives of the Air Quality Strategy.

Table 10 The proposed objectives of the Air Quality Strategy

Pollutant	Standard		Objective
	Concentration	Measured as	
Benzene	5 ppb	running annual mean	to be achieved by 2005
1,3 Butadiene	1 ppb	running annual mean	to be achieved by 2005
Carbon Monoxide	10 ppm	running 8-hour mean	to be achieved by 2005
Lead	0.5 µg/m^3	annual mean	to be achieved by 2005
NO_2	104.6 ppb 20 ppb	1 hour mean annual mean	104.6 ppb, measured as 99.9th percentile to be achieved by 2005
Ozone	50 ppb	running 8-hour mean	50 ppb, measured as 97th percentile to be achieved by 2005
PM_{10}	50 µg/m^3	running 24-hour mean	50µg/m^3, measured as 99th percentile to be achieved by 2005
SO_2	100 ppb	15 minute mean	100ppb, measured as 99.9th percentile to be achieved by 2005

The Agency must ensure that the operation of all existing and any new IPC processes do not result in the above air quality objectives being breached.

6.2 Water

6.2.1 Water Resources

The Agency's principal aim in relation to water resources is:

* To manage water resources through conservation, redistribution and augmentation of surface and ground water supplies in order to achieve the right balance between the needs of the environment and those of the abstractors.

Surface Water

The rivers and minor watercourses in the middle Severn area are important for water supply to agriculture and public water systems. The flow regime of the minor watercourses is generally unregulated whereas the River Severn itself is regulated by releases from Clywedog Reservoir in the Upper Reaches area and also through releases via some of the more major tributaries from the Shropshire Groundwater Scheme. (See Section 2.4.3)

Licences to abstract from watercourses are nowadays issued subject to special conditions which have the effect of restricting abstractions at times of low flows. These restrictions may be tied to either local flow measuring structures which are self-regulating or to Agency controlled flow gauging stations which are enforced by written notification to the licence holder from the Agency.

Targets

Policy is to encourage winter abstraction for storage and subsequent summer irrigation wherever possible - indeed, this is the only option in some areas. Ideas are being explored to assess the viability of utilising groundwater abstraction at critical flow times to relieve the pressure on watercourses.

State of the area

Table 11 below, shows the number of licences that are tied to Agency flow gauging stations. Restrictions on licences increase incrementally such that newer licences are restricted first thus protecting existing rights. Several watercourses have already been closed to further summer abstraction or are subject to severe restriction conditions. This will ensure protection of the source from any additional detrimental abstraction.

Table 11 Licences restricted by flows at Agency gauging stations
(as at 31 December 1996)

Source of Water	No. of licences	Controlling watercourse	Agency Gauging Station	Thres-hold Ml/d
R. Perry	16	R. Perry	Yeaton	53
Rea Brook	5	Rea Brook	Hookagate	21
Cound Brook	5	Rea Brook	Hookagate	23
R. Tern	6	R. Tern	Ternhill	56
R. Tern	29	R. Tern	Walcot	230
Bailey Brook	1	Bailey Brook	Ternhill	11
R. Meese	27	R. Meese	Tibberton	65
Coley Brook	1	Coley Brook	Coley Mill	14
R. Strine	3	R. Strine	Crudgington	27
R. Roden	15	R. Roden	Rodington	57
Borle Brook	1	Dowles Brook	Oak Cottage	3.3
Mor Brook	3	Dowles Brook	Cottage/Dowles	5.2
R. Worfe	11	R. Worfe	Burcote	54.6
R. Salwarpe	6	R. Salwarpe	Harford Hill	40
R. Severn	27	R. Severn	Oak Bewdley	773

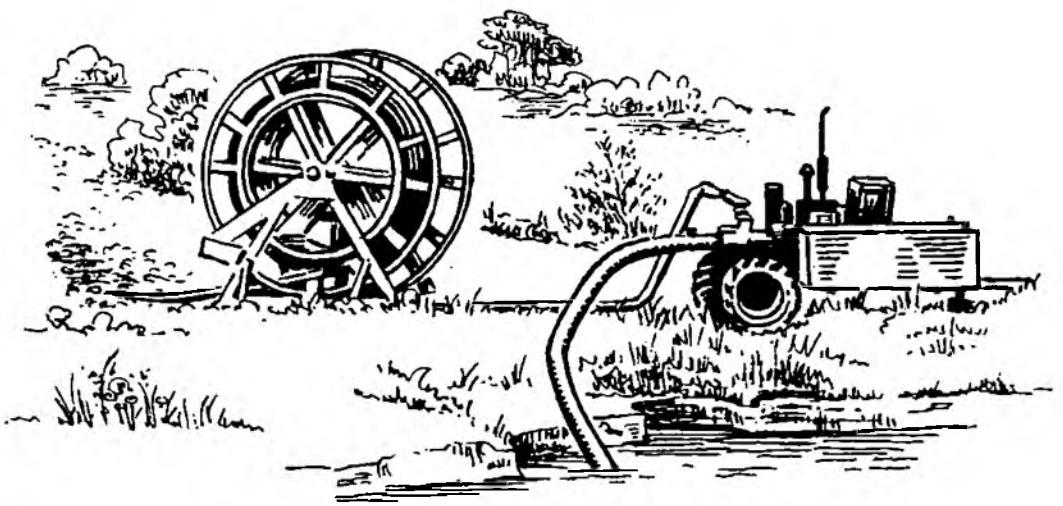


Table 12 Summary of Abstraction Policy for Main Watercourses in Area.
(as at 31 December 1996)

Watercourse.	Policy.
River Severn	Abstraction subject to R Severn regulation scheme and local prescribed flow (LPF) for minor tributaries.
Ford Brook	Closed to summer abstraction, winter subject to LPF.
River Perry	Closed to further summer abstraction. Winter abstractions considered subject to restriction conditions related to Yeaton and LPF in upper reaches & tributaries.
Rea Brook	Subject to restriction conditions related to Hookagate for both summer and winter abstractions and LPF in upper reaches..
River Tern	Subject to restriction conditions related to either Ternhill or Walcot for both summer and winter abstractions. LPF for minor tributaries.
Bailey Brook	Subject to Bailey Brook (Ternhill) restriction for both summer and winter abstractions.
River Meese	Closed to summer abstraction. Winter abstraction considered subject to restriction.
River Strine	Abstractions subject to restrictions related to Crudgington gauging station. Upper reaches subject to LPF policy.
River Roden	Abstraction subject to restrictions related to flows at Rodington and a LPF policy for upper reaches and minor tributaries.
Cound Brook	Closed to summer abstraction. Winter abstraction subject to restriction condition related to flows at Hookagate or Cound Stank.
River Worfe	Closed to summer abstraction. Winter abstraction subject to restrictions related to flows at Burcote. LPF policy in upper reaches.
Mor Brook, Borle Brook and Dowles Brook	Subject to restriction policy related to flows in the Dowles Brook.
Salwarpe	Abstractions subject to restricions related to flows at Harford Hill and local prescribed policy for upper reaches and minor tributories.

Groundwater

Classifications in Table 13 are based on the known abstraction rates and long-term recharge rates of the unit together with any environmental needs in the area. The Agency is committed to an annual review of all units in the area and to conduct modelling for those units classified as category A (*i.e.* no further resources are available). The modelling will enable the Agency to formulate an accurate and up-to-date licensing policy for the critical units.

In groundwater units where resources are available, further licensing of new abstractions is possible, but the objective is to ensure that this is not beyond the sustainable limit.

State of the area

Several groundwater management units in the area are closed to further abstraction to protect existing users and the environment (See Table 13). Much of the area is underlain by major and minor aquifer with the exception of areas around Wem, Worcester, Droitwich and areas covered by the Severn River Authority (Exception from Control) Order 1967 around Much Wenlock and Worthen; the so-called "Exempt Area". Abstraction of groundwater in this exempt area does not require licensing by the Agency.

Targets

The Agency's policy is to classify aquifers on the basis of present usage and an understanding of environmental problems related to existing levels of abstraction. The existing licences for 1.5 megalitres per day or more are shown on Map 10. The classification is shown in Table 13.

Table 13 Groundwater Units and Classification.

UNIT NO.	UNIT NAME	CATEGORY
D 61	Oswestry (part)	D
F 61	Whittington	A
F 62	Knockin (part)	D (some reduction in baseflow occurring @ Kinnerley)
F 64	Ensdon (part)	D
F 63	Alberbury (part)	A
D 62	Hanwood (most)	D
F 65	Merrington	D
F 66	Stanton	D (large applications - consider baseflow)
F 67	Radmoor	D (large applications - consider baseflow)
F 68	Longdon	D (consider baseflow in East)
D 63	Dorrington	D
D 72	Cluddley	D
F 72	Wistanwick	D (need to protect baseflow)
F 71	Market Drayton	D (need to protect baseflow on large applications)
F 78	Wellings	A
D 71	Chipnal	D
F 41	Bishops Wood	D
F 73	Sambrook	D (some compensation flows maybe required update)
F 75	Aqualate	B (TL)
D 73	Coalport	D
F 76	Cosford	A
F 77	Worfield	A
F 81	Wombourne (part)	A
D 81	Six Ashes	D
D 82	Highley	D
D 83	Lem Hill	D
F 84	Stourport (part)	A
F 83	Kidderminster (part)	A
F 85	Astley	D (consider baseflow)
F 86	Ombersley	A
F 87	Bromsgrove	A

Category A : No resources available
Category B : Special study needed; presumption against large licences
Category C : Special study - no presumption
Category D : Resources available

Strategic Water Resource Development

Over and above these essentially local/regional plans, national needs for future water resource developments can impact substantially on the middle reaches of the River Severn. These national needs arise in response to regionally identified shortfalls in water supply provision in any part of the country, and may be promoted by water companies, singly, jointly or in partnership with others, such as the Agency. This is more fully explained in *'Water - Nature's Precious Resource'* published in March 1994 by the former NRA.

In practice, the three potential medium term future water resources developments with Middle Severn impacts are:-

(a) Redeployment of part of the yield of Lake Vyrnwy

(b) Transfer of River Severn water to the Trent for use in Trent / Anglian districts

(c) Transfer of River Severn water to Thames/South Western regions

Lake Vyrnwy water can be used to further regulate the River Severn to support further abstractions either for local/regional use or for inter-basin transfers - (b) or (c) above. Better use of this under-reservoired catchment can provide substantial extra resources via the River Severn provided some alternative provision can be arranged to meet NW regional demands in drought years.

Transfer to the River Trent from the middle reaches of the River Severn would most likely take place in the Telford area. This would only be pursued if demands in Trent/Anglia could not be met through better use of water or leakage control. The development would only abstract water when it was naturally plentiful in the River Severn or if supported by specially identified and newly authorised river regulation releases.

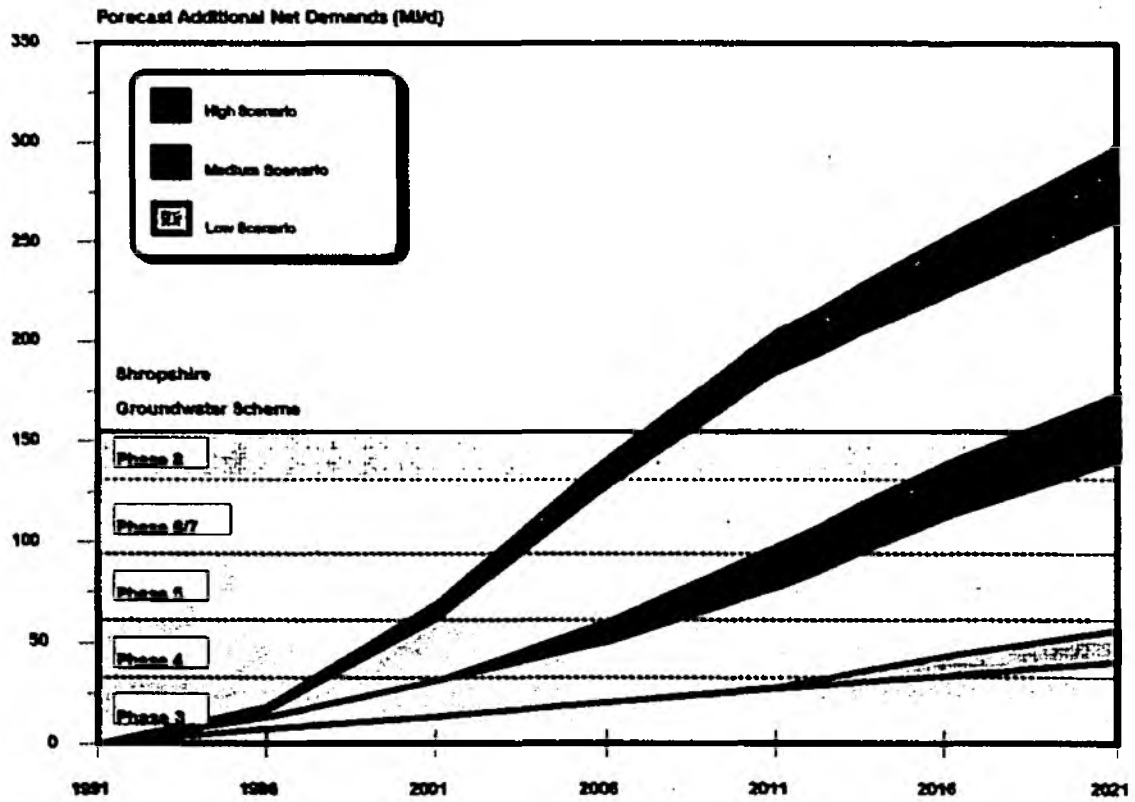
Transfer to the River Thames or to South West England would take place from the lower reaches of the River Severn - probably downstream of Tewkesbury. The only impacts this would have on the middle reaches would arise during periods when additional river regulation releases may be passing through the area en route to a new intake. As with the Trent transfer, such releases would only arise if the options of plentiful seasonal water from the river had also been made.

In all three cases (a), (b) and (c) above, the use of summer regulation releases to support extra-regional demands would require additional authorisations to use and operate control storages, over and above the existing commitment to further develop resources to meet regional demand increases via the already authorised Shropshire Groundwater Scheme.Increased abstraction from the River Severn is the preferred option for meeting resource deficits in the Severn and South staffs supply areas which cannot be met by local resources.

