EA · MIDLANDS LEAPS - BOX 7

local environment agency plan

WEST MIDLANDS STOUR

CONSULTATION REPORT

MARCH 1998

ENVIRONMENT AGENCY

YOUR VIEWS~

This Consultation Report is about the West Midlands Stour area. It is the Environment Agency's first analysis of the status of the local environment.

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 March to June 1998. Please send your comments in writing to:

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Fax: (01743) 272138

Comments are required by 19 June 1998

Further copies of this Report are available at the above address.

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

Photographs: Clockwise from centre: River Stour, Kidderminster; Wilden Marsh with Black Poplar, Kidderminster; Cobbs Engine House, Windmill End Junction, Dudley Canal, (Courtesy of British Waterways); Water Vole

West Midlands Stour Key Details

N

0 5km

Map 1 Main Rivers, Administrative Boundaries and Infrastructure

KEY

- Area Boundary
- Main River
- Ordinary Watercourse
- Canal
- Built up Area
- Motorway
- Main Road
- Railway
- County boundary
- District boundary
- Metropolitan Borough boundary

General

Area:	374km²
Topography:	Highest point 315m (AOD) (top of Walton Hill)
	Lowest point 20m (AOD) (River Stour/River Severn confluence)
Water Companies:	Severn Trent Water Ltd South Staffordshire Water Plc

Population *(estimated from 1991 Census)*

Year	*Population*
1991	437,341
2001 (predicted)	439,152

Main Towns and Populations

Towns	*Population*
Dudley	235,980 (part)
Wolverhampton	96,420 (part)
Kidderminster	54,300
Stourport	17,450
Wombourne	13,711
Stourbridge	12,335
Kinver	5,054
Hagley	4,258

Administrative Details

County Councils	*Metropolitan Borough Councils*	*District Councils*
Staffordshire	Wolverhampton	South Staffordshire
Shropshire	Dudley	Bridgnorth
Hereford & Worcester	Sandwell	Wyre Forest
(reorganisation due April 1998,		Bromsgrove
see Section 5.1)		Wychavon

Environment Planning and Protection

Water Quality

Length of watercourse (km) in each component of the General Quality Assessment (GQA) 1996 is shown below.

Component		GQA Grade Chemistry		Inferred Water Quality Class Biology	
		Rivers	Canals	Rivers	Canals
GOOD	A	0	0	0	0
	B	11.4	0	3	4
FAIR	C	31.3	10.7	9.1	6.7
	D	30.3	46.7	38.4	5
POOR	E	30.9	0	24	22
BAD	F	0	0	21.5	0

Water company sewage discharges and storm overflows	178
Private sewage treatments plants	127
Industrial	47
Surface water sewers	15
Total number of consented discharges:	367

Waste Management Facilities

Landfill sites (inert)	5
Landfill sites (biodegradable)	7
Former landfill sites	226
Waste treatment plants	2
Metal recycling sites	51
Transfer stations	38
Household waste reclamation sites	5

Integrated Pollution Control (IPC)

IPC authorisations	13
Radioactive substances authorisations	4
Radioactive substances registrations	35

Conservation and Fisheries

24km of the Staffordshire & Worcestershire Canal is designated under the EC Freshwater Fisheries Directive (78/659 EEC)

Sites of Special Scientific Interest	20
Special Wildlife Sites	82
Scheduled Ancient Monuments	25

Land Use

Type	*Area covered*
Urban development	32.07%
Arable	35.78%
Grass	18.85%
Woodland	7.55%
Fallow/bare soil	5.66%

Water Resources and Flood Defence

Length of Main River in catchment	90.0km
Average annual rainfall (1961 - 1990)	697mm
Length of navigable canal (administered by British Waterways)	75.1km
River Stour flows at Kidderminster:	
Mean daily flow (1953 - 1996)	241 Ml/day
Maximum recorded flow (1953 - 1996)	4,500 Ml/day
Mean annual flood flow (1976 - 1996)	1,827 Ml/day

Total licensed abstaction:	76,543 Ml/year
Groundwater	74,839 Ml/year
Surface water	1,704 Ml/year
Number of licensed abstractions:	156
Groundwater	94
Surface water	62

FOREWORD

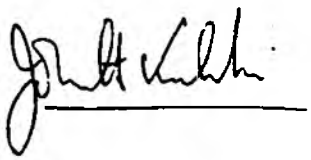
This is one of the Environment Agency's new Local Environment Agency Plans (LEAPs). The Agency aims to protect and enhance the whole environment through the promotion of sustainable development. One way of achieving this aim is through local environment planning and collaborative action with both the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

Over a long period of time a significant part of the landscape of the West Midlands Stour has changed, from rural and relatively undeveloped countryside to built up, intensively developed urban area. This has resulted in significant and varied impacts on the local environment and put pressure on our natural resources, wildlife and habitats. 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 West Midlands Stour 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 your views.



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, District and Borough Councils for the information provided, and to the Farming and Rural Conservation Agency (FRCA), an executive agency of the Ministry of Agriculture, Fisheries and Food (MAFF), for the provision of information on agriculture. Thanks must also go to the West Midlands Stour project group members, the AEG sub-group and to all those who have helped with the production of this document.

Draft Vision for the West Midlands Stour Area

The Environment Agency's vision for the West Midlands Stour area is:

"To develop a better local environment in which people can live and work and maintain this, by sustainable management, for future generations."

It will be evident from the information provided throughout this document that the LEAP area is subject to considerable pressures. The impact of urban development, including housing, industry and infrastructure has resulted in; pressures on water resources, air and water quality; problems resulting from waste production, and the loss of wildlife and habitat. It is, of course, important that the economic and housing needs of the area are met, but at the same time for the impacts of this development to be minimised. The challenge is to ensure that the needs of all users and the environment are balanced and we aim to do this through integrated and sustainable environmental management.

It is important that we realise and develop the full potential of the West Midlands Stour area. By promoting ownership of the local environment and raising people's awareness, we will work towards a healthy and diverse environment that is valued by, and of benefit to, its residents and visitors alike.

The Environment Agency cannot make this vision reality, or effectively carry out the objectives set out below, without the help of others. We will therefore seek to work in partnership with Local Authorities, industry, environmental groups, other organisations and individuals who share an interest in the area.

Our key objectives for the West Midlands Stour area are to:

* Educate and raise awareness of the local environment and environmental issues.
* Work in partnership with local people and organisations to realise the potential of the area and encourage ownership of the local environment.
* Maintain and improve the water quality of rivers, canals and groundwater.
* Manage water resources in an environmentally sustainable way by balancing the needs of legitimate users with those of the environment.
* Reduce the impact of flooding on existing developments, where possible, and resist development where it would be at risk from flooding or may cause flooding elsewhere.
* Develop a monitoring programme, in partnership with Local Authorities, to assess air quality and the impact of Integrated Pollution Control (IPC) processes on it and enable improvements to be made.
* Promote waste minimisation, encourage the achievement of national waste management targets and ensure the effective regulation of waste.
* Protect and enhance river/green corridors, and support biodiversity through the protection and enhancement of species and habitats.
* Develop the recreational and amenity value of watercourses and protect the varied cultural heritage that exists within the area as a whole.

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PART I THE MANAGEMENT PLAN

Part I This 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 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 I

* **Section 1 Uses, Activities and Pressures**
* **Section 2 State of the Environment**
* **Section 3 Issues and Options**
* **Section 4 Protection Through Partnership**

Section 1 Introduction

This section gives an introduction to the Environment Agency and describes the Local 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
1.1 The Environment Agency
1.2 Local Environment Agency Plans (LEAPs)
1.3 Sustainable Development
1.4 Biodiversity

1.0 Introduction

This is the first Local Environment Agency Plan (LEAP) for the West Midlands Stour area. It supersedes the River Stour Catchment Management Plan (CMP) produced by the former National Rivers Authority and the subsequent Final Plan and Annual Reviews. There are, however, several issues raised in the CMP that have been carried over into the LEAP (see Table 5, page 29). These include issues relating to surface water quality and contamination of groundwater, low flow and groundwater resource pressures, flood risk resulting from urbanisation and various issues emphasising the need for improvement of fish stocks, the conservation value of the catchment and recreation. Several new issues have also been raised, some of these have resulted from the additional responsibilities of the Environment Agency. All the issues are detailed in Section 3.

The Environment Agency is committed to the delivery of environmental improvement at the local level and through this plan we will continue to work in collaboration and partnership with various organisations and individuals to achieve this aim.

1.1 The Environment Agency

1.1.1 The Agency's Role, Aims and Objectives

The Environment Agency of England and Wales was established on 1 April 1996 by the Environment Act 1995. It is an independent public body and has taken over the functions of three previously 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.

The Agency's principle aim, set out under Section 4 of the 1995 Environment Act, is to protect and enhance the environment as a whole, thus contributing to the Government's commitment to sustainable development (see Appendix 1). The integrated management of land, air and water, through pollution prevention and control, education, and where necessary, enforcement, are key means in meeting this aim.

A recent Environment Agency publication *An Environmental Strategy for the Millennium and Beyond* sets out further aims in order to meet the Agency's vision of *A better environment in England and Wales for present and future generations.* These are:

* To achieve major and continuous improvements in the quality of air, land and water.
* To encourage the conservation of natural resources, animals and plants.
* To make the most of pollution control and river-basin management.
* To provide effective defence and warning systems to protect people and property against flooding from rivers and the sea.
* To reduce the amount of waste by encouraging people to re-use and recycle their waste.
* To improve standards of waste disposal.
* To manage water resources to achieve the proper balance between the country's needs and the environment.

* To work with other organisations to reclaim contaminated land.
* To improve and develop salmon and freshwater fisheries.
* To tell people about environmental issues by education and informing.
* To set priorities and work out solutions that society can afford.

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 (see Appendix 5, page 164). The Agency protects the environment by issuing consents and licences for activities which have an environmental impact, for example, water abstraction, the management and transport of waste, and the disposal of waste water following treatment. We also regulate the releases into the environment from some of the larger and potentially most polluting industries. This system of integrated pollution control regulates releases to air, to controlled waters and wastes that may be sent for disposal to land.

More detail about the Agency's role, regulatory powers and monitoring responsibilities can be found throughout this document and in Appendices 1 and 2.

The Agency has eight regions in England and Wales (see Figure 1), sub divided into twenty-six areas. The Midlands Region comprises four areas; the West Midlands Stour is within the Upper Severn Area. Most of the Agency's work operates at a local level and this allows an integrated and personal approach to managing the environment. Scotland is covered by its own Scottish Environmental Protection Agency and Northern Ireland has an Environment and Heritage Service and Rivers Agency.

Figure 1
The Environment Agency's
Eight Regions

1.1.2 Responsibilities Outside the Remit of the Agency

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. Some of these agencies and organisations are further discussed in Section 4, Protection through Partnership.

The Local Authorities deal with environmental health issues and 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. Problems with water supply, such as discoloured water or burst water mains should be directed to either Severn Trent Water Ltd or South Staffordshire Water Plc. Further details can be found in your local telephone directory.

1.1.3 The Agency's 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 Environment 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 (AEG)**. 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 advises the Agency on LEAPs, on other important local environmental issues and on the delivery of local services. It acts as a link between the local community, the Agency and its statutory committees. Meetings are held four times a year and are open to the media and the public. The current Chairperson of the AEG is Mr Michael Barker. A sub-group of the main AEG has been set up for this LEAP and includes members from varying backgrounds who have expressed an interest in the Stour area. The group has had opportunities to input into the plan process from an early stage. The four members of the sub-group are: Mr Gerald Godby, Mr Richard Martin, Cllr Rosemary Tomkinson and Mr Keith Mayou.

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. These 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 help contribute to the principle of sustainable development through integrated environmental management and improvement. They 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 five years

The West Midlands Stour LEAP is the second of four LEAPs to be published for the Upper Severn Area. A timetable for LEAP production in Upper Severn Area is set out below.

Table 1 Upper Severn Area LEAP Programme

LEAP	Consultation Report	Action Plan	1st Annual Review
Middle Severn	April 1997	November 1997	January 1999
West Midlands Stour	March 1998	October 1998	December 1999
Severn Uplands	December 1998	July 1999	September 2001
Teme	December 1999	July 2000	September 2002

Three other LEAPs, the Middle Severn, Staffordshire Trent Valley and Midlands Tame share boundaries with the West Midlands Stour (the latter two fall within the Upper Trent Area of Midlands Region). The adjacent LEAP areas are shown on the map below.

Figure 2 The West Midlands Stour and Adjacent LEAPs

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 issues consultation exercise with a range of organisations and groups took place in September 1997. The results of this exercise are summarised in Appendix 7, page 166.

Figure 3 The West Midlands Stour LEAP Process and the Main Outputs in the Five Year Cycle

1.2.2 The Consultation Process

The purpose of a three month consultation period 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 19 June 1998

It is an opportunity to:

* highlight the issues within the area
* establish the existing quality of the area and the range and extent 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 at the front of the report.

This document is, therefore, part of a process that will enable a shared vision to be developed, along with a strategy for the management of the area. 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 October 1998.

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 should compliment and integrate with other organisations' plans such as Local Waste Plans, Local Air Quality Management Plans, Local Development Plans, Local Agenda 21 Action Plans and Local Biodiversity 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 LEAP objectives will depend upon the Town & Country Planning policies of the County, Borough or District Councils in their Development Plans. The Environment Agency is a statutory consultee in the formulation of such policies. In Section 4, Protection Through Partnership, planning guidance statements are included which set out policies and approaches which could help to address longer term issues and problems highlighted in the plan.

The National Waste Strategy sets out targets for the reduction and use of waste (see Section 6.0.1, page 121), but the Agency has no powers to require businesses or the general public to reduce wastes or use more sustainable methods of waste management. Similarly, the National Air Quality Strategy sets out targets that need to be met (see Section 6.1.1, page 126), but the Agency has no powers to regulate emissions from motor vehicles, the main cause of air pollution. However, by identifying and publishing these issues in the LEAP, and through education the Agency can encourage and promote the means by which to achieve the targets set out in these documents.

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.

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 UK 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 mentioned in section 1.1.1, page 3. In November 1996 Ministers issued statutory guidance to the Agency on its contribution to sustainable development. A summary of this guidance as set out in *An Environmental Strategy for the Millenium and Beyond* is given in Appendix 1. Sustainable development does not necessarily mean less economic development. The statutory guidance takes account of the fact that there should be delivery of environmental goals without imposing disproportionate costs on industry or society as a whole.

Integrated environmental management is a means by which the Agency can promote sustainable development, and LEAPs are an important part of this process.

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 UK 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 (BAP) 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 BAP. A Biodiversity Steering Group, established under the BAP has identified 116 key species and fourteen key habitats, many of them aquatic or wetland related.

We will be a 'contact point' (co-ordinating body) for twelve species and for chalk river habitats. Chalk river habitats are not found in this area, but two of the twelve species for which the Agency are responsible are found in the LEAP area and the Agency will pay particular attention to these, they are the water vole and otter. Additionally, there are other water related species and habitats in the area which have been identified in the UK Biodiversity Action Plan and will require protection. These include the great crested newt, carr, marsh and reedbed habitats.

All our operational and regulatory activities will take account of these species and habitats in the 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 and Section 3, Issue 15, page 56 for further information).

Section 2 The Local Environment

This section provides a general overview of the locality and describes the natural features and resources of the area, including the importance of its heritage. These are considered under the headings of land, water, air, 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 River Stour and its tributaries drain an area of just over 374km^2. The River Stour rises in the Clent Hills and the Smestow Brook, its principal tributary, rises in Wolverhampton. These two watercourses converge at Stourton and flow south to meet the River Severn at Stourport. The Staffordshire and Worcestershire Canal follows the river along much of its course, it is joined by the Stourbridge Canal near Stourton allowing connection of the Dudley Canal and the rest of the Birmingham Canal Network to the River Severn (see Map 1, front cover).

The plan area mostly falls within the counties of Staffordshire and Hereford & Worcester, and the West Midlands area which includes the Metropolitan Boroughs of Wolverhampton, Dudley and Sandwell. These three boroughs constitute the majority of the urbanised part of the catchment, approximately 32%, and form much of what is historically known as the Black Country. The urbanised area has a significant impact on the character of the river and the state of the area in general, a fact which is highlighted throughout this plan and is particularly evident in the Issues raised in Section 3, and in Sections 5 and 6.

Development of the Black Country resulted from the Industrial Revolution. Population figures for the Black Country for 1801 and 1831 demonstrate the effect that the Industrial Revolution had in terms of urbanisation of the area. The population rose from around 97,000 to over 450,000 in thirty years. These dramatic population increases in themselves had disastrous consequences. With no controls on development, no sanitation or adequate water supplies there was an outbreak of cholera in 1832 resulting in thousands of deaths.

The Industrial Revolution began in Coalbrookdale in the adjacent Severn catchment area but spread into this area in the mid 18th Century. This movement was due to the plentiful supplies of minerals, principally coal which was exploited for the making of iron. Iron ore, found in geological association with the coal, and limestone in outcrops near Dudley, were also in plentiful supply. High quality fireclay, which is still mined today (see Map 8, page 87), was present in a belt from Stourbridge to Brierley Hill and Pensnett to Kingswinford and was used with coal for glassmaking,. The legacy of extensive mining operations in the thick 'Ten Yard Coal' seams of the South Staffordshire coalfield and other mineral workings are still in evidence. Much industrial heritage remains, particularly in the form of canals which were built to replace the packhorse as a better means of moving raw materials and finished goods.

The Black Country is believed to have got its name from the profusion of chimneys belching out smoke from ironworks and furnaces and the grey/black of the South Staffordshire coalfield shown on maps of the time. Before the Industrial Revolution, however, industry was still in evidence in the form of the woollen industry and some wrought iron was produced using water-powered hammers which harnessed the power of the River Stour. A slitting mill for nail making was located on the Stour at Kinver. Previous to this the area had been farmed and indeed not all areas of the Black Country even in the mid 19th Century were "Black by day and red by night" (Elihu Burritt, 1868). The areas around Halesowen were described in 1844 by an unknown writer "Everywhere cottages and mud hovels met the eye in the most picturesque situations".

Today, the headwaters of the River Stour in the Clent Hills is an area made up of woods, fields and isolated farms, lying on the edge of the coalfield it is untouched by the legacy of the Industrial Revolution but is under pressure from the threat of expansion of the West Midlands conurbation. The remainder of the plan area to the south and west is largely rural in character, with the exception of Kidderminster and Stourport. Much of this is Green Belt, the urban/sub-urban fringes are mainly pasture land and the rest is utilized for intensive arable agriculture.

The sections on land, air, water, wildlife and heritage which follow, provide a general outline of the local environment and help illustrate how the legacy of the Industrial Revolution, described above, impacts on the West Midlands Stour area.

2.1 Land

2.1.1 Geology

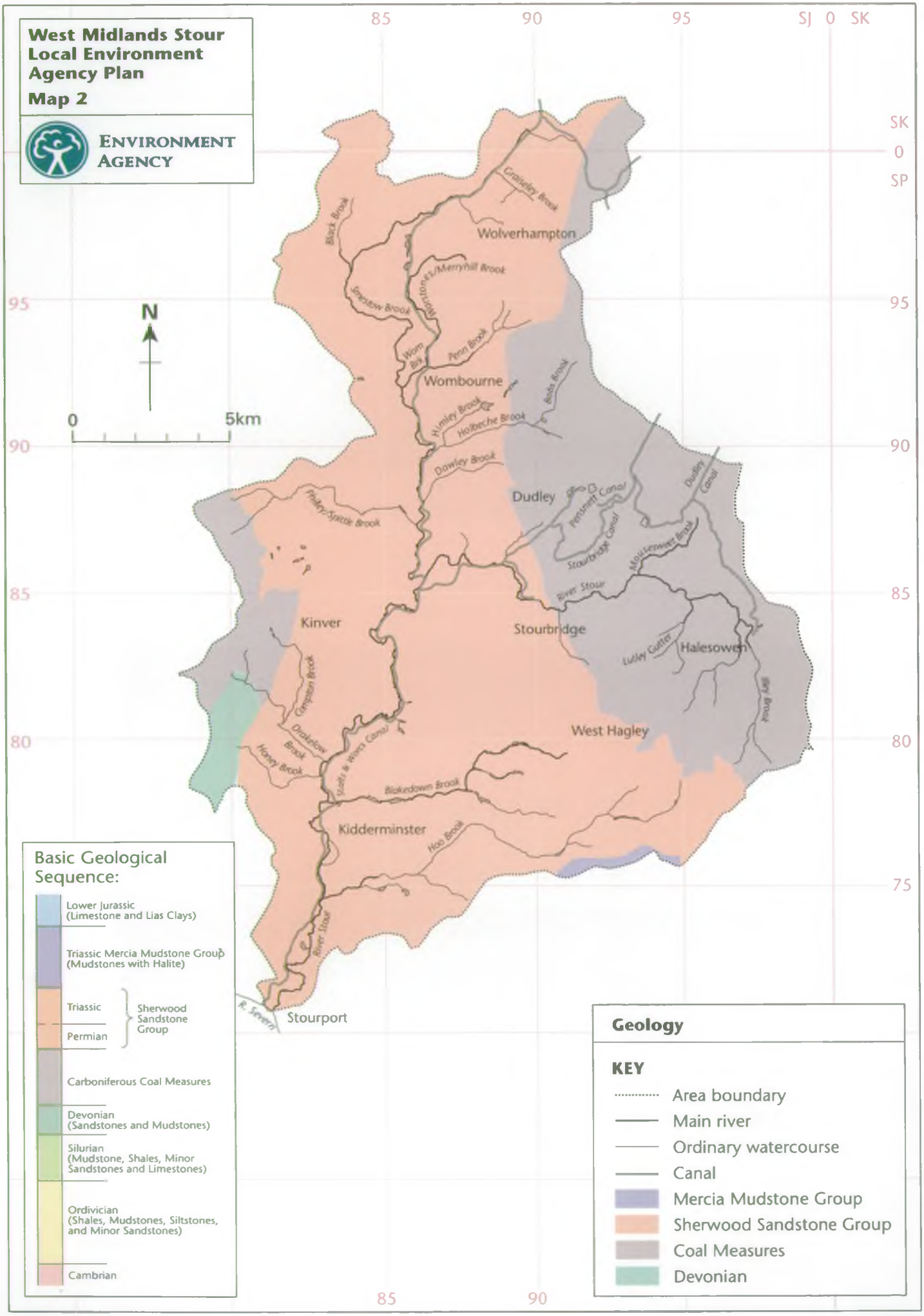
Over 75% of the LEAP area is underlain by eastward dipping red sandstones and conglomerates of the Permo-Triassic Sherwood Sandstone Group. South of Hagley these sandstones are overlain by Triassic Mercia Mudstones in the upper reaches of the Blakedown and Hoo Brooks. To the west of Kinver the Sherwood Sandstone Group lies faulted against Middle and Upper Carboniferous Coal Measures, marking the western extreme of the Wyre Forest Coalfield. East of Wombourne and Stourbridge, Carboniferous Coal Measures reappear around Sedgley, Brierley Hill and Halesowen to form the South Staffordshire Coalfield. An inlier of Silurian Shales and Limestones occurs at Dudley, this combined with the coal provided an important local source of raw materials which fuelled the beginnings of the West Midlands heavy industry. The area is largely devoid of drift deposits. These are confined to isolated patches of glacial till, which overlie the sandstones in the north, Fluvio-Glacial Sands and Gravels and river terraces (see Map 2, page 13).

2.1.2 Landscape

The landscape of the catchment falls into four main landscape types, these are shown on a national map published jointly by the Countryside Commission and English Nature *The Character of England; landscape, wildlife and natural features.* Details of these are given in Section 5.15 (page 115) and the Countryside Character Areas are shown on Map 16 (page 114).

The main areas of landscape character are:

* Industrial, post industrial and urban areas
* Arable land with heathland and conifer plantations
* Broadleaved woodlands and hedgerow trees
* Ancient landscape of small fields and winding lanes


West Midlands Stour Local Environment Agency Plan
Map 2
Environment Agency
85
90
95
SJ 0 SK
SK 0 SP
N
0
5km
Wolverhampton
Wombourne
Dudley
Kinver
Stourbridge
Halesowen
West Hagley
Kidderminster
Stourport
Basic Geological Sequence:
Lower Jurassic (Limestone and Lias Clays)
Triassic Mercia Mudstone Group (Mudstones with Halite)
Triassic
Permian
Sherwood Sandstone Group
Carboniferous Coal Measures
Devonian (Sandstones and Mudstones)
Silurian (Mudstone, Shales, Minor Sandstones and Limestones)
Ordivician (Shales, Mudstones, Siltstones, and Minor Sandstones)
Cambrian
Geology
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Mercia Mudstone Group
Sherwood Sandstone Group
Coal Measures
Devonian

2.1.2 Land Use

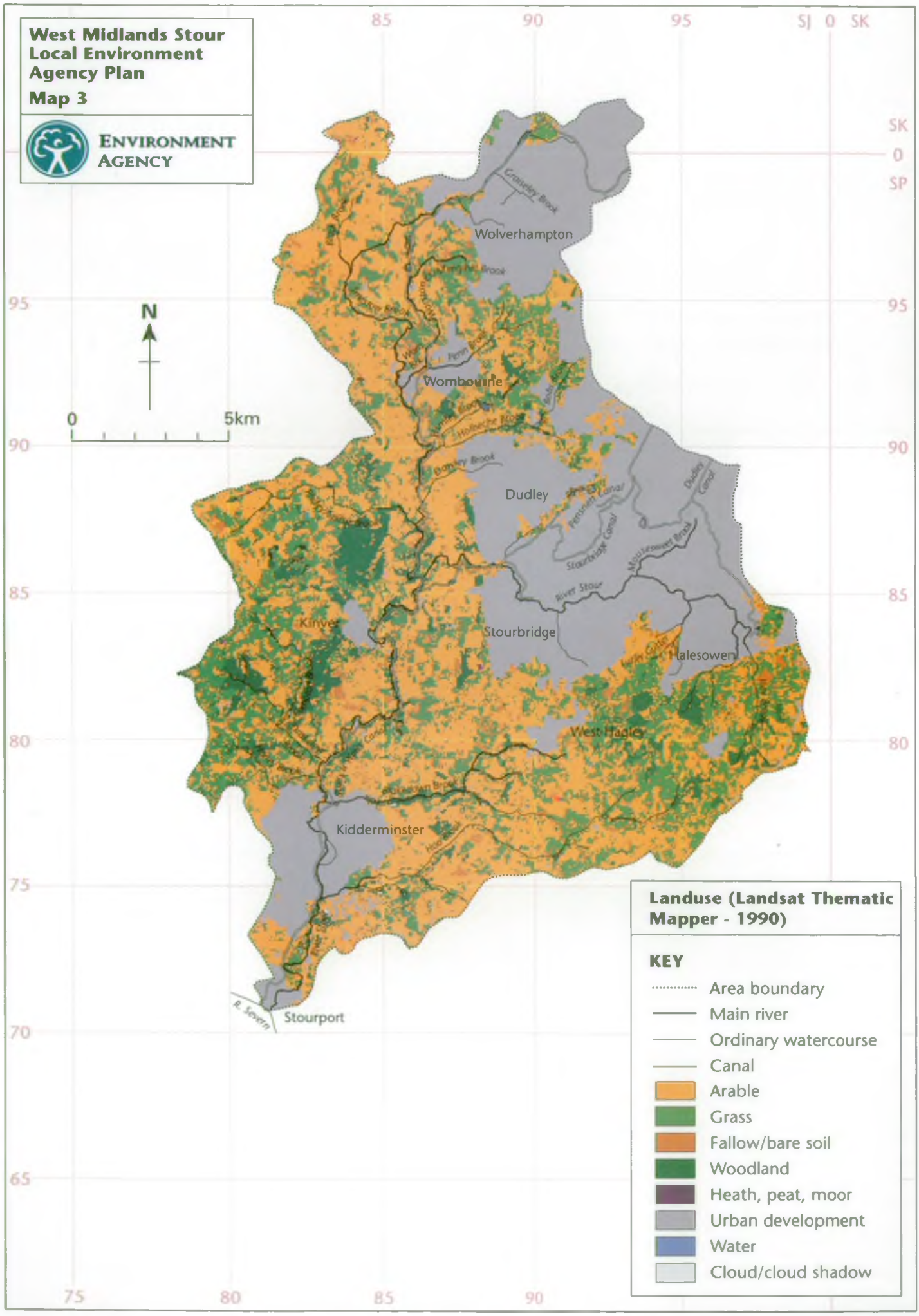
The land area covered by the LEAP is dominated in the north-east and east by the urban area of the West Midlands conurbation and by Kidderminster in the south-west. LANDSAT figures for the Stour catchment are shown in Table 2 below and land use is illustrated on Map 3 (page 15). The figures indicate that the urban area covers just over 32% of the total land area. Urban development pressures in the catchment are significant, see Section 5.1 (page 76) for further details. Agricultural land makes up over 60% of the plan area, this is mainly found on the western side of the catchment and in the south. 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 use of fertilisers, herbicides and pesticides, for example see Issue 3 (page 37).

Table 2 Land Use Classification in the West Midlands Stour Area

Legend	Area %	Area (km^2)
Arable	35.78	134.044
Grass	18.85	70.617
Fallow/Bare Soil	5.66	21.218
Woodland	7.55	28.277
Heath/Peat/Moor	0.03	0.125
Urban Development	32.07	120.135
Water	0.02	0.082
Cloud/Cloud Shadow	0.04	0.161
	100.00	**374.659**

(Source: LANDSAT 1990)

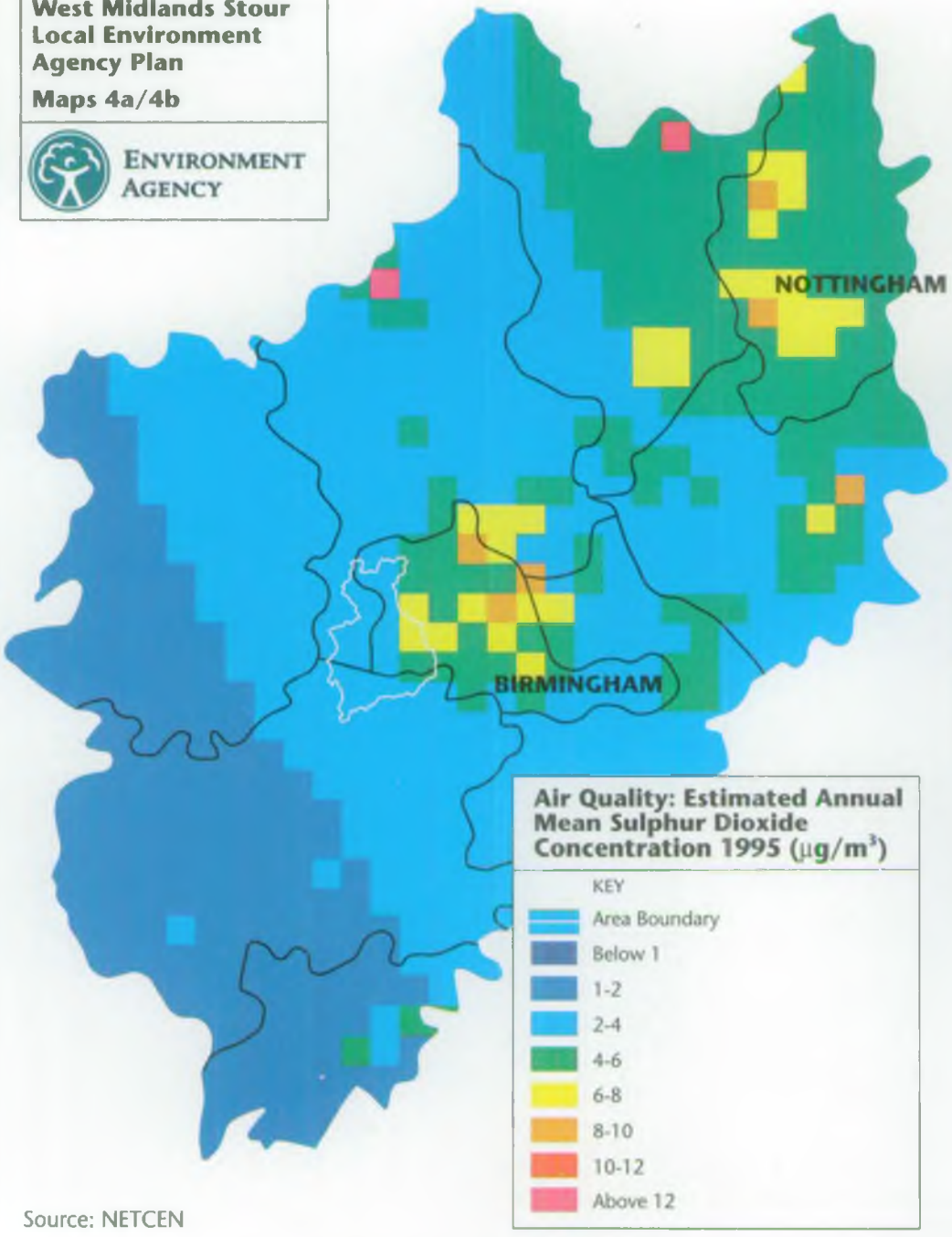
Centres of population and industry give rise to waste which has to be managed. Whilst waste management facilities do not represent a major land use in terms of the total plan area they cover, their potential environmental impact can be very significant unless suitably regulated (see Issue 12, page 52). The built up areas, especially in and around Dudley, are characterised by a high proportion of metal recycling sites, waste transfer stations and old landfill sites (see Map 13, page 101).

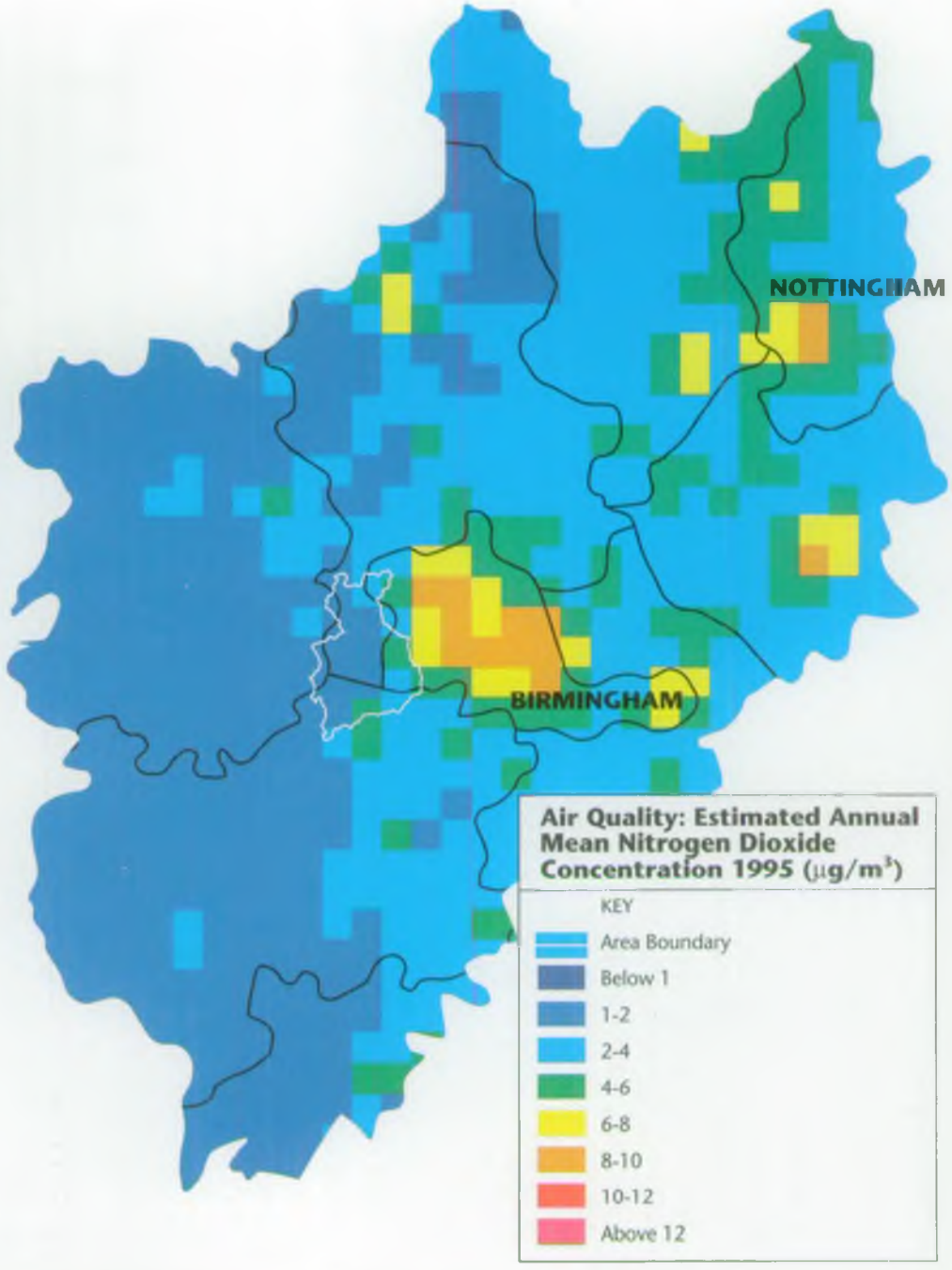

West Midlands Stour Local Environment Agency Plan
Map 3
Environment Agency
SJ 0 SK
SK 0 SP
N
0
5km
Wolverhampton
Wombourne
Dudley
Kinver
Stourbridge
Halesowen
West Hagley
Kidderminster
Stourport
R. Severn
River Stour
Stourbridge Canal
Dudley Canal
Pensnett Canal
Landuse (Landsat Thematic Mapper - 1990)
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Arable
Grass
Fallow/bare soil
Woodland
Heath, peat, moor
Urban development
Water
Cloud/cloud shadow

West Midlands Stour Local Environment Agency Plan

Maps 4a/4b

ENVIRONMENT AGENCY





Source: NETCEN

2.2 Air

Air quality is an important indicator of environmental quality. Nationally there have been significant improvements in air quality since the famous London smogs of 1952 which caused over 4000 premature deaths. Levels of sulphur dioxide and smoke have fallen considerably. Other pollutants, however, have increased in significance as road traffic has increased, particularly in urban areas. High levels of oxides of nitrogen (NO_2), fine particulates (PM_{10}) and volatile organic compounds (VOCs) can be present at times of high traffic flows, (see Section 5.2, page 80).

The monitoring of air quality is undertaken by central government and Local Authorities. The level of monitoring currently taking place is of concern to the Agency (see Issue 10, page 50), but it is possible to make general assessments of air quality for the catchment. Maps 4a and 4b show levels of both sulphur dioxide and nitrogen dioxide across the Midlands Region, the West Midlands Stour is outlined within this area. Where monitoring has been carried out in the plan area indications are that the EC standards for annual average background levels for nitrogen dioxide and sulphur dioxide are generally being met. Parts of the West Midlands conurbation, however, do show elevated levels of nitrogen oxides. Table 3 below shows details of Local Authority air pollution monitoring in the LEAP area.

Table 3 Local Air Quality Monitoring for Nitrogen Dioxide and Sulphur Dioxide, 1995/96.

Local Authority	SO_2 $\mu g/m^3$ Median of Daily Values	NO_2 $\mu g/m^3$ Estimated 98th percentile
Bridgnorth DC	No information available	No information for area
Bromsgrove DC	No information available	111, 79, 67, 66 (4 sites)
Wyre Forest DC	No information available	146, 92, 62, 58 (4 sites)
Wychavon DC	No information available	No information for area
Dudley MBC	16	54 - 141 (20 sites)
Sandwell MBC	No information available	No information for area
Wolverhampton MBC	4 sites (45, 34, 13, 20)	62 - 163 (26 sites)
South Staffordshire DC	39	80 - 119 (7 sites)

The existing European Union Air Quality Standard for nitrogen dioxide is 200µg/m³ (expressed as the 98th percentile of hourly means) and for sulphur dioxide it is 120µg/m³ (expressed as the median daily value).

Emissions from the most potentially polluting industrial processes are regulated by the Agency through the integrated pollution control (IPC) system. The impact of these sites on local air quality will be assessed (see Issue 11, page 51). The sites are listed in Section 5.3, page 82. Any future actions required to reduce impacts will be discussed with site operators and may be included in later improvement programmes.

Indications have shown that instances of high ozone concentrations at ground level can occur, particularly in the rural areas. These are caused by complex interaction between organic compounds and nitrogen dioxide in the presence of ultra violet light. As these pollutants typically arise many miles from the site of the ozone event, action on a national level is necessary to reduce their occurrence.

2.3 Water

2.3.1 Water Resources

Surface Water

The two principal watercourses within the catchment are the River Stour and its main tributary the Smestow Brook which rise in the Clent Hills, and Wolverhampton, respectively. They flow west and south through the heavily urbanised environment of the West Midlands conurbation to their confluence at Stourton. The River Stour continues south through the town of Kidderminster and flows into the River Severn at Stourport.

A section of the Staffordshire and Worcestershire Canal follows the course of the Smestow Brook and then the River Stour. This provides a link between the Shropshire Union and Trent and Mersey Canals to the north, the Birmingham Canal network to the east, and the River Severn. The locations of the watercourses and canals are shown on Map 1 (front cover).

Two river flow measurement stations linked by telemetry currently operate within the catchment and provide continuous flow data. In addition there are three river level stations also linked by telemetry which provide additional information for flood warning purposes. See Map 5. Representative flows in the two principal watercourses are summarised in Table 4.

Table 4 Flows in the River Stour and Smestow Brook

Name of watercourse	Flow under dry weather conditions (megalitres per day)	Average daily flow (megalitres per day)
Smestow Brook (Swindon)	23	46
River Stour (Kidderminster)	150	300

Average annual rainfall in the catchment is 697mm. Potential loses through evaporation and transpiration account for approximately 445mm. The remaining 252mm either runs off into rivers via overland flow or percolates down to groundwater and eventually contributes to river flow via springs (baseflow). River flows vary seasonally with rainfall and runoff patterns. A simplified version of the 'hydrological cycle' illustrating this is shown below in Figure 4, page 20. Superimposed on the natural flow regime of the river are the artificial influences of abstractions and discharges. There is a large artificial component to the river flow in the main River Stour and canal networks comprising treated sewage and industrial effluent. However, these surface waters are only used to support industrial and agricultural abstraction.

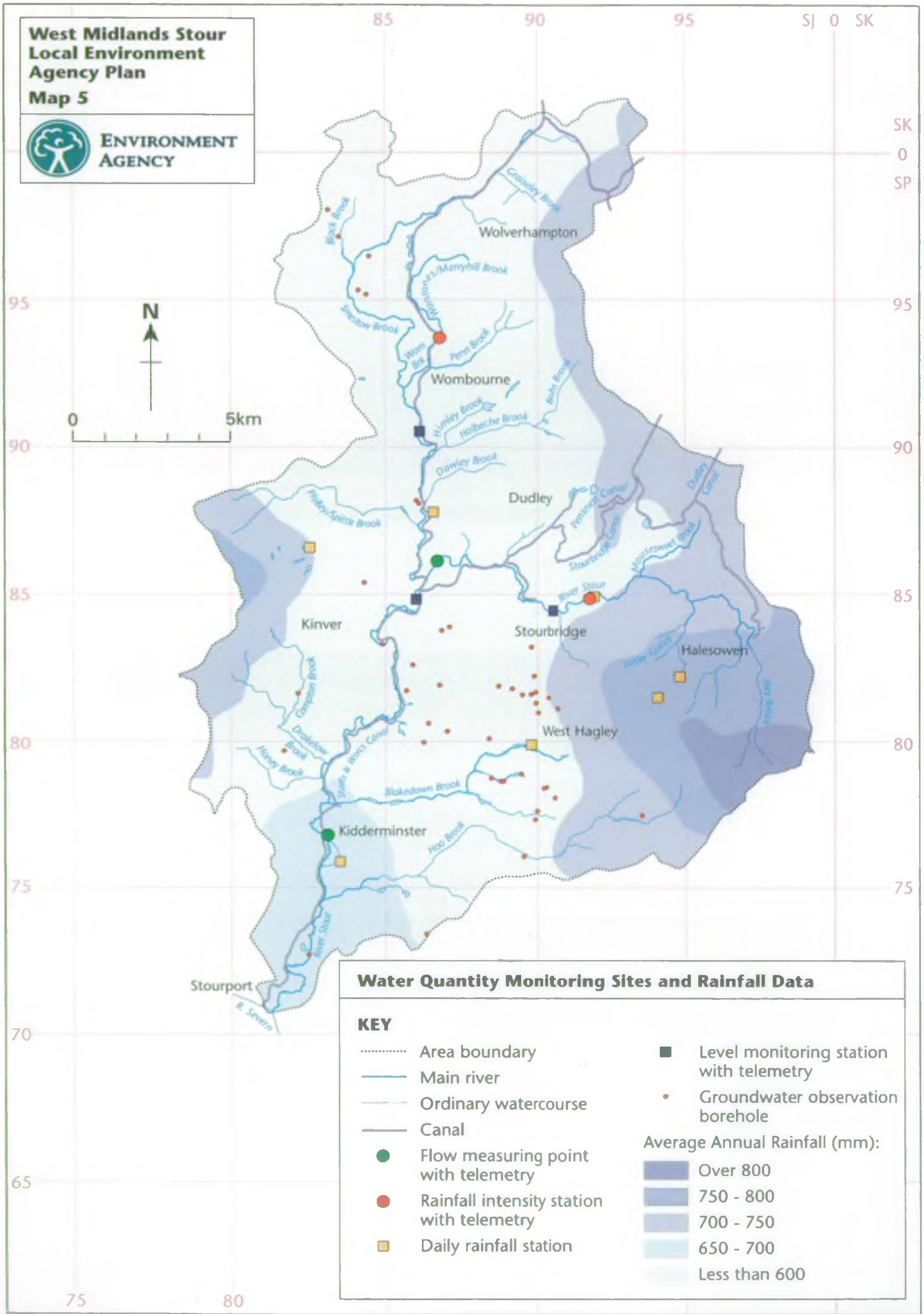
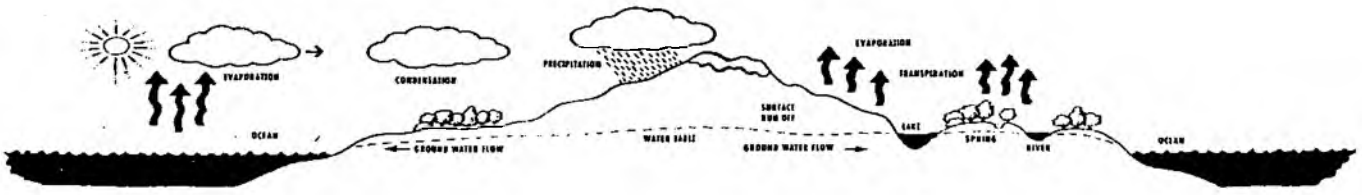
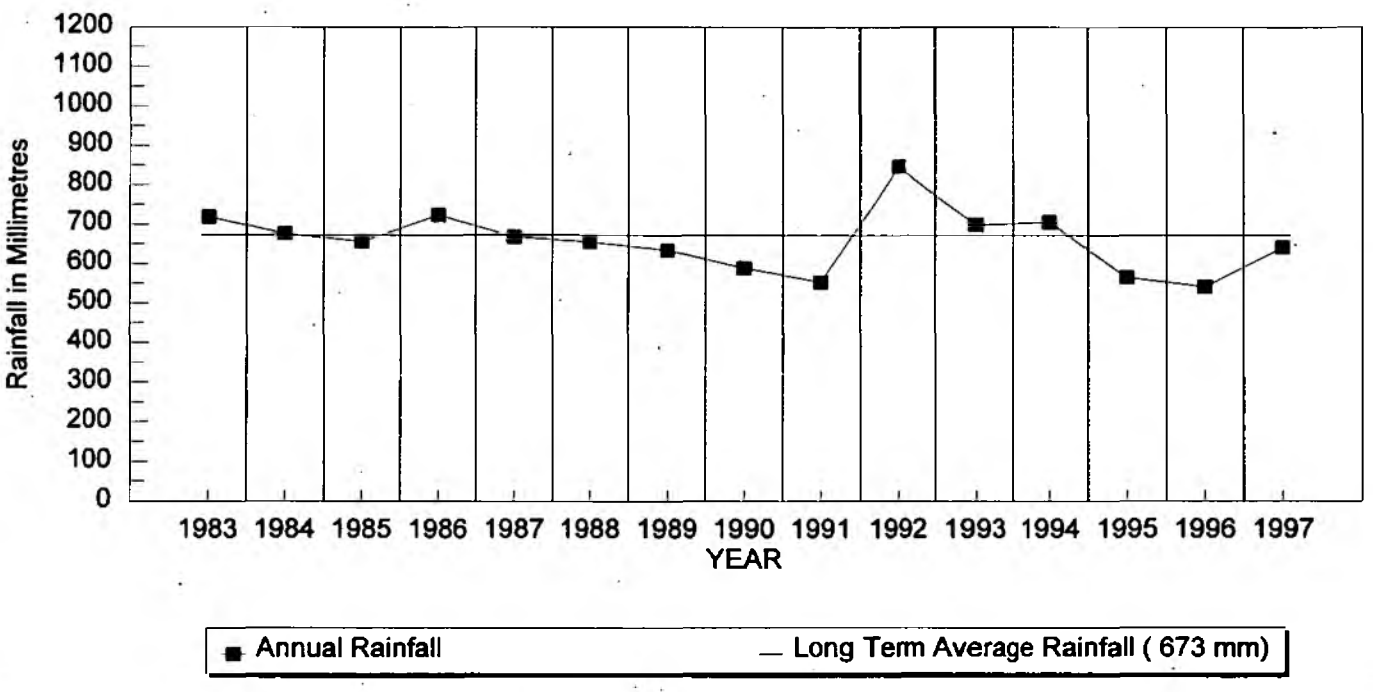

West Midlands Stour
Local Environment
Agency Plan
Map 5
Environment
Agency
N
0
5km
Wolverhampton
Wombourne
Dudley
Kinver
Stourbridge
Halesowen
West Hagley
Kidderminster
Stourport
Black Brook
Smestow Brook
Wom Brk
Penn Brook
Graiseley Brook
Himley Brook
Holbeche Brook
Dawley Brook
Phillips/Spittle Brook
Stourbridge Canal
Mousesweet Brook
Dudley Canal
River Stour
Compton Brook
Drakelow Brook
Honey Brook
Blakedown Brook
Hoo Brook
Staffs & Worcs Canal
R. Severn
Water Quantity Monitoring Sites and Rainfall Data
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Flow measuring point with telemetry
Rainfall intensity station with telemetry
Daily rainfall station
Level monitoring station with telemetry
Groundwater observation borehole
Average Annual Rainfall (mm):
Over 800
750 - 800
700 - 750
650 - 700
Less than 600

Figure 4 The Hydrological Cycle



Since the late 1980s the UK has experienced drier weather conditions and with the exception of a few wet years in the early 1990s, annual rainfall figures within the catchment have been consistently below the long term average. Figure 5 shows the deficit in rainfall within the Stour catchment since the mid 1980s by comparing annual rainfall figures at Kidderminster with the long term average rainfall. This will have contributed to the low flow problems experienced in parts of the catchment, such as the Blakedown Brook (see Issue 5, page 39). Whether this is part of a long term climate change is as yet uncertain. The Department of Environment, Transport and Regions (DETR) Climatic Change Impacts Review Group (CCIRG) has identified the climatic change implications to be considered by the Environment Agency. There is agreement that winters will be wetter/stormier and the summers warmer and dryer, especially in the south. There is also expected to be an increase in summer water demand. The Environment Agency will consider the implication of climatic change in the formulation of policy and in the delivery of its duties.

Figure 5 Annual Rainfall at Kidderminster Compared to the Long Term Average



Groundwater

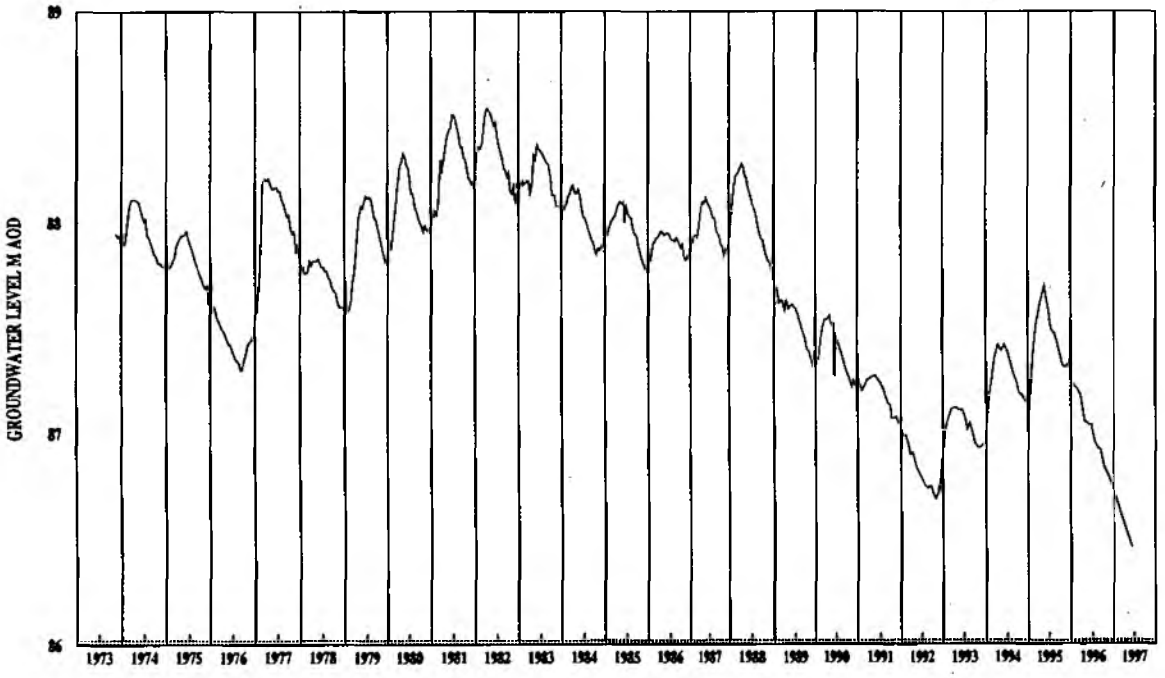
The Sherwood Sandstone which underlies much of the West Midlands Stour area is classified by the Agency as a major aquifer and has historically supported a high level of groundwater abstraction for public supplies. However, there are no public water supply abstractions from the Carboniferous and Devonian strata, which are classified as minor aquifers and are not significant sources of groundwater in the area. The principal aquifers within the catchment are shown on Map 6 (page 22), see Appendix 3 (page 160) for definitions.

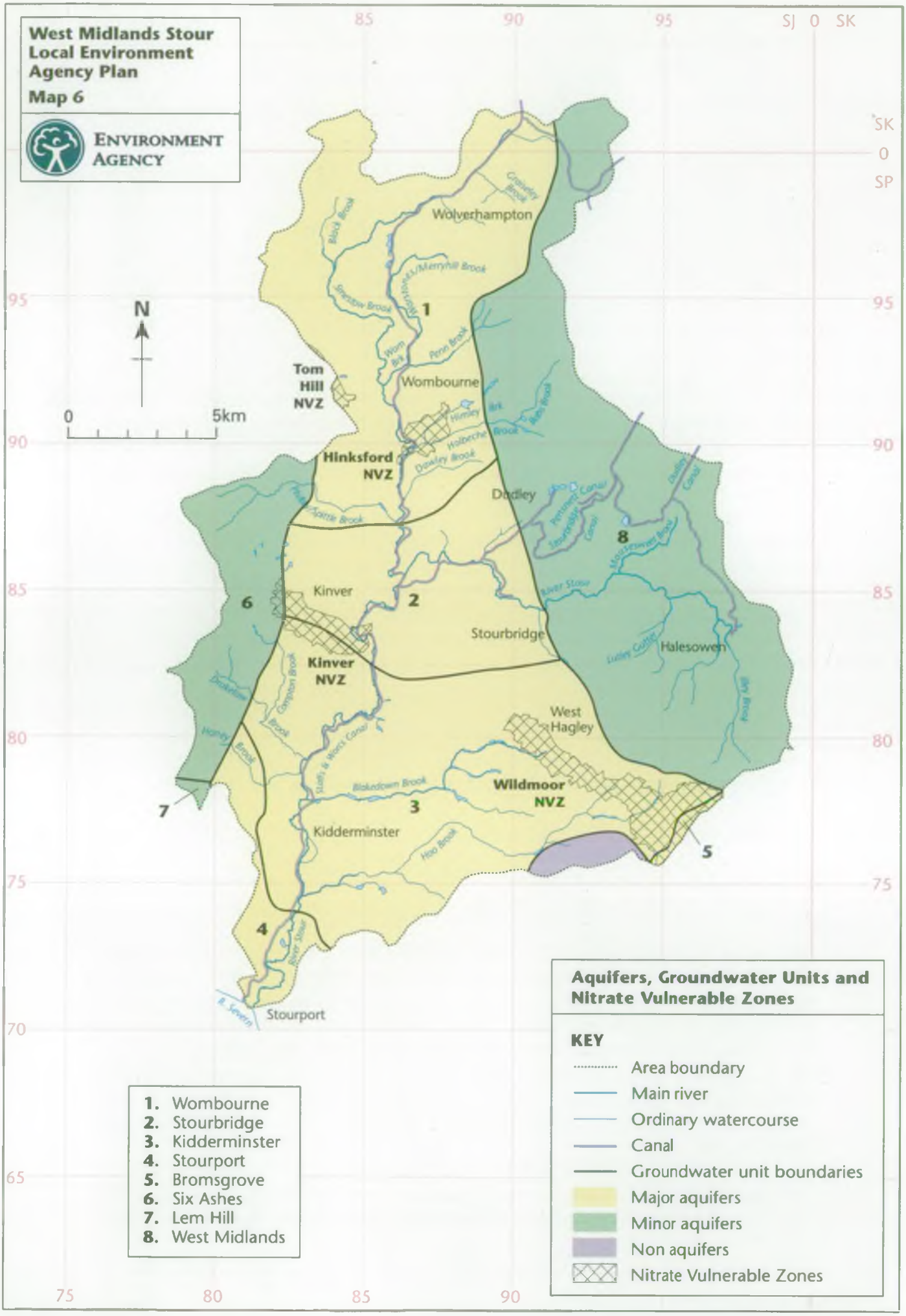
The groundwater levels in the Sherwood Sandstone slope generally towards the River Stour, but superimposed on to this are the cones of depression (see Glossary) caused by abstraction from public water supply boreholes. In addition, the drier weather conditions experienced in recent years have caused a decline in levels due to a lack of groundwater recharge. This decline has also led to a reduction in the baseflow contribution to streams with consequent detrimental effects on wetland areas (see Issues 4 and 5, pages 38 and 39). The groundwater hydrograph in Figure 6 (page 21) illustrates this fall in groundwater levels.

The Agency manages groundwater resources in terms of groundwater management units. In principle, these function like surface water catchments, so that groundwater does not flow between units and discharges as baseflow into watercourses within the given unit.

The Sherwood Sandstone in the West Midlands Stour area includes the whole of the Stourbridge groundwater management unit and parts of the Wombourne, Kidderminster and Stourport units (see Map 6, page 22). The groundwater resources in each of these units are either fully or over committed. As a result, these units are closed to further abstractions to protect existing users and the environment (see Section 6.2.1, page 129).

Figure 6 Hydrograph Showing the Fall in Groundwater Levels at Yeildingtree Cottages, Kidderminster




West Midlands Stour Local Environment Agency Plan
Map 6
Environment Agency
SJ 0 SK
SK 0 SP
N
0
5km
Wolverhampton
Tom Hill NVZ
Wombourne
Hinksford NVZ
Dudley
Kinver
Kinver NVZ
Stourbridge
Halesowen
West Hagley
Wildmoor NVZ
Kidderminster
Stourport
1
2
3
4
5
6
7
8
1. Wombourne
2. Stourbridge
3. Kidderminster
4. Stourport
5. Bromsgrove
6. Six Ashes
7. Lem Hill
8. West Midlands
Aquifers, Groundwater Units and Nitrate Vulnerable Zones
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Groundwater unit boundaries
Major aquifers
Minor aquifers
Non aquifers
Nitrate Vulnerable Zones

2.3.2 Water Quality

Surface Water

River water quality, as measured by chemical sampling methods in 1996, was generally 'fair'. Biological sampling methods, however, indicate that the quality of invertebrate life is lower than the water quality would suggest, and is typical of watercourses in an urban area which receive intermittent discharges of surface water and storm sewage (see Issue 1iv, page 35). (see Section 6.2.2, page 133, for more information). Since 1990 the overall quality of the Stour catchment's watercourses has improved slightly. Of the thirty nine classified stretches, nine have improved by one class (eg. fair to good) and two have improved by two classes, eight other stretches have gone down one class while the others have remained the same.

The canals in the plan area are all chemically of 'fair' quality. There is a greater variety in the biological quality which ranges from 'good' to 'poor'. Much of the variability in the biological classification is due to the popularity of the canals for boating which restricts the growth of plants and in turn restricts the invertebrates which are dependent on them. Of the 57.5 km of classified canal stretches in the area, all but 11 km are compliant with their River Quality Objectives (RQOs) (see Section 6.2.2).

In addition to the improvement works required to prevent deterioration of water quality in the West Midlands Stour catchment, further work has been agreed in conjunction with users of the watercourses, especially Severn Trent Water Ltd (STWL). This program of work will result in greater and more sustainable achievement of RQOs (see Section 6.2.2, for an explanation of these). Agreed work includes improvements to Sewage Treatment Works, sewerage overflows and wrong connections (see Issue 1, page 31).

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

* point source pollution from Sewage Treatment Works and industry
* the urban nature of the catchment
* low flow in watercourses

Groundwater

The quality of groundwater in the West Midlands Stour catchment is generally good, particularly in the areas underlain by the Sherwood Sandstone Group. However, the eastern part of the area is underlain by Coal Measures within which groundwater quality can be affected naturally by the minerals in the strata and by chemical changes induced by the closure of coal mines. Certain areas yield poor quality water as a result of contamination related to urban and industrial development. Past industrial practices in the upper reaches of the catchment have created large tracts of contaminated land, which can result in the pollution of groundwater due to the leaching of contaminants (see Land Use Statement No. 6, page 66).

Groundwater quality has deteriorated in parts of the West Midlands Stour area mainly as a result of increased crop production and grassland management. These types of farming

practice involve the use of nitrates which can be leached into underlying aquifers where there is insufficient natural protection against such contamination. In response to the EC Nitrate Directive, the Agency has defined Nitrate Vulnerable Zones (NVZs) around public water supply abstractions, where nitrate concentrations in groundwater have been found to exceed a certain level (see Issue 3, page 37). There are four NVZs in the plan area, these are Tom Hill, Hinksford, Kinver and Wildmoor and these are shown on Map 6 (page 22).

2.3.3 Flood Defence

Flooding History

The growth of the West Midlands conurbation has caused development to encroach onto the floodplains of both the River Stour and Smestow Brook. This is particularly true of the town centre of Kidderminster, where since 1795, there have been at least nineteen serious flood events. The most serious floods occurred in February 1795, May 1886, June 1924, March 1955 and December 1960. The effects of the flood of 1955 in Kidderminster town centre are shown in the photograph below. To protect people and property at risk from flooding the Agency operates a flood warning system for Kidderminster which involves the 24 hour monitoring of rainfall and river levels. Warnings are issued when there is a risk that flooding could occur. (Further information on flood defence, flood warning and flooding is given in Sections 5.8, page 94, and 6.2.3, page 147, and Appendix 4, page 161. Also see Section 3, Issues 7, 8 and 9, pages 45, 46 and 47).

Flooding in Vicar Street, Kidderminster, 27th March 1955

2.4 Wildlife, Heritage and Recreation

2.4.1 Wildlife

A significant part of the Stour area is urban and this is the major factor influencing the wildlife. However, it is an area of surprises and amongst the industry and houses, pockets of green exist, some of them supporting important species such as the water vole. These open spaces are essential as refuges for both people and wildlife. Rivers are of particular importance as they tend to form green corridors linking urban areas to the surrounding countryside (see Issue 18, page 60). For example, in Kidderminster the Stour valley still supports some of the richest and most important marshland in the area.

The main factors limiting the value of the area for wildlife, including fish stocks, are water quality and water quantity. The over-abstraction of groundwater units in the Blakedown area (Issue 5) is causing a problem to several important areas for nature conservation. The areas of open space mentioned above are under tremendous pressure both directly from development and from degradation resulting from pollution and flytipping (see Issue 6).

2.4.2 Heritage

Much of the area's heritage is in the form of industrial remains which are a legacy of the Industrial Revolution. The energy harnessed from the fast flowing River Stour was one of the reasons why industry developed in the area. The importance of the river is reflected in the large number of mill sites. There are also many fine examples of canals and canal architecture eg. the Delph Locks between the Dudley and Stourbridge Canals, and warehouses such as the Bonded Warehouse at Stourbridge.

There are a number of large estate houses with their associated parks and gardens. Some of these are now open to the public for example Wightwick Manor, a National Trust property on the edge of Wolverhampton, whilst others now have alternative uses such as old peoples homes, country clubs and golf courses.

The intensive urbanisation of the area has meant that signs of earlier history have often become masked. Exceptions to this are a site on the Lutley Gutter which bears ancient artifacts and Roman camps at Greensforge. However, new sites of importance are continually being discovered (see Issue 19, page 60).

2.4.3 Recreation and Navigation

Water sports are poorly catered for in the area, this is largely due to problems with water quality. In the case of river angling, the poor water quality means that in many areas there is little to catch (see Issue 16, page 58). With immersion sports such as canoeing there are the potential dangers of Weils disease or Leptospirosis, though canoeing does take place on an informal basis. The canals, however, with their fine architecture and impressive flights of locks, are very popular and attract visitors to the area on boating holidays.

There are ample opportunities for walking and cycling and many disused railways and canal towpaths are used for passive recreation, although in the heavily urbanised areas access tends to be fragmented. There are also four Country Parks in the area, these are shown on Map 17, page 119. (Also see Sections 5.14, 15 and 16, and Section 3, Issues 15 to 18).

Section 3 Issues and Options

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

The issues have been identified by:

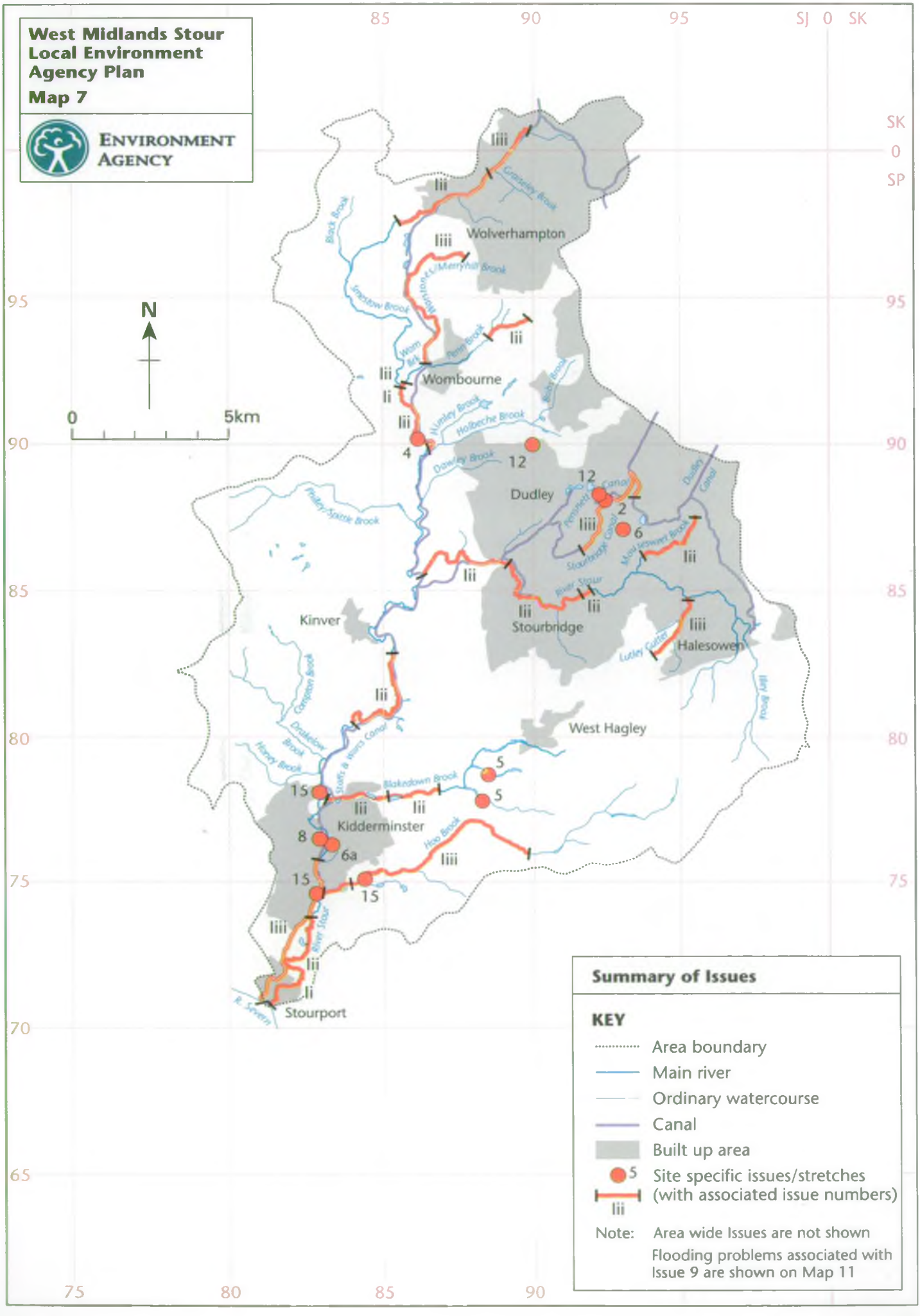
* Using the local knowledge of Environment Agency staff.

* 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 Environment Agency Upper Severn Area, Midlands Region, 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.


West Midlands Stour Local Environment Agency Plan
Map 7
Environment Agency
N
0
5km
Wolverhampton
Wombourne
Dudley
Kinver
Stourbridge
Halesowen
West Hagley
Kidderminster
Stourport
Summary of Issues
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Built up area
Site specific issues/stretches (with associated issue numbers)
Note: Area wide Issues are not shown
Flooding problems associated with Issue 9 are shown on Map 11

3.0 The Local Issues

The issues identified are not in priority order. Some issues are site specific (See Map 7, page 27) whilst others can affect many parts of the area.

3.0.1 The Impact of Urbanisation

Many of the issues identified have a common theme; they have resulted from the impact of urbanisation on the Stour area. As mentioned in the Draft Vision Statement (page ii), urban development in the form of housing, industry and infrastructure has put pressures on the natural resources, wildlife and habitat of the area. These pressures are addressed in the issues set out below for; water resources (Issues 4 and 5), air (Issues 10 and 11) and water quality (Issues 1 and 2), problems resulting from waste production (Issues 6/6a, 12 and 13), and loss of wildlife and habitat (Issues 7, 15, 16, 18 and 19). Flooding and culverting also result from urbanisation and are addressed in Issues 7, 8 and 9.

Issue 1: **Compliance with River Quality Objectives and EC Directives**
Issue 2: **The Need for Assessment of the Current Status of the Pensnett Canal**
Issue 3: **Nitrate Contamination of Groundwater**
Issue 4: **The Sustainability of Water Resources**
Issue 5: **Impacts of Over-abstraction within the Blakedown Valley**
Issue 6: **Flytipping and Litter**
Issue 6a: **Shopping Trolleys in Watercourses**
Issue 7: **The Impact of Culverted Watercourses**
Issue 8: **Kidderminster Town Centre Redevelopment**
Issue 9: **Flooding Resulting from Urban Development, and Flood Warning**
Issue 10: **The Current Level of Air Quality Monitoring**
Issue 11: **Environmental Monitoring of Integrated Pollution Control Authorisations**
Issue 12: **Metal Recycling Sites**
Issue 13: **Sustainable Waste Management**
Issue 14: **The Need to Raise and Promote Environmental Awareness and Education**
Issue 15: **Low Conservation Value and Poor Biodiversity**
Issue 16: **Poor Fish Stocks**
Issue 17: **Lack of Recreation and Amenity Facilities**
Issue 18: **Protection and Expansion of the River Corridor and its Associated Wildlife**
Issue 19: **The Effects of Development on Wildlife, Cultural Heritage and the Landscape**

3.0.2 The Relationship between CMP and LEAP Issues

The table below illustrates the continuity between the West Midlands Stour Local Environment Agency Plan (LEAP) and the River Stour Catchment Management Plan (CMP) in relation to the issues raised, (also see Section 1.0). Some issues require further action and have therefore been carried over from the CMP into the LEAP. Other issues which were in the CMP have been included in other sections of this LEAP, for example in the Land Use Statements in Section 4, and some have been completed or are now considered to have become part of the day to day work of the Agency ie. a routine activity. The Stour Fourth Annual Review published in February this year sets out the progress made on the CMP issues. New issues contained in the LEAP mainly relate to the Agency's new duties.

Table 5 Comparison of Issues in the Stour CMP and the West Midlands Stour LEAP

CMP Issues	LEAP Issues
A1 Seek to minimise the adverse effects of urban development on the water environment	19. The effects of development on wildlife, cultural heritage and the landscape
B1-13 Poor surface water quality	1. Compliance with River Quality Objectives and EC Directives
B14 Investigate use of settling lakes to treat urban runoff	9. Flooding resulting from urban development, and flood warning Land Use Statement No. 6
B15 Progressively improve water quality throughout catchment and protect against risk of pollution incidents	Now considered routine activity
C1 Ensure that development of waste disposal sites or redev. of contaminated land sites does not compromise groundwater quality	Land use statement No. 5
C2 Ensure that any activity does not compromise groundwater quality	3. Nitrate contamination of groundwater
D1 Encourage more efficient use of existing resources	4. The sustainability of water resources Now considered routine activity
D2 Reduce licensed abstractions, initially to arrest further decline in the water table and later to promote a return of baseflow to currently affected streams	4. The sustainability of water resources
E1 Ameliorate low flow problems	5. Impacts of over-abstraction within the Blakedown Valley
F1 Increase biological diversity of water environment	15. Low conservation value and poor biodiversity 1. Compliance with River Quality Objectives and EC Directives 19. The effects of development on wildlife, cultural heritage and the landscape 5. Impacts of over-abstraction within the Blakedown Valley
F2 Improve damaged landscape areas related to water environment	Considerable work undertaken/Now considered routine activity
F3 Improve educational conservation facilities	Now considered routine activity - see Section 4 Protection Through Partnership
F4 Improve site management on wetland SSSI's and Prime Sites	15. Low conservation value and poor biodiversity
F5 Improve knowledge on typical landscape styles to enable protection and enhancement to be done	Completed/Now considered routine activity
F6 Improve records on relevant archaeological sites in catchment	Completed/Now considered routine activity

CMP Issues	LEAP Issues
F7 Improve protection, interpretation of, and access to, sites of industrial heritage significance	19. The effects of development on wildlife, cultural heritage and the landscape Now considered routine activity
G1 Increase fish stocks throughout catchment	16. Poor fish stocks in the catchment 1. Compliance with River Quality Objectives and EC Directives 19. The effects of development on wildlife, cultural heritage and the landscape 5. Impacts of over-abstraction within the Blakedown Valley
G2 Provide adequate information on canal fish stocks (to monitor compliance with EC Directives and Statutory Water Quality objectives)	Completed
H1 Increase scope for recreational uses within catchment	17. Lack of recreation and amenity facilities 1. Compliance with River Quality Objectives and EC Directives 19. The effects of development on wildlife, cultural heritage and the landscape 5. Impacts of over-abstraction within the Blakedown Valley 6. Flytipping and litter
Protect people, property and land from flooding to standards which are practical, economic and appropriate. I Potential flooding in Kidderminster	8. Kidderminster town centre redevelopment 9. Flooding resulting from urban development, and flood warning
J Periodic flooding of Wolverhampton Racecourse and properties in Aldersley area	Completed
K Periodic flooding at 16 specific locations	9. Flooding resulting from urban development, and flood warning
	New Issues: 6/6a. Flytipping and litter/Shopping trolleys in watercourses 7. The impact of culverted watercourses 10. The current level of air quality monitoring 11. Environmental monitoring of Integrated Pollution Control authorisations 12 Metal recycling sites 13. Sustainable waste management 14. The need to raise and promote environmental awareness and education 18. Protection and expansion of the river corridor and its associated wildlife

Issue 1 Compliance with River Quality Objectives and EC Directives

While the majority of the watercourses within the LEAP area comply with EC Directives and their Rivers Ecosystem (RE) targets (see Section 6.2.2, page 133 and Maps 21a and 21b, pages 142 and 143) some problem areas do exist which require work by the Agency. An assessment of the river quality data for the three years 1994 to 1996 inclusive, has shown three general categories into which the quality objective failures fall:

i) Failures to meet EC Directives
ii) Failures involving specific discharges
iii) Failures requiring investigation by the Agency

A fourth category is included for sites which do not necessarily experience River Quality Objective failures but have in the past attracted justified public complaint.

iv) Problems associated with unsatisfactory sewer overflows.

River Quality Objectives
River Quality Objectives (RQOs) are applied to all rivers and canals. The objectives, both medium and long term, are based on chemical and biological criteria and in the future these will have statutory status. The Stour catchment is one of several pilot schemes that have been set up nationally to test the operation of Statutory Water Quality Objectives (SWQO). (see Section 6.2.2).

Asset Management Plans
These are part of the Water Companies' Strategic Business Plans drawn up following negotiation between the Agency, the DETR (Department of the Environment, Transport and the Regions (formerly the DoE)), OFWAT (Director of Water Services) and the Water Service Companies. These Asset Management Plans (AMPs) specify the improvement work programmed for a five year period. The second stage of these plans (AMP2) was agreed in 1994 and governs the priorities for investment by the water companies until the year 2000. AMP3, the third stage of this periodic review process, is currently being drawn up and the investment programme for this will run from 2000 to 2005. (See Section 6.2.2, page 133).

i) EC Directive Failures

Dangerous Substances Directive

There have been no failures for List One substances caused by STW discharges but the following have occurred for List Two substances:

River Stour at Stourport, failure for Cyfluthrin, concentration slightly above UK National Environmental Quality Standard (EQS) of 0.001µg/l (micrograms per litre).