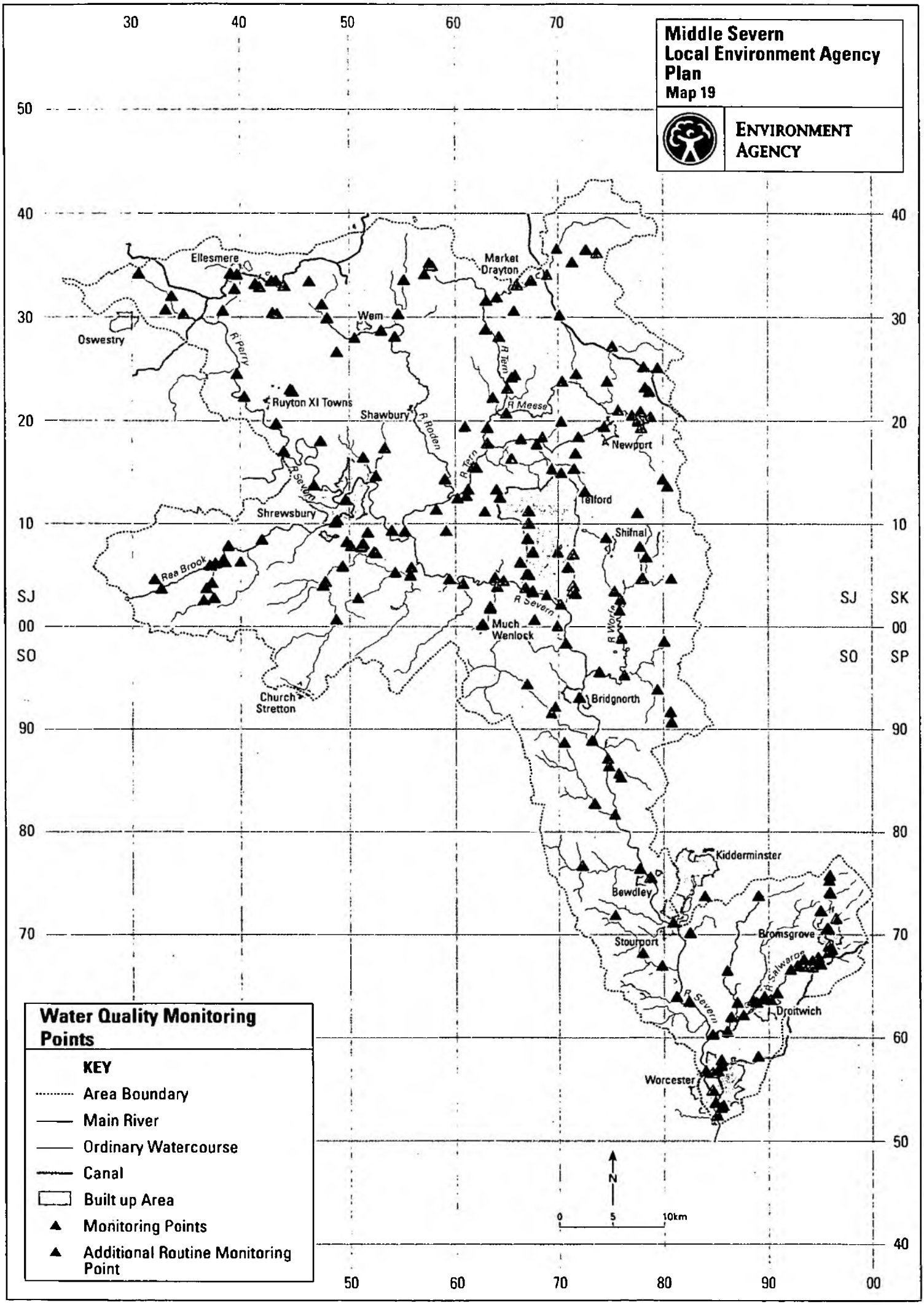
Further phased development of the Shropshire Groundwater Scheme will support increased local, net abstractions from the River Severn.

The Scheme is fully licensed with two phases already developed yielding a net of 80 Ml/d. Phase 3 is scheduled for completion by autumn 1997 and this combined with the five remaining phase areas would support up to an estimated further 155 Ml/d net abstraction from the River Severn. See Figure 6 below.

Figure 6 Demand Scenarios in the Severn Supply Area and the Phased Development of the Shropshire Groundwater Scheme.



Projections of the likely phasing of the scheme for a range of low, medium and high demand.


Middle Severn
Local Environment Agency
Plan
Map 19
Environment Agency
Ellesmere
Market Drayton
Wem
Oswestry
R Perry
R Tern
Ruyton XI Towns
Shawbury
R Roden
R Meese
Newport
R Severn
Telford
Shrewsbury
Shifnal
Rea Brook
R Severn
R Worfe
Much Wenlock
Church Stretton
Bridgnorth
Kidderminster
Bewdley
Stourport
Bromsgrove
R Salwarpe
R Severn
Droitwich
Worcester
SJ
SK
SO
SP
30
40
50
60
70
80
90
00
10
20
N
0
5
10km
Water Quality Monitoring Points
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Built up Area
Monitoring Points
Additional Routine Monitoring Point

6.2.2 Water Quality

The Agency's principal aim for water quality is:

* To achieve a continuing overall improvement in the quality of rivers, estuaries and coastal waters through the prevention and control of pollution. In achieving this we aim to ensure that the polluter pays.

Targets

(i) Water Quality Objectives

The Environment Agency has strategic targets for all significant rivers known as Water Quality Objectives (WQOs).
These objectives provide a basis for water quality management decisions and are based on a scheme known as the Rivers Ecosystem (RE) Classification. The RE scheme comprises five quality classes which reflect the chemical water quality requirement of different types of river ecosystems.

Table 14 Water quality within each ecosystem can be described as:

Class RE 1:	Water of very good quality suitable for all fish species.
Class RE 2:	Water of good quality suitable for all fish species.
Class RE 3:	Water of fair quality suitable for high class coarse fish populations.
Class RE 4:	Water of fair quality suitable for coarse fish populations.
Class RE 5:	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.

For each designated stretch of water medium and long term RE Class targets are proposed. The **medium term objectives** are designed to be realistic and achievable and include a date by which the target water quality should be met.

Where work is planned in the catchment to improve water quality the date assigned to the medium term objective reflects the date by which the improvements should have taken place. **Long term objectives** are set for planning the maintenance and improvement of water quality.

Ultimately the RE targets may be given a statutory footing by the setting of Statutory Water Quality Objectives (SWQOs) by the Secretary of State. The Environment Agency would be required, as far as practicable, to ensure that such targets were met. A pilot scheme is currently in progress on the Worcestershire Stour to test the operation of SWQOs.

Water Quality Objectives are established for stretches of river defined according to their upstream and downstream limits. Physical features such as tributaries, weirs or significant discharges often mark the ends of river stretches since they could potentially affect the quality of the classified watercourse. Details of the WQOs assigned to river stretches, along with compliance and the monitoring data upon which compliance is assessed is included on the Public Register, information on which can be obtained from the Area Office.

Some consents for water company sewage treatment works (STWs) are based on historical needs and performance rather than river quality targets. Improvements in effluent quality are needed to meet these targets and one of the roles of the Agency, in conjunction with the DoE, is to negotiate future investment by the water companies. Asset Management Plans (AMP) are produced which specify the improvement work programmed for the period of the plan. The second stage of these plans (AMP2) was agreed in 1994 and it is this plan that governs the priorities for investment for the period covered by the Middle Severn LEAP. Map 19 shows the Water quality monitoring points in the area.

Table 15 Water Quality Criteria of the R E Classification Scheme.

Class	Dissolved Oxygen % saturation 10 percentile	BOD (ATU) mg/l 90 percen -tile	Total Ammonia mg N/l 90 percentile	Un-ionised Ammonia mg N/l 95 percentile	pH lower limit as 5 percentile; upper limit as 95 percentile	Hardness mg/l Ca CO_3	Dissolved Copper µg/l 95 percentile	Total Zinc µg/l 95 percentile
RE1	80	2.5	0.25	0.021	6.0 - 9.0	≤10 >10 and ≤50 >50 and ≤100 >100	5 22 40 112	30 200 300 500
RE2	70	4.0	0.6	0.021	6.0 - 9.0	≤10 >10 and ≤50 >50 and ≤100 >100	5 22 40 112	30 200 300 500
RE3	60	6.0	1.3	0.021	6.0 - 9.0	≤10 >10 and ≤50 >50 and ≤100 >100	5 22 40 112	300 700 1000 2000
RE4	50	8.0	2.5	-	6.0 - 9.0	≤10 >10 and ≤50 >50 and ≤100 >100	5 22 40 112	300 700 1000 2000
RE5	20	15.0	9.0	-	-	-	-	-

(ii) EC Directive Reporting

EC Directives apply to the quality of surface water for potable (drinking water) abstraction, to support fish life and to control the discharges of dangerous substances. The relevant directives are given in Appendix 4.

(iii) Nitrate Vulnerable Zones

These are designated as part of the UK Government implementation of the EC Nitrate Directive 91/676/EEC which says that all member states must

* Desígnate as Nitrate Vulnerable Zones (NVZs) all known areas of land which drain into waters where the nitrate concentrations exceed, or are expected to exceed, 50 mg/1 or where there is evidence of nitrate limited eutrophication;

* Establish action programmes which will become compulsory in these zones
at a date to be agreed between 1995 and 1999;

* Review the designation of NVZs at least every four years.

For groundwaters, the scheme required the Environment Agency to assess which public water supply boreholes either exceed 50mg/l at present or are likely to do so before the year 2010. For each of these, where the main cause of the high nitrate concentrations is considered to be agricultural, Nitrate Vulnerable Zones have been drawn. These are the areas in which any rain draining through the soils are thought to contribute to the water drawn from the borehole.

For surface waters, sources were designated as polluted where nitrate samples failed to meet the 50 mg/l criteria for at least 95% of the samples with 95 % confidence in the result. The appropriate NVZ was defined as the topographical catchment to the failing sampling point but excluding all land contributing to upstream sample points which passed similar tests.

The zones were put out for public consultation in 1994 and any comments received were answered or zones changed where this was appropriate. During the summer of 1995, any unresolved queries were assessed by an independent appeals panel whose review was received in the Autumn 1995. The boundaries of the Nitrate Vulnerable zones were published in 1996

The measures to be taken in the NVZs ('the action plan') have been put out for consultation and are likely to be in line with the Code of Good Agricultural Practice for the protection of Water. As such, it is considered that there will be no loss of production resulting from these measures so no compensation will be given to farms within the zones.

Zones will be reviewed during 1997. Nitrate Vulnerable Zones are statutory areas and when the scheme is implemented between now and December 1999, adherence to the action plan will be **compulsory.** Map 6 shows the NVZs in the area.

Nitrate Sensitive Areas

The present Nitrate Sensitive Areas are designated as part of the EU Agri-Environment Regulations and are all groundwater areas. The National Rivers Authority (now subsumed within the Environment Agency) produced maps of the areas contributing to the designated boreholes. Within these, farmers can **voluntarily** join the scheme and opt for one of a number of schemes of increasingly restrictive agricultural practices designed to substantially reduce nitrate leaching. In return, they receive compensation in line with the perceived reduction in crop yield. Farmers can join at any time from 1995 to 1999 and sign up for a period of 5 years. All Nitrate Sensitive Areas lie within a Nitrate Vulnerable Zone.

State of the area

(i) Water Quality

Table 16 details the stretches of water covered by this LEAP together with the Rivers Ecosystem targets assigned to them. For each stretch three RE designations are given:

Current Quality

The actual quality of the river over the last three years (1993-95) in terms of an RE class is given in Table 16 and this can be compared with the medium and long term water quality objectives. (See Maps 20 and 21).

Where the current quality is less than the desired medium or long term quality action is required by the Agency, either to investigate the causes of the problem or to assess the need for investment to be programmed in future AMPs. (See **Issue 9**)

Medium Term Objectives

Targets which should be met within the five year period of the LEAP. This objective assumes that all consented discharges in each river stretch discharge to the limit of their consents both in terms of quality and volume.

Long Term Objectives

Targets which go beyond the time period of the plan. These are shown on Map 21.

Most rivers in the area are of good water quality with only a relatively small number of fairly localised problems (see **Issue 9**). Fish populations are reduced in parts of the Salwarpe catchment through the impacts of sewage effluents against a background of naturally elevated salinity and fisheries interests may be affected along a stretch of the River Tem downstream of Rushmoor Sewage Works (see **Issue 19**).

Many watercourses in the area are potentially vulnerable to agricultural based pollutions. Large scale fish mortalities have occurred in the past on the River Perry and Rea Brook as a result of slurry spillages, but incidents of this type have greatly reduced in recent years.