Wom Brook at its confluence with the Smestow Brook, failure for copper (limit of 10µg/l) on eight separate occasions. It is thought that the low dilution of the effluent combined with the slightly above average copper levels in the water distribution system are the cause of this exceedance. It has been agreed to improve the levels of treatment at Wombourne Sewage Treatment Works (STW) and direct the discharge to the Smestow Brook where the greater dilution will significantly reduce the impact of the STW on the water quality of this stretch.

ISSUE NO. 1 (i)	Objective: Seek improvements to ensure compliance with standards set out in the EC Dangerous Substances Directive		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
List 2 failures: a. River Stour at Stourport. Investigate results, check the error inherent in this type of sampling b. Wom Brook, Smestow confluence Pipe Wombourne STW effluent to Smestow brook to improve dilution (see Issue 1 (ii) options table)	Environment Agency Severn Trent Water Ltd	Establish whether failures are significant to water quality at this level and frequency No further failures for copper No excessive cost	Time, manpower. Do not wish to divert resources away from more significant problems Copper will still be in system, not solving problem at source

ii) Failures involving specific discharges

Where a watercourse does not meet its RE target due to the discharge from a STW, or there is potential for the RE target not to be met if the STW discharged at the limit of its consent, then the Agency will seek improvements in treatment facilities and/or a tightening of consent conditions. Watercourses affected in this way include;

River Stour

a) 1.0 km from Freehold STW to Caledonia STW, 3.5 km from Caledonia STW to confluence with the Audnam Brook and 3.0 km from the confluence with the Audnam Brook to the confluence with the Smestow Brook. The main impacts are from the two large STW discharging to these stretches which are programmed for improvement by Severn Trent Water Ltd (STWL) under AMP2. Foul drainage infrastructure impacts, combined sewage overflows and surface water discharges also have some effect on the quality of these stretches. Agreement has been reached for transferring sewage from Freehold and Caledonia STW to Roundhill STW for treatment with a proportion of treated effluent being returned to the vicinity of Caledonia STW for discharge to the River Stour.

b) 3.3 km from Roundhill STW to Cookley road bridge. Major impact from Roundhill STW which is to be upgraded through the AMP program.

c) 5 km from Kidderminster STW to the confluence with River Severn. The main impact is the discharge from Kidderminster STW in relation to organic matter and substances in carpet industry trade effluents. Diazinon, propetamphos and pyrethroids have been detected in this stretch.

Mousesweet Brook

a) 2.2 km from Withymoor Road to the confluence with the Black Brook. Investigations carried out when this problem was initially highlighted identified the probable cause as an industrial discharge which was subsequently stopped. This will not be investigated further unless routine monitoring identifies further problems.

Smestow Brook

a) 3.5 km from Compton overflow to Trescott STW. Impacts from upstream and the Graiseley Brook combined with the Staffordshire & Worcestershire Canal overflow cause water quality problems in this stretch. Investigations are continuing.

b) 2.8 km from the confluence with the Wom Brook to the confluence with the Holbeche Brook. The impact here may be Wombourne STW via the Wom Brook, this STW is due to be improved under the AMP2 program, the work is scheduled for completion by the end of March 2000 (see Wom/Penn Brook (b) below).

Wom/Penn Brook

a) 2.0 km from Gospel End STW to A643 road bridge. Main impact is from Gospel End STW which is being recommended for inclusion in AMP3.

b) 0.5 km from Wombourne STW to the confluence with the Smestow Brook. Improvements to the level of treatment have been agreed at Wombourne STW and to direct the discharge to the Smestow Brook where the greater dilution will significantly reduce the impact of the STW on the water quality of this stretch.

Blakedown Brook

a) 1.9 km from Blakedown STW to the road bridge at Hurcott and 2.0 km from the road bridge at Hurcott to the confluence with the River Stour. Main impact is Blakedown STW which is being recommended for inclusion in AMP 3, the effect of the STW is made worse by the low flow problems being experienced in this stretch (also see Issue 5, page 39).

ISSUE NO. 1 (ii)	**Objective: Seek improvements in relation to specific discharges to ensure compliance with River Quality Objectives**		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Tighten consent conditions to protect watercourse	Environment Agency Severn Trent Water Ltd	Improvement of water quality to meet long term objectives	Limited resources STWL likely to appeal if not part of AMP programme
Pipe Wombourne STW effluent to Smestow brook to improve dilution (see Issue 1 (i) options table)	Environment Agency Severn Trent Water Ltd	No excessive cost	

iii) Failures requiring investigation by the Agency

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

Smestow Brook

2 km from Aldersley Stadium to Compton overflow. The major impact in this stretch has been identified as urban drainage problems originating in Wolverhampton. Some of these have been resolved and the investigations will continue.

Lutley Gutter

2.4 km from road bridge Lutley Lane to the confluence with the River Stour. This is a marginal failure on the amount of organic material in the brook and is being investigated.

Merryhill/Warstones Brook

5.8 km from the road bridge at Newhouse Farm to the confluence with the Wom Brook. A marginal failure on the pH in the watercourse which is being investigated.

Hoo Brook

7 km from Hillpool road bridge to Spennels road bridge and the next 1.1 km to the confluence with the River Stour. Both are marginal failures due to the amount of organic matter in the brook. It is thought that this originates from surface water drainage that enters the brook along this stretch and an investigation is being carried out to confirm this.

Staffordshire and Worcestershire Canal

6.2 km from Worcester Road, Kidderminster to the River Severn. There was a marginal failure for organic content and dissolved oxygen, determinands that are strongly affected by boat traffic. Further investigations are being made.

Dudley Canal

5 km from the junction with the Stourbridge Canal to the Blackbrook bridge. There are no discharges to or abstractions from this stretch and the failure is thought to be due to algae growth. Investigations are being carried out to confirm this.

ISSUE NO. 1 (iii)	Objective: Investigate failures to ensure compliance with long term River Quality Objectives		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Investigate to identify/confirm cause of failure: Smestow Brook Lutley Gutter Merryhill/Warstones Brook Hoo Brook Staffs/Worcs Canal Dudley Canal	Environment Agency	Improvement of water quality to the long term objective	Limited resources

iv) Problems associated with unsatisfactory combined sewer overflows

A number of combined sewer overflows (CSOs) discharge to the River Stour along its length. Some of these contribute to water quality and aesthetic environmental problems leading to public complaint but do not necessarily lead to River Quality Objective failures.

ISSUE NO. 1 (iv)	Objective: Reduce the number of unsatisfactory combined sewer overflows to help improve water quality and aesthetic problems		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Eliminate sewer overflows	Severn Trent Water Ltd	No pollution	Larger sewers and STWs Cost (highest cost option)
Eliminate clean surface water from foul sewers	Severn Trent Water Ltd	No pollution	Cost (high cost option)
Improve CSOs to no visible or detectable impact	Severn Trent Water Ltd	No public complaints No detrimental water quality deterioration	Cost (least cost option)

Issue 2: The Need for Assessment of the Current Status of the Pensnett Canal

The Pensnett Canal is a disused branch of the Dudley Canal that is privately owned by Dudley Metropolitan Borough Council (MBC). This has the potential, if cleaned up, to become an interesting urban walkway and an important site for local conservation.

The main problems are aesthetic. The canal is subject to the impact of fly-tipped wastes and receives surface water run-off from adjacent metal recycling sites (see Issue 12, page 52). Water quality problems include a persistent layer of oil on the water surface. Part of the canal is used as a source of cooling water for a metal rolling mill, the overflow from this section is via a siphon that retains any oil contamination within the mill's area of control. Discharge from the canal to other surface water systems is again via a siphon system that retains oil in the canal and then by surface water sewers controlled by Severn Trent Water Ltd. This stretch of the canal is not routinely monitored for chemical or biological quality.

Any assessment will need to have due regard for the current status and future development of the canal which is currently being investigated by Dudley MBC and discussions will be necessary.

ISSUE NO. 2	**Objective: Assess status of the Pensnett Canal to allow possible future improvements to be made**		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Discuss current status and future proposals for canal with Dudley MBC	Environment Agency Dudley MBC	Avoid conflict of interests and duplication of assessment Partnership approach	Resources
Assess water quality of canal	Environment Agency	Baseline data on the communities it could support Evaluate the potential for providing aquatic habitats	Access,manpower and sampling resources
Assess polluting inputs to canal (also see Issue 12)	Environment Agency	Identify the scope of the problems and possible solutions and timescales	Manpower and sampling resources
Assess importance/ potential importance of canal to local conservation	Environment Agency Dudley MBC	Identify importance and priority of any future scheme to improve the area	Manpower and sampling resources

The Pensnett Canal and Adjacent Metal Recycling Site

Issue 3: Nitrate Contamination of Groundwater

The majority of the Stour catchment is underlain by Sherwood Sandstone which is a major aquifer and has historically supported a high level of groundwater abstraction for public and private supplies. However, fertilisers used for crop production and organic wastes which are spread onto farmland, for example, are sources of nitrate that can leach into underlying aquifers where there is insufficient natural protection against such contamination. The maximum admissible concentration of nitrate in water used for human consumption is 50 mg/l, and in conjunction with the Ministry for Agriculture Fisheries and Food (MAFF), the Farming and Rural Conservation Agency (FRCA) and the Public Water Supply Companies, the Agency is involved in monitoring the nitrate concentration in areas of the aquifer which are potentially at risk from nitrate leaching.

The Nitrate Sensitive Areas (NSA) scheme was set up in 1990 to encourage changes in farming practice which would reduce the amount of nitrate leaching. Farmers can voluntarily join the scheme, and receive compensation providing they ensure that nitrate loadings to the soil do not exceed a given value. However, in response to the EC Nitrate Directive (91/676) the Government intends to replace this with the statutory Nitrate Vulnerable Zone (NVZ) scheme, whereby compulsory action programmes to reduce nitrate levels within these zones are due to be implemented before 1999. Nitrate Vulnerable Zones have been defined by the Agency, for the West Midlands Stour area, around the public water supply abstractions at Kinver, Hinksford, Tom Hill, and Wildmoor (which includes the abstraction at Hagley), (see Map 6, page 22) where the monitoring programme has shown that nitrate concentrations in groundwater either exceed 50 mg/l, or are expected to do so by 2010.

The Agency will continue to monitor nitrate levels in groundwater and will redefine Nitrate Vulnerable Zones as appropriate.

ISSUE NO. 3	Objective: Monitor nitrate levels and implement schemes to help prevent/reduce nitrate contamination of groundwater		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Do nothing - continue with NSA scheme only	Environment Agency	Reduced nitrate contamination from participating farms	Nitrate contamination from non-participating farms manpower and sampling resources
Discontinue NSA scheme	Environment Agency	None	Excessive nitrate concentration in groundwater at all sites at risk Cost of water treatment Waste of fertiliser
Implement and extend NVZ scheme	Action plan to be agreed between Environment Agency and DETR	Aims to maintain nitrates in soil at levels that will keep future concentrations in groundwater within potable limits.	Possible increase in costs to farmers obliged to change agricultural practices

Issue 4: The Sustainability of Water Resources

Groundwater abstraction from the Sherwood Sandstone has exceeded the available resource in many parts of the Stour catchment which, combined with the effect of recent droughts has resulted in a fall in the water table. This has implications for future public water supplies in the area, which are dominated by groundwater. It has also led to a reduction in the baseflow contribution to stream flows with consequent detrimental effects on wetland areas and their wildlife and associated archaeological remains at risk from dessication. Low flow problems exist in several watercourses in the area including the Hoo Brook, Compton Brook, Graiseley Brook, and particularly in the Blakedown Brook which has been highlighted as a separate issue (see Issue 5, page 39).

Where over-abstraction has occurred the Agency has already taken action to prevent the situation from deteriorating by defining areas which have no further groundwater resources available for licensing. These are the Wombourne, Kidderminster, Stourbridge and Stourport groundwater units. Abstraction in these areas is dominated by public water supply boreholes, many of which are authorised by historic "Licences of Right" which were issued during the 1960's. At the time these licenses were issued there was no legal need to consider environmental sustainability.

In the short term, the Agency is considering enhancement of the existing gauging site on the Smestow Brook at Swindon in order to provide greater control over surface water abstraction at times of low flow. Winter abstraction into storage reservoirs is also encouraged to relieve the

pressure on depleted summer resources. In addition, two pool compensation boreholes have been constructed in the Blakedown Valley (see Issue 5).

The Agency's long term strategy for the catchment involves developing a groundwater model of the Sherwood Sandstone, which will provide a resource management tool for the aquifer and enable the Agency to refine its groundwater licensing policy. This will then form a basis for negotiations with the water supply companies on reductions in licensed quantities to more sustainable levels, as part of the ongoing AMP3 process. The model will also take into account the effects of reduced abstraction in parts of Wolverhampton which has resulted in locally rising groundwater levels, and the possibility of aquifer recharge due to an estimated 20-30 Ml/d leakage from the Staffordshire and Worcestershire canal between Barnhurst STW and Compton Lock. The implications of this leakage for groundwater quality will also be considered.

ISSUE NO. 4	**Objective: Develop a groundwater model to aid long term aquifer resource management and implement short term measures**		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Develop groundwater model	Environment Agency	Refine aquifer management policy	Limitations of model
No new licences and negotiate reduced abstraction	Environment Agency/ Water Company Licence Holders	Restore groundwater levels and baseflows	Cost of developing alternative sources
Enhance Swindon gauging station for low flow measurements	Environment Agency	Better abstraction control, less environmental impact	Cost of modifications
Encourage winter abstraction and storage	Licence holder Environment Agency	Reduces impact of abstraction during summer period	Investment on behalf of licence holder

Issue 5: Impacts of Over-abstraction within the Blakedown Valley

The Blakedown Brook rises to the west of the Clent Hills and flows west into the River Stour at Kidderminster. A feature of the valley is the large number of artificially created pools which pre-date the turn of the 18th Century. Two of the pools, Podmore and Hurcott, have particular significance as a Site of Special Scientific Interest (SSSI). The pools are important as a wetland complex containing open water spaces and the largest area of wet valley alder carr in the county. The remainder of the valley corridor is locally designated as a Special Wildlife Site (SWS).

Water features are dependent on either flows from upstream, groundwater levels or a combination

of both. The abstraction of groundwater has resulted in an artificial fall in the water table with a consequent reduction in baseflow to both watercourses and dependent pools. As a result a number of historic pools are permanently dry including Windmill Pool, Broom Mill Pool and Cottage Pool. A further three pools Pavilion Pool, Swan Pool and Forge Pool had all dried up seasonally prior to the Agency taking remedial action. Further downstream the Hurcott and Podmore Pools SSSI has been affected by diminished stream flows with the consequent threat to the sustainability of water dependent habitats. The summer flows have become so reduced that there is insufficient water to allow any of the on-stream pools to overflow. Flows may be reduced further in the Blakedown Brook with the proposed closure of Hagley STW which discharges on average 1.5 Ml/d. However, there is an agreement under AMP2 to divert sewage from Hagley STW to the improved Roundhill STW for treatment and pump back 3 Ml/d of treated effluent to be discharged to the Gallows Brook. This has the potential to solve quality problems as the returned effluent will be of higher quality than the effluent currently discharged by Hagley STW (see Issue 1, page 31) and will also help to relieve the low flow problems.

The Agency's long term strategy for managing resources within the valley is discussed in Issue 4 (page 38). The Agency has taken short term action to restore levels in some of the pools by transferring groundwater from purpose drilled boreholes. The first of these Alleviation of Low Flow (ALF) boreholes was drilled in 1992 and supplies Pavilion and Harborough Pools. The more recent borehole drilled in 1995 supplies Forge and Swan Pools with the ultimate plan to restore levels in Ladies Pool later in 1998. The Agency will also now be examining the potential to support water levels beyond these pools and to augment flows in the brook itself, to supplement flows into pools further downstream namely Hurcott and Podmore Pools. In order to gain more understanding of the complex hydrological regime within the valley the Agency is proposing to sink some further observation wells and installing level monitoring equipment on Hurcott Pool.

The Agency is proposing to work towards these short term and long term goals in partnership with the Water Companies.

Swan Pool - Before and After
Artificial Restoration of Water Levels

ISSUE NO. 5 Long-term measures see Issue No. 4	**Objective: Restore levels in pools at Blakedown and gain a greater understanding of the hydrological regime within the valley**		
Options	**Responsibility**	**Benefits**	**Constraints**
Quantify impacts: Install observation wells & water level monitoring equipment Determine effects on ecological and archaeological environment	Environment Agency Environment Agency	Gain greater understanding of local water regime Identify vulnerable habitats, species and archaeological sites	Capital investment Resources
Complete full support of water levels in Swan Pool, Forge Pool and Ladies Pool in 1998 using groundwater	Environment Agency	Restore water levels and protect associated habitats from further damage	Localised affect on water table Different water quality characteristics
Review trial releases of water to Blakedown Brook in 1998/99 and assess the benefit to Hurcott/Podmore SSSI	Environment Agency Severn Trent Water Ltd South Staffordshire Water Plc	Restore higher flow regime to brook and improve associated habitats With particular regard to the SSSI woodland at Hurcott/Podmore Pools	Capital investment More pressure on groundwater resources - not seen as a long-term solution
Reduce groundwater licences to a sustainable volume as indicated by groundwater modelling (Issue 4)	Environment Agency Severn Trent Water Ltd South Staffordshire Water Plc	Recharge to the aquifer will be above licensed abstraction Savings made by Water Company leakage reduction to be focused on environment	Alternative water supplies may be needed if leakage cutbacks are insufficient
Review the possibility of restoring dried pools higher up system in Blakedown using groundwater from new and/or existing sources	Severn Trent Water Ltd, South Staffordshire Water Plc and Environment Agency	Restoration of pools which have been dry since mid 1980's	Landowner permissions needed

Issue 6: Flytipping and Litter

Flytipping is the illegal disposal of waste. It occurs on both private and public land and may vary from a single black bag of domestic refuse to one or more skip loads of waste. Both the Agency and Local Authorities have powers to take action against flytippers. A national Memorandum of Understanding between the Envrionment Agency and the Local Government Association has been established in order to promote a lasting framework for consultation and cooperation to make best use of limited resources. Specialist protocols are being developed to underpin this framework, including one on flytipping.

The urban nature of the West Midlands Stour area means that there are a number of litter and flytipping 'hot spots' and a strategy needs to be developed for litter and flytipping control at these locations. For example flytipping occurs around the Oak Lane area, see Issue 12 (page 52).

One specific example of flytipping/littering is at various sites around Mushroom Green, debris is washed down the Mousesweet/Black Brooks and affects Saltwells Nature Reserve. Over many years urban debris and fallen trees have built up to create an area of wetland within the Nature Reserve which is of value to wildlife. However, the debris and poor quality water which collects in this area is a health hazard and the area is being colonised by invasive plants including Giant Hogweed. Flood flows wash debris and rubbish downstream blocking a large grille at the upstream end of a major culvert. Recently, local residents have expressed concern to the Agency and requested that the area is cleaned up. Responsibilities fall between many parties. The Agency has recently initiated urgent work in the area which will involve improving its conservation and amenity value (also see Issue 17, page 59).

ISSUE NO. 6	**Objective: Reduce flytipping and litter activity at certain locations within the plan area**		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Develop a strategy to control litter and flytipping at specific locations.	Environment Agency Local authorities Tidy Britain Group Landowners	Reduction in the number of flytipping and litter incidents.	Resources
Remove 'build up' of litter at certain locations eg. Mousesweet/Black Brooks	Tidy Britain Group Landowners Environment Agency Voluntary organisations Local authorities	Improved environmental image leading to reduction in incidents.	Resources
Discussions with responsible parties to tackle flytipping/littering in Mushroom Green Area	Sandwell/ Dudley MBC Environment Agency Groundwork Urban Wildlife Trust	Protect and enhance wildlife and amenity value of wetland and Nature Reserve Reduce risk to public health	Resources Landowner permission

The Effects of Flytipping/Littering on the Mousesweet Brook

Shopping Trolleys in a Watercourse

Issue 6a: Shopping Trolleys in Watercourses

One aspect of flytipping/littering is the problem of debris being washed down/deposited in watercourses. There is a particular problem in Kidderminster with shopping trolleys being thrown into the river. There can be over 200 trolleys per year retrieved from the Stour by the Agency. The Agency has to remove these in order to prevent blockages, as the trolleys often catch branches and leaves, as well as other man-made debris. These unsightly obstructions can lead to flooding of property and affect the visual quality of watercourses.

Wyre Forest District Council Environmental Health Department are taking positive steps to address the problem which occurs from retail outlets using trolleys throughout Kidderminster town centre. They have raised public awareness by approaching the local newspaper and have met one of the larger supermarkets in the area to try to explore solutions to the problem.

ISSUE NO. 6a	**Objective: Reduce the number of shopping trolleys deposited in watercourses**		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Seek solutions in partnership with others to resolve problem	Supermarkets Wyre Forest District Council Environment Agency	Partnership approach fosters joint ownership of problem	Solutions may not cure the problem
Coin operated shopping trolleys used	Supermarkets	Trolleys less likely to leave the supermarket car parks	Stock of trolleys will need alteration. May be against supermarkets company policy
Publish a national league table of offending supermarkets	Environment Agency	Raises public awareness of problem. Supermarkets will seek solutions to avoid negative publicity.	Resources required to collect data.
Prosecute offenders under Land Drainage Byelaw 11 for permitting an obstruction to a main river	Environment Agency	Associated publicity raises awareness of problem. Supermarkets will seek solutions to avoid fines	Resources required to collect evidence and prosecute

Issue 7: The Impact of Culverted Watercourses

Historically man has culverted many smaller watercourses for the purposes of access or developing the land above. This culverting can cause many problems, such as:

- Increased likelihood of flooding due to blockage.
- Increased impact of flooding.
- Loss of storage of floodwater.
- Increased difficulties in providing for drainage connections.
- Difficulties in the maintenance and replacement of culverts.
- Increased health and safety hazards.
- Loss and interruption to the continuity of wildlife habitats.
- Loss of amenity value.
- Reduced groundwater recharge.
- Increased difficulty in detecting pollution.
- Increased difficulty in monitoring water quality.

The Agency is currently preparing a policy document on the issue of culverting. The Environment Agency will only approve an application to culvert a watercourse where there is a demonstrable need, no practical alternative and damage to habitats is not caused.

The Agency will encourage the restoration of culverted watercourses to open channels through imaginative redevelopment of sites, for example on the Brinton site in Kidderminster (see Issue 8, page 46). In order to improve areas where culverting has previously taken place, the Agency would consider funding river restoration schemes, in partnership with land owners and Local Authorities, particularly on existing derelict sites, where culverts could be removed and replaced by open channels. This would benefit the environment as a whole.

ISSUE NO. 7	**Objective: Prevent inappropriate culverting of watercourses and encourage restoration of culverted watercourses where possible**		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Publish national policy	Environment Agency	The public are made aware of the problem	Resources
Undertake more enforcement action on illegal culverting works	Environment Agency	Illegal culverts can be removed and the landowners recharged for the work	Resources
Remove culverts, where possible	Riparian Owner	Reduce the risk of flooding Improve wildlife habitats by continuity of wildlife corridor Ability to observe impacts and detect problems at an early stage	Opportunities are rare. Land use limited. Capital cost.
Identify significant lengths of culverting for potential removal	Environment Agency	Clearly identifies problem culverts Raises awareness with public and Local Authorities	Resources

Issue 8: Kidderminster Town Centre Redevelopment

For many years, the River Stour, through the town centre of Kidderminster, has been culverted beneath the Brintons carpet factory. A major redevelopment of Kidderminster town centre is planned, which will open up the watercourse. This will be beneficial in terms of both flood defence and conservation interests. Through partnership with the developers, the Agency will seek to make a major improvement to flood protection in Kidderminster and an open channel will improve the wildlife habitat and recreational access in the town centre.

Although the extent of flooding will be reduced within the town centre area, the increased flow which will be able to pass through the open channel may exacerbate flooding downstream of the development. In its consideration of the development proposals, the Agency must ensure that the flood risk to other properties is not increased. Further hydraulic modelling will therefore be necessary to determine the extent of any remaining areas at risk from flooding. A flood alleviation scheme may then be required to upgrade the flood defences in any areas where it is economically and environmentally viable.

ISSUE NO. 8	Objective: Improve conservation interests and flood protection in Kidderminster town centre		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Provide early advice at feasibility stage of the development on the improvement of flood defence standards and ecological quality	Environment Agency	Best possible improvement to ecological quality and flood defence standard achieved	Resources Cost to developer
Improve "off-site" flood defences	Environment Agency	Flood defences in Kidderminster are raised to a consistent standard	Capital cost Must be economically and environmentally viable

Issue 9: Flooding Resulting from Urban Development, and Flood Warning

The River Stour, Smestow Brook and their tributaries all have limited capacity to contain flood flows and use adjoining land (the floodplain) to assist in conveying and temporarily storing flood water in excess of their capacity. This is not a problem unless:

a) the floodplain is used for intensive, high value arable crops; residential or commercial development.
b) flooding is made worse by restricting flood flows (eg. bridges, culverts, infilling and development of the floodplain)
c) flood flows are increased by development that makes land more impermeable

All of the above have occurred in the West MidlandsStour area, resulting in conflict between the needs of the watercourse and land uses. This has led to flooding problems in the areas set out in Table 19 in Section 6 of this Plan.

Kidderminster provides a good example of both points a) and b) ie. development in the floodplain and increased flooding due to watercourse restrictions, (see Issue 8, page 46). The extent of development in the West Midlands Stour catchment upstream of Stourton and in the upper reaches of the Smestow Brook at Wolverhampton are examples of point c) ie. development has increased run-off and flood flows which may also have compounded the problems in Kidderminster. Industrial waste tipping, extensive in the Stour valley from Stourbridge to Halesowen, is a further example of point b) ie. this has raised flood levels locally and flows passing downstream.

The Agency operates a flood forecasting and warning service for Kidderminster. Currently, flood warnings are disseminated to the Local Authority, local radio and the police. At present in this catchment, there is only coverage of a limited area. If it is technically feasible and economically justifiable a larger area could be warned.

As a result of taking over the role of the police in many parts of the country from 1st September 1996, the Agency has developed new systems and technology to disseminate flood warnings. Some of these systems could be applied to Kidderminster and in the future, the Agency may consider introducing a flood warden system or direct dissemination to the public by an automatic voice messaging system.

ISSUE NO. 9	**Objective: Protect people, property and land from flooding to standards which are practical, economic and appropriate and improve flood warning**		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Alleviate risk of flooding to property at locations identified in S105 survey (see Section 6, Table 19): a) Construct flood defences to protect property at risk b) Reduce flood levels by increasing watercourse capacity to protect property at risk c) Reduce flood flows by upstream surface water balancing	Environment Agency Local Authorities Property owners/Developers	Reduce flooding and damage to property Possible restoration of pre-development flood flow regime Possible conservation benefits	Needs to be technically and economically feasible Environmental impact No detriment to other property at risk from flooding Availability of suitable land

Options/Actions	Responsibility	Benefits	Constraints
Remove obstructions/ culverts and developments which increase flood levels (also see Issue 7)	Environment Agency Local Authorities Property owners/Developers	Reduce damage to property from flooding Environmental benefit of open watercourses	Possible downstream detriment to flooding if structure impounds flood flows Subject to occurrence of redevelopment opportunities
Map floodplain, provide maps for Local Authorities and highlight areas where restoration of floodplain capacity is necessary	Local Authorities supported by the Environment Agency	Reduction in flood risk/damage Clear long term strategy for floodplain protection	Resources to fund mapping Can only be carried out through the planning process and if land comes up for development/re-development Long timescale
Investigate quantitative effects of urbanisation on flooding regime and devise long term strategy to reduce detrimental effects	Environment Agency	Inception of planning and development control policies leading in longer term to reduced flood risk	Dependent on opportunities for redevelopment arising so that source control/balancing measures can be introduced
Ensure proposed new development does not add to existing flooding problems	Local Authorities	No increase of property/lives at risk from flooding or need for flood defences	Local Authorities need to consider broad range of factors in reaching decisions
Investigate the feasibility of improving/ extending the flood warning system	Environment Agency	Reduced flood damage if those warned can move vulnerable goods	Cost of dissemination systems Rapidity of watercourse response to rainfall

Issue 10: The Current Level of Air Quality Monitoring

The Environment Act 1995 requires the Secretary of State for the Environment to prepare and publish a National Air Quality Strategy. This has now been issued and contains a list of eight airborne pollutants for which target ground level concentrations are set. At present, monitoring of air quality within the catchment is limited and does not allow a full assessment to be made against these standards, or the identification of likely problem areas.

The Department of the Environment, Transport and the Regions (DETR) has established a national network of automatic monitoring stations covering both urban and rural sites. The existing system in the Midlands was expanded in 1996 to eleven sites, including one in Wolverhampton which is the only such site in the LEAP area. Whilst the network can provide useful information at a national level, it is of limited value locally.

Two of the major contributors to poor air quality are nitrogen dioxide (NO_2) and sulphur dioxide (SO_2). Nitrogen dioxide is primarily from road traffic. The major source of SO_2 is the combustion of coal and oil in power stations and industrial processes.

Air quality is monitored by Local Authorities at a number of sites in the LEAP area, but this work is usually limited to two parameters, nitrogen dioxide and sulphur dioxide, and the data is often not readily comparable with the national network or standards because the measurement time periods are too long.

Although Local Authorities have a statutory duty to carry out assessments of air quality, in certain circumstances some processes regulated by the Environment Agency are likely to have a significant impact on air quality. It is proposed that work be carried out to assess the available air quality data, identify any deficiencies in this data and produce an estimate of the impact of IPC processes on air quality within the LEAP area. This should allow priorities to be set in process improvements. (See Issue 11, page 51).

ISSUE NO. 10	**Objective: Quantify the impact of IPC processes on air quality to allow priorities to be set in process improvements**		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Work with Local Authorities to assess air quality monitoring needs for the area	Environment Agency/Local Authorities	Assess air quality monitoring and direct resources to meet identified needs	Cost Agreement of Local Authorities
Agree common data sets	Environment Agency/Local Authorities /DETR	Common base for information gathering and assessment	Data must meet the needs of each organisation
Estimate the impact of IPC processes	Environment Agency	Highlight problems on issues that affect air quality	Cost Agreement with operators

Issue 11: Environmental Monitoring of Integrated Pollution Control Authorisations

Integrated Pollution Control (IPC) authorisations set limits on releases to air from regulated processes to protect the environment. These releases are regularly monitored on site by the Agency and process operators. Monitoring of the surrounding environment (soil, herbage, ambient air etc) has been limited to campaigns aimed at assessing the local impact of specific activities. No general monitoring of the immediate environment has been undertaken and it is proposed that monitoring for specific persistent pollutants that accumulate in the environment (eg. heavy metals, dioxins, furans etc) local to known point sources, be carried out. This will then establish a datum against which the impact of IPC processes can be monitored and assessed, and will also allow potential "hot spots" to be investigated.

The Agency considers that this proposed monitoring programme of air pollution should be rationalised and developed alongside that of Local Authorities,with a view to providing a joint and consistent approach to general environmental monitoring for the local area. This will enable the Agency to determine the levels within the environment of persistent toxic pollutants (in the first instance heavy metals and dioxins/furans) released from IPC processes to air, and assess whether reductions in these releases are required. An example of a possible site is around the Municipal Waste incinerator at Lister Road, Dudley.

ISSUE NO. 11	**Objective: Develop a joint and consistent approach to environmental monitoring to determine the levels within the environment of persistent toxic pollutants released from IPC processes to air and assess whether reductions in these releases are required**		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Develop a joint and consistent approach on environmental monitoring with local authorities	Environment Agency/Local Authorities	Consistency, optimum use of resources	Agreement and support of local authorities
Identify sites for environmental monitoring	Environment Agency/Local Authorities	Provide a baseline to judge the impact of improvements	
Undertake monitoring at agreed sites	Environment Agency/ Site operators/ Local Authorities	The impact of industrial/ commercial processes can be assessed	Cost Site access Agreement of landowner/site operators Analytical techniques are expensive and subject to wide range of error

Issue 12: Metal Recycling Sites

Under the Environmental Protection Act 1990, sites keeping or treating wastes must hold a waste management licence issued by the Environment Agency unless they are exempt. Sites which are exempt still have to be registered with the Agency and meet certain criteria so that they do not cause pollution.

There are a number of sites in the Dudley area, notably in Kingwinsford (Oak Lane) and Brierley Hill (Canal Street), which do not have a waste management licence and are not registered, they are therefore not currently regulated. In addition, there are a number of other sites which, whilst regulated, are not complying with the conditions attached to the licence or the exemption criteria. The result has been a number of incidents in these areas including frequent fires, extensive fly-tipping (see Issue 6, page 36) and pollution of the Pensnett Canal (see Issue 2, page 42).

ISSUE NO. 12	**Objective: Bring all operations into line with the Regulations in order to prevent pollution of the environment and harm to human health from waste activities**		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
i) Unlicensed sites: a) ensure that all operations are licensed or registered as exempt b) take enforcement action as appropriate	Environment Agency	Reduce the number of incidents in the area. Reduce pollution and the risk to human health from activities	Resources
ii) Licensed sites: a) enforce licence conditions b) improve operating standards where necessary			
iii) Exempt sites: a) ensure sites are registered and complying with criteria. Take enforcement action where necessary b) improve operating standards where necessary			
iv) Flytipped waste a)require landowners/local authorities to remove flytipped waste as appropriate (see Issue 6)	Environment Agency Local Authority Landowners	Reduce the number of incidents in the area. Reduce risk of pollution	
v) Regularly review the situation ie. i) and ii) and monitor progress. Increase enforcement action if land occupiers/licence holders are not making improvements in accordance with set, agreed timetables	Environment Agency		

Issue 13: Sustainable Waste Management

Every year in the UK we produce about 245 million tonnes of household, commercial and industrial waste (Source: Making Waste Work), most of which (70%) is currently disposed of to landfill. There are a number of issues associated with the production of waste and its management. In particular, waste represents a loss of natural resources and there are a limited number of sites which are suitable for landfilling with wastes.

We therefore need to reduce the amount of waste we produce and make the best use of the waste which is produced.

The Department of the Environment's White Paper *Making Waste Work* sets out a national, non-statutory strategy for the management of waste and includes targets for the reduction of waste going to landfill, the recovery of value from municipal waste, the recycling and composting of household waste and many others. Progress towards these targets is slow and major improvements are required. This will necessitate close working and cooperation from a wide number of organisations.

The new Packaging Waste Regulations, which require certain businesses who use packaging to recover and recycle specified tonnages of packaging, will assist in the acheivement of some of these targets.

Household waste: One of the targets is to recycle or compost 25% of household waste by the year 2000, currently the average is around 5%, (see Map 13, page 101, for local district data). The key factors in achieving the targets relating to household waste will be action by individual householders, who need to be made aware of the issues associated with waste production and the need for sustainable waste management, and action taken by local authorities in providing recycling facilities such as bottle banks and household waste reclamation sites.

Commercial and Industrial waste: There is much scope for commerce and industry to reduce the quantity of waste being produced. The increasing costs of waste disposal makes waste minimisation, reuse and recycling more attractive 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. The Agency, in partnership with others, will act to overcome these barriers through seminars held on industrial estates and waste minimisation initiatives.

ISSUE NO. 13	Objective: Reduce the amount of waste produced in the Stour area and make the best use of waste that is produced		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Set up waste minimisation initiatives	Groundwork Trust and partners including the Environment Agency	Increased environmental awareness. Reduced commercial and industrial waste arisings	Process of culture change within companies is slow Resources
'Roadshow' style seminars to companies on industrial estates	Environment Agency	Increased environmental awareness leading to good waste management practice and fewer pollution incidents	Process of culture change within companies is slow Resources
Develop a strategy to achieve the targets in Making Waste Work with regard to household waste	Local Authorities Environment Agency	Reduce quantity of household waste requiring landfilling; increased environmental awareness	Public participation Resources

Issue 14: The Need to Raise and Promote Environmental Awareness and Education

Raising environmental awareness and education is a key objective for the Agency. It is essential for the delivery of a cleaner more sustainable environment in the long term. 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, and we need to encourage ownership and responsibility for the local environment. Education will play a key role in enabling us to achieve our vision for the Stour. There is a need for a greater level of educational involvement by the Agency and a need to raise awareness of environmental issues amongst the general public, industry and special interest groups. Section 4, Protection Through Partnership, highlights some areas where the Agency is successfully working with others to achieve this aim.

The Agency has recently published its education strategy "Green Shoots" which considers environmental education into the next century. There are six goals set out in this strategy, these 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 award 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.

We now need to put this strategy into a local context and identify how to deliver it. Many of the issues in the plan and the actions proposed to address them involve raising environmental awareness and a partnership approach. A local education strategy will help with the delivery of these actions.

ISSUE NO. 14	**Objective: Raise and promote environmental awareness and education and develop a local education strategy**		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Develop a local education strategy and establish partnerships to deliver it	Environment Agency	Promote local environmental awareness and encourage ownership of the local environment	Resources Partners needed

Issue 15: Low Conservation Value and Poor Biodiversity

In pursuance of the Government's commitment to biodiversity conservation, the Agency is developing targets for species and habitats of conservation concern. These relate to the targets for key wetland species as identified in the UK Biodiversity Action Plan. The Agency 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 also exist in this area which are not included in the UK Biodiversity Action Plan, some are notified under Annexe II of the EC Habitats Directive and some are of local importance. As a minimum we will aim to protect these species and the habitats upon which they depend.

Water Voles

A recent survey shows that water voles (*Arvicola terrestris*) are thriving in the catchment, the Smestow Brook in Wolverhampton and the canal network is of particular importance. However, protection and management of these populations and the environment in which they live is now necessary.

Otters

Recent evidence shows that otters (*Lutra lutra*) are moving back into the Stour from the Severn catchment. Improvements in water quality and an accompanying increase in food supplies appear to be the main criteria required for otters to expand into the catchment. Habitat in many instances appears to be suitable though this could be improved.

Marshlands and Reedbeds

The Stour valley contains some of the richest and most important marshlands within Hereford and Worcester and the West Midlands including Puxton, Stourvale and Wilden Marsh SSSIs. The Environment Agency is keen to continue the partnerships with Wyre Forest DC, English Nature, Worcestershire Wildlife Trust and landowners to protect and enhance the area and develop it as a Country Park and Local Nature Reserve. Reedbeds are comparatively rare in the area and opportunities need to be made for their re-creation.

The above species and habitats come under legislation relating to Biodiversity and/or the European Habitats & Species Directive. Additional species of significance in the catchment area include:

Native Brown Trout

Small populations of native brown trout can be found in the Philley, Illey and Hoo Brooks. What makes these populations of particular interest is the fact that, because of the historic degradation in water quality of the River Stour and Smestow Brook, they have been isolated for upwards of two centuries. With water quality once again improving it would be beneficial to identify the genetic characteristics of these fish in order to protect the integrity of these populations should any future restocking programme be undertaken.

Black Poplars

The native black poplar (*Populus nigra sub sp. betulifolia*) is one of our rarest native trees, with only 2,500 left in the UK, of which 150 are female. It is therefore essential that planting and management of the species is carried out to ensure its continued presence within the area. A recent survey looking at the DNA of native black poplar in Upper Severn area revealed the trees in the

Stour catchment to be of a distinctive group. This information should be taken into account when planning a replanting programme.

ISSUE NO. 15	Objective: Protect and enhance the biodiversity and conservation value of the area		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Develop and implement appropriate guidelines for the protection and management of riparian habitats for water voles	Environment Agency Urban Wildlife Trust Local Authorities	Basis for an action plan for the protection of the species in the catchment.	Continued poor levels of water quality
Monitor otter distribution and identify habitat improvement sites	Environment Agency Wildlife Trusts Local Authorities	Protection and encouragement of an endangered species.	Landowner permission. Extent to which water quality can be improved.
Determine the current status of native brown trout and investigate the degree of genetic diversity in these relict populations	Environment Agency	Effective future conservation of the species in this catchment.	Availability of suitable food source. Landowner permissions
Implement planting and management schemes to ensure the continued presence of native black poplar in the catchment	Environment Agency Forestry Commission Local Authorities	Protection of black poplar in the catchment	Gaining support from landowners
Seek opportunities for reed bed creation	Severn Trent Water Ltd Environment Agency Developers Local Authorities	Re-creation of a UK Biodiversity Habitat type Improvements to water quality	Reliability of reed bed technology which is still being developed
Promote the restoration of wetlands at Puxton, Stourvale, Wilden and Spennels Valley in Kidderminster and develop as a Country Park and Local Nature Reserve	Environment Agency Wyre Forest District Council Worcestershire Wildlife Trust Landowners English Nature	Restoration of large areas of wetland which is a target under the UK Biodiversity Action Plan	Lack of Water Landowner Permission

Issue 16: Poor Fish Stocks

Fish provide a good indication of the overall health of a river. Cyprinid fish are widespread in the catchment but generally their numbers and diversity are low, mostly because of poor water quality. Small pollution tolerant species, such as sticklebacks, are predominant upstream of the Stour/Smestow confluence. Trout are limited to a few cleaner tributaries such as the Philley Brook. The Staffordshire and Worcestershire Canal is an EC Designated Fishery south of Swindon. The Agency seeks to develop fish stocks in the river system as water quality and flows improve, and to protect the EC Designated Canal Fishery.

In addition to poor surface water quality, the main reasons identified as causing poor fish diversity and numbers throughout much of the catchment include low flows and inconsistency of flows in some watercourses, and river channels being heavily engineered and urbanised.

ISSUE NO 16	**Objective: Increase the numbers and diversity of fish stocks in the catchment**		
Options	**Responsibility**	**Benefits**	**Constraints**
Develop and implement a strategy for the creation of instream habitat and riparian buffer zones	Environment Agency	Instream improvements will be in place as water quality improves	Water quality Water quantity Landowner permission
Selective fish stocking	Environment Agency	Fish will naturally recolonise as water quality improves but selective stocking could accelerate this process	Water quality Water quantity

Issue 17: Lack of Recreation and Amenity Facilities

There is a demand for increased amenity and recreational facilities associated with the water environment in the urbanised areas of the catchment. In particular, there is a lack of provision for disabled anglers and the facilities for angling on rivers, canals and still waters could be increased.

The Agency is regularly involved with proposals for riverside walks and cycleways and see this provision as being of great importance. Examples of proposed improvements include increasing public access at Mushroom Green on the Mousesweet Brook (also see Issue 6, page 42).

ISSUE NO. 17	**Objective: Increase Scope for Recreation and Amenity Facilities**		
Options	**Responsibility**	**Benefits**	**Constraints**
Increase the opportunities for angling on the rivers, canals and other water bodies	Environment Agency Angling Clubs Local Authorities British Waterways Landowners	Recreation facilities available to large numbers of people	Poor water quality Vandalism Suitable sites
Improve the opportunities for disabled angling	Environment Agency Angling Clubs Local Authorities British Waterways Landowners Fieldfare Trust	Easy access close to conurbation	Poor water quality Vandalism
Promote and support access initiatives	Local Authorities Groundwork Sustrans British Waterways Landowners	Improved access between countryside and conurbation	Impacts on other users
Improve public access at Mushroom Green	Environment Agency Sandwell MBC Dudley MBC BTCV	Improved access to and clean up of badly neglected area (also see Issue 6)	Resources Long term management

Issue 18: Protection and Expansion of the River/Green Corridor and its Associated Wildlife

Green corridors are always of particular importance to wildlife but where the surrounding areas are industrialised and highly populated their value increases. Rivers, brooks, canals and disused railways are all examples of green corridors, their importance is highlighted in the Black Country Nature Conservation Strategy which has been compiled and published by all the Local Authorities in the area and English Nature. The Agency is already supporting this policy by promoting particular projects and commenting on planning applications.

ISSUE NO. 18	Objective: Implement and promote schemes to protect and expand the river/green corridor		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Continue to implement and promote collaborative schemes that enhance areas of urban green desert adjacent to watercourses and wetland eg. Wom Brook Walk	Environment Agency Local Authorities Local community groups and forums	Greater continuity of river corridor from a wildlife perspective	Vandalism Opinions of local residents

Issue 19: The Effects of Development on Wildlife, Cultural Heritage and the Landscape

Any landscape is made up of many facets. In the West Midlands Stour area past intensive use has left its mark, contributing to the present varied landscape which, today, still demonstrates a strong sense of place. In contrast many new developments are bland, and whilst there are examples of excellent new development, it is recognised that damaged to the landscape has occurred as a result of development that does not respect local character.

Thorough consideration of wildlife, cultural heritage and the landscape is essential to ensure that new engineering and redevelopment schemes contribute to creating an environment that is both attractive to those that live and work there and sympathetic to nature conservation.

The Agency influences this by discussions with applicants for land drainage consents and planning applications as well as carrying out appropriate environmental assessment for their own capital and maintenance programme. Two good examples of this are the proposed re-development of Kidderminster (see Issue 8, page 46) and the recent river diversion by Severn Trent Water Ltd near Gigmill.

The aim for environmental best practice is particularly important in urban areas since many of the designations aimed at protecting the environment eg. landscape, historical and archaeological sites, are non-statutory. In addition, areas that are of importance, for archaeology in particular, are being discovered all the time.

Opportunities for best practice are often lost, not due to a lack of interest, but because lines of communication and areas of responsibility between the many parties involved are not always as clearly defined and effective as they could be. It is essential that the Agency staff and their counterparts in Local Authorities and other organisations continue to build on established communication links to identify, protect and enhance sites of importance.

It is hoped that schemes such as the Community Pride initiative and Local Agenda 21 (see Section 4), will help to involve local residents in influencing the protection and enhancement of their environment.

In an area that supports so many people and where wildlife is marginalised, it is vital that new constructions, erected both by the Agency and developers, are built to designs sympathetic to the local character of the area and the environment.

ISSUE NO. 19	**Objective: Encourage and promote best practice in relation to new developments to protect and enhance the local environment**		
Options/Actions	**Responsibility**	**Benefits**	**Constraints**
Develop a joint and consistent approach between all those involved with new developments in the area.	Local Authorities Developers Environment Agency	New developments are designed to the highest visual standard and take account of the needs of wildlife and heritage	Support from other parties.
Actively seek greater publicity for examples of best practice.	Environment Agency Local Authorities Developers	Raises the perspective of this work. Raising of standards More effective communication due to greater awareness of the responsibilities of different parties	Long timescale for effects to be seen.
Launch the Community Pride initiative in Dudley	Environment Agency Local Authorities Community Groups	Greater publicity for smaller conservation projects that often provide good examples of best practice.	Community Groups fail to enter scheme.

Section 4 Protection Through Partnership

This Section highlights the need to work together, if we are to make any lasting environmental improvements to the West Midlands Stour 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. This kind of understanding 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, page 8).

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. Partnerships will enable the key objectives and the long term vision of the plan to be realised; they will encourage local accountability as well as helping the financial need to pool limited resources. This plan discusses a number of issues and their progression will involve the joint action of a number of organisations, the general public and individuals within the Agency.

4.0.1 Working with Local Authorities

A Memorandum of Understanding has been drawn up between the Agency and the Local Authority Associations. It sets out how we will work with Local Authorities in protecting and improving the environment and in promoting sustainable development, better integrate our work and make the best use of limited resources. The agreement covers various shared responsibilities including, development control, flood defence, water resources, flytipping and air quality. The Agency already works closely with Local Planning Authorities on land use planning issues, this is explained in section 4.1 below.

4.1 Land Use Planning

4.1.1 Planning Liaison

Land use change is primarily the responsibility of the Local Planning Authorities (LPAs) through the implementation of the Town and Country Planning Acts. As planning decisions can have a significant impact on the environment, it is important that the Agency contributes to this process where appropriate. A considerable range of statutory and non-statutory planning consultations are received by the Agency from LPAs. A response is given by the Agency, enabling the relevant planning committee to consider our views in determining the planning application. Guidance regarding the applications the Agency would wish to see is contained in the publication *Liaison with Local Planning Authorities* (March 1997).

Development plans provide a framework for land use change and are the key consideration in the determination of planning applications. As a statutory consultee in the development plan process, we welcome this opportunity to join the LPAs in promoting sustainable development. To provide a guide to LPAs on what policies should be included in Development Plans and why they are important, an annex to the above mentioned document *The Environment Agency and Development Plans* is due to be published. Section 5.1, Table 7 (page 79) shows the current status of Local Development Plans in the area.

4.1.2 Land Use Planning and LEAPs

LEAPs, in addition to outlining a vision for the future, set out problems, issues and actions within the plan area and therefore act as an important source of information for 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.

4.1.3 Land Use Statements

The following statements relate to issues raised in the LEAP (Section 3) and to other areas of concern which will require the support of the LPAs in the area to seek a solution. It is hoped that we will receive comments from the Local Authorities during the consultation stage, so that these statements can be agreed with them and incorporated into the Action Plan. These statements will also apply to developers in relation to both the development and re-development of land (see Section 5.1, page 76). It is important that the information provided in the statements is incorporated into development proposals at an early stage, in order to ensure that development is sustainable and does not result in adverse impact on the environment.

West Midlands Stour LEAP - Land Use Statements

Land Use Issue	Land Use Statement	Issue & Site Examples	Development Plan Policy Examples*
WMS/LUS 1 - Sustainable Development			
As increasing and often conflicting demands are being placed on the environment, a sustainable approach to growth and development is required to balance demands with the need to protect and enhance the environment for now and the future.	**The adoption of a precautionary approach to development which might affect the environment is encouraged. The environmental effects of development should minimise adverse impacts and maximise potential benefits. In particular, opportunities should be taken to incorporate natural features and environmental enhancements as part of development.**	General application. Issue 19.	**HWSP:-** H.16A; H.20A; G.2; E.6; T10A; CTC.3; CTC.4; A.1 **HWMLP:-** 4, 15 **BLP:-** DS10; DS11; C4; C9; RAT21; ES10 **SSP:-** D1 **DUDP:-** 20; 21; 22; 24; 25; 67; 68 **WUDP:-** E15; S13; ENV1; ENV8; ENV23
WMS/LUS 2 - Energy Conservation and Waste Minimisation			
The waste management hierarchy (see Section 6.0.1) is a framework for sustainable development. Options towards the top of the waste hierarchy, have the potential to contribute towards sustainable waste management where they are the best practicable environmental option (BPEO).	**To promote a pattern of development and use which is more sustainable, opportunities for recycling, waste minimisation and energy conservation must be considered. Examples such as aggregate reuse, reclamation of production process base materials, facilities enabling recycling of materials and the promotion of energy saving construction and production processes, would reduce demand on primary resources, waste disposal facilities, landfill, etc.**	Issue 13.	**HWMLP:-** 17 **BLP:-** ES11; ES12; ES15 **WFLP:-** RC1 **SSP:-** D1; D6; T1; MW3; MW5 **DUDP:-** 47; 50 **WUDP:-** ENV32

Land Use Issue	Land Use Statement	Issue & Site Examples	Development Plan Policy Examples*
WMS/LUS 3 - Effluent Disposal			
The quality of groundwater, and surface waters is important for a wide range of users. Inadequate foul and surface water drainage provision can have an adverse effect on water quality, e.g. sewerage facilities with premature storm overflow discharges or lack of carrying or treatment capacity. Some smaller settlements have no sewerage provision. Storage and use of some substances without adequate precautions poses a pollution risk and may not be safe at all in certain areas.	**The availability and provision of sewerage/drainage and pollution prevention facilities will be taken into account when development is planned so that adequate means of disposal for foul sewage, surface water and effluent are provided. The operation of effluent treatment/disposal sites must not be jeopardised by locating new, sensitive development in the immediate vicinity. In the case of proposals producing effluent or waste, e.g. intensive livestock units, it should be established that there is an adequate means of disposal. Developments involving the storage or use of potentially polluting toxic substances must incorporate adequate safe-guards, including measures to retain fire fighting water, to minimise pollution risk. The use of source control techniques to reduce diffuse pollution will be encouraged.**	Issues 1, 3, 12, &16 Areas draining to Barnhurst, Blakedown, Freehold, Gospel End, Hagley, Lower Gornal, Roundhill, Trescott & Wombourne STWs. Textile/carpet producers (Kidderminster). Oak Lane, Pensnett. Intensive livestock units. Development near public water supply sources.	**HWSP:-** H2A; H.16A; H.20A; G.2; E.6; E.9; E.14; T10A; CTC.9; CTC.14; A.5; M.4 & WD.3 **BLP:-**DS11; E9; ES1; ES3 ES4; ES5; ES6 **WFLP:-** E6; D2; NC1; NC2; EP1; EP4; EP5; AG10 **SSP:-** D1; D7; E3; E7; NC3 **SSLP:-** H15; BE25; BE26; BE28; BE29; BE30; BE33 **DUDP:-** 49; 53; 58; 63; 73; 83; 85 **WUDP:-** E14; E15; S13; H16; ENV2; ENV25
WMS/LUS 4 - Water Resources			
Limited resources exist to support surface water and groundwater abstractions. Some abstractions are causing environmental damage. An available and adequate sustainable water supply is an important consideration for new development and its location. (See also "Policy and Practice for the Protection of Groundwater" - HMSO: ISBN 0 11 885822X).	**Full account will be taken of the availability of water resources and provision of water supplies in considering the location and extent of significant new developments. Key issues are quantity, location, and source (i.e. surface water or groundwater) of abstractions and the need to maintain aquifer recharge whilst protecting the resource from pollution. 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.**	Issues 4 & 5 Development in Hagley Kidderminster and Wombourne.	**HWSP:-** H2A; CTC.9; M.4; WD.3 **HWMLP:-** 9 **BLP:-** DS11; ES4; ES6 **WFLP:-** NC1; EP4 **SSP:-** D1; NC3; R5A **SSLP:-** H15;BE25; BE26; BE28; BE31; BE33 **DUDP:-** 53; 58; 73 **WUDP:-** ENV1; ENV25

Land Use Issue	Land Use Statement	Issue & Site Examples	Development Plan Policy Examples*
WMS/LUS 5 - Floodplain and Surface Water Run Off			
Unsuitable development can itself be at risk from flooding, or increase flood risk elsewhere. This not only places lives and property in danger, but can also adversely impact upon ecosystems by interfering with natural processes. (See also "Policy and Practice for the Protection of Floodplains" - Environment Agency 1997).	**The floodplains of watercourses will be safeguarded from encroachment by development. Where appropriate, changes in land use which will lead to a reduction in life and property at risk from flooding will be sought. Additionally, development must not exacerbate flooding elsewhere due to increased rates of run off. To address these problems, the use of wetland restoration and source control techniques is encouraged.**	Issues 7, 8, 9, &18 Development in Hagley. Coloroll Factory, Stourvale Works & Town Centre Redevelopment Sites, Kidderminster Thorns Rd., Lye. North of Wollaston Rd., Stourbridge. Canal Basins Area, Power Station Rd., Sandy La/Barracks Rd., Timber La/Mill Rd. & Wilden La. Ind. Est. Stourport-on-Severn	HWSP:- CTC.9; M.4 BLP:- DS11; C4; C8; C12; C14; ES1; ES2 WFLP:- H2ii(m)&(r)&v; H17; E2D&F; E3; E4; NC1; NC2; EP1; EP2; EP3; TM13; KTC1 SSP:- D1 SSLP:- H15; BE25; BE27; LS8 DUDP:- 53 WUDP:- ENV1; ENV10; ENV24; R9
WMS/LUS 6 - Contaminated and Reclaimed Sites			
Development on or near contaminated land can cause the release of contaminants which may result in significant harm to the local environment.	**Contaminated sites, such as ex-industrial, gas works, waste disposal operations and old mine workings cause, or have the potential to cause, pollution problems. Any scheme for the redevelopment of such sites should be accompanied by a site investigation indicating the degree of contamination and, where appropriate, remediation proposals. The Environment Agency will be consulted both prior to and at the planning application stage for developments involving contaminated land.**	Issue 1 Hawne Colliery, Halesowen. Town Centre Site, Kidderminster Gas Works @ High St., Stourbridge & Stafford Rd., Wolverhampton. Dudley Southern By-Pass. Dudley (Roundoak) and Merry Hill Centre	HWSP:- CTC.9 BLP:- ES7 WFLP:- EP6 SSP:- D1; D2; E7; R1; R2A SSLP:- BE33; R19; DL1 DUDP:- 46; 70; 71 WUDP:- E15; H13
WMS/LUS 7 - Source Control			
Increasing areas of impervious surfaces, contribute to rapid run off of rainfall, instead of the infiltration and slow greenfield run off. Rainfall and surface pollutants quickly access watercourses, exceeding their carrying and self cleaning capacity .	**Local Authorities, in partnership with the Environment Agency, will encourage the use of environmentally sensitive techniques, such as source control, to ensure the problems of surges in surface water run off, pollution loads (including silt) and diminished aquifer recharge are not exacerbated by new development. Where possible, the solution adopted should address existing problems.**	Issues 1, 4, 5, 16, 17 & 18 The reed bed on Graiseley Brook, Compton. Development in Hagley. Dudley Southern By-Pass.	HWSP:- H.20A; LR.15 BLP:- DS11; ES6 WFLP:- H13; D10; NC6; EP3; LR1 SSP:- D7 SSLP:- H15; BE26; BE30; LS8; NC7 DUDP:- 24; 53; 58; 73; 83; 85 WUDP:- E24; ENV1; ENV12; R2; R9

Land Use Issue	Land Use Statement	Issue & Site Examples	Development Plan Policy Examples*
WMS/LUS 8 - Mineral Extraction and Waste Disposal			
Mineral extraction can adversely affect the environment if appropriate safeguards are not put in place. Conversely restoration works may offer opportunities for environmental enhancement and water based recreation. Landfill, or land raising, unless effectively engineered, can pose a threat of pollution to the surrounding environment.	**The management of mineral extraction and waste disposal sites must provide for the protection of the environment from pollution in their construction, operation and aftercare. The effects on water resources, site drainage, leachate and air born litter will be considered. Care will be taken to avoid locating new, sensitive development in the immediate vicinity of these sites. Proposals for restoration of worked-out mineral sites which present opportunities for environmental enhancement will be encouraged. The Environment Agency will be consulted both prior to and at the planning application stage for developments involving mineral working and waste disposal.**	Issues 1, 3, 12, 13, 16, 17 & 18 Oak La., Kingswinford. Clay Quarries at Himley Wood and Sedgeley Sand and Gravel Quarries at Seisdon, Stourton Swindon, Trysull, Wall Heath and Wombourne	**HWSP:-** E.14; E.15; A.5; LR.15; M.4; WD.3 **HWMLP:-** 9; 11 **BLP:-** E4; E9; RAT20; ES7; ES8; ES14 **WFLP:-** E6; D2; CRB7; AG10 **SSP:-** E7; R1; MW5; MW6; MW7; MW9 **SSLP:-** C3, BE25; BE32; R11; R17; R19; M1; M2; W1 **DUDP:-** 5; 6; 46; 48; 49; 67; 68 **WUDP:-** E6; H16; ENV2; ENV12; ENV29; ENV30; ENV31
WMS/LUS 9 - Air Quality			
Many factors affect local air quality. Amongst these are vehicle emissions, heavy and light industry, weather, domestic emissions and climate change. (See also "National Air Quality Strategy")	**Local Authorities will work in partnership with developers, the Environment Agency and others to meet the aims of the 'National Air Quality Strategy'. Development Plans will promote new development which does not adversely impact upon air quality and promotes improvements by minimising HGV and car journeys and encouraging the use of less polluting means of transport. Care will be taken to avoid locating new, sensitive development in the immediate vicinity of sites discharging to air.**	Issues 10 & 11 Merry Hill Centre. Heavy Industry Traffic Growth	**HWSP:-** H2B; H16A; H20A; E13; T.1; T.2; T.3; T.4; T.7; A.5; M.5 **BLP:-** E4; E9; TR5; TR13; TR14; TR15; TR16; ES14 **WFLP:-** H15; D2; CRB7; AG6; T11; T14; T15; T18; TC10 **SSP:-** D1; D7; E3; E7; E11A; H2; T1; T2; T3; T5; T8; T18; MW8 **SSLP:-** TR6; TR8, TR9; BE25 **DUDP:-** 5; 6; 53; 58; 75; 77; 89; 90; 96; TC20 **WUDP:-** E8; S10; S13; H16; ENV2; ENV29; C4; TP1; TP2; TP3; TP5; TP8; TP13; TP18; TC35
WMS/LUS 10 - Watercourse Corridors			
Water corridors are an important nature conservation resource. Development encroachment can adversely affect their character and nature conservation value. Conserving and where practicable enhancing biodiversity is an essential element of sustainable development.	**The conservation, fisheries, landscape, heritage/archaeological and recreational value of watercourse corridors will be protected and enhanced. This includes non-designated, as well as statutory and locally designated water based sites. Appropriate guidelines, such as those produced by the Forestry Authority, will be used. Inappropriate uses leading to degradation by soil erosion, increased flood risk, etc. will be avoided. The value of buffer zones and sensitive riparian management is recognised.**	Issues 6, 7, 8, 15, 16, 17, 18 & 19 Development in Hagley Hawne Colliery, Halesowen. Town Centre Site, Kidderminster Thorns Rd., Lye. North of Wollaston Rd., Stourbridge. Smethstow Valley, Wolverhampton The Bratch, Wombourne	**HWSP:-** CTC.6; CTC.8; CTC.9; CTC.12; LR.15 **BLP:-** DS11; C4; C8; C12; HAG5 **WFLP:-** E3; D2; D6; D10; LA4; LA5; LA6; NC1; NC2; NC5; NC6; NC10; EP1; EP2; TM11; KTC1 **SSP:-** D7; NC1; NC2; NC3; NC4 **SSLP:-** SB1; H3(site 12); BE26; R3; R6(site 18); LS1; LS8; LS10; NC1; NC2; NC3; NC4; NC9 **DUDP:-** 3; 5 **WUDP:-** H2; ENV1; ENV3; ENV8; ENV10; ENV11; ENV12; R3; R10

Land Use Issue	Land Use Statement	Issue & Site Examples	Development Plan Policy Examples*
WMS/LUS 11 - Tourism and Recreation			
There is an increasing amount of tourism and countryside recreation occurring within the area. Watercourses, canals and lakes as an integral and attractive part of the countryside scene, have the potential to play an increasingly important role.	**Local Authorities in partnership with the Environment Agency will seek to ensure tourism and recreation developments are sympathetically designed and located to take into account the protection, and where possible enhancement, of the water environment. Promotion of water-based recreation facilities will take into account the need to safeguard high quality riverine habitats, with sensitive areas being monitored and protected from recreational pressure as appropriate.**	Issues 1, 2, 7, 8, 15, 16, 17 & 18	**HWSP:-** E.20; TSM.4; LR.3; LR.15 **HWMLP:-** 13; 14 **BLP:-** RAT4; RAT5; RAT11; RAT20 **WFLP:-** LR2; LR12; LR18; LR23 **SSP:-** E11A; R1; R3; R5A; R7 **SSLP:-** C10; R7; R8; R15; R17; TSM4; TSM5 **DUDP:-** 4; 26; 27 **WUDP:-** R1; R3; R5; E13

HWSP:- Hereford And Worcester County Structure Plan 1986-2001 (June 1993)
HWMLP:- The County of Hereford and Worcester Minerals Local Plan (April 1997)
BLP:- Bromsgrove District Local Plan (Deposit Draft - November 1993)
WFLP:- Wyre Forest District Local Plan (Adopted May 1996)
SSP:- Staffordshire & Stoke-on-Trent Structure Plan 1996-2011 (Consultation Draft - October 1997)
SSLP:- South Staffordshire Local Plan (Adopted December 1996)
DUDP:- Dudley M.B.C. Unitary Development Plan 2001 (Adopted November 1993)
WUDP:- Wolverhampton Unitary Development Plan (Adopted September 1993)

* Further relevant policies are incorporated in the following development plans:-
Staffordshire Aggregates Local Plan (Adopted March 1996)
Staffordshire Minerals Local Plan (Consultation Draft - November 1995)
Sandwell Unitary Development Plan (Deposit Draft - March 1992)

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 Local Agenda 21 at the United Nations Conference on Environment and Development held in Rio de Janeiro, 1992. Local Agenda 21 (LA21) is intended to be *"a programme of action needed throughout the world to achieve a sustainable pattern of development for the next century"*. The central role of Local Authorities, the local community and the value of partnerships is recognised in achieving sustainable development. This is also highlighted in the Agency's guidance on Sustainable Development (November 1996).

Local Agenda 21 recognises that action by governments alone is not enough and that all groups, civic, community, business and industrial, have to be involved to bring about change. The Environment Agency supports this approach by providing information, expertise and support where possible. The Local Authorities were to have undertaken a consultative process with the people in their area and achieved a LA21 for their community by 1996. In the LEAP area the Local Authorities are all at different stages of this process.

The Local Authority LA21 contacts and progress on LA21 are set out in the table below.

Table 6 Local Agenda 21 Contacts and Progress

Local Authority	Contact	Progress on LA21
Wolverhampton MBC	Mr Simon Lucas Tel: 01902 555618	Seminar scheduled for March 1998 on LA21 to agree a way forward. Proposing to produce a document setting out the councils internal approach to LA21.
Sandwell MBC	Mr Terry Jones Tel: 0121 5694054	Environmental Forum and Working Groups set up to look at issues. A Consortia of organisations in the area, of which Sandwell DC are part, is hosted by Sandwell Volunteer Bureau and employs a LA21 Officer they are looking to produce Local Environmental Action Plans with the local community.
Dudley MBC	Ms Clare Palmer Tel: 01384 814403	Published LA21 Action Plan "Towards a Sustainable Environment" in August 1997.
Staffordshire CC	Mr Andrew Christelow Tel: 01785 277252	LA21 Action Plan drawn-up well before the end of 1996 through the Staffordshire Environmental Forum Working Group set up in 1993. Specialist Working Groups will implement the actions identified. Produced the "Good Environment Guide" which lists contacts and LA21 information.
South Staffordshire DC	Mr Paul Collings Tel: 01902 696426	Officer Working Group set to draw up a LA21 Action Plan, looking at mobile display on LA21 to send round to local communities.
Hereford & Worcester CC	Mr Chris Carter/Ms Fiona Narburgh Tel: 01905 766745	LA21 Action Plan published in November 1996 and working groups have been established to implement the actions identified.
Wyre Forest DC	Mr David Bulmer Tel: 01562 732552	Agreement to participate in County's Action Plan rather than produce a separate one and to look at implementing the actions at a local level.
Bromsgrove DC	Mrs Phillipa Stanley Tel: 01572 873232	Agreement to participate in County's Action Plan rather than produce a separate one and to look at implementing the actions at a local level.
Wychavon DC	Ms Cherry Mansfield Tel: 01386 565508	Agreement to participate in County's Action Plan rather than produce a separate one and to look at implementing the actions at a local level.
Shropshire CC	Mr C J Harrison Tel: 01743 252565	Focusing on particular issues/area rather than producing one Action Plan eg. Biodiversity, energy and air quality issues.
Bridgnorth DC	Mr Peter N Jarratt Tel: 01746 713130	Early stages of LA21 process, proposing to produce a strategic overview document by next spring which will set out the councils' general approach to LA21.

4.2.2 Waste Minimisation Groups

Three Waste Minimisation Groups have been set-up, with Agency involvement, in the plan area, with the main aim of reducing the environmental impact of local businesses by:

* raising awareness of environmental, legislative and technical issues relevant to member companies and encouraging a networking forum

* promoting the efficient use of resources

* achieving reductions in the waste arising from the participating companies

* encouraging companies to develop their own environmental management systems

The groups that have currently been set up are the Worcestershire Waste Minimisation Group, the Silver End Waste Minimisation Group and the Shropshire Waste Minimisation Group. These projects are joint ventures by a number of organisations which include the Environment Agency, Business Links, Groundwork Trust, Dudley Metropolitan Borough Council, University of Wolverhampton, Beacon Waste Ltd, Severn Trent Water and the Environmental Technology Best Practice Programme.

4.2.3 Pollution Prevention Projects

Oil Care Campaign

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

Work with Fire Services

The Agency has carried out pollution training with Fire Services in the area and worked with them to find out how best we can support their efforts in pollution control. We have now provided Fire Services, who are often the first on the scene at incidents, with special pollution control chemicals and equipment. This has helped prevent pollutions in the area, for example, at a nitric acid spillage at Bromley Street, Lye, when chemicals were used by the West Midlands Fire Service to neutralise the spilt acid and oversized drums were used to stop any further leakage.

Industrial Estates

Many industrial estates in the catchment are old established sites where infrastructure does not always meet modern standards, for example no separation of foul and surface water drainage and the lack of interception facilities. Accidental spillages from sites may result in environmental pollution, as occurred at Fens Pool following an oil spill on the Pensnett Industrial Estate. The Agency is seeking to reduce the risk of pollution from these estates by working with firms to encourage safe practices and improving installations.

4.2.4 Raising Awareness of Water Resources

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

The Agency controls abstraction by issuing licences and enforcing licence restrictions when river levels are low, but is also working proactively with licence holders, particularly within the farming community, to ensure effective use of water through irrigation scheduling and soil moisture measurement. Farmers are encouraged to invest in winter storage reservoirs which enable them to abstract water during less critical periods of the year.

The Agency is also working alongside water companies and OFWAT to promote measures to manage public demand.

This joint approach relates to various areas where reduction in demand can be achieved, thus enabling reduction in abstraction. The main areas of activity are:-

* Education and information
  (eg. roadshows, high street displays, schools guides, gardening tips, help lines)

* Promotion of water efficient appliances
  (eg. low flush or dual-flush WCs, water efficient washing machines and dishwashers, trigger-gun sprinklers, water butts)

* Promotion of low-cost retrofit water-saving devices
  (eg. hippo bags in cisterns, low flow shower heads, sprinkler exchange schemes)

* Water audits
  (eg. washer replacement schemes, fitting hippos, fitting urinal controllers, installing waterless urinals, water use surveys)

* Promotion of water recycling and refuse
  (eg. grey water recycling systems, recirculation systems, water butts)

* Waste minimisation scheme.
  (eg. industrial process audits, waste minimisation clubs)

* Leakage Reduction Programmes.
  (eg. active leakage detection and repair, refurbishment and renewal programmes, for supply pipes, communication pipes, distribution mains, service reservoirs, raw water mains and reservoirs, installation of pressure reduction systems)

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

However, in order for the above demand management measures to be effective and to help reduce the demand for water in general, **you** need to be involved. If you would like to know more about water saving appliances or using water wisely please contact either John Ellis-Tipton who is the Agency's Regional Environmental Management Advisor, Tel: 01743 272828, or the Customer Services department of the water company serving your area: Severn Trent Water Ltd, Tel: 0121 722 4000 or South Staffordshire Water Plc, Tel: 01922 683282.

4.2.5 Local Biodiversity Initiatives

Three groups have so far been set up within the plan area, one in the West Midlands and two others by Worcestershire and Shropshire County Councils in response to the UK Biodiversity Action Plan (BAP), (see Section 1.4, page 9). The working groups include the Agency, Local Authorities, English Nature, Wildlife Trusts and voluntary bodies. The aim is to conserve and enhance biological diversity in these local areas in order to contribute to overall global biodiversity. Shropshire and Worcestershire have produced 'Biodiversity Challenge' documents and a draft framework document has been produced for Birmingham and the Black Country. Objectives and targets for individual species and habitats have been set up within the action plans. The Agency is committed to the Biodiversity challenge and is helping with input into and the implementation of Habitat and Species Action Plans (HAPs and SAPs).

4.2.6 Conservation, Recreation and Other Collaborative Projects

* Graiseley Brook reed beds - Wolverhampton Metropolitan Borough Council
* Partnership projects involving the management of the Valley Park Nature Reserve in Wolverhampton - Wightwick Wedge Group
* Wetland management and reed planting at Saltwells Nature Reserve - Dudley Metropolitan Borough Council.
* Planting and wetland creation along the Wom Brook walk - South Staffordshire District Council
* Disabled fishing platforms at Bumble Hole and Warrens Hall - Sandwell and Dudley Metropolitan Borough Councils

The projects listed above are joint ventures with a number of organisations including Local Authorities, English Nature, Wildlife Trusts and other environmental groups and residents in the local area.

The Agency will be launching a Community Pride initiative in Dudley this year. This is already up and running with a great deal of success in Hereford and Worcester and provides local groups with the opportunity to get involved in community based environmental projects (see Issue 19, page 60).

The pressures on land use in the area are accompanied by a wide range of issues and concerns that are expressed by local groups and residents. The Agency is committed to seeking and listening to these opinions wherever possible. The benefits of close communication are many. Sites that are well used and watched over suffer less from neglect, lack of management, vandalism and illegal tipping (see Issue 6, page 42).

4.3 Education

The Environment Agency sees education as an important part of its work. There is a need for a greater level of educational involvement by the Agency and a need to raise awareness of environmental issues (see Issue 14, page 55). The Agency's education strategy "Green Shoots" 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.

A Regional Education Coordinator is to be appointed to translate these goals into actions at a regional level and consider the educational needs of the areas (see Issue 14).

The production of this LEAP, and the summary booklet that goes with it, is one step towards increasing the accessibility of information about the local environment. Many of the projects mentioned in Section 4.2 above have helped/are helping to raise awareness of the issues facing our local environment, however more needs to be done. We all have a role to play in making this happen.

The Agency has produced a wide range of leaflets and educational material and much of this information is free of charge and available from the Customer Services Departments at Area Offices. The contact for Upper Severn Area is: Adrian Harding, Team Leader Customer Contact. Some of the leaflets produced are listed in Appendix 8 (page 168). Information is also available on the Internet at our web site.

Some useful numbers are listed below:
General Enquiry Line - **0645 333 111**
Upper Severn Area Office - **Tel: 01743 272 828/Fax: 01743 272 138**
Flood Warning Information Service - **0645 88 11 88**
Internet World Wide Web - **www.environment-agency.gov.uk**
E-mail Messages - **enquiries@environment-agency.gov.uk**
ECOfacts[SM] 'fax back' Service - **0881 88 22 88**
Minicom Service - **01904 692 297**

Information exchange and education is a two way process. Please help us to protect the environment by reporting environmental incidents and emergencies on our
Emergency Hotline - 0800 80 70 60 open 24hrs a day

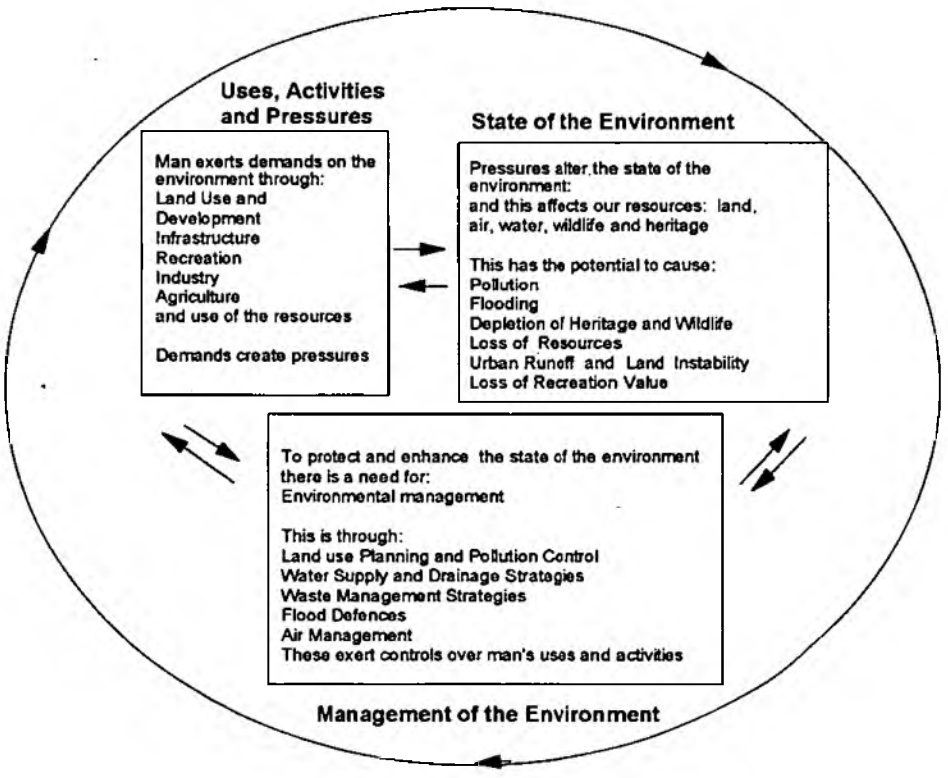
PART II SUPPORTING INFORMATION

Part II This part of the Consultation 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 II

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

Figure 7 Management of the Environment



Section 5 Uses, Activities and Pressures

This section details the uses of and activities in the area and the pressures that they exert on the environment. 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
5.1 Development and Infrastructure
5.2 Traffic and Transport
5.3 Heavy Industry
5.4 Storage, Use and Disposal of Radioactive Materials
5.5 Power Generation and Renewable Energy
5.6 Mineral working
5.7 Water Resources and Abstraction
5.8 Flood Water - Conveyance and Storage
5.9 Sewage and Industrial Effluent Disposal
5.10 Waste Management
5.11 Contaminated Land
5.12 Agriculture
5.13 Forestry
5.14 Fisheries, Conservation and Wildlife
5.15 Landscape, Archaeology and Heritage
5.16 Recreation, Amenity and Navigation

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.

5.1 Development and Infrastructure

General

Development, be it new building works, changes in land use, development of communications or 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).

The Agency is a statutory consultee under planning legislation and advises Local Authorities on development proposals that can have an impact on matters relevant to the Agency. To facilitate this process the Agency has published *Liaison with Local Planning Authorities* (March 1997). To provide a guide to LPAs on what policies should be included in Development Plans and why they are important, an annex to the above mentioned document *The Environment Agency and Development Plans* is due to be published.

The Agency operates at all levels of the planning system:

At the national level there is direct liaison with the Department of the Environment and Local Authority Associations, seeking to influence Planning Policy Guidance Notes (PPGs), Circulars and new legislation.

At the regional level there is liaison with government offices and regional steering groups with the aim of influencing Regional Planning Guidance.

At the local level we are statutory consultees for draft Structure and Local Plans, Minerals and Waste Plans to ensure our interests are protected and that development proposals have positive, sustainable, impacts on the environment. We also seek to pursue our aims and policies regarding development through the planning consultation process for individual proposals. Although the final decision on the planning matters rests with the LPA, government guidelines advise on the need to consider the Agency's concerns when determining proposals.