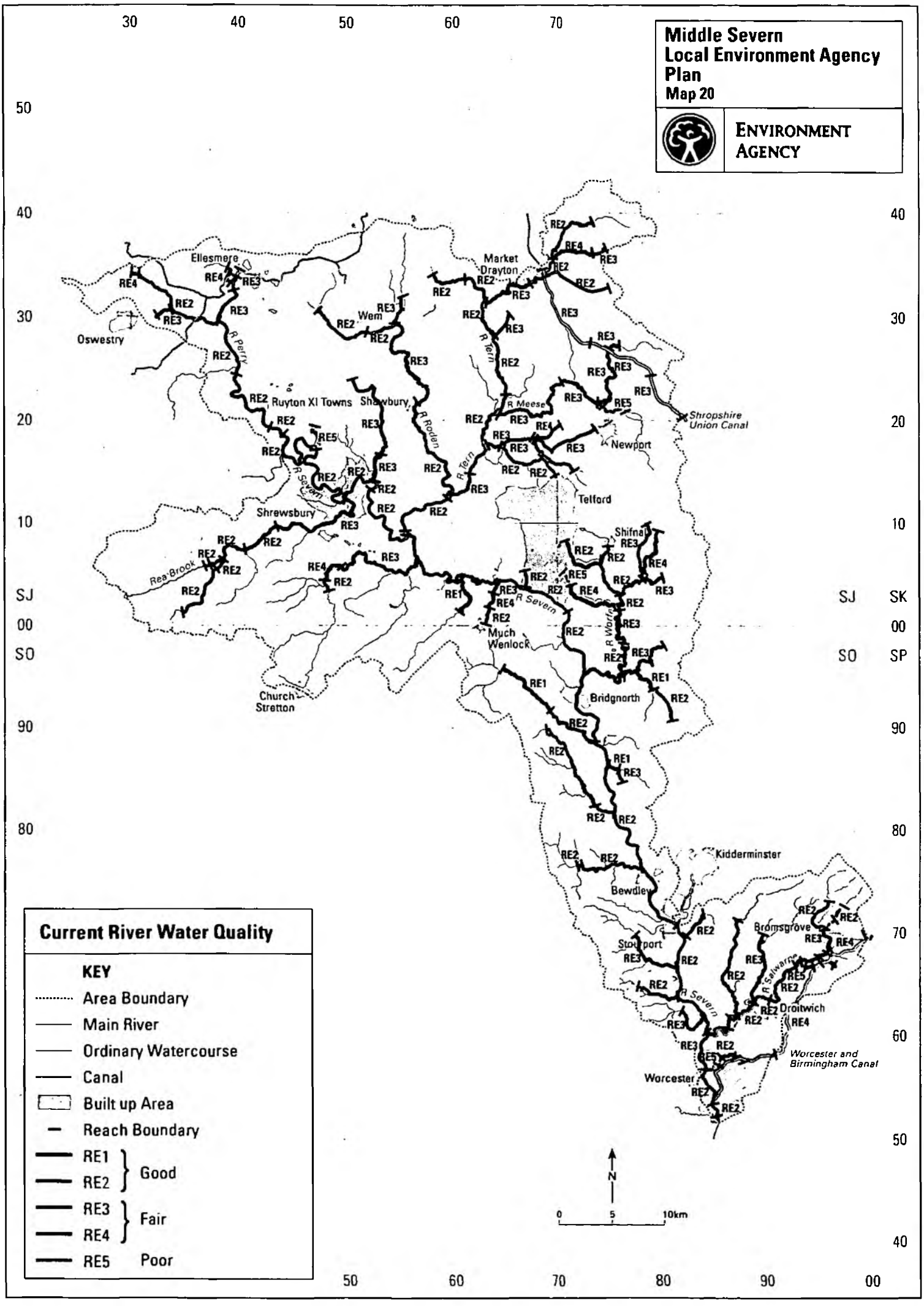

Middle Severn
Local Environment Agency
Plan
Map 20
Environment Agency
Current River Water Quality
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Built up Area
Reach Boundary
RE1
RE2
Good
RE3
RE4
Fair
RE5
Poor
Ellesmere
Oswestry
Wem
Market Drayton
Ruyton XI Towns
Shrewsbury
Newport
Telford
Shifnal
Much Wenlock
Church Stretton
Bridgnorth
Kidderminster
Bewdley
Stourport
Bromsgrove
Droitwich
Worcester
Shropshire Union Canal
Worcester and Birmingham Canal
R Perry
R Severn
R Roden
R Tern
R Meese
R Worfe
R Salwarpe
Rea Brook
N
0
5
10km
SJ
SK
SO
SP
00
30
40
50
60
70
80
90

Table 16 River Ecosystem River Quality Class Objectives

* Stretches which require work to achieve LEAP objective

UPSTREAM BOUNDARY	DOWNSTREAM BOUNDARY	REACH LENGTH (km)	CURRENT QUALITY	MEDIUM TERM CLASS OBJECTIVE	LONG TERM CLASS OBJECTIVE
River Severn					
Conf. R. Perry	Monkmoor STW outfall	25	RE2	RE2	RE2
Monkmoor STW outfall	Conf. R Tern	10	RE2	RE2	RE2
Conf. R Tern	Conf. Much Wenlock Bk*	14	RE3	RE2 (2000)	RE2
Conf. Much Wenlock Bk	Coalport STW	11.5	RE2	RE2	RE2
Coalport STW	Conf. R Worfe	3.5	RE2	RE2	RE2
Conf. R Worfe	Conf. R Stour	30	RE2	RE2	RE2
Conf. R Stour	Conf. R Salwarpe	22	RE2	RE2 (2000)	RE2
Conf. R Salwarpe	Barbourne Brook*	5.4	RE3	RE2	RE2
Barbourne Brook	Worcester STW	2.3	RE2	RE2	RE2
Worcester STW	Conf. R. Teme	1.3	RE2	RE2	RE2
River Perry					
B5009 Br Gobowen	B5069 Br Gobowen	0.5	RE4	RE4	RE2
B5069 Br Gobowen	Conf. Common Bk	5.5	RE2	RE2	RE2
Conf. Common Bk	Conf. Tetchill Bk	5	RE2	RE2	RE2
Conf. Tetchill Bk	Minor Rd Bk Wykey	5.5	RE2	RE2	RE2
Minor Rd Bk Wykey	Conf. War Bk	9.5	RE2	RE2	RE2
Conf War Bk	Conf. R. Severn	4.5	RE2	RE2	RE2
Common Brook					
Rounds Wood Drenewydd	R. Perry	2.4	RE3	RE4	RE4
Tetchill Brook					
D/S Wharf Meadow STW	Conf. Newnes Bk	2	RE3	RE5	RE5
Conf. Newnes Bk	Tetchill	1.5	RE3	RE4	RE4
Tetchill	Conf. R. Perry	4	RE3	RE3	RE3
Newnes Brook					
Loop Fm Ellesmere	Conf. Tetchill Bk	2	RE4	RE5	RE4
Leaton Brook					
Medley Fam Nr. Bomere	R. Severn	2.5	RE5	RE5	RE5
Rea Brook					
FB US of Horsebridge	Minsterley STW	0.5	RE2	RE2	RE2
Minsterley STW	Conf. Minsterley Bk	1.7	RE2	RE2	RE2
Conf. Minsterley Bk	Conf. Pontesbury Bk	3.6	RE2	RE2	RE2
Conf. Pontesbury Bk	Conf. Cruckton Bk	4.6	RE2	RE2	RE2
Conf. Cruckton Bk	Conf. R. Severn*	13.1	RE3	RE2 (2002)	RE2
Minsterley Brook					
Bank Coppice Hope	Creamery	5.5	RE2	RE2	RE2
Creamery	Conf. with Rea Bk	1	RE2	RE2	RE2
Sundorne Brook					
Yorton Rd Br	Sunderton Pool inlet	9.4	RE3	RE4	RE4
Sunderton Pool inlet	Conf. R. Severn	3.1	RE3	RE3	RE3
River Tern					
FB at Knighton Farm	Coal Bk	8.9	RE2	RE2	RE2
Coal Bk	Walkmill Br	2	RE2	RE2	RE2
Walkmill Br	Bailey Bk	6.2	RE3	RE3	RE2
Bailey Bk	Allford Bk	10.8	RE2	RE2	RE2
Allford Bk	R Strine	6	RE2	RE2	RE2
R Strine	Commission Drain	3.3	RE2	RE3	RE3
Commission Drain	R. Roden	4.9	RE3	RE3 (1999)	RE3
R. Roden	R. Severn	7	RE2	RE2	RE2

UPSTREAM BOUNDARY	DOWNSTREAM BOUNDARY	REACH LENGTH (km)	CURRENT QUALITY	MEDIUM TERM CLASS OBJECTIVE	LONG TERM CLASS OBJECTIVE
Loggerheads Brook					
White House Fm	Loggerheads STW	0.9	RE3	RE4	RE3
Loggerheads STW	R. Tern	4.5	RE4	RE4	RE4
Coal Brook					
Road Br Goldenhill Farm	R. Tern	7.5	RE2	RE2	RE2
Bailey Brook					
Millen Heath Br	Hourstone Lane Br	4.1	RE2	RE3	RE3
Hourstone Lane BR	R. Tern	4.7	RE2	RE3	RE3
Stoke Brook					
FB Stoke Heath	R. Tern	2.6	RE3	RE3	RE2
River Meese					
Aqualate Mere Outfall	Lonco Bk	3.8	RE5	RE3	RE2
Lonco Bk	A41 (T) Rd Bridge	6.0	RE3	RE2	RE2
A41 (T) Rd Bridge	R. Tern	12.8	RE3	RE2	RE2
Lonco Brook					
Offley Grove FM	FB at Knighton	1.2	RE3	RE3	RE2
FB at Knighton	R. Meese	8.8	RE3	RE3	RE2
Strine Brook					
Newport STW	Conf. Pipe Strine	8.4	RE3	RE3	RE3
River Strine					
Conf. of Pipe Strine	R. Tern	5.1	RE3	RE3	RE3
Wall Brook					
Honnington Rail Br	Strine Bk	5.6	RE3	RE3	RE3
Pipe Strine					
The Birch Moors	Conf. Strine Bk	3.5	RE4	RE4	RE2
Red Strine					
Humber Bk	R Strine	5.3	RE2	RE3	RE3
Humber Brook					
Source	R. Red Strine	2.7	RE2	RE3	RE3
River Roden					
Woverley Bk	Wem STW outfall	6.9	RE2	RE2	RE2
Wem STW outfall	Conf. Soulton Bk	3.5	RE2	RE2	RE2
Soulton Bk	Shawbury STW outfall*	15.2	RE3	RE2 (1998)	RE2
Shawbury STW	R. Tern	14.5	RE2	RE2	RE2
Soulton Brook					
Upper Lacon FB	R. Roden	2.5	RE3	RE3	RE2
Cound Brook					
Church Br	Stapleton Br*	1	RE2	RE1 (1999)	RE1
Stapleton Br	Rd Br Nr Home Fm*	3.5	RE4	RE1 (1999)	RE1
Rd Br Nr Home Fm	Conf. R. Severn*	10	RE3	RE1 (1999)	RE1
Sheinton Brook					
Conf. Harley Bk	Conf. R. Severn	5	RE1	RE2	RE2
Much Wenlock Brook					
Forrester Cot Hosp	Landowner Culvert	1	RE3	RE4	RE4
Landowner Culvert	Rd Br Tick Hill	1.5	RE4	RE4	RE4
Rd Br Tick Hill	Conf. R. Severn	2	RE2	RE3	RE3
Lyde Brook					
Coalbrookdale rd Br	Conf. R. Severn	1.5	RE2	RE2	RE2

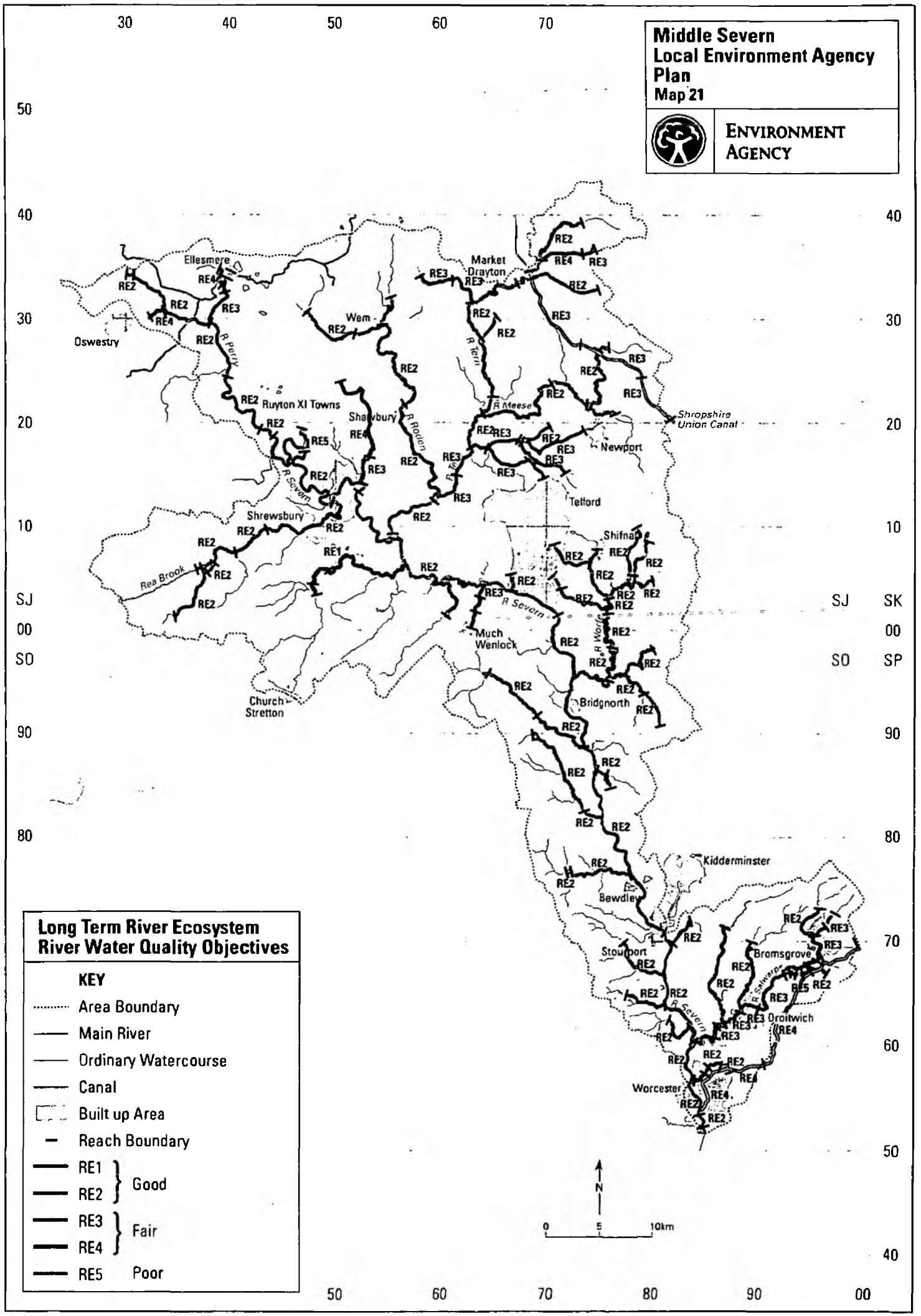
UPSTREAM BOUNDARY	DOWNSTREAM BOUNDARY	REACH LENGTH (km)	CURRENT QUALITY	MEDIUM TERM (CMP) CLASS OBJECTIVE	LONG TERM CLASS OBJECTIVE
River Worfe					
Albrighton Bk	Water Abstraction	0.1	RE2	RE2	RE2
Water Abstraction	Beckbury STW	5	RE2	RE2	RE2
Beckbury STW	B. road Br Stapleford	5	RE3	RE3	RE2
B. road Br Stapleford	Conf. R. Severn	17	RE2	RE2	RE2
Albrighton Brook					
Chapel House Fm	Conf. R. Worfe	2.7	RE3	RE3	RE2
Neachley Brook					
Norton Mere Inlet	Burlington Bk	5	RE4	RE4	RE2
Burlington Brook					
Ford at Lizard Mill	Albrighton Bk	5	RE3	RE3	RE2
Wesley Brook					
B4379 Br Shifnal	Conf. R. Worfe	6.5	RE3	RE3	RE2
Nedge Brook					
FB at Randley Woods	Conf. Wesley Bk	5	RE2	RE3	RE2
Mad Brook					
Cuckoo Oak	Culvert Exit at Haldane R.	1.3	RE5	RE5	RE2
Culvert Exit at Haldane	Worfe	6	RE4	RE4	RE2
Stratford Brook					
Copley Lane Ford	Trib from Rudge	0.3	RE4	RE4	RE2
Conf. Trib. from rudge	Conf. R. Worfe	7	RE3	RE3	RE2
Hilton/Claverley Brook					
US Bobbington STW	Bobbington STW	0.2	RE2	RE2	RE2
Bobbington STW	Conf. Stratford Bk	9.1	RE1	RE2	RE2
Mor Brook					
Weir at Muckley	B4364 Crosshouses	6.5	RE1	RE2	RE2
B4364 Crosshouses	Conf. R. Severn	6	RE2	RE2	RE2
Hampton Loade Brook					
Lakehouse Dingle Bk	Conf. R. Severn	1	RE1	RE2	RE2
Lakehouse Dingle Brook					
DS of Alveley	Conf. Hampton Loade Bk	1	RE3	RE4	RE4
Borle Brook					
FB below Down Mill	B4555 Netherton	9.5	RE2	RE2	RE2
B4555 Netherton	Conf. R. Severn	2	RE2	RE2	RE2
Dowles Brook					
FB at the Bank	Conf. Lem Bk	0.1	RE2	RE2	RE2
Conf. Lem Bk	Conf. R. Severn	7.2	RE2	RE2	RE2
River Salwarpe					
Sugar Bk	B4091 Stoke Prior	1.5	RE4	RE5	RE4
B4091 Stoke Proir	Conf. Hen Bk	3.5	RE3	RE4	RE3
Hen Bk	Chapel Br Droitwich	6.2	RE2	RE3	RE3
Chapel Br Droitwich	Droitwich STW	5.7	RE3	RE3	RE3
Droitwich STW	Conf. Martin Bk	2.1	RE3	RE4	RE3
Martin Bk	Conf. withR. Severn	5.5	RE3	RE3	RE3
Sugar Brook					
Battlefield Bk	Bromsgrove STW	2.5	RE3	RE3	RE3
Bromsgrove STW	R. Salwarpe	0.5	RE5	RE5	RE4

UPSTREAM BOUNDARY	DOWNSTREAM BOUNDARY	REACH LENGTH (km)	CURRENT QUALITY	MEDIUM TERM (CMP) CLASS OBJECTIVE	LONG TERM CLASS OBJECTIVE
Battlefield Brook					
Washingstocks Farm	Confl. Sugar Bk	5	RE2	RE2	RE2
Hen Brook					
Meadows Farm Woodgate	U/S Bayer	1.6	RE3	RE3	RE2
U/S Bayer	Shaw Lane*	0.8	RE4	RE3 (2002)	RE3
Shaw Lane	Trib. from Marshy Pond	0.5	RE5	RE5 (1998)	
Trib from Marshy Pond	R. Salwarpe	0.6	RE5	RE5	RE4
					RE4
Elmbridge Brook					
Rd Br Nr Caches Farm	R. Salwarpe	7.5	RE3	RE3	RE2
Hadley Brook					
Bradford Br A442	R. Salwarpe	7.6	RE2	RE2	RE2
Hartlebury Brook					
US of Hartlebury Castle	R. Severn	3.5	RE2	RE2	RE2
Dick Brook					
Weir US of Worrall's Mill	R. Severn*	7	RE3	RE2+	RE2
Shrawley Brook					
A443 Bridge	R. Severn	4.7	RE2	RE2	RE2
Grimley Brook					
DS Bentley Farm	R. Severn*	5	RE3	RE2 (1999)	RE2
Barbourne Brook					
Spellis Green	B4450 Rd Br Blackpole	0.8	RE3	RE3	RE2
Blackpole	U/S Perdiswell Culvert	2	RE2	RE3	RE2
U/S Perdiswell Culvert	Bilford Road	0.7	RE5	RE5	RE2
Bilford Rd (US Culvert)	R. Severn	2	RE5	RE5	RE4
Spadesbourne Brook					
Lickey End	Battlefield Bk	2.8	RE2	RE3	RE3

Canals

Shropshire Union					
Gnosall Bridge	A519 Rd. Br. Norbury	5	RE3	RE3(2000)	RE3
A519 Rd. Br. Norbury	Rd. Br. Park Heath	7	RE3	RE3(2000)	RE3
Rd. Br. Park Heath	Market Drayton	10.1	RE3	RE3(2000)	RE3
Worcs & Birmingham					
Broad Green Road	Minor Rd. Br. Tibberton*	17	RE5	RE4(2000)	RE4
Minor Rd. Br. Tibberton	R. Severn	9.4	RE4	RE4	RE4

* Stretches which require work to achieve LEAP objective


Middle Severn
Local Environment Agency
Plan
Map 21
ENVIRONMENT AGENCY
Long Term River Ecosystem
River Water Quality Objectives
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Built up Area
Reach Boundary
RE1
RE2
Good
RE3
RE4
Fair
RE5
Poor
Ellesmere
Oswestry
Wem
Market Drayton
Ruyton XI Towns
Shawbury
Shrewsbury
Newport
Telford
Shifnal
Much Wenlock
Bridgnorth
Church Stretton
Kidderminster
Bewdley
Stourport
Bromsgrove
Droitwich
Worcester
Shropshire Union Canal
R Severn
R Perry
R Tern
R Meese
R Roden
R Worfe
Rea Brook
N
0
5
10km

(ii) EC Directive Reporting

Monitoring is carried out in the area for the relevant directives. This data is reviewed annually and any non compliance is highlighted. The main areas of concern have been raised as issues in section 3 **Issue 9**.

(iii) Rising Nitrate Levels

The Environment Agency has an involvement with two schemes designed to combat the problem of rising levels of nitrate in groundwater where these are predominantly caused by agricultural practices. The Agency is not responsible for either scheme but it has assisted in their implementation by collating the necessary nitrate data and by defining those areas which contribute water to particular sources. This includes both surface and groundwaters where these meet the Government criteria for designation. See Section 2.3 and Section 3 **Issue 1**, for further detail.

In the area covered by the Middle Severn LEAP, there are NVZs at Wildmoor, Astley, Tom Hill, Shifnal, Telford Swynnerton (part of) and NSAs at Wildmoor, Tom Hill, Wellings (in Swynnerton NVZ), Sherrifhales (in Telford NVZ), Grindleforge (in Shifnal NVZ). See Map 4.

Pollution Incidents

The Agency deals with a wide range of pollution incidents. Pollution of the environment is a criminal offence and the Agency will prosecute whenever necessary.

During 1996, 521 pollution incidents were reported and investigated in the Middle Severn area. Of these 2 were classes as major (Category 1) incidents and 20 as being significant (Category 2) incidents. Table 17 summarises the pollution incident data for 1996 by cause and type.

The Agency responds to reports of pollution incidents at all times and has a 24-hour emergency hotline for members of the public to report any water, air or land-related incidents:

Environment Agency Emergency Hotline: 0800 80 70 60

Table 17 Reported Pollution Incidents 1996

CAUSE	Category 1	Category 2	Category 3	TOTAL
Industrial & Commercial	1	1	48	50
Water Utility Companies	0	4	76	80
Agriculture	0	5	59	64
Other	1	10	157	327
Unsubstantiated				159
	2	20	340	521

TYPE	Category 1	Category 2	Category 3	TOTAL
Chemical	0	4	29	33
Oil	1	5	91	97
Sewage	0	4	73	77
Agriculture	1	1	56	58
Other	0	6	91	97
Unsubstantiated				159
	2	20	340	521

Category 1: A major incident involving one or more of the following:

- Potential or actual persistent effect on water quality of aquatic life
- Closure of potable water, industrial or agricultural abstractions necessary
- Extensive fish kill or significant adverse effect on conservation site
- Excessive breaches of consent conditions
- Extensive remedial measures necessary
- Major effect on amenity value

Category 2: A significant pollution which involves one or more of the following:

- Notification to abstractors necessary
- Significant fish kill
- Measurable effect on invertebrate life
- Water unfit for stock
- Bed of watercourse contaminated
- Amenity value to the public, owners or users reduced by odour or appearance

Category 3: A minor pollution incident which results in localised impact only. The following criteria may apply:

- no notification of abstractors necessary
- mortality of less than 10 fish
- no observable effect on invertebrate life
- minimal environmental impact and amenity value only marginally affected

Category 4: (Unsubstantiated)

A reported pollution incident which upon investigation proves to be unsubstantiated, with no evidence of a pollution incident having occurred.

6.2.3 Flood Defence

Targets

The Agency's principal aims in relation to flood defence are to:

* Provide effective protection for people and property against flooding from rivers.

* Provide adequate arrangements for flood forecasting and warning.

Regulation

The Agency seeks to ensure that flood risks are not increased by development. It does this by close liaison with local planning authorities. The following targets are used:

* No loss of flood plain flow or storage capacity.

* No increase in flood risk as a result of development.

* No new development in an area where the existing level of service is considered below the standard required for the type of development proposed.

*Provision of suitable access for maintenance of the river channel.

Operations and Flood Defence Improvements

The Agency seeks to maintain and improve watercourses to ensure that the appropriate Standard of Service (SoS) is achieved. The following targets are used:

* The actual SoS of rivers should meet their target SoS for the land use band.

* All Capital schemes must be technically, economically and environmentally sound.

Flood Warning

In order to ensure that timely warnings are issued to the right people, the Agency operates a system of Flood Warning Standards of Service. The following target is used:

* Provision of a two hour warning of commencement of flooding wherever practicable.

State of the Environment

Regulation

Pressure for development in flood plain is usually associated with urban areas. The Severn and its tributaries are no exception, with pressure for flood plain encroachment arising particularly in the towns of Shrewsbury and Worcester. (See **Issue 22**). For further detail on Flood Defence roles see Appendix 3.

Operations and Flood Defence Improvements

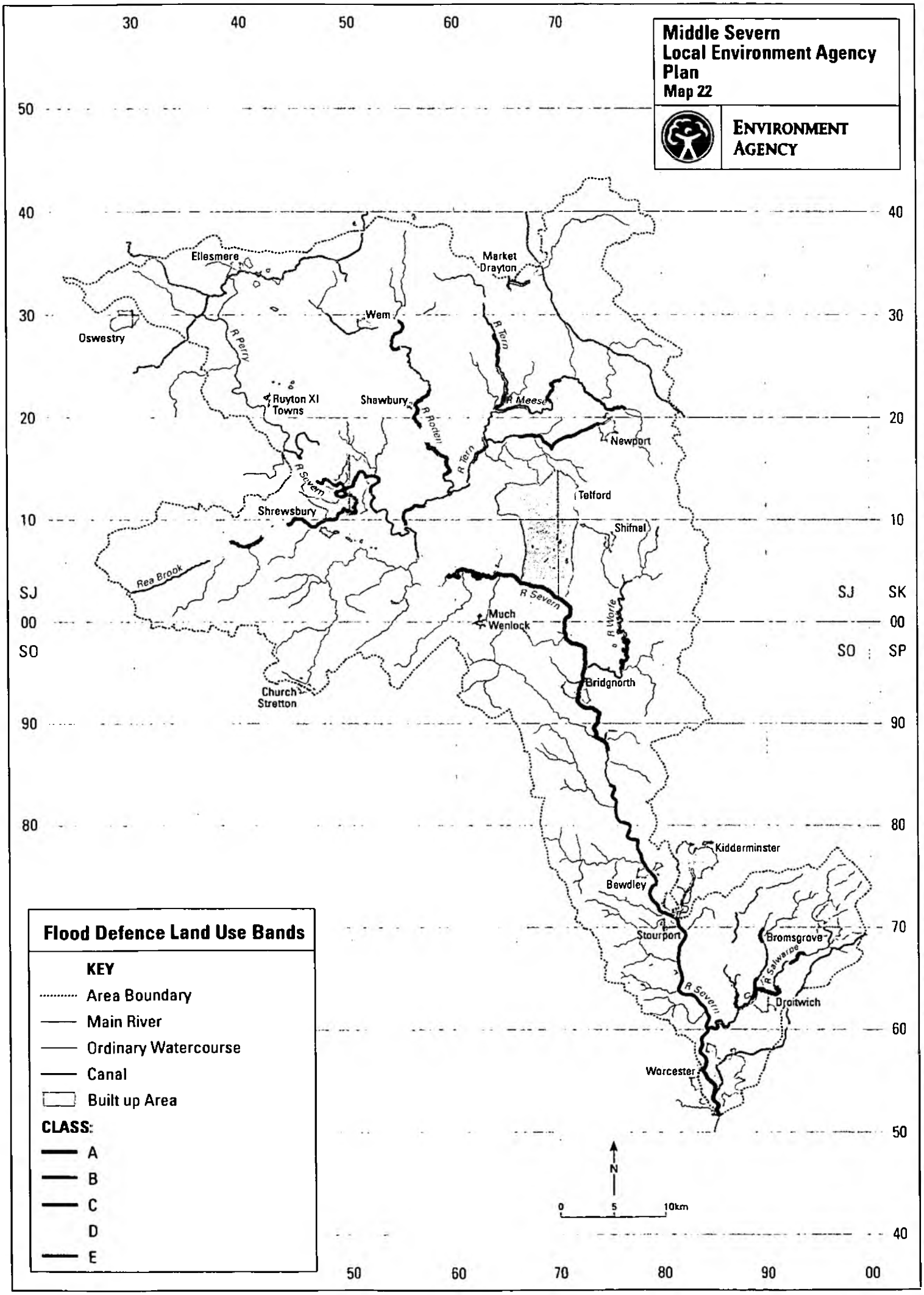
A comparison of the target land use band and actual standards of service allows improvement and maintenance works to be prioritised towards those rivers which do not meet their target standards. Map 22 shows the land use bands in the area. In this area, the Standards of Service (SoS) indicates that the main river of the Severn and its tributaries meets the SOS required for its flood plain uses. However, there are many individual sites where flooding problems occur. (See Appendix 3 for further details on Standards of Service)

A detailed description of flooding problems covering the whole catchment and including all main rivers and ordinary watercourses was first undertaken in 1980 to satisfy Section 24(5) of the Water Act 1973. This has now been updated several times with the most recent update published in 1990 (now under Section 105 of the Water Resources Act 1991). A full update is expected to be completed later in 1997. The flooding problems identified within the area of this plan are shown on Map 11 and the breakdown by district is shown in Table 18.