Local Perspective

The LEAP area falls, in roughly equal proportions, into the West Midlands and the counties of Staffordshire and Hereford and Worcester. In April 1998 Hereford and Worcester CC will reorganise creating Worcester County Council and Hereford will become a Unitary Authority. A small area of Shropshire is also included (<1%). The map on the inside front cover shows the administrative boundaries and infrastructure within the area.

Table 7 (page 79) shows Local Authorities in the West Midlands Stour LEAP area and the current status of their Development Plans. Regional Planning Guidance for the West Midlands was published in September 1995. The table also includes population percentages and housing figures for the plan area.

The principal urban areas in the Stour catchment are, from north to south; Wolverhampton, Dudley, Stourbridge, Kidderminster and Stourport. Much of the catchment is heavily urbanised, the areas of Wolverhampton, Dudley are part of the Black Country. The headwaters of the principal watercourses rising in these areas are subject to great pressures as a result of urban development. Some examples of sites allocated for development within the areas' Development Plans, which have the potential to impact on the environment, are given below. The Land Use Statements in Section 4.1.3 (page 64) should be considered in relation to the development/re-development of these sites.

The recent Government consultation document *Where Shall We Live* identifies the West Midlands Region as requiring 367,000 new homes. Accommodating necessary development with minimum environmental damage is a challenge faced by the land use planning system. The Agency hopes that LEAPs will make a useful contribution to meeting this challenge and promoting genuinely sustainable development in the area.

Dudley Metropolitan Borough Council area

Large areas of land in Dudley have historically been subject to mineral mining activities and are therefore likely to be contaminated. Development/re-development of these sites could cause the mobilisation of contaminants resulting in pollution of surface and groundwater and harm to human health. As indicated in Section 5.11 (page 102) and in Land Use Statement 6 (page 66), the Agency will advise that a contaminated land survey is carried out for these sites including recommended remediation measures.

A strategy has recently been unveiled to reclaim 26 derelict sites in Dudley borough for housing, industry and leisure. The sites have been identified by Dudley MBC and English Partnerships and discussions will take place with the Agency, some of these sites are mentioned below.

Specific sites which could potentially be subject to contamination include; land allocated for industrial development at Jews Lane, Gornal; Tansey Green Road/Stallings Lane and Oak Lane, Kingswinford and two sites on the Pedmore Industrial Estate. Industrial development particularly, should incorporate source control measures to control surface water runoff (see Land Use Statements 5 and 7, page 66) and should also include pollution prevention facilities such as petrol/oil interceptors.

The Industrial Renewal Priority Area in Stourbridge is crossed by the River Stour and the river corridor should be maintained and/or enhanced in this area in accordance with Policy 3 of the Development Plan.

Wolverhampton Metropolitan Borough Council area
Many areas in Wolverhampton are likely to be contaminated due to previous uses, for example, a group of employment sites adjacent to the railway to the north of Wolverhampton and two sites to the east of the town on the site of an old steel works. As stated above for Dudley MBC area, the potential impacts of contamination on the environment will need to be addressed. These sites also have culverted watercourses running through them which need to be protected during re-development and may offer opportunities for habitat improvement if culverts can be removed (see Issue 7, page 45).

Sandwell Metropolitan Borough Council area
Any further extraction or landfill proposals at Hailstone Quarry must address aquifer protection issues and the impact of possible landfill gas migration and leachate production on the nearby residential areas.

Bromsgrove District Council area
Two sites are earmarked for future development; land at the Hagley Sewage Treatment Works (STW) site and land off Kidderminster Road South and Western Road. The Hagley STW site may be contaminated and the advice given above would therefore apply. The Gallows Brook, a tributary of the Blakedown Brook flows through this site and the river and its corridor should be protected and/or enhanced, for example, opportunities should be taken for opening up the watercourse. Source control measures, which would ensure clean surface water is used to recharge the groundwater aquifer, should be incorporated into any development, as problems with low flows in the Brook and low groundwater table are experienced in this area (see Issue 5, page 39). Source control should also be employed on the second of the sites mentioned above and no development should take place until the proposals to redirect sewage from Hagley STW to Roundhill STW have been finalised. This is in order that there is sufficient capacity for the disposal of foul sewage from the development.

Wyre Forest District Council area
The town of Kidderminster is undergoing re-development as the carpet industry 're-groups' following recession and job losses. There are opportunities on one site in Kidderminster for major improvements to the corridor of the River Stour which the Local Authority are supporting in partnership with the Agency (see Issue 8, page 46).

The Stour Vale Works and an area to the south of Kidderminster at Wilden Industrial Estate are allocated for re-development for industrial/employment purposes, part of the Coloroll Factory Site is also still available for re-development. These sites are all located close to the River Stour and there is therefore a need for floodplain and river corridor issues to be addressed and adequate source control and pollution prevention facilities to be included in the re-development of these sites. The sites may also be contaminated due to previous uses and the above mentioned criteria would apply. A residential development at Timber Lane/Mill Road, Stourport is subject to similar constraints.

South Staffordshire District Council area
A housing proposal on land west of the Bratch, Wombourne has the potential to impact on the river corridor of the Wom Brook which lies very close to the edge of the site boundary. There are also problems with flooding in this area and the groundwater resources are under

pressure from overabstraction. Floodplain and river corridor issues therefore need to be addressed and adequate source control and pollution prevention facilities included in the development of this site. A balancing facility is mentioned in the Local Plan, which should ideally be in the form of an infiltration pond, to control runoff to the watercourse while allowing recharge of the groundwater aquifer. The Agency consider it important to be involved in the production of the Development Brief for this site.

A large area at Himley is marked as a search area for premium peripheral employment. Should this be developed, consultation with the Agency will be necessary, at an early stage. In order to determine the potential impact on the groundwater aquifer, in terms of recharge and pollution prevention, and to discuss source control and the protection of surface water features in the area.

Table 7 Population, Housing and Current Development Plan Status in the Area

Local Authority	% of Plan Area	Population in the Plan Area 1991	No. of Homes Allocated (per District Council)	Development Plan Status
West Midlands	35.0	366,805	Not applicable	Not applicable
Wolverhampton MBC	8.1	96,420	4,500 (between 1988 and 2001)	Wolverhampton Unitary Dev. Plan adopted Sept. 1993
Sandwell MBC	2.8	34,405	8,500 (between 1988 and 2001)	Sandwell Unitary Dev. Plan adopted Jan. 1995 (re-pub. June 1996)
Dudley MBC	24.1	235,980	7,400 (between 1988 and 2001)	Dudley Unitary Dev. Plan adopted Nov. 1993
Staffordshire CC	31.3	37,482	Not applicable	Staffordshire County Council Structure Plan operative April 1991, review commenced. Staffordshire Aggregates Local Plan adopted March 1996 Staffordshire Minerals Local Plan Public Inquiry due June 1998 Staffordshire Waste Local Plan at draft stage.
South Staffordshire DC	31.3	37,482	5,100 (between 1986 and 2001)	S. Staffordshire Local Plan adopted Dec. 1996

Local Authority	% of Plan Area	Population in the Plan Area 1991	No. of Homes Allocated (per District Council)	Development Plan Status
Shropshire CC	<1	486	Not applicable	Shropshire County Structure Plan operative Jan. 1993, review commenced Shropshire Minerals Local Plan, Public Inquiry June 1997, Inspectors Report due January 1998 Shropshire Waste Local Plan consultation draft due Spring 1998
Bridgnorth DC	<1	486	Not applicable	Bridgnorth Local Plan adopted Sept. 1994
Hereford & Worcester CC	33.3	32,568	Not applicable	Hereford & Worcester Structure Plan operative June 1993, review commenced Hereford & Worcester County Minerals Local Plan adopted April 1997
Wyre Forest DC	22.0	19,890	4,000 (between 1986 and 2001)	Wyre Forest District Local Plan adopted May 1996
Bromsgrove DC	11.0	12,304	2,000 (between 1986 and 2001)	Bromsgrove District Local Plan, Inspectors Report Feb. 1997
Wychavon DC	<1	374	Not applicable	Wychavon District Local Plan, 2nd Public Inquiry April 1997

In rural areas of the catchment, agricultural activities include fruit and vegetable growing in addition to arable cropping and dairying (see Section 5.12, page 105). Creation of golf courses and fishing pools for leisure use are a popular farm diversification. The Ministry of Agriculture, Fisheries and Food (MAFF) encourage the Local Planning Authorities to take a positive approach to farm diversification in Development Plans and in decisions on planning applications. These type of developments often require the consent of the Agency, for example for water abstraction and fish stocking and consultation with the Environment Agency is advisable. *Planning Policy Guidance Note 7* (PPG7) sets out the Government's policy for the protection of agricultural land from development and also indicates the importance attached to the diversification of the rural economy.

5.2 Traffic and transport

General

Air pollution in the UK has traditionally been associated with industrial activity and the domestic burning of coal. However, industrial emissions are declining and transport pollution is emerging as the key issue. In recent decades traffic emissions have grown to

match or exceed other sources of many of the important pollutants. In many areas, particularly urban, they have now become the largest cause of air pollution. This is due to the large increase in road traffic over the period. The table below summarises the contribution that road transport makes to U K pollutant emissions.

Table 8 Emissions from Road Transport

Pollutant	1995 Total Emissions (kilotonnes)	1995 Emissions from Road Transport (kilotonnes)	% of National Emissions from Road Transport
Benzene	34.840	23.440	67
1,3 Butadiene	9.570	9.490	78
Carbon monoxide	5478	4112	75
Lead	1.492	1.068	72
Nitrogen oxides (NO_x)	2293	1062	46
Particulates (PM_{10})	232	59	25
Sulphur dioxide	2365	51	2
Volatile organic carbons	2257	690	31

Source: National Air Quality Strategy, March 1997

In a heavily congested city such as London, road transport emissions make up well over 90% of all carbon monoxide, particulates and volatile organic compounds. Poor air quality from traffic can affect human health by increasing the risk of cancer and causing respiratory problems. All motor vehicles produce carbon dioxide a major cause of global warming.

The government has set out a strategy for achieving reductions in air pollution from road transport by tackling vehicle and fuel technology, better emission controls on existing vehicles, development of environmental responsibilities by fleet operators and the public and changes to planning and transport policies to reduce the need to travel and rely on the car.

The Environment Agency has no direct role to play in monitoring or controlling pollution from road traffic. Monitoring for air quality is primarily the responsibility of Local Authorities. The Agency will, however, ensure that its own transport policies are in line with the government's approach.

Local Perspective

The impact of transport on air quality in the area warrants the inclusion of this section in the Plan, despite the fact that monitoring and control fall outside the remit of the Agency. In line with trends elsewhere in the UK road traffic levels are increasing in the West Midlands Stour LEAP area. The growth in traffic levels, particularly in the congested West

Midlands conurbation, has made cleaner methods of transport such as walking and cycling less safe and less pleasant. The information available on air quality is fairly limited, however, the contribution of road traffic to the overall level of air pollution is shown with raised levels of oxides of nitrogen and particulates in Wolverhampton and Dudley. Issue 10 in Section 3 (page 50) highlights the problems with current levels of air quality monitoring. The options suggested include working with the Local Authorities and Department of the Environment, Transport and the Regions (DETR) to assess monitoring and identify deficiencies.

The Environment Agency has set targets to improve overall fuel efficiency for fleet vehicles and for all staff to reduce mileage on Agency business. At the local Agency offices in Shrewsbury and Kidderminster car sharing for work purposes eg. meetings and between offices is practiced wherever possible.

5.3 Heavy Industry

General

Industrial processes which are included 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 twelve sites in the West Midlands Stour area which hold authorisations under Part 1 of the Environmental Protection Act 1990 ie. Integrated Pollution Control (IPC) processes regulated by the Agency. These operate a range of processes including the incineration of municipal waste, aluminium recovery and chemical manufacture.

All companies carrying out 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 would be gained from it. Table 9 (page 83) lists the companies that operate processes regulated under 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.

Limits have been set for these companies 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 these limits. Any exceedence 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.

Table 9 IPC Sites in the West Midlands Stour Area

Company	Type of Processes Operated	Pollutants Discharged
Ashland Chemicals Ltd, Kidderminster	Manufacture of phenolic resins	Air - amines, phenols and volatile organic compounds
British Steel, Cookley Works, Brierley Hill, West Midlands	Hot dip coating of steel with lead/tin alloy	Air - particulates, volatile organic compounds, carbon monoxide, hydrogen chloride. Sewer - heavy metals
British Sugar, Kidderminster	Combustion process, sulphur burner and lime kiln	Air - particulates, sulphur dioxide, oxides of nitrogen, odour, carbon monoxide
Drywite Ltd, Halesowen, West Midlands	Manufacture of acid	Air - sulphur dioxide
MES (Environmental) Ltd, Dudley, West Midlands	Incineration of municipal waste (operational March 1998)	Air- particulates, sulphur dioxide, oxides of nitrogen, hydrogen chloride, heavy metals, dioxins, carbon monoxide, volatile organic compounds
Ferro GB Ltd, Wombourne, Wolverhampton.	Manufacture of colour pigments	Air - particulates, heavy metals. Sewer- heavy metals
Goodyear Tyres, Wolverhampton	Combustion process	Air - particulates, sulphur dioxide, oxides of nitrogen
Halesowen Metals, Halesowen.	Recovery of aluminium dross.	Air - particulates, sulphur dioxide, oxides of nitrogen, hydrogen chloride.
Lanstar Oil Refineries, Halesowen.	Recovery of oils and chlorinated solvents	Air - volatile organic compounds. Sewer- heavy metals.
National Standard, Kidderminster	The incineration of hazardous waste	Air- cyanides and lead, particulates.
Severn Trent Roundhill Incinerator, Stourbridge, West Midlands	Incineration of sewage sludge	Air - particulates, sulphur dioxide, oxides of nitrogen, hydrogen chloride, volatile organic compounds, dioxins, heavy metals
MES (Environmental) Ltd, Wolverhampton	Incineration of municipal waste	Air - particulates, sulphur dioxide, oxides of nitrogen, hydrogen chloride, heavy metals, dioxins, volatile organic compounds, carbon monoxide

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

processes operated by the companies given above. The extent to which these emissions contribute to air quality in the Stour area is addressed in two of the issues raised within the LEAP (see Issues 10 and 11, pages 50 and 51).

Table 10 Main Air Pollutants Emitted from IPC sites

Pollutant	Quantity (tonnes)
Volatile Organic Compounds	5
Oxides of Sulphur	620
Oxides of Nitrogen	320
Particulates	140

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. Furthermore, 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 four sites authorised under the Radioactive Substances Act 1993. These include two sites belonging to the Dudley Group of Hospitals NHS Trust, one site is at Wolverhampton University and the Leigh Environmental clinical waste incinerator in Dudley. Such sites discharge radioactive waste to sewer, controlled waters and air, but the vast majority of the waste is exported from the LEAP area for disposal via the incineration route. These 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.

5.5 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 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 and energy from waste are becoming more 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 (now the DETR) and the Welsh Office.

Local Perspective

There are no fossil fuel power stations in the West Midlands Stour area. Examples of renewable energy production in the area are the new Municipal Waste Incinerators being constructed at Wolverhampton and Dudley. These will deal with, jointly, up to 200,000 tonnes of waste annually producing some 15MW of electricity to be fed direct into the national grid. The releases of sulphur dioxide, oxides of nitrogen, particulates and heavy metals should all be lower than those produced by a conventional coal fired power station. Incineration reduces the volume of waste for final disposal by about 80% with a weight reduction of 70%. There is also the possibility of further materials recovery from the solid waste produced in the incineration process, for example, in road construction. Landfill sites at Himley Wood, Dudley and Cradley Heath generate landfill gas which is burnt in a furnace to produce some 2MW of electricity at each site and this is fed into the national grid.

5.6 Mineral Working

General

Areas of current or former mineral workings can pose a threat to the environment by exposing 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. Abandoned mine discharges 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 and spring flows can be reduced as a result of the loss of water storage capacity of the mineral that has been removed. Restoration 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.

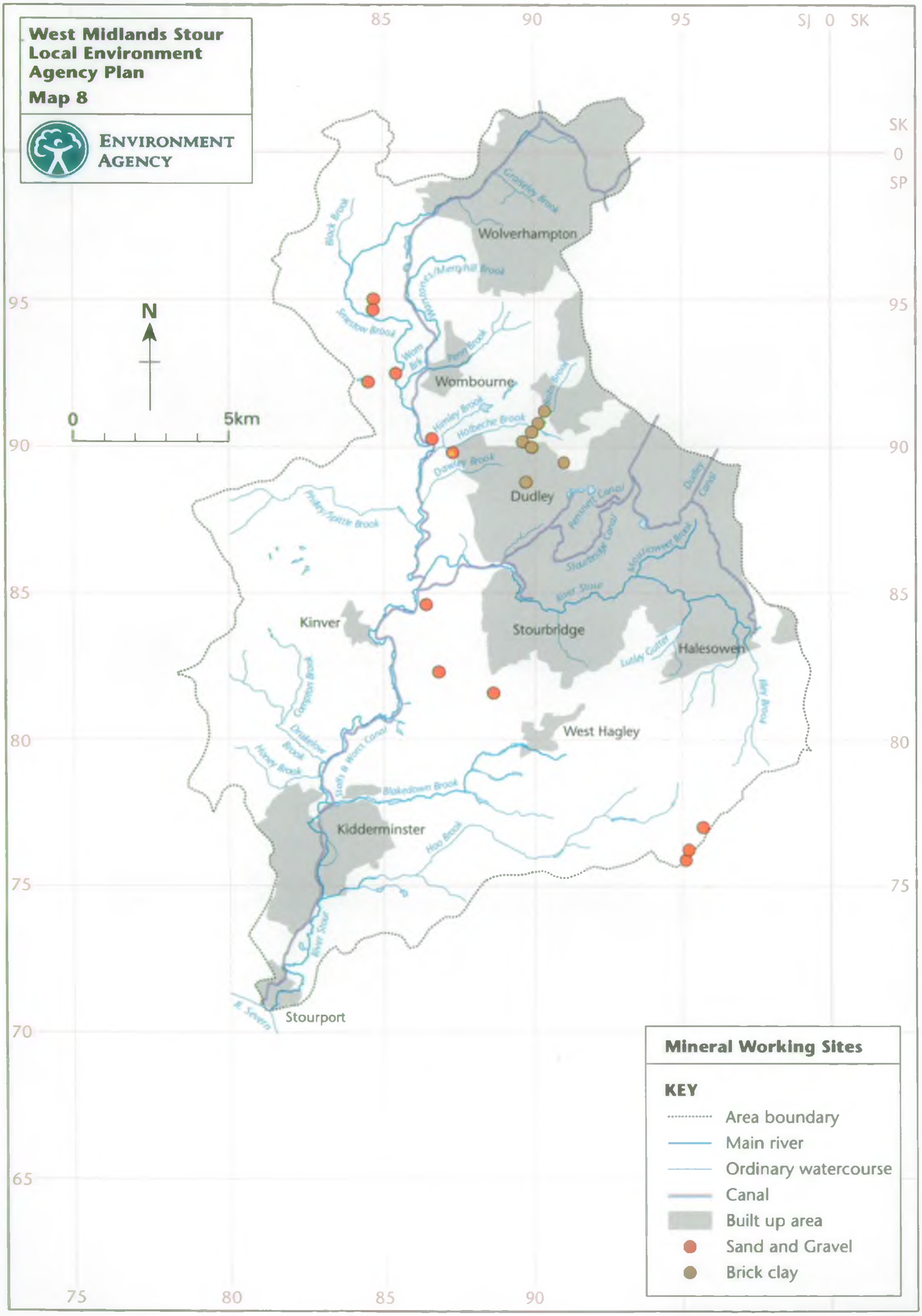
All mineral workings are subject to general planning controls. The Agency is a consultee on such applications, and seeks to have planning consent conditions imposed which control operations.

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

This area, due to its geology (see Section 2.1.1, page 12), is rich in exploitable mineral deposits and historically provided the raw materials to fuel the industrial revolution. The 'Thick Coal' or 'Ten Yard Seam' as it was known in the 1700s occurred in the Stour valley at or near the surface and was extensively exploited particularly around Netherton, Stourbridge and Brierly Hill. This has left a legacy of abandoned mine workings and disused shafts. Ironstone was found in geological association with the coal, and limestone and clay were also mined.

Today only a few sites are exploited, the main active and dormant mineral workings are shown on Map 8 (page 87), the many abandoned quarries and mines are not shown. The current sites fall into two main categories of sand and gravel and brick clay extraction sites. The Sherwood Sandstones which underlie a large part of the catchment are an important source of sand and gravel. Sand and gravel extraction mainly takes place in South Staffordshire and the brick clays are mostly found in and around Dudley.



West Midlands Stour Local Environment Agency Plan
Map 8
Environment Agency
N
0
5km
Wolverhampton
Wombourne
Dudley
Kinver
Stourbridge
Halesowen
West Hagley
Kidderminster
Stourport
Black Brook
Graiseley Brook
Penn Brook
Smestow Brook
Himley Brook
Holbeche Brook
Dawley Brook
Philley/Spittle Brook
Dudley Canal
Stourbridge Canal
Mousesweet Brook
River Stour
Lutley Gutter
Compton Brook
Drakelow Brook
Honey Brook
Staffs & Worcs Canal
Blakedown Brook
Hoo Brook
R. Severn
SJ 0 SK
SK 0 SP
Mineral Working Sites
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Built up area
Sand and Gravel
Brick clay

5.7 Water Resources and Abstraction

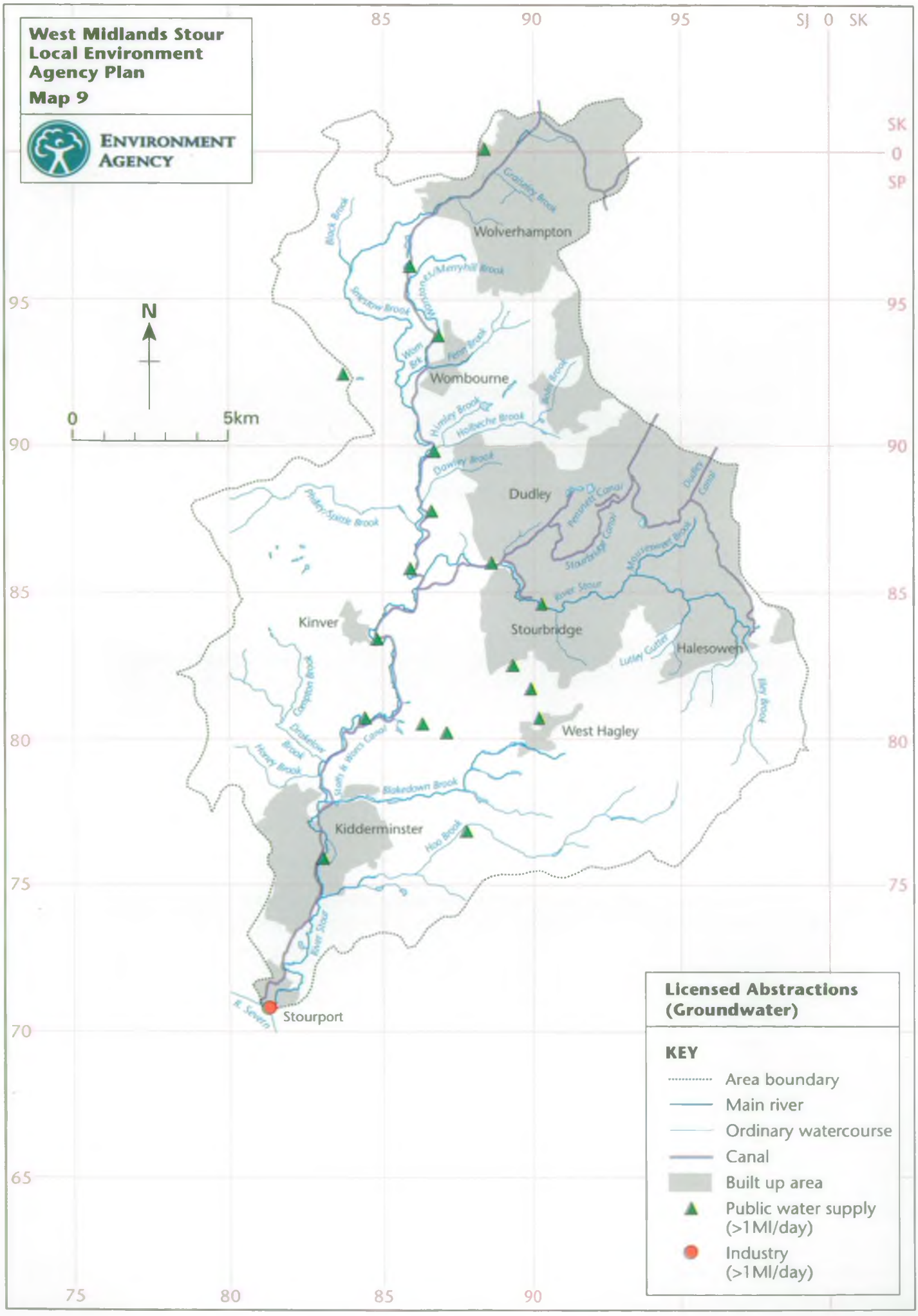
General

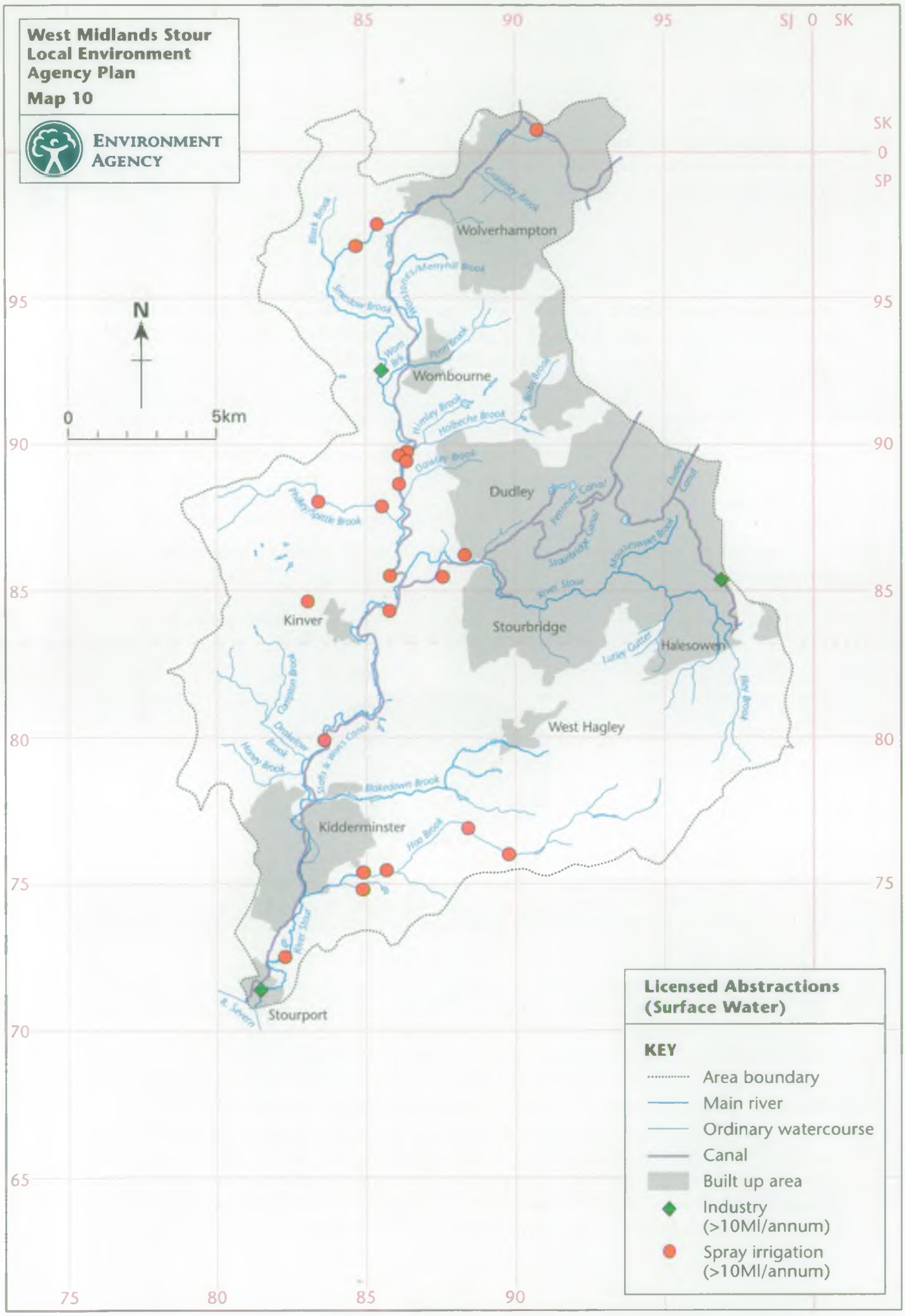
The removal of water from streams, rivers or groundwater by man is termed abstraction. Abstractions are controlled by licences granted under the Water Resources Act 1991. The abstraction licensing process enables the Agency to manage water resources so as to ensure that the right balance is struck between 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. Many contain conditions to protect the environment and other abstractors, the exceptions are licences granted as "Licences of Right" in 1965 and "Licences of Entitlement" in 1990 legislation, where the legislation did not permit the Agency's predecessors to restrict pre-existing abstractions. In considering applications for new licences, the Agency must ensure that there is no derogation of existing abstractions without the agreement of the abstractors, 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 intended use.

Uses in this are include the supply of water from groundwater for public supply, and from groundwater and surface water for industrial, agricultural, amenity and domestic purposes. Over 90% of abstraction is from groundwater. The larger surface and groundwater abstractions in the area are shown in the Maps 9 and 10 (pages 89 and 90). Private supplies are generally derived from springs, wells and boreholes and 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 potentially polluting activities. The *Policy and Practice for the Protection of Groundwater* (NRA 1992) forms the basis for the Agency's policies on controlling these activities (Appendix 3, page 160).

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 water resources and to protect existing rights, abstraction restrictions are put into operation when natural river flow falls below a certain threshold (see Section 6.2.1.1, page 129). 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.


West Midlands Stour Local Environment Agency Plan
Map 9
Environment Agency
N
0
5km
Wolverhampton
Wombourne
Dudley
Kinver
Stourbridge
Halesowen
West Hagley
Kidderminster
Stourport
Licensed Abstractions (Groundwater)
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Built up area
Public water supply (>1Ml/day)
Industry (>1Ml/day)


West Midlands Stour Local Environment Agency Plan
Map 10
Environment Agency
N
0
5km
Wolverhampton
Wombourne
Dudley
Kinver
Stourbridge
Halesowen
West Hagley
Kidderminster
Stourport
Licensed Abstractions (Surface Water)
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Built up area
Industry (>10Ml/annum)
Spray irrigation (>10Ml/annum)

Local perspective

5.7.1 Groundwater abstraction

The two water companies supplying the area, Severn Trent Water Ltd. and South Staffordshire Water Plc. principally abstract from groundwater to service public supply. The majority (91.9%) of water licensed to be abstracted is for public water supply to areas around Wombourne, Stourbridge, Kidderminster, Stourport and the West Midlands conurbation. Groundwater abstraction from the Triassic Sherwood Sandstone Group is the most important source of water in the area, and the production from nineteen public water supply sources accounted for 94.5% of the total actual groundwater abstraction in the year up to March 1996. The remainder of groundwater abstraction is for industrial (5.7%), agricultural, domestic and amenity uses (shown as 'other' on the pie chart below, 2.4%), (see Figure 8).

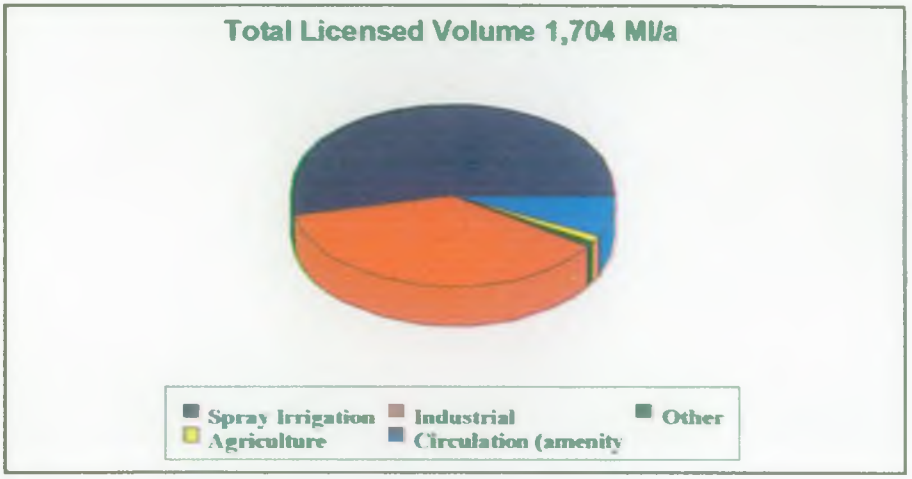
Two of the public water supply sources operated by Severn Trent Water Ltd are licensed for emergency use only in times of drought, and abstraction from one of these is only permitted for volumes of water which have previously been injected down the borehole to artificially recharge the aquifer.

Figure 8 Licensed Groundwater Abstraction in the West Midlands Stour Area (Megalitres/annum).

5.7.2 Surface water abstraction

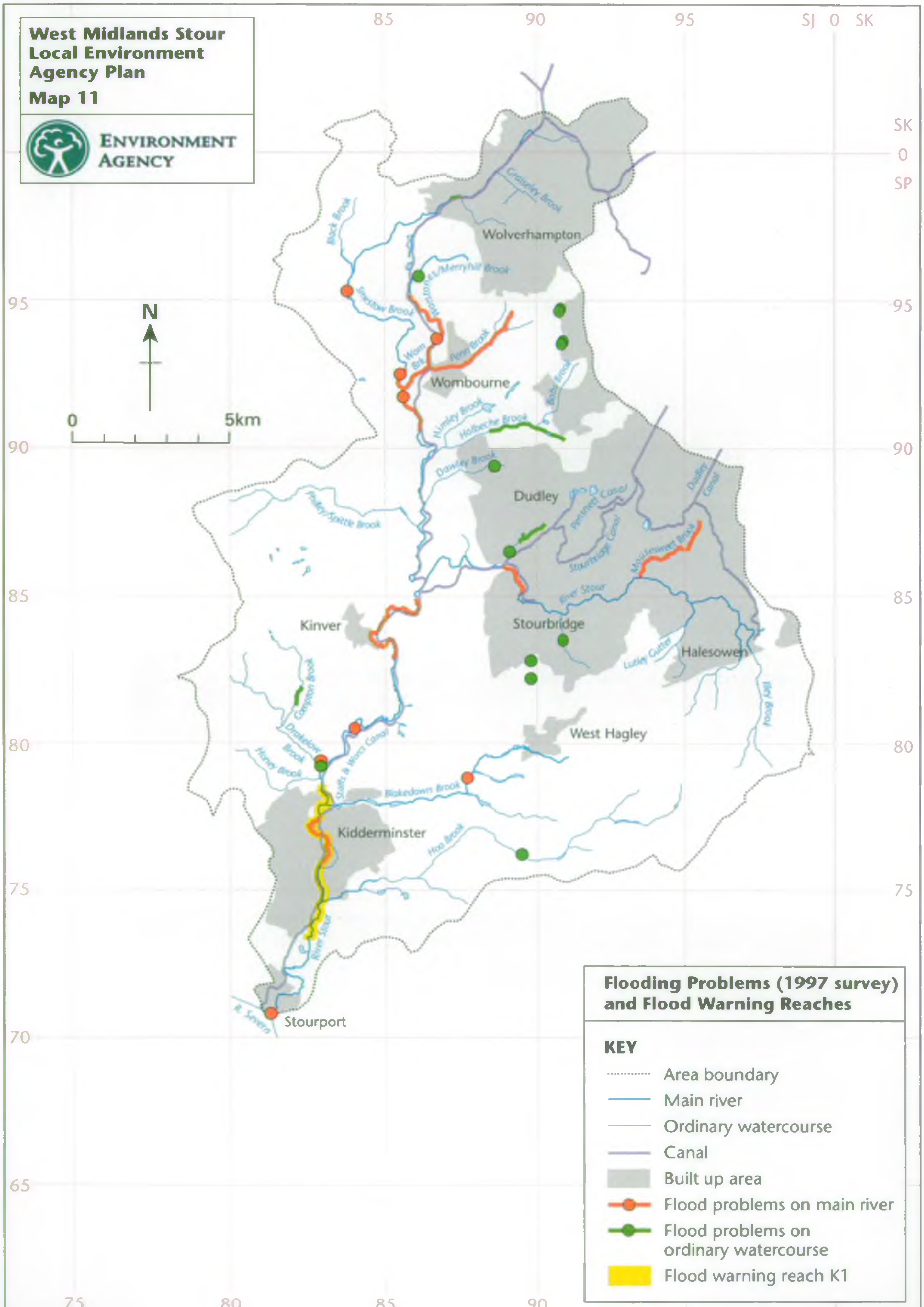
The majority of surface water is abstracted for agricultural purposes (particularly spray irrigation) and industrial use (37.1%), (see Figure 9). Spray irrigation represents the major use for abstracted water within the Stour catchment (53.5%). There are a large number of relatively small abstractions in the southern part of the catchment concentrated around the River Stour/Smestow Brook confluence and along the Hoo Brook. British Waterways have seven licences which authorise abstraction for spray irrigation purposes from the canal network. This represents approximately 10% of the annual authorised quantity in the catchment for spray irrigation. Over 90% of authorised abstraction for industrial use takes place from the canal network under licences issued to British Waterways. The largest industrial user is British Steel's Halesowen plant for abstraction from the Dudley Canal.

Figure 9 Licensed Surface Water Abstraction in the West Midlands Stour Area (Megalitres/annum).



United Utilities (formerly North West Water Ltd) and British Waterways are investigating the possibility of utilising the Birmingham Canal networks in the adjoining Upper Trent catchment and the Shropshire Union Canal to transfer groundwater to North West Region (Bradley Borehole Transfer Scheme). The details of the scheme are still being investigated and an initial period of test pumping is required. The scheme may involve the transfer of up to 60Ml/d into the Wolverhampton Level for transfer to the Shropshire Union Canal via pipeline near Barnhurst STW in the extreme north east of the catchment. British Waterways initial proposals involve transferring water during the trial phases for supporting navigation in the Grand Union and associated canals. The use of the Bradley transfer will be addressed in more detail during the winter of 1998/9.

Many surface water licences are restricted according to flows in the watercourse. These restrictions are based on prescribed flows 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 tied to Agency gauging stations are given in Section 6.2.1.1 (page 129). Some watercourses are now subject to such restrictive conditions that further summer abstraction is not feasible. These include the Hoo Brook and Blakedown Brook. The only 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. Several licence holders have invested in construction of such reservoirs in recent years.