Although these problem sites have been identified, it must be borne in mind that these are only likely to be resolved where the benefits over the life of the scheme exceed the costs.

Flood Warning

In this area, only the River Severn between Shrawardine and Powick is covered by a flood warning service. Flood warning reaches are shown on Map 11 (see Appendix 3 for further information).


Middle Severn
Local Environment Agency
Plan
Map 22
ENVIRONMENT AGENCY
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Ellesmere
Oswestry
R Perry
Wem
Market Drayton
R Tern
Ruyton XI Towns
Shawbury
R Roden
R Meese
Newport
R Severn
Shrewsbury
Tetford
Shifnal
Rea Brook
R Severn
R Worfe
Much Wenlock
Bridgnorth
Church Stretton
Kidderminster
Bewdley
Stourport
Bromsgrove
R Salwarpe
R Severn
Droitwich
Worcester
SJ
SK
00
SO
SP
70
60
50
40
N
0
5
10km
Flood Defence Land Use Bands
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Built up Area
CLASS:
A
B
C
D
E

Table 18 Middle Severn Area Flooding Problems (1990 Survey)

Code No	Watercourse	Location	Code No	Watercourse	Location
NORTH SHROPSHIRE DISTRICT COUNCIL					
1-83-210-3	*River Roden	SJ 511 285	1-83-210-16	Sidley Moor Brook	SJ 555 308
1-83-210-4	War Brook	SJ 432 206	1-83-210-17	*River Tern	SJ 642 242
1-83-210-5	Sleap Brook	SJ 472 271	1-83-210-18	Platt Brook	SJ 631 227
1-83-210-6	River Roden	SJ 462 334	1-83-210-19	*Potford Brook	SJ 635 222
1-83-210-7	Wolverley Brook	SJ 472 306	1-83-210-20	Smythemoor Brook	SJ 630 328
1-83-210-9	Wemsbrook	SJ 509 286	1-83-210-21	River Tern	SJ 698 368
1-83-210-10	*River Roden	SJ 565 240	1-83-210-22	Sambrook	SJ 714 260
1-83-210-11	Hawk Lake Brook	SJ 552 291	1-83-210-23	River Tern	SJ 672 336
1-83-210-12	Sundorne Brook	SJ 536 174	1-83-210-24	Houlston Brook	SJ 485 264
1-83-210-13	Steel Brook	SJ 553 358	1-83-210-25	Un-named	SJ 736 418
1-83-210-14	Sandford Brook	SJ 581 341	1-83-210-26	Un-named	SJ 540 298
1-83-210-15	Darliston Brook	SJ 586 331	1-83-210-27	Muckleton Brook	SJ 602 201
			1-83-210-28	*River Tern	SJ 628 315
BROMSGROVE DISTRICT COUNCIL			SOUTH SHROPSHIRE DISTRICT COUNCIL		
1-87-210-6	Elmbridge Brook	SO 911 707	1-83-410-2	Worthern Brook	SJ 318 043
1-87-210-7	Battlefield Brook	SO 954 704	1-83-410-4	Worthern Brook	SJ 334 042
1-87-210-11	Hen Brook	SO 965 667	1-83-410-6	Cound Brook	SO 461 953
1-87-210-12	Trib. of Elmbridge Brook	SO 923 708	1-83-410-7	Carding Mill Stream	SO 454 941
			1-83-410-10	Trib. of Aylesford Brook	SJ 274 014
SHREWSBURY AND ATCHAM BOROUGH COUNCIL					
1-83-510-2	America Brook	SJ 375 154	1-83-510-13	Cob Brook	SJ 481 192
1-83-510-3	Pontesford Brook	SJ 408 076	1-83-510-14	Cot Brook	SJ 489 134
1-83-510-4	Habberley Brook	SJ 403 037	1-83-510-16	*River Severn	SJ 505 140
1-83-510-7	*Rea Brook	SJ 433 098	1-83-510-17	Cound Brook	SJ 567 062
1-83-510-8	Un-named	SJ 412 095	1-83-510-18	Cound Brook	SJ 558 057
1-83-510-9	Cruckton Brook	SJ 433 097	1-83-510-19	*River Severn	SJ 594 045
1-83-510-11	Trib. of Rea Brook	SJ 481 099	1-83-510-21	*Rea Brook	SJ 489 107
1-83-510-12	*River Perry	SJ 440 174	1-83-510-22	*Rea Brook	SJ 482 100
BRIDGNORTH DISTRICT COUNCIL			WREKIN DISTRICT COUNCIL		
1-83-110-1	None	SJ 790 030	1-83-710-1	*River Severn	SJ 672 034
1-83-110-2	*Wesley Brook	SJ 743 067	1-83-710-2	*River Severn	SJ 694 025
1-83-110-3	*River Worfe	SJ 762 023	1-83-710-3	Coal Brook	SJ 667 038
1-83-110-4	*Albrighton Brook	SJ 795 045	1-83-710-4	Coal Brook	SJ 668 040
1-83-110-7	Quatt Brook	SO 754 884	1-83-710-5	Un-named	SJ 673 075
1-83-110-8	*River Severn	SO 750 831	1-83-710-8	Un-named	SJ 675 105
1-83-110-9	*River Severn	SO 724 943	1-83-710-9	*River Strine/Red Strine	SJ 640 150
1-83-110-10	*River Severn	SO 723 913	1-83-710-11	Strine Brook	SJ 719 184
1-83-110-11	Stratford Brook	SO 757 945	1-83-710-12	*Hurley Brook	SJ 645 156
1-83-110-12	Milton Brook	SO 773 955	1-83-710-13	Wrockwardine	SJ 639 121
1-83-110-14	Mad Brook	SJ 709 042	1-83-710-14	Un-named	SJ 659 109
1-83-110-15	Burlington Brook	SJ 761 113	1-83-710-15	Moorfield Brook	SJ 735 192
OSWESTRY BOROUGH COUNCIL			MALVERN HILLS DSITRICT COUNCIL		
1-83-310-3	Frankton Brook	SJ 365 299	2-87-310-5	Ditches in Severn Floodplain	SO 845 564
1-83-310-4	Trib. of River Perry	SJ 315 329	2-87-310-6	Un-named	SO 820 515
1-83-310-5	Trib. of River Perry	SJ 312 315	2-87-310-43	Shrawley Brook	SO 777 647
1-83-310-6	*River Perry	SJ 347 303	2-87-310-44	Dick Brook	SO 797 668
1-83-310-7	Common Brook	SJ 337 308	2-87-310-45	Dick Brook	SO 789 672
1-83-310-8	Hinford Brook	SJ 332 326	2-87-310-46	*River Severn	SO 813 642
1-83-310-9	*River Perry	SJ 347 303	2-87-310-50	Little Witley	SO 780 633
1-83-310-10	Un-named	SJ 360 297	2-87-310-53	Un-named	SO 802 693
STAFFORD BOROUGH COUNCIL			WYRE FOREST BOROUGH COUNCIL		
1-99-710-1	Back Brook	SJ 779 200	1-87-910-1	*River Severn	SO 779 765
1-99-710-2	*River Meese	SJ 737 227	2-87-810-3	Elmley Brook }	SO 870 710
1-99-710-3	*Lonco Brook	SJ 737 227	2-87-910-2	(part main river) }	SO 882 717
			2-87-910-1	Trib. of River Severn	SO 786 749
WYCHAVON DISTRICT COUNCIL					
2-87-210-1	Elmbridge Brook	SO 911 707	2-87-810-3	Elmley Brook	SO 870 710
2-87-810-1	Body Brook	SO 922 635	2-87-810-6	Elmbridge Brook	SO 927 719
2-87-810-2	*Elmbridge Brook	SO 893 653	2-87-810-8	*River Salwarpe	SO 841 601
NEWCASTLE UNDER LYME BOROUGH COUNCIL					
1-99-510-1	Coal Brook	SJ 685 341	1-99-510-2	River Tern	SJ 726 390

* Main River

6.3 Wildlife and Amenity

6.3.1 Fisheries

The principal aim is

* To maintain, improve and develop fisheries.

Targets

The fisheries targets for the Middle Severn area are:

* To maintain existing high quality fishery habitats in the catchment and where appropriate restore damaged fishery habitats.

* To maintain an abundance of salmon, trout, coarse fish, eels and shad which is related where possible to the carrying capacity of the catchment based upon habitat characteristics.

* To maintain a monitoring programme which accurately quantifies stock abundance.

* To provide access, where appropriate, for migratory fish to all suitable spawning and nursery areas.

* To control illegal fishing by use of a bailiff force in anti-poaching patrols, by targeting the market in illegally caught fish and by refining fisheries byelaws to address local problems.

Trends in fish stock abundance can be identified and comparisons made with 'expected' abundances based upon habitat characteristics. A Fisheries Classification system based on this concept is currently under development and will be used to generate fish population targets in the future. A Local Salmon Management Plan for the whole of the River Severn Catchment is also presently in preparation which will include targets for stock levels and spawning escapement.

State

Habitat quality

Except for a number of short impounded lengths of river associated with navigation weirs, the physical character of much of the Middle Severn is predominantly natural with a wide range of habitats including pools, shallow areas with fast flowing water and longer, deeper, slow flowing stretches. These varied habitats support an abundant and diverse fish fauna. Any alteration to the existing river regime, *e.g.* by further impoundments for navigation purposes, would undoubtedly impact on the current status of these fisheries which constitute a valuable resource.

The tributaries of the middle Severn are more mixed in habitat quality. Some of the North Shropshire rivers, especially the Perry and Tern, have been heavily engineered and partly 'canalised' in the past for agricultural benefit resulting in an impoverished habitat for fish.

In recent years the Agency and its predecessors have carried out habitat improvement schemes on badly affected rivers which have resulted in greatly increased fish biomass, species diversity and improved riparian habitat quality. Such work will continue. Other tributaries, such as the Cound, Mor and Borle Brooks, remain more natural in quality.

Water Quantity

Low flow problems, caused by over abstraction, which affect fisheries interests occur in several parts of the catchment, most notably the River Worfe (see **Issue 10**). Native brown trout populations have particularly suffered as a result. The potential impacts of low flows in other tributaries, such as the Cound Brook, River Meese and River Perry, have been recognised and closures of catchments to further summer abstractions are in place or under consideration.

Stock Levels

Stock levels are monitored by electrofishing surveys carried out at 119 sites in the catchment (see Appendix 2).

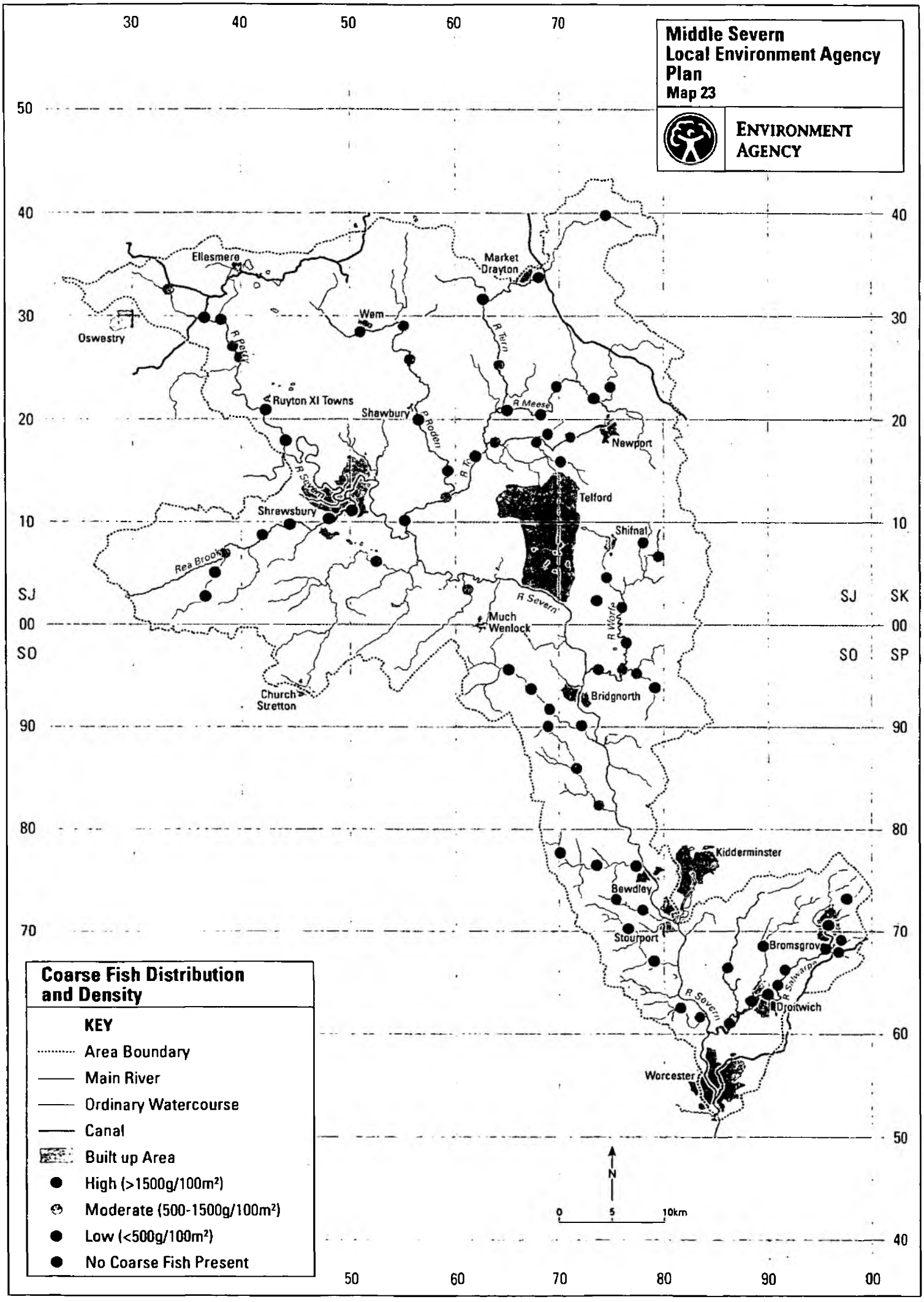
Fish populations in the middle Severn are dominated by coarse fish, predominantly fast-water species such as chub, dace, barbel and gudgeon, although roach are also abundant and bream, bleak and perch are present in several locations. Pike are common throughout the river and in some locations are thought by anglers to be present in excessive numbers. There have been a number of confirmed captures of zander in this area, all downstream of Diglis weir. Minor species, minnow, stoneloach, bullhead and brook lamprey are abundant. Eels are present throughout the area but their numbers have declined in recent years.