West Midlands Stour
Local Environment
Agency Plan
Map 11
ENVIRONMENT AGENCY
N
0
5km
Wolverhampton
Wombourne
Dudley
Stourbridge
Halesowen
Kinver
West Hagley
Kidderminster
Stourport
R. Severn
River Stour
Smestow Brook
Penn Brook
Holbeche Brook
Dawley Brook
Blakedown Brook
Hoo Brook
Gibbons Brook
Honey Brook
Drakelow Brook
Staffs & Worcs Canal
Mousesweet Brook
Lutley Gutter
Illey Brook
Dudley Canal
Stourbridge Canal
Black Brook
Flooding Problems (1997 survey) and Flood Warning Reaches
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Built up area
Flood problems on main river
Flood problems on ordinary watercourse
Flood warning reach K1

5.8 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 runoff, 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 (see Map 11, page 93, and table in Section 6.2.3, page 147, for flooding problem areas). 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 is 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 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 larger proportion of rainfall 'running off' rather than soaking into the ground and this prevents the recharge of groundwater resources. The use of surface water source control measures can alleviate this

problem (see Land Use Statement No. 7, page 66).

Local Perspective

A consequence of the historic urbanisation of the West Midlands Stour area has been the encroachment of buildings onto the floodplain. This has resulted in a loss of flood flow area and flood storage volume (see Issue 9, page 47). These losses increase the effects of high flood flows and the frequency of floods. Development pressures continue to be significant. Wherever possible, through regulation, the Agency endeavours to ameliorate both past and future losses, such as in the Kidderminster Town Centre re-development, see Issue 8 (page 46).

There are also problems with unauthorised tipping and debris being washed down the watercourse. There is a particular problem in Kidderminster with shopping trolleys being dumped into the river, see Issue 6a (page 44).

Many of the watercourses in this catchment suffer from culverting (see Issue 7, page 45). Although culverting of watercourses is necessary for access purposes, historically many lengths of watercourse have been culverted in order to build factories and houses. This impacts on Flood Defence maintenance activities making it much more difficult to clear debris from the watercourse. Particular examples of this are on the Lutley Gutter and Warstones Brook.

Recent maintenance of the Blakedown Brook by the Agency to improve the flow regime has also improved the wildlife habitat. Consequently, the Agency has had an opportunity to work in partnership with Wyre Forest District Council to raise local community awareness of the wildlife and archaeology of the area.

The Agency operates a flood forecasting and warning service for Kidderminster (see Map 11, page 93), however there is currently only limited dissemination of this information and a larger coverage as well as alternative ways to warn people are being considered, see Issue 9.

5.9 Sewage and Industrial Effluent Disposal

General

As towns grow and develop continued investment to improve sewerage systems and sewage treatment is required. This is 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 to controlled waters require the consent or authorisation of the Environment Agency. Such consents set limits on both the quality and volume of effluent which can be discharged and are set according to two factors:

* The quality and quantity of 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.

In addition to the consented discharges, there are many discharges which do not require consents. Most of these are discharges of surface water from urban and agricultural areas. Individually, very few of the surface water discharges have a significant effect on the quality of the receiving watercourses. However, the total surface water drainage from urban areas can contribute a significant quantity of suspended solids and toxic metals to the river system, while surface water drainage from agricultural land can add organic pollutants, nitrates and phosphates to the aquatic environment.

Local Perspective

5.9.1 Sewage Disposal

There are a total of 367 consented effluent discharges within the West Midlands Stour area, the table below sets out the number and types of discharge and Map 12 (page 98) shows the larger sewage and industrial discharges in the area.

Table 11 Consented Effluent Discharges in the West Midlands Stour Area

Type of Discharge	Number of Discharges
Severn Trent Water STWs	18
Storm Tank Discharges	13
Sewer Overflows	128
Emergency Sewage Discharges	19
Private sewage treatment plant discharges	127
Industrial treated effluent discharges	47
Surface water sewer discharges	15
Total	**367**

The largest sewage discharges (dry weather flows) are from; Wolverhampton's Barnhurst Sewage Treatment Works (STW) which has a maximum consented discharge of 53.6 Megalitres per day (Ml/d) and discharges to the Staffs. & Worcs. Canal and to the Shropshire Union Canal (not in the Stour catchment), also, Kidderminster (23.5 Ml/d), Roundhill (43 Ml/d) and Freehold STWs (18 Ml/d), these discharge to the River Stour. These STWs also discharge effluent originating from outside the catchment. Compliance with consent conditions at the Severn Trent Water Ltd (STWL) STW is generally good, although in some cases further investment work is required to improve or maintain the quality of the receiving watercourses (see issue 1, page 31). The discharges from the Severn Trent Water Ltd STW have a major impact on the quality and quantity of surface water within the catchment. Under dry weather conditions, over half the flow of the River Stour at Stourport is treated sewage effluent.

During periods of wet weather, the river system can also receive 13 discharges of partially treated sewage from storm tanks and 128 discharges of untreated storm sewage from sewer overflows. These discharges are allowed in order to prevent foul flooding of property which would otherwise occur when the sewers become overloaded with storm water. If the sewerage system is correctly designed and constructed, overflows only occur when sewage is highly diluted by both the storm water in the sewer and the high river flows on discharge. Under these circumstances the impact on the receiving water is minimal and does not affect any of its legitimate uses. The sewerage system discharging to the upper reaches of the River Stour within the West Midlands conurbation is currently being assessed by Severn Trent Water Ltd and the Environment Agency with a view to identifying the more unsatisfactory sewer overflows and implementing improvements as necessary (see Issue 1iv, page 35).

In addition to the discharges of treated sewage effluent from the Severn Trent Water Ltd STW, there are 127 discharges from privately owned Sewage Treatment Plants (STPs), 53 of these are to surface waters and 74 are to underground strata (via soakaways). These serve either single properties or small groups of properties. Such discharges are only permitted where mains drainage is not available, where ground conditions do not permit septic tank drainage and where a suitable watercourse is available to receive the effluent.

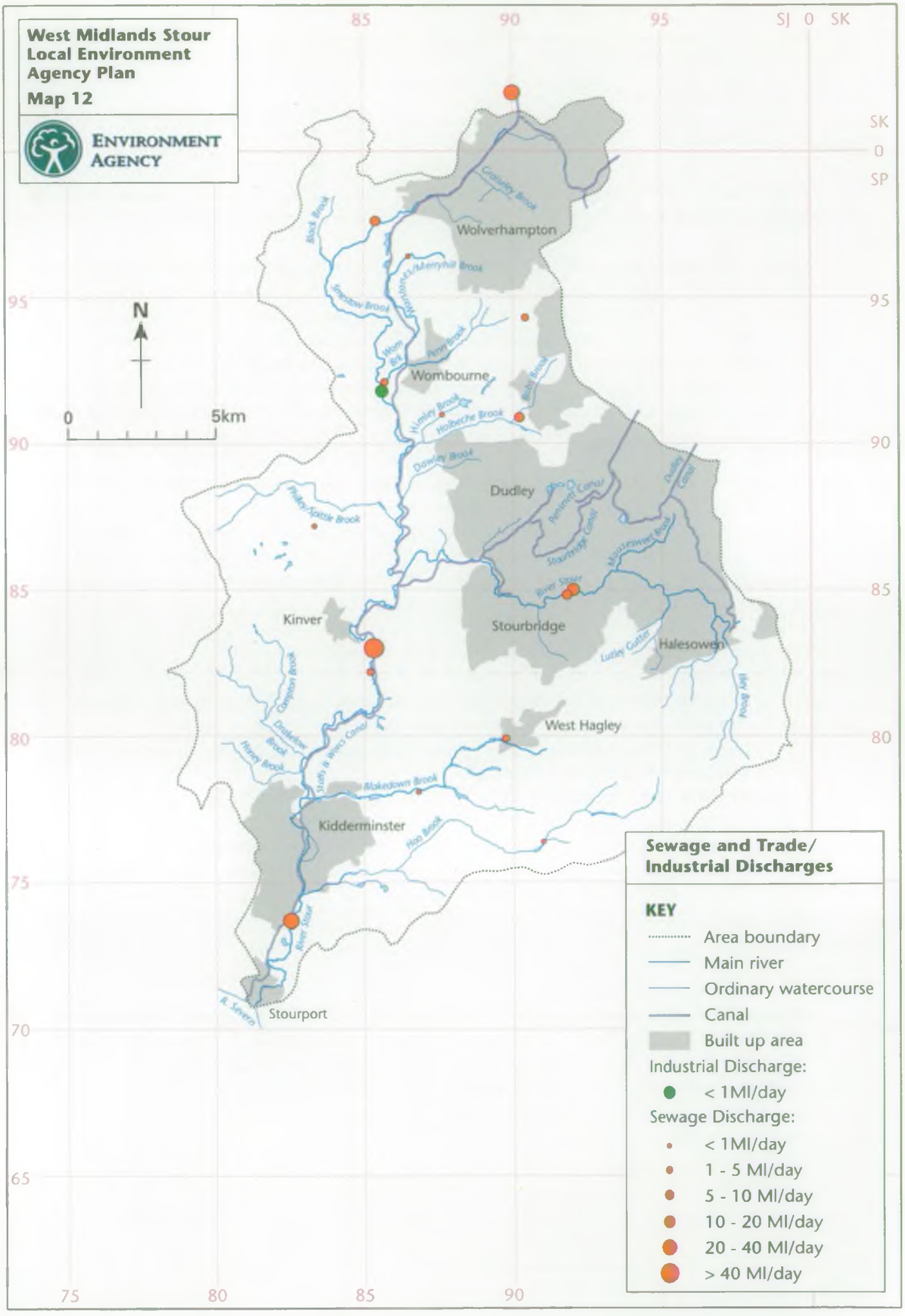
5.9.2 Trade Effluent Disposal

There are 47 consented industrial discharges to watercourses in the catchment. The main discharge originates from Everest Frozen Foods, which discharges potato-processing effluent from a modern treatment facility. Other industrial discharges in the catchment include site drainage from quarries and waste disposal sites, cooling water from manufacturing processes and swimming pool water.

The majority of industrial effluents produced in the catchment are not discharged directly to the river system, but to foul sewers for treatment at the Severn Trent Water Ltd STW. The ability of the sewage treatment process to treat some types of industrial effluents is limited, so the amounts and types of industrial effluent which are discharged to sewer must be closely controlled by the water company if the sewage works is to comply with the discharge consent conditions applied by the Agency.

5.9.3 Sewage Sludge

Sewage sludge arises in liquid and semi-solid cake form from STW. In the plan area, most is incinerated except in the Kidderminster area where it is spread on to land. The problems which can arise from this activity include a build up of heavy metals in soils and pollution of ground and surface waters. The Agency is responsible for auditing the disposal of sewage sludge to land.


West Midlands Stour Local Environment Agency Plan
Map 12
Environment Agency
N
0
5km
Wolverhampton
Wombourne
Dudley
Kinver
Stourbridge
Halesowen
West Hagley
Kidderminster
Stourport
Sewage and Trade/ Industrial Discharges
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Built up area
Industrial Discharge:
< 1Ml/day
Sewage Discharge:
< 1Ml/day
1 - 5 Ml/day
5 - 10 Ml/day
10 - 20 Ml/day
20 - 40 Ml/day
> 40 Ml/day

5.10 Waste Management

General

Waste management includes the recovery, reuse, treatment and disposal of waste. If not properly controlled waste management sites can have an adverse impact on the environment.

Prior to 1974 there were few controls over the deposit of waste and much industrial waste was deposited on land adjacent to the producer. Today, 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. 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. 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. In order to ensure that these objectives are met, an applicant must submit a working plan to the Agency as part of the licence application. This consists of a written statement accompanied by drawings, specifications and procedures detailing the design of the site and how the site is to be managed and operated on a day to day basis. The working plan also provides details of the provisions to deal with environmental monitoring.

The Agency's control over waste is achieved in a number of ways:

* Licensing waste management facilities including landfill sites, transfer stations, treatment plants, scrapyards and storage facilities
* Inspecting and monitoring these facilities to ensure that they are complying with the conditions attached to the licence
* Investigating the unauthorised deposit of waste including fly tipping
* Registering persons who carry or manage waste
* Visiting local industry and giving advice regarding waste management
* Checking that exempt activities are carried out in accordance with the exemption
* Taking enforcement action where necessary and responding to emergencies

Local Perspective

5.10.1 Waste Management Facilities

There are 108 licensed waste management facilities within the catchment, the number of each type is shown in Table 12 (page 84), this table also includes 2 incinerators which hold IPC Authorisations, and 226 closed landfill sites. Map 13 (page 101) shows the location of former and currently active landfill sites and other waste management facilities.

Table 12 Waste Management Facilities

Type of Facility	No. of Sites
Operational Landfill Sites	12
Former Landfill Sites	226
Transfer stations	38
Treatment Plants	2
Household Waste Reclamation Sites	5
Incinerators (Municipal)	2
Metal Recycling Sites	51

5.10.2 Landfill Sites

Most of the former landfill sites were operated prior to the introduction of the waste management licensing regime. For example, in Dudley 25% of the sites were operated prior to the introduction of waste management licensing in 1974 and little is known about what was deposited. Many of them are small sites which were used by factories for their own waste. It is likely that there are further sites in the area which have not been identified.

Flytipping of biodegradable wastes at inert sites has been a problem in the past and a number of so called inert sites continue to produce elevated levels of landfill gas above that expected for a purely inert site.

The two largest landfill sites in the plan area are at Himley Wood and Stourton. These sites, both operated by Biffa Waste Services, are licensed to accept a wide range of household, commercial and industrial wastes. Landfill capacity in the catchment is limited, this is discussed further in Section 6.0.1 (page 121).

5.10.3 Other Waste Management Facilities

Dudley, Sandwell and Wolverhampton have a high number of transfer stations and treatment facilities for dealing with special wastes. Facilities exist for the treatment of a wide range of wastes which include contaminated water, acid and alkaline wastes, organic wastes, solvents and oil/water mixtures. A large proportion of the waste handled at these facilities is imported from the surrounding counties.

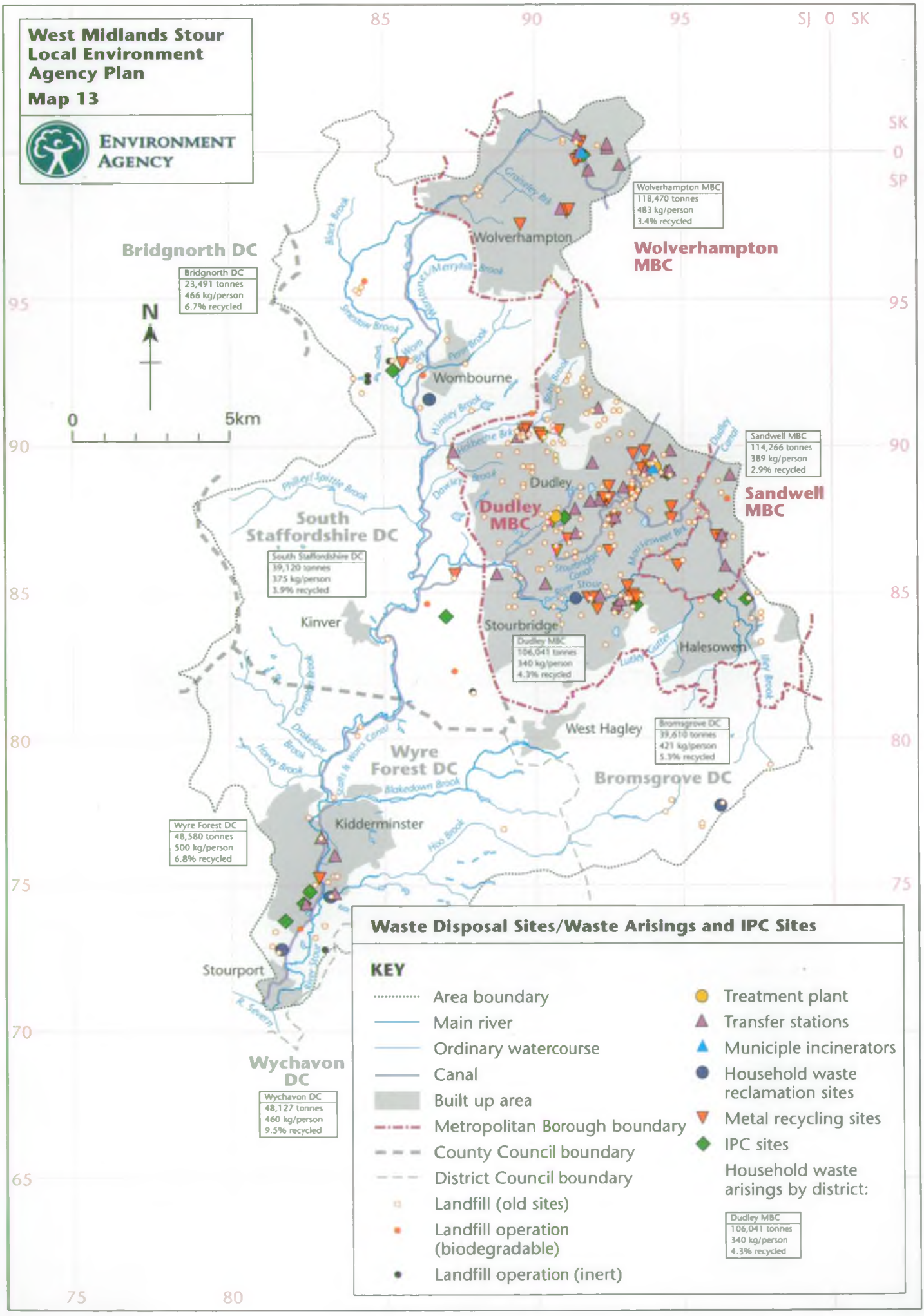
5.10.4 Metal Recycling Facilities

Most of the metal recycling facilities in the plan area are concentrated in the district of Dudley. A number of these sites are not currently regulated, see Issue 12 (page 52).

West Midlands Stour 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
- Metropolitan Borough boundary
- County Council boundary
- District Council boundary
- Landfill (old sites)
- Landfill operation (biodegradable)
- Landfill operation (inert)
- Treatment plant
- Transfer stations
- Municiple incinerators
- Household waste reclamation sites
- Metal recycling sites
- IPC sites

Household waste arisings by district:

Dudley MBC
106,041 tonnes
340 kg/person
4.3% recycled

5.10.5 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 1997 there were 490 exempt activities in the Districts within the plan area. These exemptions include activities such as the temporary storage of wastes which are to be recycled (eg paper, cardboard, plastic), the recycling of scrap plastic polythene, the use of waste soil for land reclamation or construction purposes and the land application of certain organic industrial wastes.

5.10.6 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.

Within the catchment there are a number of flytipping hot spots (see Issue 6, page 42) and a number of sites operating without a waste management licence, in particular scrap yards (see Issue 12, page 52).

5.11 Contaminated Land

General

The Environment Act 1995 sets 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 legislation has been implemented (scheduled for October 1998). Having identified such areas of land, councils will be able to serve "Remediation Notices" on the current owners requiring further investigation, monitoring and clean up measures, if there is a risk to public health or the environment.

The Agency's powers will relate to "special sites" which will have the greatest potential to cause harm. These powers will enable the Agency to serve notices requiring landowners to prevent (and mitigate) the pollution of both surface and groundwater and harm to human health. 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's response to planning applications on potentially contaminated sites, we request that a site investigation is undertaken prior to re-development and that remedial works are carried out if required (see Land Use Statement No. 6, page 66). Once suitably remediated, existing contaminated land sites offer an opportunity for re-development. The Agency would, however, wish to comment on every proposal on a site by site basis.

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 registered waste carrier and in accordance with the requirements of the 'Duty of Care' under the Environmental Protection Act (EPA) 1990.

Where land is not subject to a planning proposal, 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, operators are encouraged 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 pollution of a controlled water is detected, prosecution under Section 85 of the Water Resources Act 1991 will be considered.

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

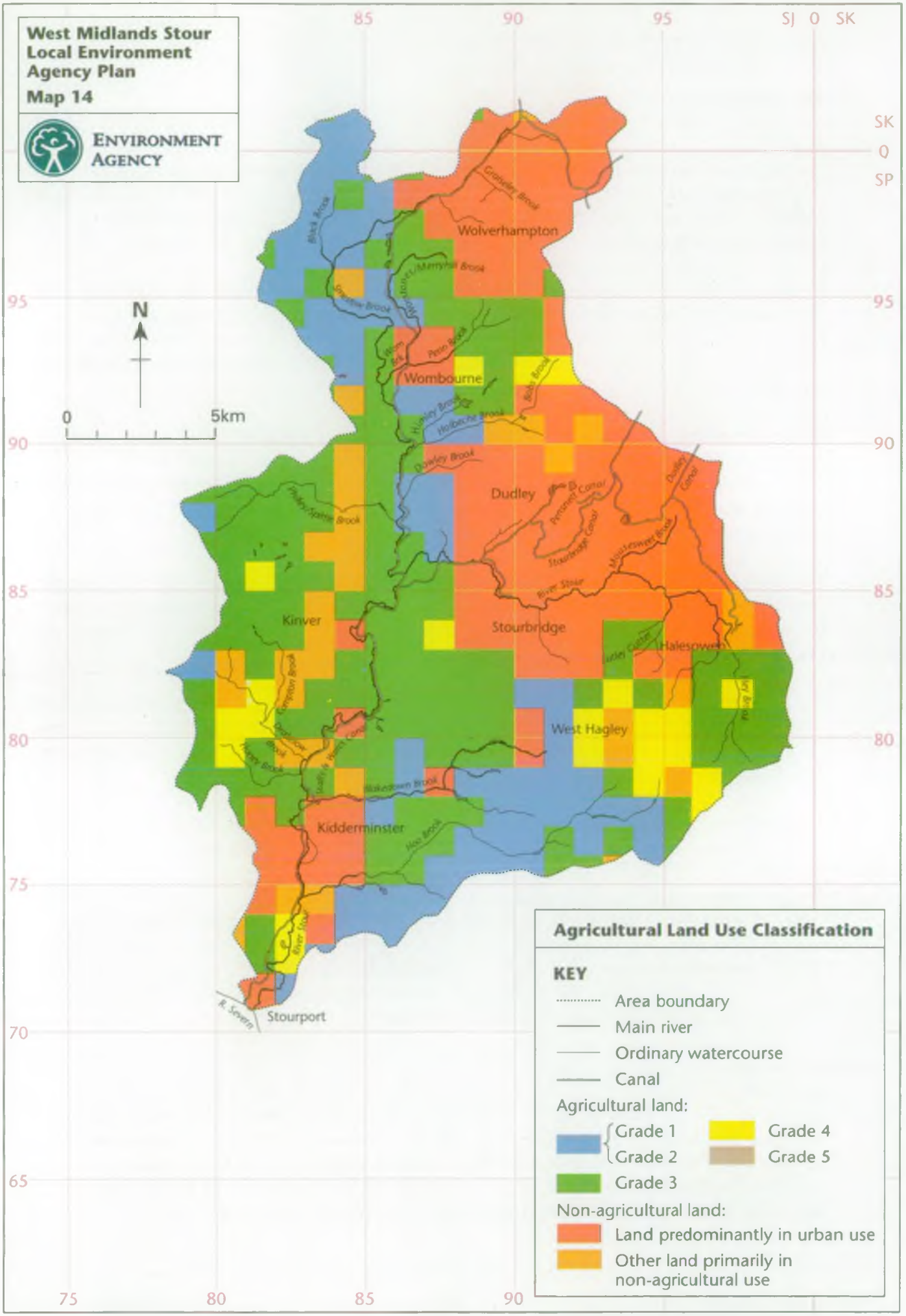
Local perspective

The West Midlands Stour 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. In the Black Country (Dudley, Sandwell, Wolverhampton) and in Kidderminster, industry was so widespread that few areas can be considered uncontaminated. In addition, more recent land use developments have resulted in fresh areas of land being contaminated. For example, contaminated land sites in the area also include closed landfills (see Map 13, page 101) and old gasworks sites. Many contaminated land sites are located in environmentally sensitive locations such as near rivers or above aquifers.

Past industrial practices were subject to fewer controls than they are today and less account was taken of the by-products of manufacturing and extractive processes. Consequently, contamination has occurred through a mixture of accidental spillage and casual disposal during the normal operation of the factory or plant. This contamination can remain within the ground until sites are re-developed.

Addressing the problem of contaminated land is made difficult by the fact that detailed information on the location of contaminated sites is scarce. Records of where materials were deposited were seldom kept and it is often necessary to carry out a thorough site investigation in an attempt to reveal the location and nature of contamination. This can be a costly exercise for potential developers, especially if investigation reveals that remediation works are necessary.

Examples of contaminated sites currently being redeveloped include parts of Merry Hill and the Dudley Southern By-pass. To ensure environmental protection these areas were subject to negotiation during the planning/consultation stage as part of the statutory process.


West Midlands Stour Local Environment Agency Plan
Map 14
Environment Agency
SJ 0 SK
SK 0 SP
85
90
95
N
0
5km
Wolverhampton
Wombourne
Dudley
Kinver
Stourbridge
Halesowen
West Hagley
Kidderminster
Stourport
Agricultural Land Use Classification
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Agricultural land:
Grade 1
Grade 2
Grade 3
Grade 4
Grade 5
Non-agricultural land:
Land predominantly in urban use
Other land primarily in non-agricultural use

5.12 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 cubicle housing, producing a large volume 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 the farming community, 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, will continue to play a central role in this process. Examples of the work of the Agency include:

* 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 or the Protection of Water, Soil, Air and also Farm Waste Management Plans.

MAFF themselves have various incentive schemes to encourage environmental improvement, for example, the Countryside Stewardship Scheme, Habitat Scheme, Countryside Access and Farm Woodland Premium.

Local perspective

Less than two-thirds of the LEAP area is used for agriculture, this is mainly due to the high percentage of land taken up by the urbanised areas of the catchment. In the rural parts of the area, however, agriculture forms the economic base and the climate is favourable for agriculture. Based on the provisional Agricultural Land Classification information for 1995, provided by FRCA on behalf of MAFF, much of the land is considered Grade 3 agricultural land (see Map 14, page 104, see Appendix 6, page 165, for definition).

Just under half (45.72%) of the agricultural area in 1995 was under crops and fallow and a similar proportion was grassland (42.33%). The area under crops and fallow has decreased over the period since 1985 probably due to the introduction of the Set Aside policy aimed at reducing agricultural surpluses. The area of farm woodland has increased by 41.6% since 1985 reflecting grant scheme incentives to encourage the planting of trees and increased conservation interest. Woodland, however, still represents a very small proportion of the agricultural land in the catchment (see Section 5.13 on Forestry for further information).

Table 13 Changes in Farm Type from 1985 to 1995

Farm Type	1985 (No. of holdings)	1995 (No. of holdings)
Dairy	34	20
Cattle and Sheep	24	40
Pigs and Poultry	16	9
Cropping	63	61
Horticulture	31	28
Mixed	16	7
Part-time	245	235
Total No. of Holdings	**429**	**400**

The table above was estimated using a system of standard man days labour required and the number of part-time holdings is significant. As shown in the table, the number of dairy farms has fallen in the last 10 years partly due to the pressures of changes in legislation covering pollution, milk quotas and hygiene for example. Holdings farming beef and sheep have increased as a result of the decrease in dairying, but for beef the trend may reverse with the impact of the BSE crisis. Pigs farms have decreased due to a fall in profitability but the poultry industry has experienced a dramatic increase (176%). These changes impact on the Agency's routine activities in relation to farm visits and on the impact of farming practices on the environment.

The West Midlands Stour area contains a number of Nitrate Sensitive Areas (NSAs) and Nitrate Vulnerable Zones (NVZs) have also been identified (see Section 6.2.2.2, and Map 6, page 22). Compensation is given to farmers for farming practices which take into account the NSAs. The scheme will be compulsory with the designation of statutory NVZs.

The Government's White paper *Rural England: A Nation Committed to a Living Countryside*, published in October 1995, tackles the subject of sustainable development in rural areas. Their approach to the countryside is set out in this document and includes the need to reverse the decline in wildlife, maintain the diversity of rural landscapes and ensure that new buildings enhance the quality of the environment. The need to protect agricultural land against development and the subject of farm diversification are both issues promoted in

Government planning guidance (see Section 5.1, page 76). These two issues are particularly important in the Stour catchment with the pressures for development from the large urban area impacting on good quality agricultural land and the opportunities that the West Midlands conurbation provides for marketing the products/attractions of farm diversification. As already stated in Section 5.1, popular types of diversification in the area include the creation of golf courses and fishing pools for leisure use.

5.13 Forestry

General

Well managed woodland in the right places does not harm the environment and will often bring benefits. However, in certain circumstances forestry development and management can cause problems. Areas of concern include acidification, soil erosion, pollution, reduced water yield, increased flooding risk and damage to wildlife habitats.

While the Agency has duties to regulate some forestry works, overall regulation of forestry is the responsibility of the Forestry Authority. In recognition of the potentially harmful impact of poorly managed forest development, the Forestry Authority has published *The Forests and Water Guidelines*, against which all forest operations are assessed. It has also produced *The UK Forestry Standard* which is a benchmark for the sustainable management of forests.

To ensure that the environment is properly considered the Agency aim to:

* Continue to liaise with Local Authorities about the production of Indicative Forest Strategies.
* Liaise with the Forestry Authority and local forest managers about the production of Forest Design Plans and general forest management issues.
* 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 Forestry Authority and forest owners and managers to recommend that forest management complies with Forestry 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.

The Agency recognises that well managed forestry in appropriate areas can have minimal impacts on water and can benefit the overall environment.

Local Perspective

Before Saxon times the whole of the West Midlands Stour area, including the area known as the Black Country ie. Dudley, Wolverhampton and Sandwell, was forested. The Saxons cut clearings in the forest called 'leahs' or 'leys' after which some settlements were named,

for example, Dudley, meaning the ley of a man called Dudda. Some areas of forest still exist in the wooded valleys of the southern and western parts of the catchment today, noteably the woodland around Kinver, the remains of the Kinver Forest of Saxon times.

With the beginnings of the Industrial Revolution, however, before Abraham Darby's discovery in 1709 that iron could be smelted with coke, timber was needed for the production of charcoal to feed the many blast furnaces, forges and slitting mills in the Black Country. This, and the continued industrialisation and urbanisation of the area, has meant that forests are now few and far between. Isolated pockets still remain, for example, the wooded slopes of the Clent Hills, and the Black Country Urban Forestry Unit has produced a strategy to encourage the 'greening' of the area to aid environmental and economic regeneration. The Environment Agency supports this initiative and will help promote the idea and adopt the principles of the Urban Forest. The extension of the Urban Forest fits in with the Agency's concern for the protection and expansion of the river/green corridors in the catchment, raised in Issue 18, page 60.

5.14 Fisheries, Conservation and Wildlife

5.14.1 Fisheries

General

The Agency has duties to maintain, develop and improve fisheries. Fish populations are affected by the availability and suitability of physical habitat features as well as long term quality and quantity of water. Fish are therefore important indicators of the overall health of a watercourse or canal. The Agency is committed to the maintenance of breeding populations of salmonid and cyprinid fish.

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 rivers in the West Midlands Stour area are not designated fisheries under the EC Fisheries Directive (78/659/EEC), however, the Staffordshire & Worcestershire Canal is designated as a coarse fishery between Swindon and the junction with the River Severn, a length of 26.2km. Map 17 (page 119) shows the designated fishery together with stretches of the River Stour which are used for angling.

Coarse Fish

Coarse fish are widespread in the River Stour but species diversity and abundance vary widely from place to place. Although the physical habitat is often of good quality the distribution of fish continues to be limited by the quality of the water.

The upstream reaches of the Stour are virtually devoid of fish life apart from minor species such as stoneloach and sticklebacks which appear to tolerate the fluctuating water quality to some degree. Occasional bullheads are also found in this part of the river and brook lampreys were captured at Lower Illey in 1995. Not until downstream of the confluence

with the Smestow Brook do other species appear, when gudgeon become common, as they are in the Smestow itself. Roach, perch and eels are also found occasionally in the middle section of the Stour, but the fish population can only be described as poor. Angling activity is extremely limited in the upper part of the Stour.

At Whittington there is a dramatic improvement in fish species diversity, with nine species recorded including dace, perch roach and pike as well as gudgeon and eels. With distance downstream the quality of the fish population continues to improve, with chub present at Wolverley and barbel at Kidderminster. Abundance of fish also increases downstream and is relatively good at Kidderminster and below. Some organised angling takes place below Kidderminster, especially in the vicinity of Wilden and Stourport.

The Staffs. & Worcs. Canal contains a generally sound population of coarse fish though there are variations in species composition and abundance with location. In 1994, a relatively severe pollution and associated fish mortality reduced the fish populations by up to 80% in some places but there has been significant recovery since. At the 'upstream end' of the canal, near to Oxley and the point where the canal receives the discharge from the Barnhurst STWs there is a relatively good fish population, with specimen-sized perch quite common. Roach dominate the canal throughout its length but there are also good numbers of gudgeon, carp and in some areas, bream, dace, chub and bleak. Pike are rare, as is typical for canals carrying considerable traffic. Extensive angling takes place on the Staffs. & Worcs. Canal especially in the vicinity of Kidderminster and to a lesser extent the Stourbridge canal.

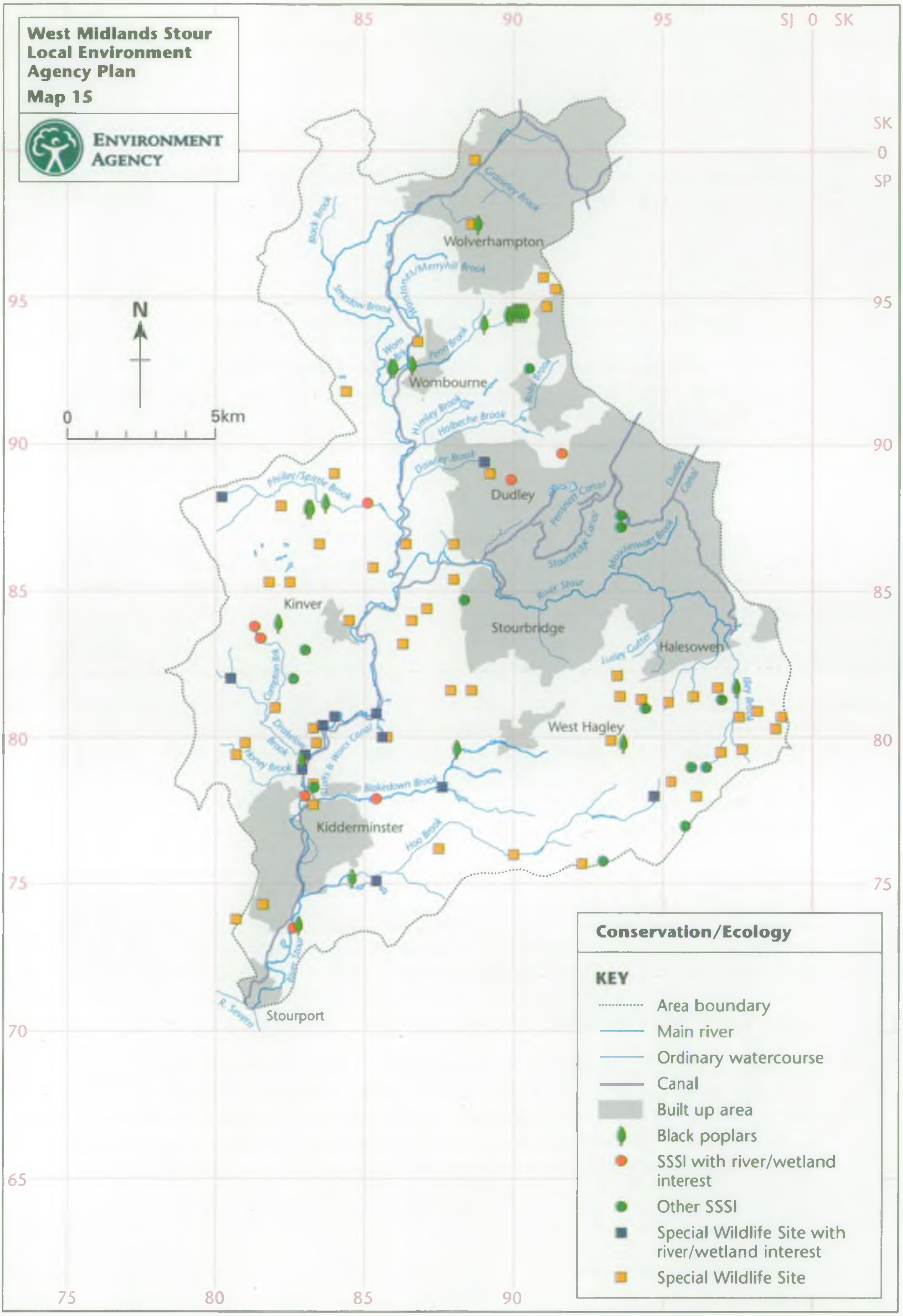
Coarse fish angling in pools is reasonably widely available in the Stour catchment. Lakes at Himley Hall and Pool Hall provide 'traditional' coarse fishing in naturalised pools, whilst Shatterford Pools and several smaller fisheries provide opportunities for angling in intensively stocked waters.

Trout

It is likely that at one time the River Stour and its tributaries supported an excellent trout population as the physical habitat provided by the river in its natural state is well suited to this species. Unfortunately the quality of the water in most of the Stour itself and many of the tributaries is now too poor to support trout. There are a few relict populations in the catchment in the Hoo Brook, the Philley Brook and, in the most recent survey, in the Stour at Whittington, Wolverley and Kidderminster.

Whilst the trout in the lower Stour may have moved into the river from the River Severn, the trout in the tributaries are almost certainly the descendants of the original population of the Stour and have survived for many generations isolated from other populations in the Severn catchment. They are therefore particularly important to conservation and fisheries and efforts must be made to ensure their continued existence (see Issue 15, page 56).

There is no organised angling for trout in the rivers of the West Midlands Stour catchment. Some angling for stocked trout in stillwaters is available.



West Midlands Stour Local Environment Agency Plan
Map 15
Environment Agency
Conservation/Ecology
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Built up area
Black poplars
SSSI with river/wetland interest
Other SSSI
Special Wildlife Site with river/wetland interest
Special Wildlife Site
N
0
5km
SJ 0 SK
SK
0
SP
75
80
85
90
95
70
65
Wolverhampton
Wombourne
Dudley
Kinver
Stourbridge
Halesowen
West Hagley
Kidderminster
Stourport
Smestow Brook
Black Brook
Penn Brook
Holbeche Brook
Dawley Brook
Phillips/Spittle Brook
River Stour
Blakedown Brook
Hoo Brook
Staffs & Worcs Canal
Stourbridge Canal
Dudley Canal
Lutley Gutter
Honey Brook
R. Severn

5.14.2 Conservation and Wildlife

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 includes:

* 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.

The pressures exerted on wildlife by urbanisation have led to a greater emphasis being placed on the importance of conserving the commonplace. Protection of the most important sites alone will not ensure the survival of the present day diversity of wildlife habitats or variety of geological features.

Local Perspective

Conservation sites

There are twenty designated Sites of Special Scientific Interest (SSSIs) in the West Midlands Stour area of which six are associated with watercourses or wetlands. There are also thirty water related Special Wildlife Sites (SWS) which are of county importance for nature conservation. (see Map 15, page 110). The area is particularly rich in sites of geological importance.

Natural Areas have been defined by English Nature for the whole of England in a joint publication with the Countryside Commission, *The Character of England; landscape, wildlife and natural features*. These are areas with similar types of wildlife and natural features and will provide a framework for much of English Nature's work. The West Midlands Stour area has been defined as Midlands Plateau, a detailed description of the areas' ecological character is available from English Nature. The sub-divisions of Natural Areas, Countryside Character Areas, are mentioned in Section 5.15, page 115.

The Hoo and Blakedown Brooks and their associated pools and wetlands are of great ecological value and have been designated as Special Wildlife Sites, Hurcott and Podmore Pools are SSSI's. These valleys represent some of the largest areas of alder carr woodland in the Midlands. However, over-abstraction of groundwater continues to put pressure on conservation interests in this area (see Section 6.3.2, page 153, and Issue 5, page 39).

Marshland is a habitat that was of former importance in the area and substantial areas still exist, especially in Kidderminster, including Puxton, Stourvale and Wilden marshes which are all SSSI's. This is a habitat noted under the UK Biodiversity Action Plan and its status in the area is discussed in Section 6.3.2, also see Issue 15, page 56.

In general, however, the principal rivers of the area, the Stour and Smestow Brook, are ecologically poor. There is limited marginal vegetation and banks are frequently steep and colonised by tall, rank vegetation and invasive exotic species such as Japanese Knotweed and Himalayan Balsam. Giant Hogweed, which is a risk to public health, has also recently been found in the area. Much of the bankside has been built up or dredged and straightened so that physical structure as well as water quality are both limiting factors. In certain areas, such as the River Stour near Cradley and Halesowen and the Smestow near Trysull and Seisdon, the physical structure of the river is diverse but the water quality is still a limiting factor. Conversely, a number of the smaller tributaries of the Stour are of importance to conservation. The upper reaches of the Stour the Illey Brook and the Lutley Gutter are examples of steeply flowing brooks with varied structure and good quality water.

Wildlife

Mammals

The area is generally poor in the numbers and range of species to be found. This is due to numerous pressures, many resulting from the heavily urbanised nature of the catchment, however, some important species are present in the area. Daubenton's bat (*Myotis daubentoni*) is relatively common in the West Midlands and it appears to favour the habitat provided by the canals in the area. Opportunities exist for supplementary roosting sites, for example on new buildings and bridges.

The otter and water vole are species which come under the UK Biodivesity Action Plan. Their status within the area is discussed in Section 6.3.2, also see Issue 15.

Birds

There are a wide range of bird species that are recorded in the catchment, many of them on passage, however, there is still much that could be done to improve the habitat. There are records of nesting little ringed plover (*Charadrius dubius*) and skylark (*Alauda arrensis*) in the Valley Park in Wolverhampton. The former is protected under Schedule I of the Wildlife and Countryside Act 1981 and the latter is a Biodiversity target species. The little ringed plovers also occasionally nest at industrial sites such as gravel pits and derelict land. It is important to raise the awareness of landowners on their legal status and to ensure they are protected. There have been sightings of dippers on some of the brooks in the catchment and past records show that they once frequented stony brooks such as the Illey and Upper Stour. This species is dependent on clean well oxygenated water. There are also significant populations of kingfishers (*Alcedo atthis*), a Schedule I species, in the West Midlands Stour area. The naturally occurring sandy river banks provide ideal nest sites. It is believed that these birds supplement their diet by feeding on the canals in the area.

As mentioned above it is important to protect the commonplace too. The barrage of press coverage concerning disturbance or damage to swans and ducks in local parks illustrates their importance to local people.

Invertebrates

Three sites stand out as being of national importance for Dragonflies; Saltwells Wood, Island Pool and Highgate Common. The first boasts nineteen recorded species, including the nationally important variable damselfly (*Coenagrion pulchellum*), seventeen of these species breed here. At Island Pool and at Highgate Common at least fourteen species are recorded, twelve of which breed. The River Stour itself has eleven recorded species but it is unlikely that many of these breed there.

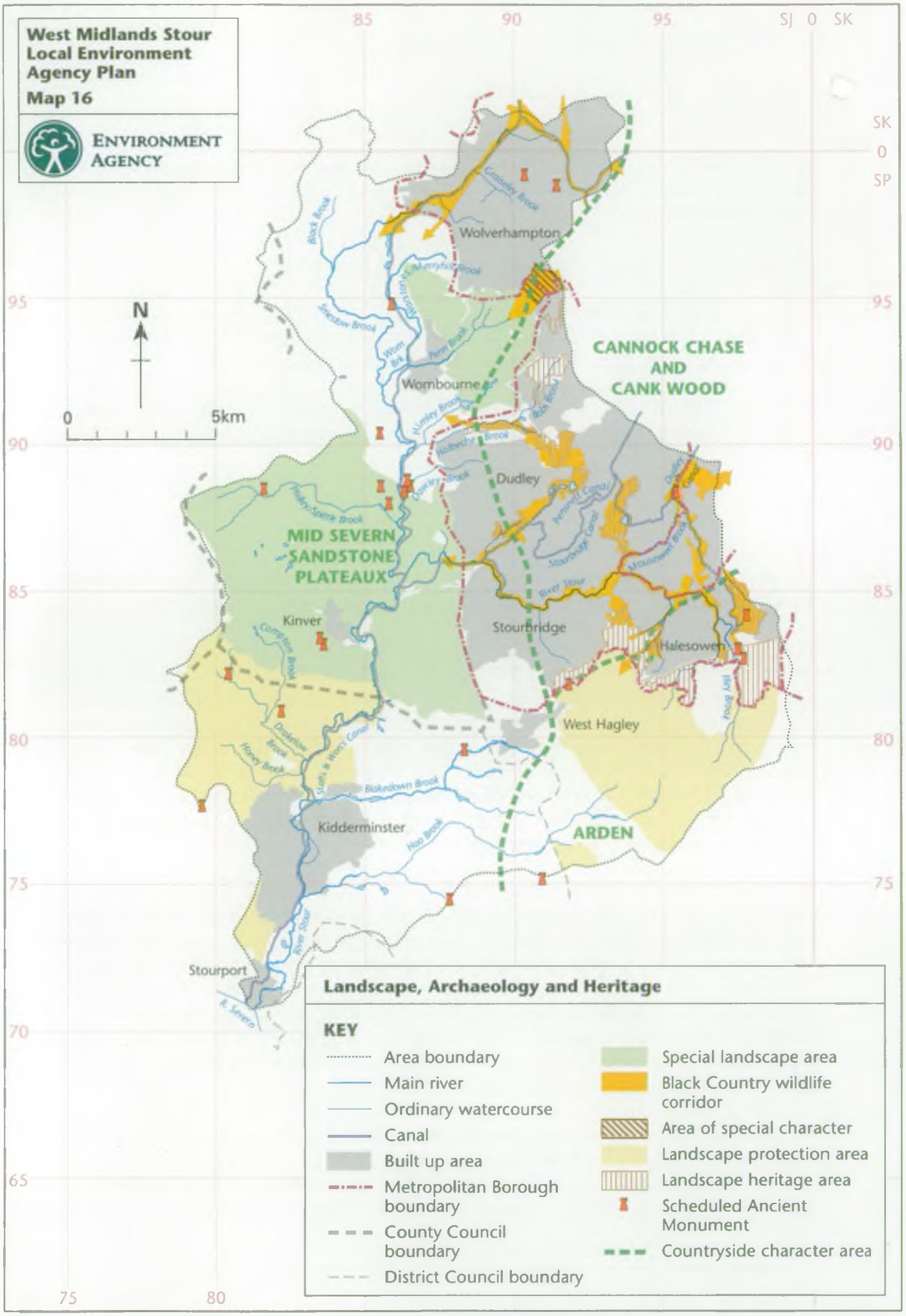
Amphibians

Great crested newts are a species which come under the UK Biodiversity Action Plan. Their status within the area is discussed in Section 6.3.2, also see Issue 15.

Flora

One species that is of particular importance to the area is the native black poplar. *Populus nigra sub sp. betulifolia* is one of our rarest native trees with only 2,500 left in the UK. 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. Recent DNA testing has shown that there is a band of trees running on a north south axis along the edge of the West Midlands which shows a specific genetic distinctiveness (see Issue 15).

Black Poplars


West Midlands Stour Local Environment Agency Plan
Map 16
Environment Agency
N
0
5km
SJ 0 SK
SK 0 SP
85
90
95
Wolverhampton
Wombourne
Dudley
Stourbridge
Halesowen
Kinver
West Hagley
Kidderminster
Stourport
CANNOCK CHASE AND CANK WOOD
MID SEVERN SANDSTONE PLATEAUX
ARDEN
Landscape, Archaeology and Heritage
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Built up area
Metropolitan Borough boundary
County Council boundary
District Council boundary
Special landscape area
Black Country wildlife corridor
Area of special character
Landscape protection area
Landscape heritage area
Scheduled Ancient Monument
Countryside character area

5.15 Landscape, Archaeology and Heritage

General

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

This includes the protection of areas:

* Formally designated as being of value eg. 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 eg. sites identified on County Sites and Monuments Records and in Development Plans.

Local Perspective

Landscape Character

The physical landscape is varied and reflects the complex interaction of geomorphology, topography and settlement patterns that is found within a relatively small area.

The Countryside Commission has recently produced national landscape guidelines in a joint publication with English Nature known as *The Character of England; landscape, wildlife and natural features*. This work divides England into Countryside Character Areas by analysis of the main landscape features. The guidelines are aimed at providing a common approach to landscape assessment nationwide. The catchment falls within three of the areas, these are; Mid Severn Sandstone Plateau, Cannock Chase and Cank Wood, and a small section of Arden. Full Countryside Character descriptions of each area are available from the Countryside Commission but a brief description of the area as a whole is given below. See Map 16 (page 114) for the boundaries of these areas.

The Black Country has a complex landscape pattern. Some of the settlements such as Dudley with its castle and wooded hill, which fall just outside the West Midlands Stour area, medieval street plan and remaining Georgian Buildings have a strong sense of identity. Other areas in contrast are dominated by uniform rows of terraced housing and estates dating from the 1940's onwards. Between the urban areas are patches of derelict and unreclaimed land, subsidence ponds, fragmented farmland and patches of naturally regenerated scrub and woodland. Other pockets contain parks, golf courses or old manor houses such as Haden Hill House, Sandwell. Some find this juxtaposition of old and new quite fascinating and stimulating.

The boundary between rural and urban is often quite sharp. Planning boundaries can almost be visualised down the centre of some roads where housing estates can look out onto open fields. Outside the urban areas the landscape is dominated by a gently rolling and dominated by pasture and arable land with some woodland and heath. Many of the villages

are attractive with some fine examples of architecture. The proximity to the urban areas can put pressure on these areas at weekends with visitors from the conurbation, improvements to urban areas of openspace may help to alleviate this.

There are no nationally protected landscapes designated within the West Midlands Stour area ie. Areas of Outstanding Natural Beauty or Environmentally Sensitive Areas. However, Development Plans covering the catchment do identify several landscape categories which are important in the local context, see Map 16 (page 114).

Cultural Heritage

Early recorded history shows the area as a series of large heathlands, woodland pastures and wetlands. The pattern of development was one of areas of common grazing, woodlands and coppices. By the beginning of the Industrial Revolution a mixture of small ironworks and coal, ironstone and limestone quarries occurring near the surface, had become part of this pattern. So quickly did the urbanisation take place that these small scale patterns are often still visible, even amongst the most built up areas. It is easy to see how the Black Country earned the nickname 'The Endless Village'.

Development has obliterated much of the earlier history. However, an area around the Lutley Gutter has recently been discovered to be of national importance. Many implements from the Palaeolithic, Mesolithic and Neolithic periods have been found around a small pool. Medieval fishponds, ridge and furrow systems and old mill buildings are also to be found within a relatively small area. There are the remains of Roman camps at Greensforge, south of Swindon. At a riverside site in Stourbridge mammoth bones have been discovered.

The River Stour is steep and fast flowing and its power has been harnessed through the ages; it made an important contribution to the early Industrial Revolution. The Stour allegedly has the more mill sites than any other river in the country. Closely linked to this are the canals with their fine flights of locks, warehouses and pounds. The valleys associated with the Blakedown Brook contain a complex system of mills and pools which are of unique historic interest. These are often still surrounded by the coppiced woodland that provided charcoal, an important raw material of the early Industrial Revolution.

On the edges of the urban areas stand the homes of those who made their fortune locally. These properties are often still stand in their original parklands, for example, the River Stour at Prestwood runs through a landscape designed by Humphrey Repton and the grounds at Himley Hall were designed by Capability Brown. One branch of the Stour emerges in Leasowes Park which is one of the few remaining 'ferme ornee' and the only example of work by the poet and landscape designer William Shenstone. This site is currently being restored by Dudley Metropolitan Borough Council. The National Trust owns several sites in the LEAP area including Wightwick Manor on the edge of Wolverhampton, once owned by Sir Geoffrey Mander who is famous for his local paint business. Also, large areas of land at Kinver Edge where there are the remains of several rock-cut houses in the soft sandstone which characterises this area, and the Clent Hills the source of the River Stour.

5.16 Recreation, Amenity and Navigation

General

The Environment Agency has a duty under the Environment Act 1995 to promote the use of waters and associated land for recreational purposes. The Agency has very few landholdings in the West Midlands Stour area and therefore works in partnership with other organisations and landowners to carry out this duty. 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 5.14.1 (page 108). 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 waterborne diseases such as Weils disease and Leptospirosis.

Local Perspective

Informal Recreation and Access

Due to the degree of urbanisation, public access in the West Midlands conurbation and in Kidderminster is fragmented. In Dudley and Halesowen this limited access is recognized by the Local Authorities and improvements are being planned in an effort to create a green corridor for conservation and recreation centred on the river. For example, Dudley MBC have a policy in their Development Plan relating to public access through and within linear open spaces and as part of this policy there is an ongoing proposal to link up the existing sections of footpath along the Stour valley.

The canal towpaths are heavily used for walking as are disused railways which are being developed as footpath and cycleway networks. There are four long distance footpaths located in the catchment which provide good access to the adjacent countryside. These can be seen on Map 17 (page 119) and are; The Staffordshire Way, The North Worcestershire Path, The Worcestershire Way and the Kingswinford Railway Path. A multitude of leaflets describing shorter guided walks are also available from the various Local Authorities in the area.

The catchment is well served by a total of four Country Parks (see Map 17), these are; Kingsford, Clent, Baggeridge and Highgate Common.

Navigation and Boating

There are a limited number of waters of sufficient size to allow active water sports in the catchment. The exceptions are Himley Great Pool and Lodge Farm Reservoirs which although modest in size are sufficient to provide dinghy sailing facilities (see Map 17, page 119). Due to the poor water quality canoeing is poorly represented in the catchment.

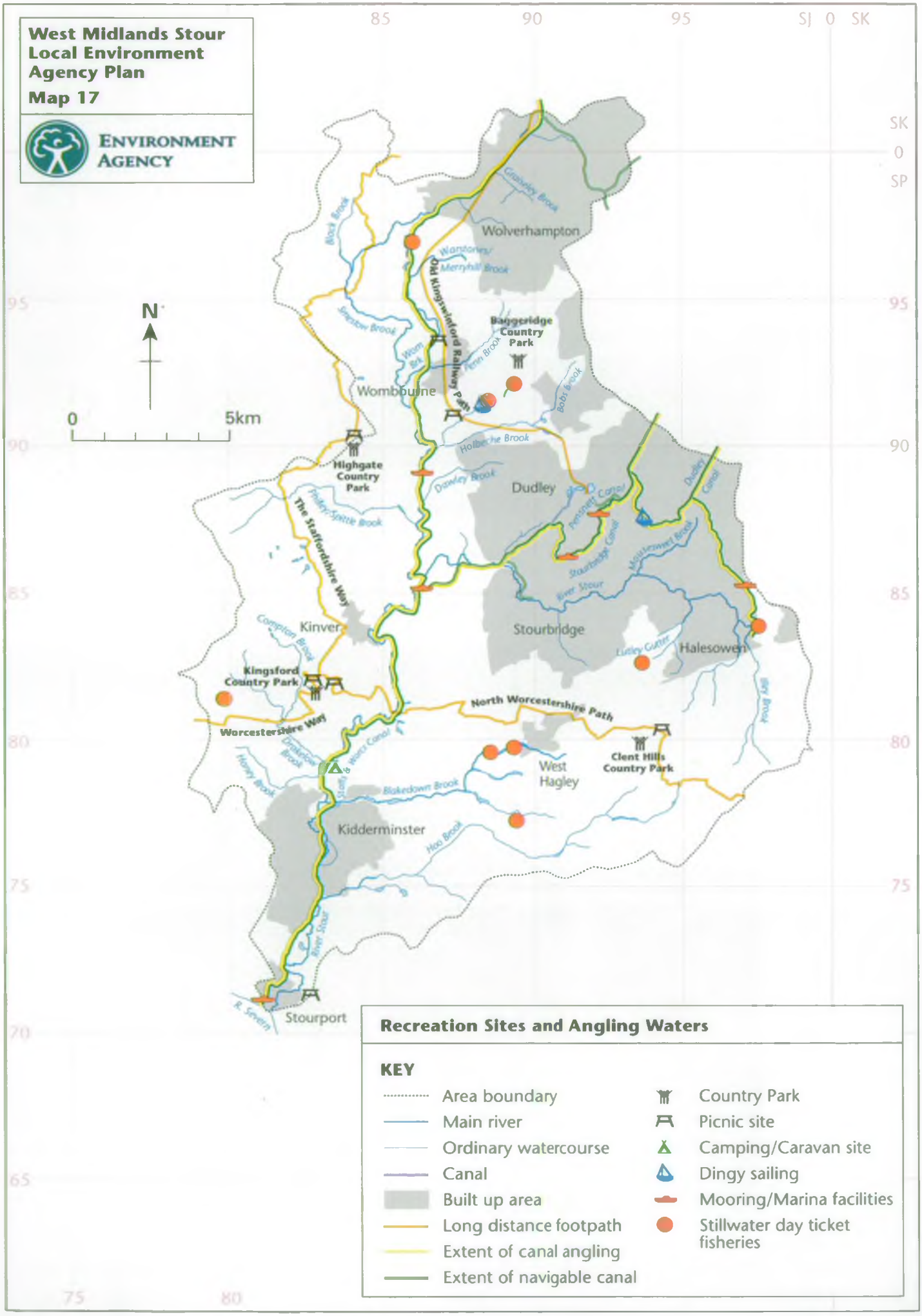
The canals are well used by narrowboats and the flights of locks and other features such as the Bonded Warehouse in Stourbridge and the historic canal basins in Stourport provide interest for canal enthusiasts. There are various schemes to restore the canals in the area eg. Dudley No.2 Canal from Lapal to Hawne Basins in Halsowen and the route from the Bumblehole Arm to the Boshboil Arm on the Dudley No.1 Canal at Netherton.

Canal Boats on the Stourbridge Extension Canal (Courtesy of British Waterways)

West Midlands Stour Local Environment Agency Plan

Map 17

ENVIRONMENT AGENCY



Recreation Sites and Angling Waters

KEY

- Area boundary
- Main river
- Ordinary watercourse
- Canal
- Built up area
- Long distance footpath
- Extent of canal angling
- Extent of navigable canal
- Country Park
- Picnic site
- Camping/Caravan site
- Dingy sailing
- Mooring/Marina facilities
- Stillwater day ticket fisheries

Section 6 - State of the Environment

This section explains the Area's targets and assesses the current state of the area in terms of compliance with these targets. 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
- 6.0.3 Radioactive Substances

6.1 Air
- 6.1.1 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

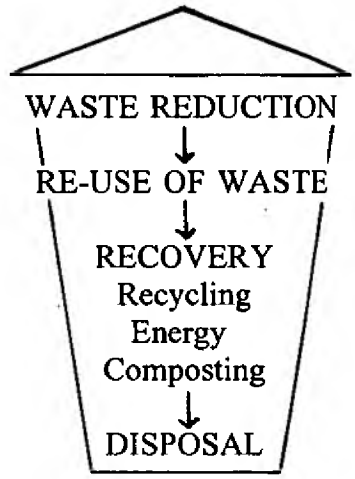
6.0.1 Waste Management

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 UK Waste Strategy for the management of waste (see Issue 13, page 53)

The Department of the Environment's White Paper *Making Waste Work* sets out a national, non-statutory strategy for the management of waste. The strategy is due to be revised and have a statutory basis in the near future. The strategy is based on the waste hierarchy:



The aim is to move our waste management practices up the hierarchy, ie to reduce waste wherever possible and where this is not possible to make the best use of the waste produced. The best way to reduce the environmental impact of waste is not to produce it in the first place. However, where this is not possible we should try to obtain some value from the waste by reusing or recovering it. Recovery includes recycling, energy generation from waste and composting. The least desirable option is disposal, however, there will be occasions where disposal is the only option or the most sustainable one.

Targets

The strategy includes both general targets and targets relating to particular waste streams. The targets which we will play a 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.

Considerable effort is needed on the part of Local Authorities, individual householders, industry and the voluntary sector to meet the targets set out in the UK Waste Strategy (see Issue 13). Household waste can be reduced by individuals taking responsibility by re-using, recycling and composting and also by buying long life, reusable and environmentally friendly products with minimal packaging. Individuals and businesses should:

* Support local waste minimisation and recycling initiatives
* Support the extension of minimisation and recycling initiatives in their area
* Reduce the amount of material thrown away
* Respond to consumer demand to reduce unnecessary packaging and other forms of waste production.

The Agency also has a key role to play through 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. However, 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 in itself.

Himley Landfill Site

State of the Area

Waste Arisings

The tables below show estimates of annual waste arisings and how these are managed. Although these are national figures it is likely that the percentages will be similar for this plan area.

Table 14 Controlled Waste Arisings by Sector (UK Totals)

Sector	Arisings (million tonnes per annum)	% of Total Arisings
Household	20	8
Commercial	15	6
Construction and demolition	70	29
Other industrial waste	70	29
Sewage sludge	35	14
Dredged spoils	35	14
Total	245	100

Source: Making Waste Work

Note: Table 14 does not include mining and quarrying waste (estimated at 110 mtpa) or agricultural waste (estimated at 80 mtpa).

Table 15 Management of Controlled Waste Arisings by Sector (UK Totals)

Method	Household	Commercial	Construction /demolition	Other industrial	Total
Landfill	90%	85%	63%	74%	72%
Incineration	5%	7.5%	0%	1%	2%
Recycled/re used	5%	7.5%	30%	19%	21%
Other	0%	0%	7%	6%	5%

Source: Making Waste Work

Household waste

Map 13, page 101, shows the household waste arisings in each of the districts within the area and the amount recycled during 1996/97. Most of the waste within each of the districts in the Plan area is currently disposed of to landfill or incinerated.

It is the duty of each waste collection authority to arrange for the collection of household waste in its area. Local authorities are also required to provide civic amenity sites where members of the public can deposit waste free of charge. 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. As the major component of household waste is putrescible matter there is considerable scope for composting.

The Producer Responsibility Obligations (Packaging Waste) Regulations 1997 place an obligation on certain businesses to recover and recycle a certain proportion of packaging waste. The amount they must recover and recycle depends in part on how much packaging they use for their products. It is hoped these Regulations will encourage manufacturers to redesign their packaging to include less materials, thereby minimising household waste.

Other Wastes

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. It is hoped that the increase in waste disposal costs as a result of the introduction of the landfill tax on 1 October 1996 will encourage industry to reduce waste production and where waste is produced consider alternative waste management routes eg. reuse/recycling. Figures are not available on the amount of these wastes arising in the plan area. However, to give an indication of the differences in scale of the amount of waste produced by different areas of the plan area, Table 16 shows the amount of wastes produced over the West Midlands as a whole compared to that produced in the Shire Counties of Shropshire, Staffordshire and Hereford & Worcester.

Table 16 Waste Arisings in the West Midlands, Shropshire, Staffordshire and Hereford & Worcester (household, commercial and industrial wastes)

District/County	Estimated Waste Arisings (million tonnes) - 1993
West Midlands	6.95
Hereford & Worcester	1.83
Shropshire	2.27
Staffordshire	4.58

Source: County Waste Management Plans

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 the Local Environment Agency Plans.

Current and Future Capacity at Waste Management Facilities

There is a lack of landfill capacity within the West Midlands conurbation as a whole. Two municipal waste incinerators are currently being extensively refurbished, one in Dudley and one in Wolverhampton. These together with the incinerator at Tyseley, Birmingham will reduce the quantity of waste for landfilling.

The future capacity of waste management facilities in the plan area cannot be considered in isolation from the West Midlands as a region. This is because wastes are not managed according to artificial boundaries and where there may be shortage in capacity in one district there may be surplus capacity in a neighbouring district. The Agency has produced a report on landfill availability and utilisation in the West Midlands Region which discusses these issues in greater detail and which will assist the local planning authorities in drawing up their Waste Local Plans.

6.0.2 Integrated Pollution Control

This is an approach to industrial 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.

The Best Practicable Environmental Option (BPEO) should be used to minimise overall environmental impact.

The Agency has a duty in authorising and regulating a process to ensure that the Best Available Techniques Not Entailing Excessive Cost (BATNEEC) are used to prevent, minimise and render harmless the releases of polluting substances to land, air and water.

IPC is applied to the largest, technically complex and potentially most seriously polluting industrial processes. A recent EC Directive (96/61/EC) known as the Integrated Pollution Prevention and Control (IPPC) Directive requires the UK Government to extend the integrated approach to pollution regulation to a wider range of processes.

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 Integrated Pollution Control (IPC) sites.

State of the area

Within the plan area there are twelve regulated processes. These have been described in Section 5.3 (page 82). All sites have their own improvement programmes, which they are currently implementing. The Agency collects data on air emissions to assess the impact on air quality from its IPC sites, but is not responsible for the regulation of air quality in itself as this falls to Local Authorities, who have wider powers in this respect. However, Issues 10 and 11 (pages 50 and 51) refer to the need to work with Local Authorities to develop more effective environmental monitoring, also see Section 6.1 below.

6.0.3 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 used to achieve this. A committed dose methodology is used for assessing the risk to man. This may include bio-accumulation 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 and medical users. These users are registered or authorised by the Agency and there have been no incidents or breaches of their conditions.

Municipal Incinerator, MES (Environmental) Ltd, Dudley

6.1 Air

6.1.1 Air Emissions

The Agency collects data on air emissions from IPC sites to assess the impact on the environment.

The Government, recognising that the quality of air that we breathe is crucial to us all, established a new framework for improving air quality and set this out in the Environment Act 1995. This resulted in the *United Kingdom National Air Quality Strategy* published earlier this year. The strategy explains the roles of Local Authorities, industry and the Agency in achieving the Government's air quality targets. These targets are set out in Table 17 below.

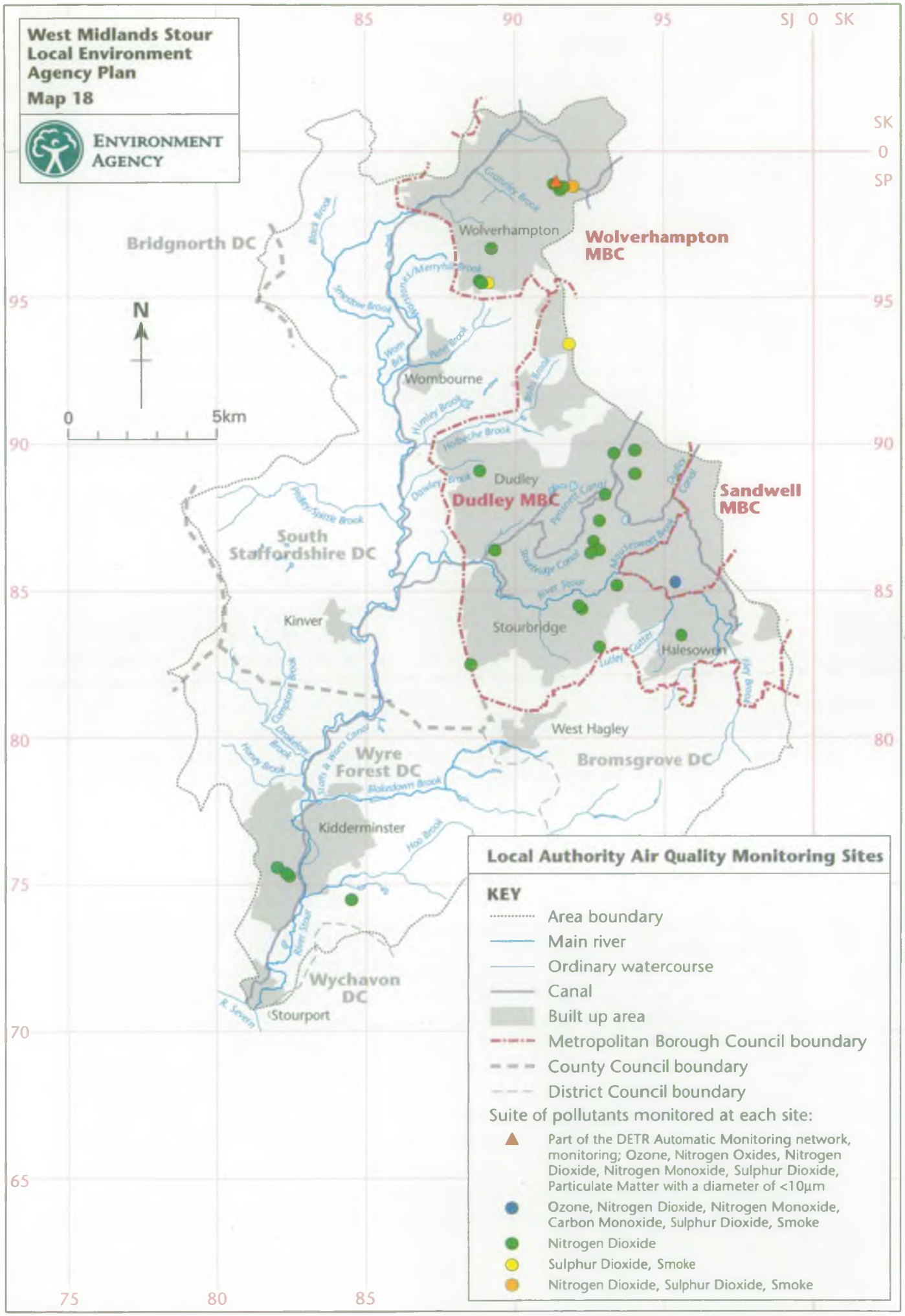
The lead role in air quality management rests with Local Authorities. The Agency plays its part through the regulation and control of emissions from IPC processes and liaison with Local Authorities. Issues 10 and 11 (pages 50 and 51) refer to the need to work with Local Authorities to develop more effective environmental monitoring.

Table 17 The Proposed Objectives of the Air Quality Strategy

Pollutant	Standard		Objective
	Concentration	Measured As	
Benzene	5 ppb	running annual mean	100% compliance to be achieved by 2005
1,3 Butadiene	1 ppb	running annual mean	100% compliance to be achieved by 2005
Carbon Monoxide	10 ppm	running 8-hour mean	100% compliance to be achieved by 2005
Lead	0.5 $\mu g/m^3$	annual mean	100% compliance to be achieved by 2005
Nitrogen Dioxide	150 ppb 21 ppb	1 hour mean annual mean	100% compliance to be achieved by 2005
Ozone	50 ppb	running 8-hour mean	50 ppb, measured as 97% to be achieved by 2005
Particulates	50 $\mu g/m^3$	running 24-hour mean	50$\mu g/m^3$, measured as 99% to be achieved by 2005
Sulphur Dioxide	100 ppb	15 minute mean	100ppb, measured as 99.9% to be achieved by 2005

Air quality is measured at a number of locations throughout the United Kingdom by the Department of Environment (now DETR) through the Automatic Air Quality Monitoring Network. There is only one automatic site within the LEAP area, however, which is located in Wolverhampton city centre. The site automatically monitors ozone, nitrogen dioxide (NO_2), carbon monoxide (CO), sulphur dioxide (SO_2)and particulates (PM_{10}). The facility has been operating since December 1995. Local Authorities also carry out some air quality monitoring for sulphur dioxide and nitrogen dioxide. The monitoring stations within the LEAP area are identified on Map 18 (page 128).

As part of the above strategy Local Authorities will have to review air quality within their districts and compare them with the standards and objectives laid out in the strategy, the objectives are set out in the table above. Detailed studies of air quality in the area will have to be carried out before results of compliance with these objectives can be discussed in detail and this is one of the objectives set out in the issue section of this document (Issue 10, page 50). The Agency must certainly ensure that the operation of all existing and any new IPC processes do not result in any of the air quality objectives being breached.


West Midlands Stour Local Environment Agency Plan
Map 18
Environment Agency
SJ 0 SK
SK
0
SP
85
90
95
N
0
5km
Bridgnorth DC
Wolverhampton
Wolverhampton MBC
Wombourne
Dudley
Dudley MBC
Sandwell MBC
South Staffordshire DC
Kinver
Stourbridge
Halesowen
West Hagley
Bromsgrove DC
Wyre Forest DC
Kidderminster
Wychavon DC
Stourport
Local Authority Air Quality Monitoring Sites
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Built up area
Metropolitan Borough Council boundary
County Council boundary
District Council boundary
Suite of pollutants monitored at each site:
Part of the DETR Automatic Monitoring network, monitoring; Ozone, Nitrogen Oxides, Nitrogen Dioxide, Nitrogen Monoxide, Sulphur Dioxide, Particulate Matter with a diameter of <10µm
Ozone, Nitrogen Dioxide, Nitrogen Monoxide, Carbon Monoxide, Sulphur Dioxide, Smoke
Nitrogen Dioxide
Sulphur Dioxide, Smoke
Nitrogen Dioxide, Sulphur Dioxide, Smoke

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.

6.2.1.1 Surface Water

The River Stour and its tributaries are important for water supply to agriculture and industry. The flow regime of the River Stour and its tributaries is unregulated. However, the flow in the Stour upstream of the Smestow Brook is artificial due to significant discharges of treated sewage effluent, discharged mainly from the Freehold and Caledonia Sewage Treatment Works (STW). In times of low flows such discharges may contribute up to 50% of the flow. Navigation is also supported in the canal network by discharges of treated sewage effluent. Discharges from Barnhurst STW in particular support flows in the Staffs. & Worcs. Canal. The River Stour itself, particularly upstream of the confluence with the Smestow Brook, responds very quickly to rainfall due to the urbanised nature of the catchment.

Licences to abstract from watercourses are currently issued subject to special conditions which have the effect of restricting abstraction 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

The Agency's 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

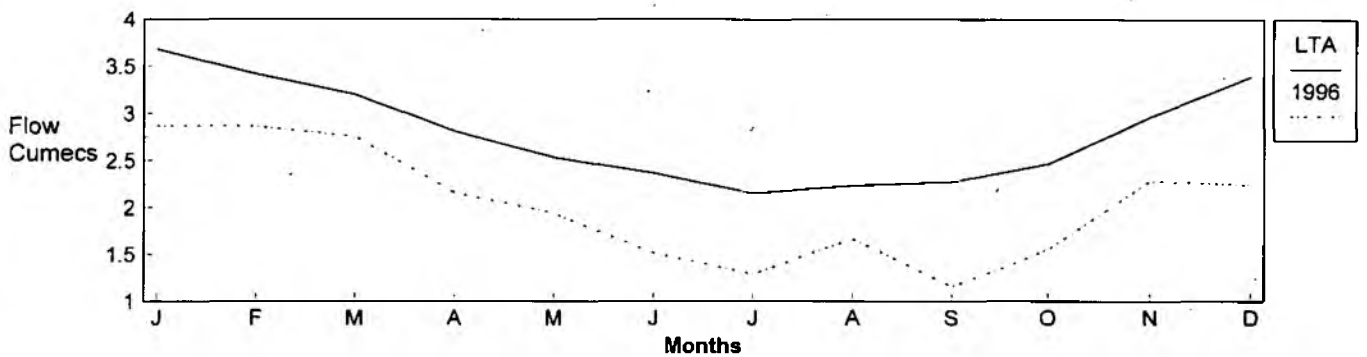
There are seventeen licences in the Stour catchment tied to the one Agency control station at Kidderminster. As this control station is situated near the downstream end of the catchment abstractions further upstream are controlled mainly through local flow measuring structures. There are a total of four licences tied to local prescribed flows. Restrictions on licences increase incrementally such that newer licences are restricted first thus protecting existing rights. There are number of watercourses where the level of resource development has reached the stage where no further applications will be considered for direct abstraction during the summer, as is the case with the Hoo Brook and the Blakedown Brook. This will ensure protection of the source from any additional detrimental abstraction. Flows in the tributaries of the Stour, including the Smestow Brook, Hoo Brook and Blakedown Brook would normally be dependent on baseflow contribution. However the abstraction of groundwater from public water supply boreholes (authorised by old 'Licences of Right') together with the recent period of below average rainfall has led to a fall in groundwater levels and the depletion of baseflow in these sensitive tributaries, see Issues 4 and 5 (pages 38 and 39). Figures 10 and 5 clearly show the effects of the drought experienced during

1996. Figure 5 in Section 2.3.1 (page 20) shows rainfall totals against long term averages for the year while Figure 10 shows river flow levels in the River Stour against the long term average as measured by the Agency's flow measurement station at Kidderminster.