Distribution and abundance of coarse fish species is shown on Map 23.

In common with other rivers throughout England and Wales, runs of salmon have declined in recent years. In particular there have been decreasing numbers of multi-sea-winter (MSW) spring-run fish and an increasing trend towards late running grilse. There have, however, been some very recent signs of improvement, with a record spawning year in 1995 and excellent runs of salmon, including good numbers of MSW fish in the first half of 1996. Many of the factors affecting the size of salmon runs occur at sea. Those factors which may be of significance in freshwater include illegal fishing, changes in land use resulting in habitat deterioration, and barriers to upstream migration to spawning grounds.

Trout are reasonably well represented throughout the area and are most abundant in the tributary systems. Remnant populations of trout occur in the upper reaches of some tributaries, including the Rea Brook, Meese, Perry, Tern and Salwarpe, whilst sound populations are found in the Worfe, Cound Brook and Dowles Brook.

Distribution and relative abundance of trout and salmon is given on Map 24.


Middle Severn
Local Environment Agency
Plan
Map 23
Environment Agency
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Ellesmere
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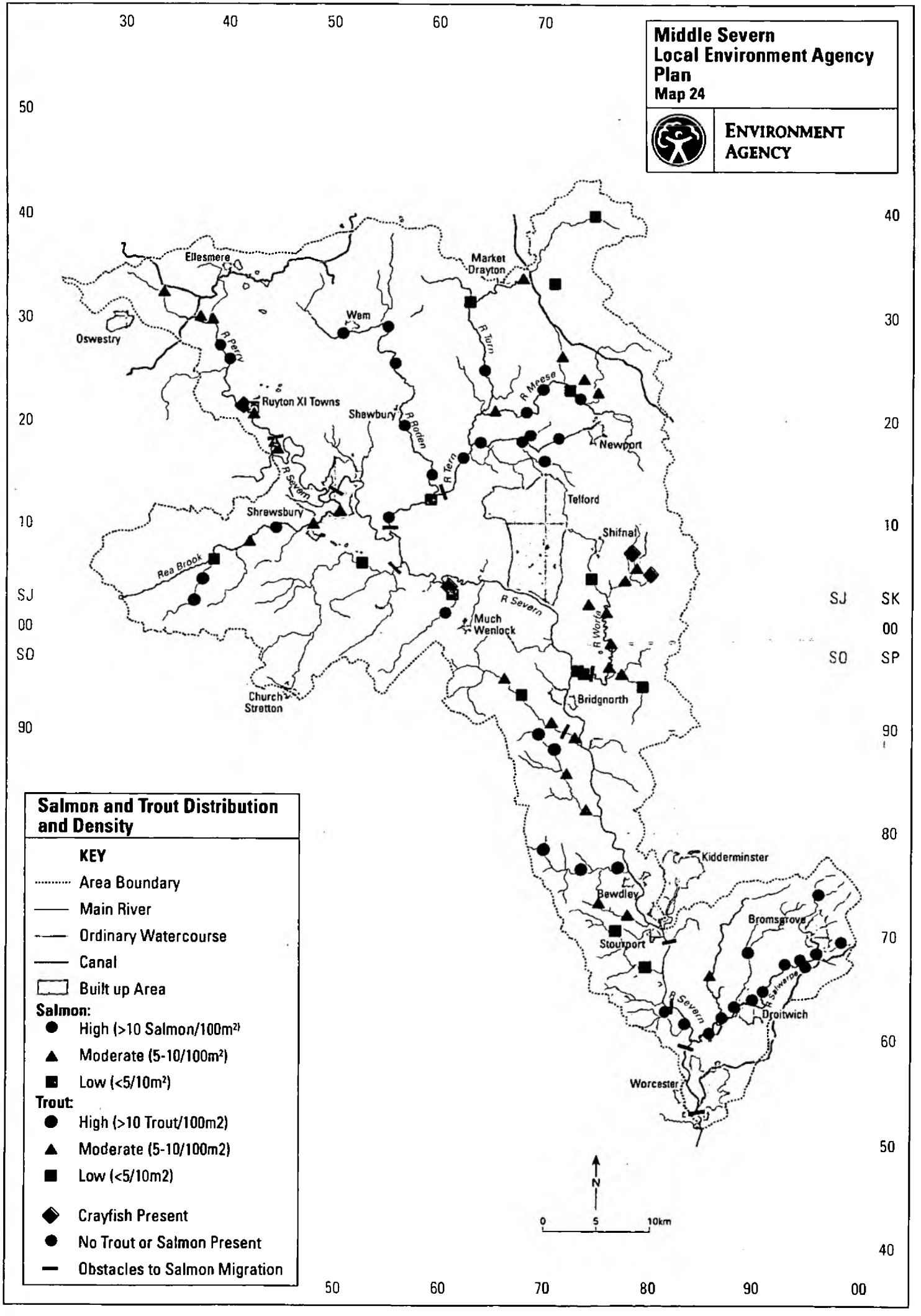
Wem
Market Drayton
R Perry
R Tern
Ruyton XI Towns
Shawbury
R Roden
R Meese
Newport
R Severn
Shrewsbury
Telford
Shifnal
Rea Brook
R Severn
Much Wenlock
R Worfe
Church Stretton
Bridgnorth
Kidderminster
Bewdley
Stourport
Bromsgrove
R Salwarpe
R Severn
Droitwich
Worcester
N
0
5
10km
Coarse Fish Distribution and Density
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Built up Area
High (>1500g/100m²)
Moderate (500-1500g/100m²)
Low (<500g/100m²)
No Coarse Fish Present


Middle Severn
Local Environment Agency
Plan
Map 24
ENVIRONMENT AGENCY
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Ellesmere
Oswestry
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Market Drayton
R Perry
R Tern
R Meese
Ruyton XI Towns
Shawbury
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Telford
Shrewsbury
Shifnal
Rea Brook
R Severn
R Worfe
Much Wenlock
Church Stretton
Bridgnorth
Kidderminster
Bewdley
Bromsgrove
Stourport
R Severn
R Salwarpe
Droitwich
Worcester
N
0
5
10km
Salmon and Trout Distribution and Density
KEY
Area Boundary
Main River
Ordinary Watercourse
Canal
Built up Area
Salmon:
High (>10 Salmon/100m²)
Moderate (5-10/100m²)
Low (<5/10m²)
Trout:
High (>10 Trout/100m2)
Moderate (5-10/100m2)
Low (<5/10m2)
Crayfish Present
No Trout or Salmon Present
Obstacles to Salmon Migration

Catches

The long term average rod catch of salmon for the River Severn is about 1000 fish, but salmon fishing has been at rather a low ebb in recent years, in common with most other rivers in the British Isles. The larger spring-run, multi-sea-winter fish have been particularly affected. However, the first half of 1996 saw the best catches of salmon for many years following a record spawning year in 1995 which may point to an upturn in future sport.

Details of angler catches in competitions along the middle Severn were monitored from 1979 to 1994. Angler catch monitoring may be reinstated in the future. Data from these surveys showed coarse fish catches in the middle Severn to be amongst the best in the region. Barbel were the dominant species caught, with catches peaking in July/August and averaging up to 300 grams per man hour at Quatford.

Obstructions

Obstructions to salmon migration, together with existing and possible future salmon passes are shown on Map 24, and are also referred to in **Issue13**.

Navigation weirs on the River Severn at Diglis, Bevere, Holt and Larford have rudimentary fish passage facilities in the form of a notch or a partial lowering of the weir crest to concentrate flows and to provide an easier route for upstream migrants. These work reasonably well, but significant delays in fish passage can occur during low flow periods, particularly at Diglis Weir. The construction of modern fish passes could greatly reduce this problem, but high costs may preclude such action in the present economic climate. Weirs on the Cound Brook, River Tern and River Perry generally prevent or severely hinder the passage of salmon to potential spawning grounds further upstream, and again fish passes could help improve this situation.

The migration of other fish, including elvers and shad, are also affected by weirs. Simple, inexpensive elver passes could be installed, but facilities for the passage of shad may be more difficult to resolve. Diglis Weir presently forms the normal upstream limit for shad migration, although it is possible that these fish occasionally bypass the weir via the adjacent lock system.

Illegal Fishing

Some salmon poaching activity is known to occur in the middle Severn, mostly targeted at concentrations of fish which build up downstream of weirs in low flow conditions, and at actively running fish as they pass over the weirs. Vulnerable areas around some of the most troublesome weirs have been fenced off to reduce this problem. Regular bailiff patrols are used to combat poaching, together with checks on hotels, fish markets and other outlets for illegally taken fish. Reports of coarse fish thefts have also increased in recent years, particularly rod caught barbel, with illegally removed fish then allegedly being sold to other fisheries. Theft of fish in these circumstances is presently a matter for fishery owners rather than the Agency, but a change in Fisheries Byelaws to prohibit the removal of more than a specified number of fish could help to deter such practices (**Issue13**).

6.3.2 Conservation

The principal aim is

* To help protect the best conservation interests and improve the rest, for the benefit of the common good.

Our two main guiding beacons are the European Habitats Directive and the UK Biodiversity Action Plan.

Catchment Targets

In implementing the broad strategy in the Middle Severn area, a number of specific targets are relevant:

* To monitor habitats and associated flora and fauna of river corridors and wetland areas.

* To work with planners and developers to ensure that future development does not reduce the conservation value of the environment, and where possibleimproves it.

* To undertake environmental assessment of all Agency works and identify opportunities for increasing the conservation value of rivers and wetlands and for improving the quality of the water-related landscape in association with these works.

* To carry out Agency consenting practices and respond to development proposals in a manner that ensures that natural features such as emergent vegetation, meanders, pools and the landscape are preserved and enhanced where appropriate, and features of archaeological, architectural, engineering or historic interest are preserved.

* To seek opportunities for the Agency to carry out capital and revenue projects to protect or improve the physical character of the water environment.

* To liaise with other bodies to promote and support initiatives for the maintenance, enhancement and rehabilitation of wetlands and river corridors.

* To seek opportunities, where appropriate, to control livestock access to river banks, thus minimising bank damage and allowing regeneration of backside vegetation in order to maintain habitat, shade cover and natural vegetation for the benefit of wildlife in the river corridor.

* To safeguard rare and protected species within the catchment and obtain additional information on the distribution and abundance of such species.

- To maintain a variable flow regime in an appropriate channel cross section where the monthly average flow reflects the natural flow condition in the river and flows do not decline below the historic monthly 95 percentile flows, except during extreme drought conditions.

- To maintain ground and surface water quality and levels so that sensitive wetland ecosystems are protected.

State

A significant influence on the rivers and wetlands of the catchment over the centuries has been, and continues to be, land drainage and river 'improvement' schemes. Areas such as Baggy Moor have been subject to drainage on an increasing scale since the 16th century and whilst such agricultural improvements have increased the economic value of the area, it has considerably degraded the scale and diversity of wetland habitats in the catchment. Over-abstraction of both surface and groundwater has also damaged conservation interests in some areas (*e.g.* River Worfe catchment). Loss of wetland habitat has led to a severe reduction in wading birds (Section 5.13.2).

These threats to our wildlife and habitats are further highlighted in the results from Shropshire Wildlife Trusts 1994 survey which shows that of the 768 special Wildlif sitesprime sites for nature conservation originally identified in the county, only 654 remain. 15% of the sites have been destroyed. A further 165 sites are known to have been damaged, or to have deteriorated through changed management.

River Corridor Surveys have been carried out for the major rivers in the catchment to establish plant and habitat diversity along these rivers. River Habitat Surveys are now also being undertaken and will be used on a larger scale in the future as a means of setting targets. Hydrological surveys have been carried out for a number of the most important wetland SSSI's in the area. At present the general diversity of the river channel and river corridor habitat is low on some rivers, eg Perry, Tern and Strine, reflecting the impact of past drainage improvement schemes and current maintenance regimes.

Despite the loss of wetland and river corridor habitat, the area has a very high conservation value, reflected in the high number of conservation sites with a wetland or river interest. There are also areas which carry a landscape designation (see Section 5.14). The Countryside Commission, together with English Nature, has recently published "*The character of England: landscape, wildlife and natural features*" map which depicts the natural and cultural dimensions of the landscape. The character areas in the middle Severn LEAP area include parts of the Severn and Avon Vales, Mid Severn Sandstone Plateau and the Shropshire, Cheshire and Staffordshire Plain. English Nature has also defined a number of 'Natural Areas' on a broader scale than the character areas, and these include the Severn and Avon Vales, the Midlands Plateau and the Mosses and Meres in this LEAP area.

It is intended that other bodies, including the Agency, will be able to use these various area designations as an aid to strategic planning.
The LEAP area is also of high archaeological interest with regard to both known and potential sites (see Section 5.14).

6.3.3 Recreation

The principal aim is

* To protect, improve and promote the water environment for recreational use.

The control over the provision of recreational facilities rarely rests with the Agency and the achievement of objectives will therefore depend on obtaining the agreement of landowners and other interested parties.

Setting realistic targets for recreation poses problems in that there are no recognised standards for the amount or nature of recreational use of rivers. Targets are likely to be based on the demand for facilities, although it has to be recognised that some recreational uses may be antagonistic to other river users or damaging to the environment. Any set targets must therefore take account of these factors and also fulfil the objectives laid down in the Agency's Conservation Strategy. The Agency is also required to take into account the needs of persons who are sick or disabled when fulfilling its recreation duties.

Targets

In implementing the broad strategy in the Middle Severn area a number of specific targets are relevant:

* To maintain and improve water quality in order that the amenity value of the watercourses may be enhanced and protected.

* To maximise public access to land in the Agency's ownership, places of natural beauty and to buildings, sites of archaeological, architectural, engineering and historic interest.

* To promote the use of river corridors as a recreational facility without compromising other uses.

* To promote suitable access and associated facilities for identified recreational uses where there is no conflict with conservation interests.

* To safeguard existing recreational uses and where practicable, incorporate recreational facilities into Agency schemes being designed for other reasons.

* To work with planners and developers to ensure that future development does not reduce the recreation value of rivers, and where possible improves it..

* To encourage the development of footpath access.

State of the area

Recreational use of the water environment within the catchment is concentrated along the River Severn, at various stillwaters (*e.g.* Ellesmere, Telford Pools, Trimpley Reservoir) and in the canal systems. There are some good opportunities for riverside access for the general public, particularly within towns where the river is an important feature. Various schemes have been carried out to enhance the amenity value of riverside areas, eg Well Meadow at Bridgnorth, and further opportunities are being investigated as bids for Lottery and Millennium funding.

Water-related recreation facilities for the disabled are limited. Disabled fishing facilities have been developed in the Telford area by Wrekin Council in collaboration with other private and public organisations, including the Agency. An excellent facility also exists at Albrighton Moat and a 'wheely boat' has recently been provided at Ellesmere for disabled visitors. A similar boat is planned for Upton Warren nature reserve.

Angling, for both coarse and game fish, is the major water-based recreational activity in the catchment, and is generally of a very high quality. There are reasonable opportunities for other water-based recreation such as sailing, pleasure boating and canoeing. Walking, rambling, and horse riding are also popular and cycling is becoming increasingly so. The Severn Way footpath follows the course of the River Severn along its whole length through this catchment area.

APPENDIX 1

The Environment Agency's Aim and Objectives

The Agency's principal aim as set out in The Environment Act 1995,

'..in discharging its functions the Agency is required, so as to protect or enhance the environment, taken as a whole, in order to play its part in attaining the objective of sustainable development, as guided from time to time by ministers.

Our objectives

Ministers have issued statutory guidance on sustainable development. This includes our seven main objectives:

* An integrated approach to environmental protection and enhancement, taking into consideration the impact of all activities and natural resources.
* Delivery of environmental goals without imposing disproportionate costs on industry or society as a whole.
* Clear and effective procedures for serving its customers, including the development of single points of contact with The Agency.
* High professional standards, using the best possible information and analytical methods.
* Organisation of its own activities to reflect good environmental and management practice, and provision of value for money for those who pay its charges, as well as for taxpayers as a whole.
* Provision of clear and readily available advice and information on its work.
* Development of a close and responsive relationship with the public, including Local Authorities, other representatives of local communities and regulated organisations.

In order to achieve these objectives the Agency will use its statutory powers and work in collaboration and partnership with various organisations and individuals. This will include local government, industry, conservation groups, the farming community and the general public.

APPENDIX 2

Environmental monitoring carried out by the Agency

Rainfall

Rainfall in measured by 36 daily gauges, of which 32 send information via the Agency to the Meteorological Office. They are read by observers who send returns monthly for data quality control and archiving. In addition 8 automatic raingauges record short duration intensity on data loggers and are also contacted by the computer-based forecasting system.

River Levels and Flows

Levels are continuously recorded at 34 sites from which flows can be derived at 27 sites including 2 multipath ultra sonic gauges and 1 electromagnetic gauge. 5 further flow measurement stations are currently not in use. 21 of these gauges have telemetry outstations allowing automatic data retrieval by telephone providing up to date information for abstraction control, river regulation and flood warning operations. More extensive low flow surveys based on spot gaugings are undertaken during drought periods.

Groundwater Levels and Other Monitoring

The Environment Agency determines groundwater quality from a number of boreholes and wells across the catchment, in order to monitor the background quality of groundwater within the Major Aquifer. In the near future the number of monitoring points is likely to increase as the Agency formulates standard monitoring regimes in line with European Union policy.

Observation Boreholes

A network of 173 observation boreholes is maintained to monitor groundwater levels, primarily reflecting the regional importance of the Sherwood Sandstone aquifer. Additional sites are monitored as part of the Shropshire Groundwater Scheme - these include 105 boreholes and 18 tubewells measuring levels in the Sherwood Sandstones, almost 80 tubewells recording variations in shallow water tables in the superficial drift deposits and a further 10 boreholes associated with other minor aquifers. 23 gauge boards monitor water levels in pools linked to groundwater in the Scheme area.

The area has large aquifers used extensively for abstraction and samples are taken by the Agency from a network of 23 groundwater chemistry monitoring sites, many in the North Shropshire Aquifers. Groundwater samples are also taken at monitoring boreholes around waste disposal sites and in conjunction with special projects such as the Shropshire Groundwater Scheme.

SurfaceWater Quality - Chemical monitoring

Water Quality samples are taken on a monthly basis from a network of 146 key sites on rivers and canals in the catchment (see map 19). The samples are analysed for a wide range of substances, the results being used to assess compliance with a range of EC Directives, Rivers Ecosystem classification targets and for General Quality Assessment purposes. In addition to the routine monitoring of river quality samples of consented discharges are regularly taken to assess compliance against targets set by the Agency. Samples are also taken during the investigation of pollution incidents, both to help track down sources of pollution and as evidence against offenders.

Biological Monitoring
In addition to the chemical monitoring of watercourses, the quality of surface waters is also assessed by using the invertebrate community present as an indicator of overall water quality. Scoring systems are used for the species found, with high scores given to species known to be intolerant of pollution and lower scores to species which can live in fairly polluted water. A high total score indicates a river of consistently good quality, while a low score indicates one which is chronically or intermittently polluted.

Biological monitoring is routinely carried out twice yearly at 119 sites, which are generally matched with chemical sampling sites. In addition, catchment surveys are carried out on an ad-hoc basis as well as work to investigate poor routine site results and post-pollution incident impact assessments.

Wildlife and Amenity

Conservation and Recreation - Habitat Surveys
River Corridor surveys have been completed for the majority of main rivers in the catchment and River Habitat Surveys are also being undertaken; although there is not yet a comprehensive coverage of the area.

Fish Stocks
Stocks of all species of fish in the area have been monitored by electric fishing surveys on a regular basis over the last five years at 119 sites on the main river and tributaries. To take into account changing fisheries priorities there is a new monitoring programme planned for the next five years to cover major and minor coarse fish stocks and salmonid indicator sub-catchments. Surveys will be carried out in the area as part of this programme. Salmon redd counts are carried out annually together with collection of anglers' catch returns. An electronic fish counter operated at Shrewsbury Weir until 1996 providing information about the size and timing of the salmon run.

Waste Management Sites
Licensed waste management sites are regularly inspected by the Agency in order to check compliance with waste management licence conditions and monitor environmental impact. The frequency of inspections depends on the type of site, thus a landfill site accepting household and industrial wastes will be inspected more frequently than a site accepting only soil wastes, and the quality of the operational management of the site.
At landfill sites monitoring is also undertaken to ensure that the products formed as a result of the breakdown of wastes - leachate and landfill gas do not escape in an uncontrolled manner and cause pollution. Leachate is a potentially polluting liquid containing heavy metals and organic materials. Landfill gas comprises methane and carbon dioxide, both of which are greenhouse gases, and can give rise to fire, explosion and asphyxiation. To prevent uncontrolled escape of leachate and landfill gas, stringent conditions are imposed by the waste management licence. Monitoring within the site and outside the site is undertaken to detect any migration of gas from site and leachate contamination of surface and groundwaters.

APPENDIX 3

Flood Defence Activities

Regulation

Main River

All watercourses are classified as either 'main river' (which is defined on maps held by the Agency and MAFF) or 'ordinary watercourse' (sometimes referred to as 'non-main river') In broad terms main river includes all watercourses which contribute significantly to a catchment's drainage though ordinary watercourses may be more significant locally. The legislation dealing with main river is The Water Resources Act 1991 and is supplemented by local Byelaws. The Agency supervise all flood defence matters but have special powers to carry out or control work on main rivers.

Local authorities and in some areas Internal Drainage Boards (IDB's) are responsible for flood defence on ordinary watercourses. The appropriate legislation relating to ordinary watercourses is to be found in The Land Drainage Act 1991.

Proposed revisions to main river are dealt with through a consultation and advertising process with the decision whether to main a river, or not, being made by MAFF.

Flood Risk Areas - DoE Circular 30/92 - Section 105 Surveys

It is preferable to avoid increased risk from flooding through control of development than to have to carry out works to alleviate problems once they occur. The relevant authority for controlling development in the floodplain is not the Agency but the local planning authority through the Town and Country Planning Act 1990 process.

Local planning authorities and the Agency are required by the Department of the Environment in Circular 30/92, on Development and Flood Risk, to liaise closely on flooding and surface water runoff matters. The aim is to ensure that flooding risks that might arise from a development are recognised and made an integral part of the decision making process undertaken by local planning authorities. Flooding and drainage issues are also to be taken fully into account during the preparation of land use development plans. In this respect the Agency has responsibility to prepare surveys under Section 105 of the Water Resources Act 1991 to define the nature and extent of flood risks.

Land Drainage Consents and Surface Water control

The Agency's consent is required for works on or near the bank of a main river. This includes construction in, over, under or within 8 metres of the watercourse including such activities as the planting of trees and mineral extraction. On ordinary watercourses, consent is only required for building any structure that would affect the flow.

These powers are used to ensure that people both upstream and downstream of the proposed works are not exposed to an increased risk of flooding.

Access along river banks for staff and equipment needs to be preserved wherever possible, especially for emergency works. To ensure this access is kept clear we will not grant a consent to any development within 8 metres of a main river watercourse which would compromise flood defence work activities.

In deciding whether to issue a consent we will also take into account whether the proposed works conserve and enhance the environment. Surface water runoff is likely to be increased to some degree as a result of development as more impermeable surfaces such as roofs and pavements are created. The impacts of such development, however small, add up and can lead to significant problems in due course. Increases in both the amount and rate of water reaching rivers can, if not managed, lead to greater risk of flooding.

We will seek to ensure new development is carefully located and designed. Where appropriate we will require measures to control surface water to be incorporated into the overall development.

Water Level Management Plans

Recent guidance has been issued by the government on the preparation of Water Level Management Plans for Sites of Special Scientific Interest or other areas of high ecological or landscape importance. Where we are the operating authority, we will liaise with English Nature to prepare a plan to ensure appropriate key water levels are safeguarded.

Flood Defence Standards of Service

As an aid to decisions on priorities for works we have determined Standards of Service for flood defence based on land usage within the floodplain. Five "land use bands", have been established, based on the presence and concentration of certain features of land use. These include housing, commercial property, agriculture, highways and other transport networks. Such features are each allocated a financial value (based on the potential losses that would ensue if the features were subject to flooding) which allows comparison of different features on the same basis.

Each land use band has a target for the maximum flood risk to which it should be exposed. The standards are expressed in terms of the frequency at which a flood is likely to occur which exceeds the magnitude for which protection is available or should ideally be provided.

For example, a standard of 1 in 50 years means that, for any given year, the likelihood of a flood flow occurring which significantly affects key land use features, is 1 to 50 or 2% in any one year.

A comparison of the target and actual standards of service allows improvement and maintenance works to be prioritised towards those rivers which do not meet their target standards.

Descriptions of land use bands are given in the Table below. Map 22 shows the various land use bands for main river in the area covered by this plan.

Standards of service land use bands and targets			
Land use band	Description of typical land use	Target standard of protection (return period)	
		Fluvial	Saline
A	High density urban areas containing significant amounts of both residential and commercial property at risk	1:50 - 1:100	1:100 - 1:200
B	Medium density urban areas, some parks and open spaces, or high grade agricultural use at risk	1:25 - 1:100	1:50 - 1:200
C	Low density urban areas or rural communities. Typically large areas of high grade agricultural land with some properties also at risk from flooding	1:5 - 1:50	1:10 - 1:100
D	Generally farmland with occasional properties at risk. Medium productivity agriculture which may also be prone to the effects of waterlogging	1:1.25 - 1:10	1:2.5 - 1:20
E	Typically low grade agricultural land or public open space, often grassland or scrub, with very few properties at risk	<1:2.5	<1:5

Routine Maintenance Regime

The Agency does not own watercourses (except in a few specific locations where flood defence structures have been constructed and their ownership retained).

The ultimate responsibility for the upkeep of a watercourse rests with the person who owns the land on the side of the river (also known as the riparian owner).

We have permissive powers, on main river, to undertake works and exercise our powers in this respect according to available resources and priorities. Regular maintenance is essential if the river system is to operate properly at times of high water levels. Such maintenance works include vegetation control, repairs to earth embankments and other floodwalls, obstruction and blockage removal and dredging. Maintenance can contribute significantly to reducing the risk of flooding.

Emergency Response

At times of high water levels in addition to our floodwarning role (see section 5) our operational priorities are to patrol the defences, check and operate flood defence structures, remove blockages and carry out any emergency repairs needed.

District councils have permissive powers to offer assistance to owners and occupiers during floods. This may include placing sandbags, moving possessions, evacuating people. Each Council has a different policy on the type and amount of help they give. The fire service provides help in flood emergencies if they are able to do so. The local station will be able to advise the public on what help is, or is likely to be, available and whether or not a charge will be made.

Depending on the location the County Council or the Local Unitary Authority are responsible for public highways and would deal with any flooding problems associated with road drainage. All County Councils and Unitary Authorities have Emergency Planning Officers who may become involved in more serious flood events.

Capital Works

In addition to general maintenance work, the Agency can build new flood defences if flooding is a serious problem in a particular area. Nowadays we usually only build new defences to protect built up areas from flooding. All schemes must be technically, economically and environmentally sound. We keep a list of schemes called a Programme of Capital Works which helps us to plan for the future.

Duty of Care for Conservation

All new schemes and maintenance works are carried out after consultation with our conservation staff to ensure that the work is done in an environmentally acceptable manner. Under the legislation three main areas have to be considered, namely to take into account the impact of proposals on natural features, to have regard to protection features of historic interest, and to further the conservation and enhancement of flora, fauna and other natural features.

Flood Warning

Flood Warning Responsibilities

The Agency recognise that irrespective of attempts to minimise the risk from flooding through the implementation of various policies and actions, flooding can occur and on occasion represents a risk to human life. With regard to public safety we operate a flood forecasting service in the catchment which uses rain gauge and river level data from a number of sites, radar and rainfall forecast data from meteorological agencies, and information from flood defence staff in the field.

As well as issuing flood warnings we have the lead role in making sure that they actually get through to the people at risk. Arrangements are agreed in consultation with local authorities and the emergency services. Regular flood warning seminars are also held to review the effectiveness of the flood forecasting and warning process.The Agency works in partnership with local authorities and people at risk to get the flood warnings to those affected by flooding. Automatic voice message computers send the warnings directly to Senior Flood Wardens who operate a cascade system to ensure that all who need the warnings get them. Other media such as local radio, teletext, AA Roadwatch and the Met Office are used to get the widest possible coverage. In addition recorded up to date local information is available by telephone on Floodcall.

APPENDIX 4

National and European legislation.

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

National Legislation

A summary of the most relevant legislation is given below:

The Environment Act 1995
Water Resources Act 1991
Land Drainage Act 1991
Salmon and Freshwater Fisheries Act 1975
Police Act 1964 and the Police and Criminal Evidence Act 1984
Environmental Protection Act 1990
The Radioactive Substances Act 1993
The Water Industry Act 1991
Control of Pollution (Amendment) Act 1989

European Legislation

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

Dangerous Substances Directive (76/464/EEC)
Freshwater Fisheries Directive (78/659/EEC)
Surface Water Abstraction Directive (75/440/EEC)
Urban Waste Water Treatment Directive (91/271/EEC)
Nitrate Directive (91/676/EEC)
Disposal of Waste Oils Directive (75/439/EEC)
Waste Directive (75/442/EEC)
Batteries and Accumulators Directive (91/157/EEC)
Adapting to Technical Progress Directive (93/86/EEC)
Packaging and Packaging Waste Directive (94/62/EEC)
Incineration of Hazadarous Waste Directive (94/67/EEC)
List of Hazadarous Waste Directive (94/904/EEC)
Commission decision on the Standard Consignment Note Referred to in Council Regulation (EEC(No. 259/93 on Shipments of Waste (94/774/EC)

APPENDIX 5

Agricultural land Classification (ALC) Grades (MAFF)

Grade 1 - Excellent Quality Agricultural Land
Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

Grade 2 - Very Good Quality Agricultural Land
Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.

Grade 3 - Good to Moderate Quality Agricultural Land
Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

> **Subgrade 3a - Good Quality Agricultural Land**
> Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.
>
> **Subgrade 3b - Moderate Quality Agricultural Land**
> Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most the year.

Grade 4 - Poor Quality Agricultural Land
Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (eg cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

Grade 5 - Very Poor Quality Agricultural Land
Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

APPENDIX 6

Results of Informal Issues Consultation

During September 1996, all unitary ,county and district councils in the LEAP area were contacted, together with over 85 other organisations who have an interest in the local environment. In total 120 organisations were consulted. This pre-consultation exercise was designed so as to focus on key groups and organisations that were likely to have information on and ideas about the sort of environmental proplems facing the area. 39 of the 120 consultees responded (33%). The breakdown of these responses is given below.

Overall comments on the issues raised were supportive. Some additional specific issues did arise from the consultation responses and these have been incorporated into the issues as described in Section 3, where appropriate.

Main areas of interest were: Environmental quality and improvements, biodiversity, water resources and abstraction and recreational uses of waters. Some queries were raised about environmental monitoring in the area and this has been addressed in Appendix 2. The Agency is grateful for all comments received.

Response Record

Classification of Consultees	Number of Consultees	Number of Responses	Response Rate (%)	Additional responses
Water Companies and Water interest groups	9	1	11	
Nature Conservation groups	16	6	38	
Environmental, Archaeology and Heritage interest groups (including LA Depts)	20	8	40	
Local Authorities:- Planning	23	11	48	
Industry/ Agricultural interest groups	9	2	22	
Countryside, Landowners, & Forestry groups	15	5	33	
Recreational groups	25	3	12	
General Consultees	3	3	100	
Local industry				1
Total	120	39	33	1

Consultee List September 1996:

ADAS (Shrewsbury)
ADAS (Worcester)
Apley Estate
Bayer Plc
Birmingham Anglers Association
Bridgnorth Angling Society
Bridgnorth British Legion Angling Club
Bridgnorth District Council
British Canoe Union
British Waterways
Bromsgrove District Council
Cadw -Welsh Historic Monuments
Campaign for the Protection of Rural Wales
Clywd & Powys Archaeological Trust
Coal Authority
CPRE (Herefordshire)
CPRE (Shropshire)
CPRE (Worcester)
CPRE (Staffordshire)
Country Landowners Association (Herefordshire)
Country Landowners Association (Powys)
Country Landowners Association (Worcs)
Countryside Commission
Countryside Council for Wales
Croome Estate Trust
Development Board for Rural Wales
Dawley Angling Society
Ellesmere Angling Club
English Heritage
English Nature (Three Counties)
English Nature (West Midlands)
Farmers Union of Wales
Forest Enterprise (Wales)
Forestry Authority - West Midlands Conservancy
Forestry Authority - Wales
Forestry Authority- Wye & Avon Conservancy
Government Offices (West Midlands)
Hereford & Worcester County Council
Herefordshire Nature Trust
Hodnet Angling Club
Inland Waterways Association (Shropshire)
Inland waterways Association (Herefordshire)
Ironbridge Power Station
Kidderminster & District Angling Association
Landowner Liquid Fertiliser
Leominster District Council
Malvern Hills District Council
Ministry of Agriculture, Fisheries & Food
Montgomeryshire District Council
Montgomeryshire Wildlife Trust
National Farmers UnionWelsh Region South
National Farmers Union,W Midlands Region
National Farmers Union (Montgomeryshire)
National Trust Syndicate
Newcastle Under Lyme Borough Council
Newnham Estate Syndicate
North Shropshire District Council
Oswestry Borough Council
Powys County Council
Preston Montford Field Studies Centre
Raby Estate (Telford)
Ramblers Association (Hereford & Worcester)
Ramblers Association (Powys)
Ramblers Association (Shropshire)
Ramblers Association (Staffordshire & West Midlands)
REPAC (Mrs P Perry)
RFAC (FA Jennings)
RFDC (J Dainty OBE)
Royal Society for the Protection of Birds (North-West England)
Royal Society for the Protection of Birds (Central England)
Royal Society for the Protection of Birds (Wales)
Rural Community Councils Association (Hereford & Worcestershire)
Rural Development Commission
Salmon & Trout Association (Shropshire & Midlands)
Salmon & Trout Association (Worcestershire)
Salopian Flyfishers
Severn Fisheries Consultative Council
Severn Gorge Countryside Trust
Severn Navigation Restoration Trust
Severn Trent Water Plc
Shrewsbury & Atcham Borough Council
Shrewsbury Angling Management Committee
Shropshire Association of Parish and Town Councils
Shropshire County Council
Shropshire Wildlife Trust
South Shropshire District Council
South Staffordshire District Council
Sports Council (West Midlands)
Staffordshire County Council
Staffordshire Wildlife Trust
Stafford Borough Council
St Georges & District Angling Society
Telford Angling Association
Tern Fisheries
Welsh Canoeing Association
Welsh Office Agriculture Department
Welsh Water
West Midlands Rowing Council
White Swan Piscatorials
Winnington Estates
Worcester & District Angling Association
Worcester City Council
Worcester Society for Open Spaces
Worcestershire Wildlife Trust
Wrekin District Coucil
Wrexham County Borough Council
Wyre Forest District Council

APPENDIX 7

Glossary

Abstraction	The removal of water from any source, either permanently or temporarily.
Abstraction Licence	A statutory document issued by the NRA to permit removal of water from a source of supply. It can limit the quantity of water taken daily etc.
Agenda 21	A comprehensive programme of worldwide action to achieve a more sustainable pattern of development for the next century. UK Government adopted the declaration at the UN Conference on Environment and Development (the Earth Summit) held in Rio de Janeiro in 1992.
Algae	Microscopic (sometimes larger) plants, which may be floating or attached. Algae occur in still and flowing water.
Algal blooms	Rapid growth of phytoplankton in marine and freshwater which may colour the water and may accumulate on the surface as a green scum. Decomposing dead cells consume large quantities of oxygen in the water which may result in the waters becoming anaerobic. Some blooms (such as certain species of blue-green algae) may produce poisons.
Alleviation of Low Flows (ALF)	The strategy for resolving environmental problems (eg caused by over-abstraction) in certain catchments.
Ameliorate	Cause something to become better.
Ammonia	A chemical compound found in water often as a result of pollution by sewage effluents. It is widely used to determine water quality. Ammonia detrimentally affects fish.
AONB	Area of Outstanding natural beauty
Aquatic	Pertaining to the water environment.
Aquifer	A water bearing-stratum situated below ground level. The water contained in aquifers is known as groundwater.
Asset Management Plan	Water Companies' Strategic Business Plans - initiated (eg AMP 2) by OFWAT as part of the periodic review of water company charges.
Augmentation	The addition of water by artificial input. (Usually to "top up" low flows in summer by either groundwater pumping or via reservoir release.)
Biochemical Oxygen Demand (BOD)	A standard test which measures over 5 days the amount of oxygen taken up by aerobic bacteria to oxidise organic (and some inorganic) matter.
Biodegradable	Capable of being decomposed by bacteria or other biological means.
Biodiversity	Diversity of biological life, the number of species present.
Borehole	Well sunk into a water bearing rock.
Buffer Zone	Strip of land 10-100m wide, alongside rivers which is removed from intensive agricultural use and managed to provide appropriate habitat types.
Cadmium	A very toxic heavy metal with a wide variety of uses.
Carbon Dioxide	Gas present in the atmosphere and formed during respiration, the decomposition and combustion of organic compounds (eg fossil fuels, wood etc). A greenhouse gas.
Catchment	The total area from which a single river system collects surface run-off.

CFCs	Chlorofluorocarbons. Volatile but inert (without active chemical or other properties) compounds of carbon and (mainly) chlorine and fluorine. Important greenhouse gases and ozone layer depletors.
Coarse Fish	Freshwater fish other than salmon and trout.
Culvert	Drain or covered channel carrying water across or under a road, canal etc.
Cumecs	Cubic Metres per Second: equivalent to 86.4 thousand cubic metres per day.
Cyprinid fish	Coarse fish eg.Roach, Dace and Bream.
Demand	The requirement for water for human use.
Dissolved Oxygen (DO)	The amount of oxygen dissolved in water. Oxygen is vital for life so this measurement is an important, but highly variable, indicator of the 'health' of the water. It is used to classify waters.
EU 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.
EC Regulation	European Community legislation having legal force in all member states.
Ecosystem	A functioning, interacting system composed of one or more living organisms and their effective environment, in biological, chemical and physical sense.
Effluent	Liquid waste from Industry, agriculture or sewage treatment plants.
Environmental Prescribed Flows	That flow which should not be artificially reduced if the riverine environment is to be protected.
Environmentally Sensitive Area (ESA)	An area where traditional farming methods may be supported by grant aid from the Ministry of Agriculture, Fisheries and Food (MAFF) to support distinctive landscape, wildlife habitats or historic features.
Eutrophic	A description of water which is rich in nutrients. At worst, such waters are sometimes beset with unsightly growths of algae.
Evapotranspiration	Water lost by evaporation and water taken up and lost by plants.
Fauna/Flora	Animal life/ Plant life.
Floodplain	This includes all land adjacent to a watercourse over which water flows or would flow but for flood defences in times of flood.
Green Belt	Any zone of countryside immediately adjacent to a town or city, defined for the purpose of restricting outward expansion of the urban area.
Groundwater	Water which saturates a porous soil or rock substratum (or aquifer). Water held in storage below ground level.
Hydrometry	The measurement of water.
Hydrogeology	Branch of geology concerned with water within the earth's crust.
Insecticide	Substances used to destroy or repel insects.
IPC Integrated Pollution Control	An approach to pollution control in the UK which recognises the need to look at the environment as a whole, so that solutions to particular pollution problems take account of potential effects upon all environmental media.

Invertebrate fauna	Animals which lack a vertebral column - used for biological classification. Especially macro-invertebrates (animals of sufficient size to be retained in a net with a specified mesh size.
Landfill	Site used for waste disposal into/onto land.
Leachate	Liquor formed by the act of leaching.
Main River	The watercourse shown on the statutory 'main river maps' held by the Environment Agency and MAFF. The Agency has permissive powers to carry out works of maintenance and improvement on these rivers.
Nitrate Sensitive Areas (NSA)	An area where nitrate concentrations in sources of public drinking water exceed, or are at risk of exceeding the limit of 50 mg/l laid down in the 1980 EC Drinking Water Directive, and where voluntary, compensated agricultural measures were introduced in 1990 as a means of reducing those levels.
Nitrate Vulnerable Zone (NVZ)	An area where nitrate concentrations in sources of public drinking water exceed, or are at risk of exceeding the limit of 50 mg/l laid down in the 1991 EC Nitrate Directive, and where compulsory, un-compensated agricultural measures will be introduced from 1996 as a means of reducing those levels.
OFWAT	Office of Water Industry's Financial Regulator of Water Service Companies .
Percolation	The descent of water through soil pores and rock crevices.
Perennial Flow	River flow present through the entire year.
Permeability	The ease at which liquids (or gases) can pass through rocks or a layer of soil.
Permissive powers	Powers which confer on the Agency the right to do things but not the duty to do them.
Pesticides	Substances used to kill pests, weeds, insects, fungi, rodents etc.
Porosity	The volume of water which can be held within a rock or soil, expressed as the ratio of the volume of the voids to the total volume of the material.
Potable Water	Water of a suitable quality for drinking.
RAMSAR	Wetland site of International Importance that is designated under the Ramsar* convention (*a town in Iran where the international convention originally agreed in 1975 to stem the progressive encroachment on, and loss of, wetland).
Raw Water	Water in its natural state; before treatment.
Raw Water Transfer	The transfer of water from one resource to another in order to meet or anticipate demand. It is usually part of a scheme such as a reservoir or pipeline.
Reach	A length of a river.
Renewable Energy	Energy produced from resources which are unlimited or rapidly replenished eg. wind, water, sunlight, wave power or waste.
River Corridor	The continuous area of river, river banks and immediately adjacent land alongside a river and its tributaries.
Salmonid Fish	Game fish eg. trout and salmon.
SAM	Scheduled Ancient Monument
Septic tank	A tank used for the treatment of sewage from properties without mains drainage. The sewage is settled and some bacterial treatment occurs. Discharge of effluent is usually to a soakaway system.