Table 18 Summary of Abstraction Policy for Watercourses in the West Midlands Stour Area

Watercourse	Policy
River Stour -upstream of Caledonia & Freehold STW's	Licences issued subject to local prescribed flow (LPF)
-downstream of Caledonia & Freehold STW's to confluence with R.Severn	Licences issued subject to restriction conditions both summer & winter - tied to Kidderminster. Tributaries subject to LPF
Smestow Brook	Licences issued subject to restriction conditions both summer and winter tied to Kidderminster and Swindon (new proposed winter control point). Tributaries and upper reaches subject to LPF
Blakedown Brook	Closed to summer abstraction Winter licences considered subject to LPF
Hoo Brook	Closed to summer abstraction Winter licences considered subject to LPF

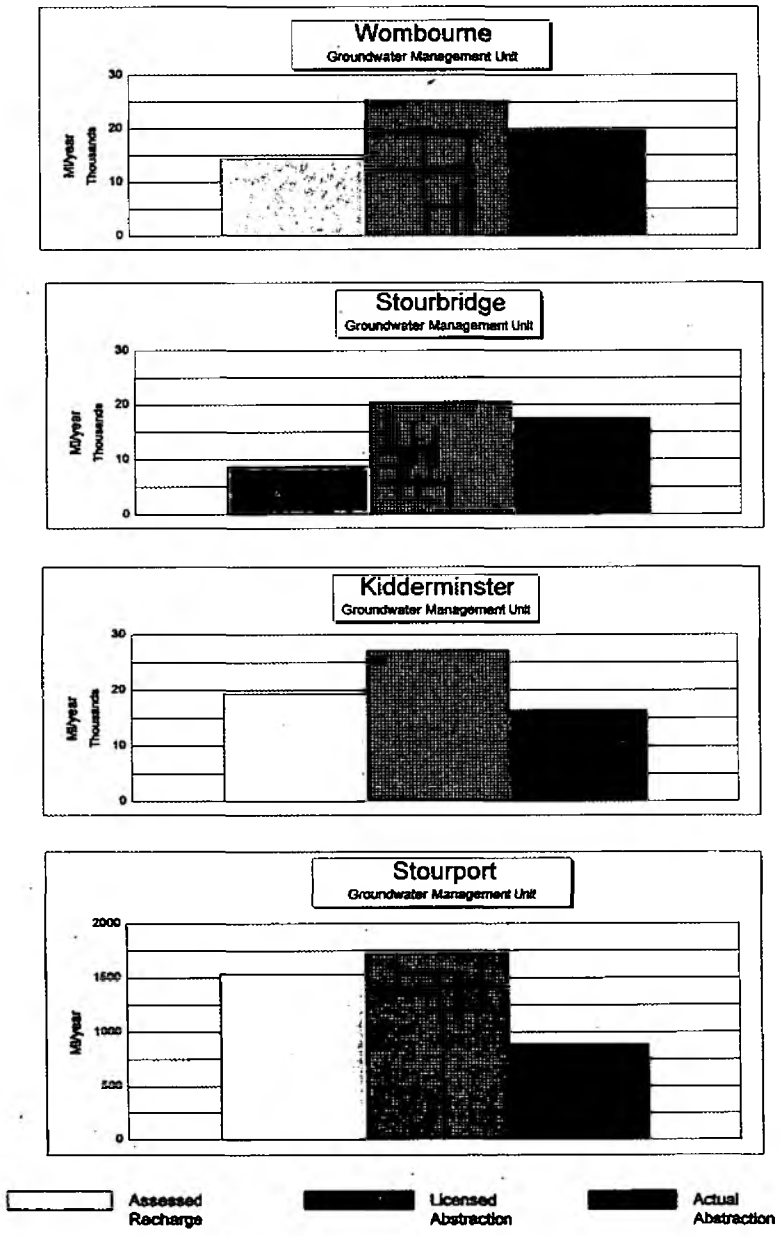
Figure 10 Hydrograph of Flow in the River Stour During 1996 Compared to the Long Term Average at Kidderminster



6.2.1.2 Groundwater

The aquifers of the Midlands Region are divided into a number of areas termed groundwater management units for the purpose of managing groundwater resources (see Map 6, page 22). The Agency carries out an annual review of groundwater resources, based on the recorded abstraction volumes and long term recharge rates of each groundwater management unit together with any environmental needs in the area. The resource balance for the Sherwood Sandstone in the Stour catchment is shown in Figure 11.

Figure 11 Groundwater Resource Balance in the West Midlands Stour LEAP Area (Megalitres/year)



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 greater than 1 megalitre per day are shown on Map 9 (page 89). The groundwater units in the catchment are shown on Map 6 (page 22), and the classification for the major aquifer units is set out in Table 19 below.

Table 19 Groundwater Units and Classification

Unit Name	Category
Wombourne	A
Stourbridge	A
Kidderminster	A
Stourport	A
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

In groundwater units where no further resources are available no new licences will be issued and the Agency will seek a reduction in both licensed and actual abstractions.

State of the Area

The Sherwood Sandstone in the Stour LEAP area includes the whole of the Stourbridge groundwater management unit and parts of the Wombourne, Kidderminster and Stourport units. The resource balance shows that the groundwater resources in each unit are either fully or over committed. This has led to the lowering of groundwater levels and the depletion of baseflow, with resulting environmental problems. As a result, these units are closed to further licensing to protect existing users and the environment.

A groundwater model of the Sherwood Sandstone in an area including the River Stour catchment will be commissioned soon in order to provide a management tool for the aquifer system and will enable the Agency to refine its groundwater management policy in the LEAP area (see Issue 4, page 38). The Agency will also address the problem of baseflow depletion in the Blakedown Brook system by the use of special compensation boreholes (see Issue 5, page 39).

6.2.1.3 Strategic Water Resources Development

Over and above these essentially local/regional plans, national needs for future water resource developments can impact substantially on the River Stour. 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 National Rivers Authority.

In practice, the additional requirements within the Stour are relatively small, but the impacts of the resource development within the River Severn will be significant. With more water becoming available within the Severn due to development of the Shropshire Groundwater Scheme, as well as changes in deployment of existing strategic sources, this will provide extra water to Water Companies. The outcome of this will be to allow modification of the abstraction quantities and patterns within the Stour groundwater units, which will provide opportunities to alleviate stressed sources. The effect of these measures will have impacts on surface water baseflow such as at Blakedown Brook.

6.2.2 Water Quality

The Agency's principle 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 and to protect the quality of underground aquifers. In achieving this we aim to ensure that the polluter pays.

6.2.2.1 Surface Water

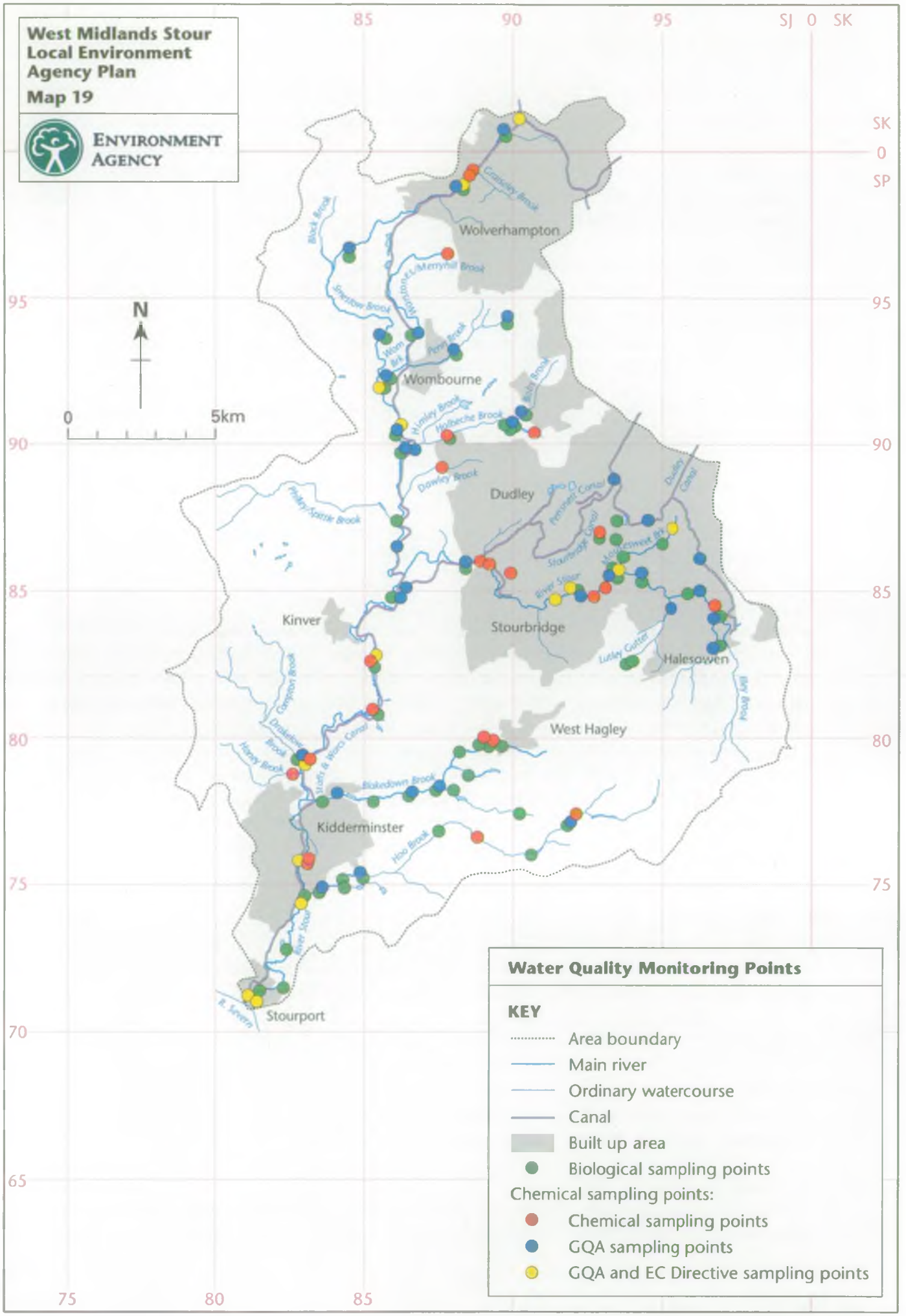
Targets

River Quality Objectives

The Environment Agency has strategic targets for all significant rivers known as River Quality Objectives (RQOs). These 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 ecosystem. This is used only as a planning tool, not to report on current water quality. The RE classes are described in the table below and the water quality criteria which are used to determine the classes are given in Table 24, Appendix 2 (page 159).

Table 20 River Ecosystem Class Classification

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.


West Midlands Stour Local Environment Agency Plan
Map 19
Environment Agency
N
0
5km
Wolverhampton
Wombourne
Dudley
Kinver
Stourbridge
Halesowen
West Hagley
Kidderminster
Stourport
Water Quality Monitoring Points
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Built up area
Biological sampling points
Chemical sampling points:
Chemical sampling points
GQA sampling points
GQA and EC Directive sampling points

RQOs are established for lengths of river (river stretches) defined according to their upstream and downstream limits. Physical features such as tributaries, weirs or significant discharges often mark the ends of river stretches due to their potential significant effects on water quality. Details of the RQOs assigned to river stretches, along with compliance and the monitoring data upon which compliance is assessed are included in the Public Register information which can be obtained from the Upper Severn Area Office.

For each designated stretch medium and long term RQOs have been proposed. These are target RE classes. Medium term RQOs are realistic, achievable and are linked to planned expenditure and works within the catchment to maintain or improve water quality. They include a date by which the target is to be met. Long term RQOs are set for planning maintenance and improvement of water quality.

Ultimately the RE targets may be given statutory footing by the setting of Statutory Water Quality Objectives (SWQOs). The Environment Agency would be required, as far as practicable, to ensure that such targets were met. The Stour Catchment was selected as one of eight pilot catchments in England and Wales to test the operation of SWQOs. Consultation on the proposals was carried out between March and June 1996 which led to recommendations being made to the Department of the Environment, Transport and the Regions (DETR), successor to the DoE, in October 1996.

Asset Management Plans

Some consents for water company Sewage Treatment Works (STWs) are based on historical needs and performance rather than river quality targets. Where improvements in effluent quality are needed to meet these river quality targets, one of the roles of the Agency is to negotiate future investment by the water companies, through discussions with the DETR, OFWAT (Director of Water Services) and the Water Service Companies themselves. Asset Management Plans (AMPs) are the Water Companies' Strategic Business Plans. They are produced as a result of these discussions and specify the improvement work programmed for the plan period. The second stage of these plans (AMP2) was agreed in 1994 and will govern some of the priorities for investment for the period covered by the Stour LEAP. Other priorities will come from the third stage of this periodic review process, AMP3, which will identify investment for the period 2000 to 2005.

EC Directive Reporting

EC Directives apply to the quality of surface water to support fish life, the control of discharges of dangerous substances and the levels of treatment performed at Sewage Treatment Works. The relevant directives are given in Appendix 5 (page 164).

State of the area

Water Quality

Table 21 (page 139) details the stretches of water covered by this LEAP together with the RE targets assigned to them. For each stretch three RE designations are given:

Current Quality

For the purposes of Table 21only, the actual quality of the watercourse/canal over the last three years (1994-96) is given in terms of an RE class. This is so that current quality can

be directly compared with the medium and long term objectives.

Where 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 1, page 31). Maps 20a and 20b (pages 137 and 138) show the current quality as assessed by the General Quality Assessment (GQA) scheme. This scheme is used to report current quality only in accordance with Table 25 in Appendix 2 (page 159).

Medium Term Objectives

These are 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 in terms of both quality and quantity.

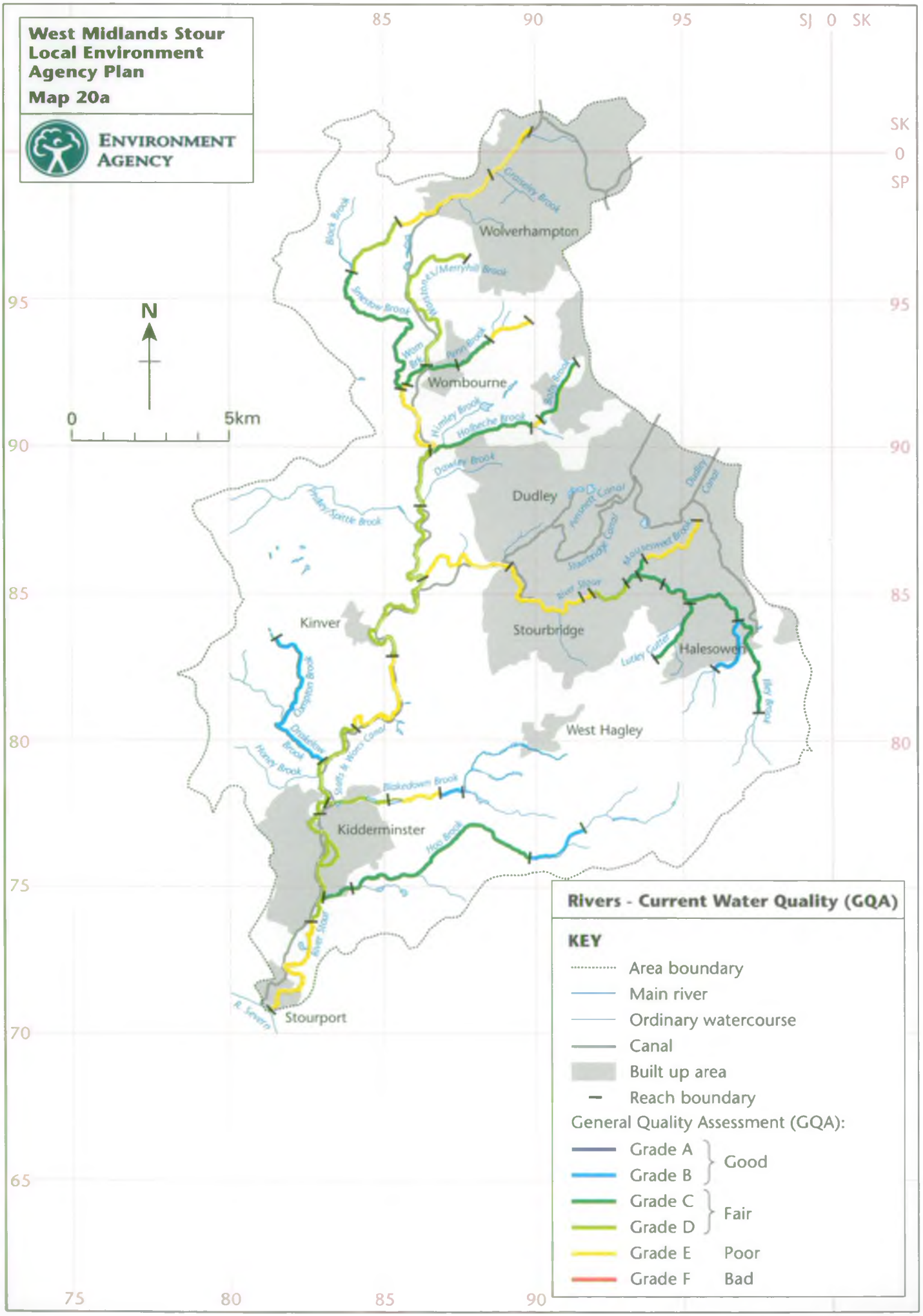
Long Term Objectives

These are targets which go beyond the time period of this plan. Compliance with these targets is shown on Maps 21a and 21b (pages 142 and 143).

Most watercourses/canals within the area are of fair quality with the majority of problems being related to pressures brought about from a highly urbanised area. These include Sewage Treatment Works (STW) discharges, unsatisfactory combined sewer overflows (CSO's), drainage from contaminated land, urban run-off, wrong connections and pollution incidents (see Issue 1).

EC Directive Reporting

Data is collected on an ongoing basis to assess compliance with the Directives that are relevant to the Stour catchment, the five water quality directives are listed in Appendix 5 (page 164). Failure has occurred in relation to the Dangerous Substances Directive and is discussed in Issue 1i.


West Midlands Stour Local Environment Agency Plan
Map 20a
Environment Agency
N
0
5km
Wolverhampton
Wombourne
Dudley
Stourbridge
Halesowen
Kinver
West Hagley
Kidderminster
Stourport
Rivers - Current Water Quality (GQA)
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Built up area
Reach boundary
General Quality Assessment (GQA):
Grade A
Grade B
Good
Grade C
Grade D
Fair
Grade E
Poor
Grade F
Bad

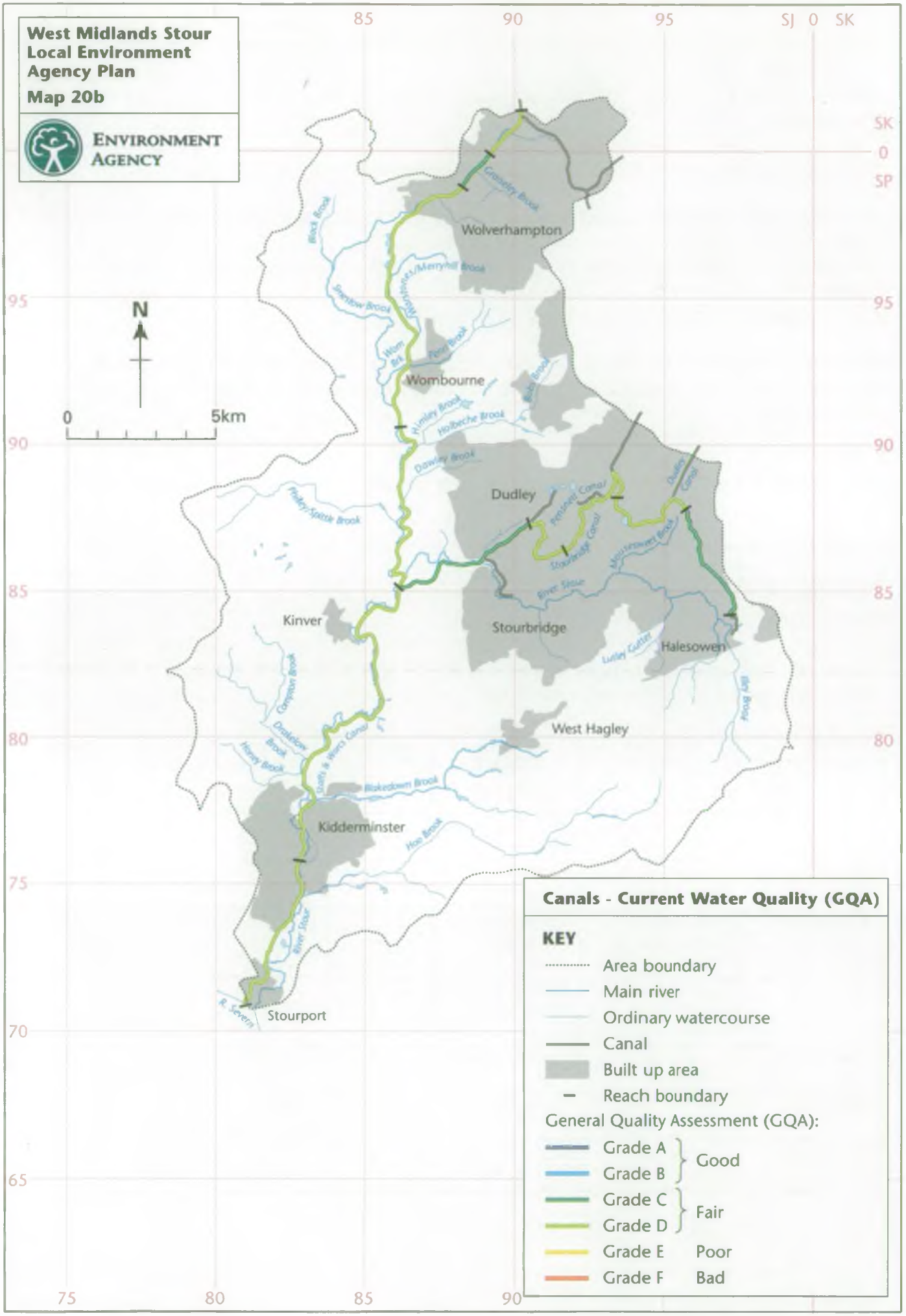

West Midlands Stour Local Environment Agency Plan
Map 20b
Environment Agency
N
0
5km
Wolverhampton
Wombourne
Dudley
Kinver
Stourbridge
Halesowen
West Hagley
Kidderminster
Stourport
Canals - Current Water Quality (GQA)
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Built up area
Reach boundary
General Quality Assessment (GQA):
Grade A
Grade B
Good
Grade C
Grade D
Fair
Grade E
Poor
Grade F
Bad

Table 21 River Ecosystem (RE) Water Quality Objectives for the River Stour and its Tributaries.

The following information should be noted in relation to the table set out below:

a. In some cases where the current quality is higher than the medium or long term objective there appears to be a planned long term reduction in water quality. This is due to the objectives being calculated on all discharges to the stretch as operating at the highest permissable value on their consent. In many cases these discharges are 'cleaner' than is required by law and this can result in a current quality that may not be realistic or sustainable.

b. Where the medium term objective is more stringent than the long term objective, and this is sustainable, than upgrading of the long term objective will be raised as an issue in the LEAP Annual Review.

c. Where the medium term objective is less stringent than the long term objective, then this is used as a stepping towards achievement of the long term objective. Compliance is shown against the long term objective.

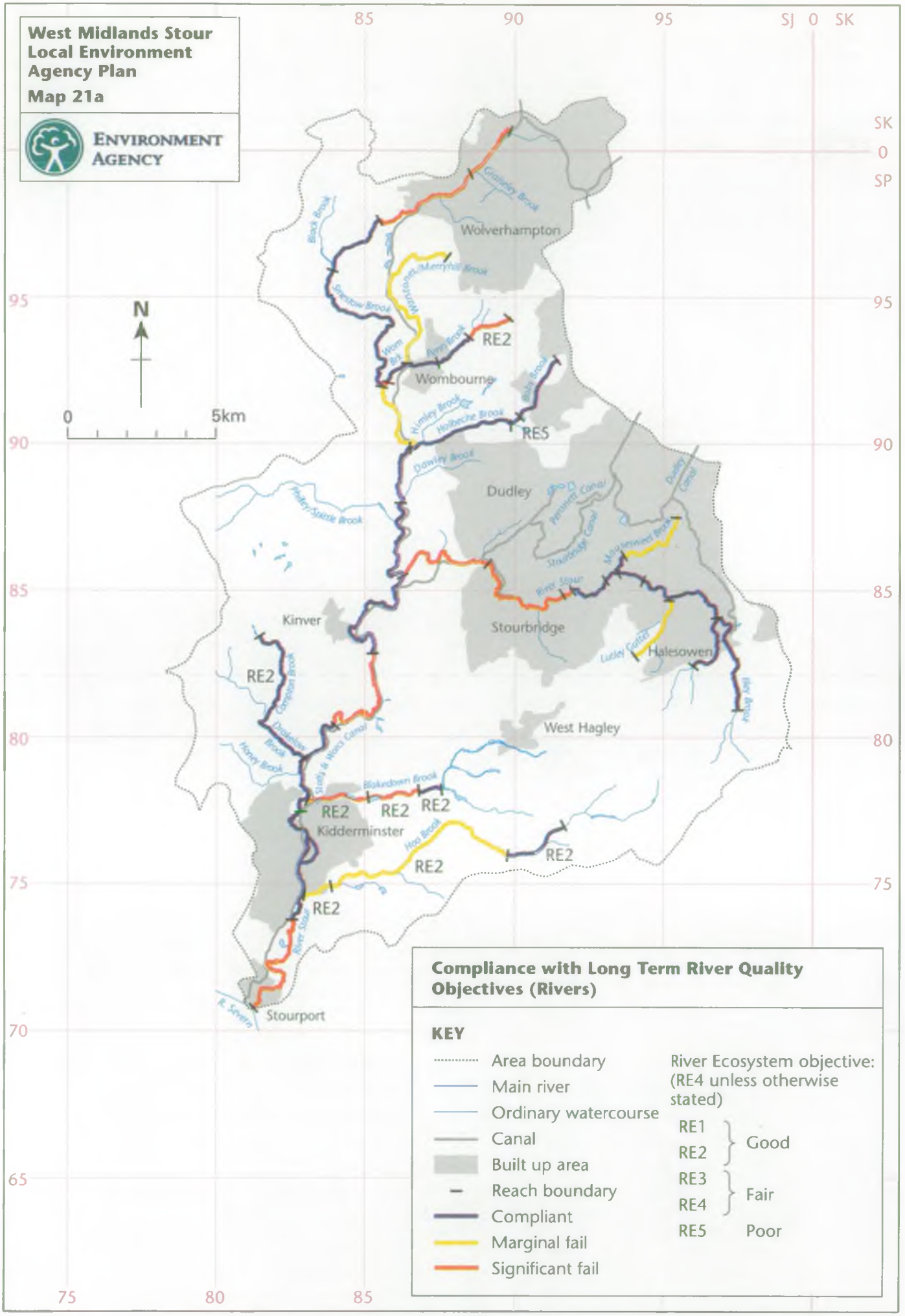
Highlighted lines indicate significant or marginal failure of the RE Class limits for that stretch of watercourse.

* Indicates that the Medium Term Objective is not being used ie. we are working to the Long Term Objective for this stretch of watercourse

NAME OF WATERCOURSE	START OF STRETCH	END OF STRETCH	LENGTH of STRETCH (km)	CURRENT QUALITY 1996	MEDIUM TERM OBJECTIVE	LONG TERM OBJECTIVE
River Stour	Tack Farm Bridge	Confluence with Illey Brook	1.5	RE2	RE3	RE4
River Stour	Confluence with Illey Brook	Footbridge at Lodge Forge	4.0	RE2	RE3	RE4
River Stour	Footbridge at Lodge Forge	Confluence with Mousesweet Brook	1.0	RE3	*	RE4
River Stour	Confluence with Mousesweet Brook	Confluence with Salt Brook	1.0	RE2	*	RE4
River Stour	Confluence with Salt Brook	Freehold STW	2.0	RE3	RE4 (2000)	RE4
River Stour	Freehold STW	Caledonia STW	1.0	RE5 (significant)	RE4 (2000)	RE4
River Stour	Caledonia STP	Confluence with Audnam Brook	3.5	RE5 (significant)	RE4 (2000)	RE4

NAME OF WATERCOURSE	START OF STRETCH	END OF STRETCH	LENGTH of STRETCH (km)	CURRENT QUALITY 1996	MEDIUM TERM OBJECTIVE	LONG TERM OBJECTIVE
River Stour	Confluence with Audnam Brook	Confluence with Smestow Brook	3.0	RE5 (significant)	RE4 (2000)	RE4
River Stour	Confluence with Smestow Brook	Roundhill STW	4.5	RE4	RE4 (2000)	RE4
River Stour	Roundhill STW	Cookley Road Bridge	3.3	RE5 (significant)	RE4 (2000)	RE4
River Stour	Cookley Road Bridge	Blakedown Brook	4.5	RE4	RE4 (2000)	RE4
River Stour	Blakedown Brook	Kidderminster STW	4.0	RE4	RE4 (2000)	RE4
River Stour	Kidderminster STW	Confluence with River Severn	5.0	RE5 (significant)	RE4 (2000)	RE4
Illey Brook	Footbridge at Twiland Wood	Confluence with River Severn	3.5	RE3	RE3	RE4
Lutley Gutter	Road Bridge, Lutley Lane	Confluence with River Stour	2.4	RE3 (marginal)	*	RE2
Mousesweet Brook	Withymoor Road	Confluence with Black Brook	2.2	RE5 (marginal)	*	RE4
Mousesweet Brook	Confluence with Black Brook	Confluence with River Stour	0.8	RE3	RE3	RE4
Smestow Brook	Aldersley Stadium	Compton Overflow	2.0	RE5 (significant)	RE5	RE4
Smestow Brook	Compton Overflow	Trescott STW	3.5	RE5 (significant)	RE4 (2000)	RE4
Smestow Brook	Trescott STW	Confluence with Unnamed Tributary	2.5	RE4	*	RE4
Smestow Brook	Confluence with Unnamed Tributary	Confluence with Wom Brook	6.0	RE3	*	RE4
Smestow Brook	Confluence with Wom Brook	Confluence with Holbeche Brook	2.8	RE5 (marginal)	RE4 (2000)	RE4
Smestow Brook	Confluence with Holbeche Brook	Confluence with Dawley Brook	2.0	RE4	*	RE4
Smestow Brook	Confluence with Dawley Brook	Confluence with River Stour	3.0	RE4	*	RE4
Wom/Penn Brook	Gospel End STW	A643 Road Bridge	2.0	RE5 (significant)	RE5	RE2
Wom/Penn Brook	A643 Road Bridge	Gravel Hill Road Bridge	1.1	RE3	*	RE4
Wom/Penn Brook	Gravel Hill Road Bridge	Wombourne STW	2.0	RE3	*	RE4
Wom/Penn Brook	Outfall Wombourne STW	Smestow Brook	0.5	RE5 (significant)	RE5 (2000)	RE4
Merryhill Brook	Road Bridge Newhouse Farm	Confluence with Wom Brook	5.8	RE5 (marginal)	*	RE4

NAME OF WATERCOURSE	START OF STRETCH	END OF STRETCH	LENGTH of STRETCH (km)	CURRENT QUALITY 1996	MEDIUM TERM OBJECTIVE	LONG TERM OBJECTIVE
Bobs Brook	Spout House	Lower Gornal STW	2.0	RE3	*	RE4
Bobs Brook	Lower Gornal STP	Holbeche Confluence	0.5	RE5	*	RE5
Holbeche Brook	Confluence with Bobs Brook	Confluence with Smestow Brook	3.3	RE3	*	RE4
Drakelow Brook	Lydiates Farm	Confluence with River Stour	5.0	RE2	*	RE2
Blakedown Brook	Gallows Brook	Blakedown STW	0.9	RE2	RE3	RE2
Blakedown Brook	Blakedown STW	Road Bridge Hurcot	1.9	RE5 (significant)	RE4	RE2
Blakedown Brook	Road Bridge Hurcot	Confluence with River Stour	2.0	RE4 (significant)	RE4	RE2
Hoo Brook	Belbroughton	Hillpool Road Bridge	2.5	RE2	*	RE2
Hoo Brook	Hillpool Road Bridge	Spennells Road Bridge	7.0	RE3 (marginal)	RE3	RE2
Hoo Brook	Spennels Road Bridge	Confluence with River Stour	1.1	RE3 (marginal)	RE4	RE2
Staffs & Worcs Canal	Oxley Railway Bridge	A41 New Bridge	2.0	RE4	*	RE5
Staffs & Worcs Canal	A41 New Bridge	Compton Locks	1.2	RE4	RE4 (2000)	RE4
Staffs & Worcs Canal	Compton Locks	Road Bridge Swindon	10.0	RE4	RE4 (2000)	RE4
Staffs & Worcs Canal	Swindon	Worcester Road, Kidderminster	20.0	RE3	RE3 (2000)	RE3
Staffs & Worcs Canal	Worcester Road, Kidderminster	River Severn	6.2	RE4 (marginal)	RE3 (2000)	RE3
Stourbridge Canal	Dudley Canal	Staffs & Worcs Canal	5.5	RE3	*	RE3
Dudley Canal	Junction with Stourbridge Canal	Blackbrook Bridge	5.0	RE4 (marginal)	*	RE3
Dudley Canal	Blackbrook Brook	Doulton Road, Rowley Regis	3.5	RE4	*	RE4
Dudley Canal	Doulton Road, Rowley Regis	Halesowen	4.0	RE3	*	RE4


West Midlands Stour Local Environment Agency Plan
Map 21a
Environment Agency
85
90
95
SJ 0 SK
SK
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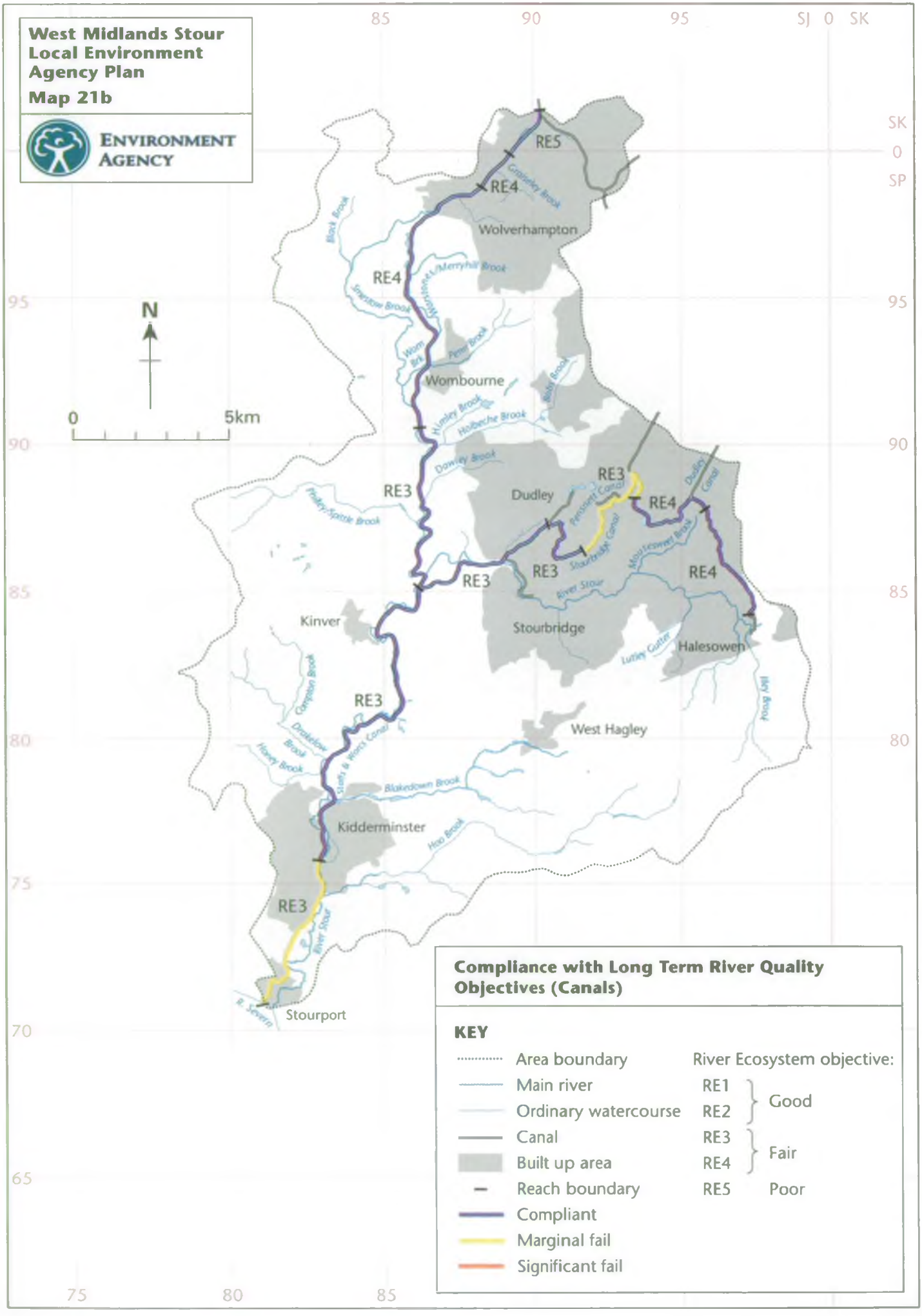
SP
95
90
85
80
75
70
65
N
0
5km
Wolverhampton
Wombourne
Dudley
Kinver
Stourbridge
Halesowen
West Hagley
Kidderminster
Stourport
RE2
RE5
Compliance with Long Term River Quality Objectives (Rivers)
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Built up area
Reach boundary
Compliant
Marginal fail
Significant fail
River Ecosystem objective: (RE4 unless otherwise stated)
RE1
RE2
Good
RE3
RE4
Fair
RE5
Poor

West Midlands Stour Local Environment Agency Plan

Map 21b

ENVIRONMENT AGENCY



Compliance with Long Term River Quality Objectives (Canals)

KEY

Area boundary	River Ecosystem objective:		
Main river	RE1	Good	
Ordinary watercourse	RE2		
Canal	RE3	Fair	
Built up area	RE4		
Reach boundary	RE5	Poor	
Compliant			
Marginal fail			
Significant fail			

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.

The graph below shows the trend in pollution incidents from 1993/4 to 1996/7 and Table 22 (page 145) summarises the number of pollution incidents for 1996/7 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:

Emergency Hotline: 0800 80 70 60 (Open 24hrs a day)

Figure 12 Overall Trend of Reported Pollution Incidents by Type 1993/4 - 1996/7

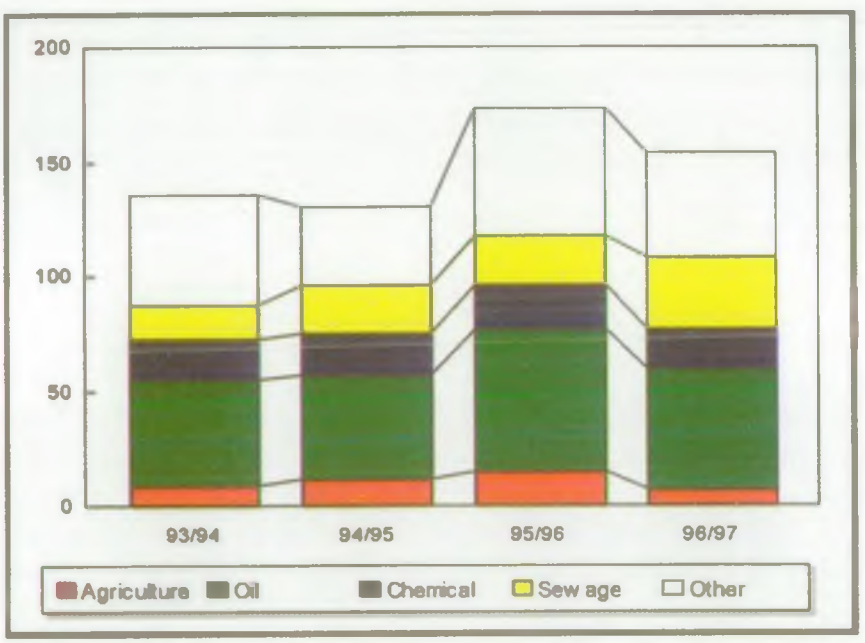


Table 22 Pollution Incidents by Type and Cause for 1996/97

		Class 1	Class 2	Class 3	Cumulative Total
TYPE	Agriculture	0	0	7	7
	Oil	0	0	52	52
	Chemical	0	0	18	18
	Sewage	1	2	28	31
	Other	0	0	46	46
	TOTAL	1	2	151	**154**
CAUSE	Industry & Commercial	0	0	55	55
	Agriculture	0	0	6	6
	Water Utility Company	1	2	30	33
	Other	0	0	60	60
	TOTAL	1	2	151	**154**

Class 1- Major incident Class 2- Significant incident Class 3-Minor incident
Number of unsubstantiated incidents: 46

6.2.2.2 Groundwater

Targets

Nitrate Sensitive Areas

The present Nitrate Sensitive Areas (NSAs) 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 which contribute to designated boreholes. Within these, farmers can voluntarily join the scheme and opt for one of a number of measures involving increasingly restrictive agricultural practices. These are 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 five years. All Nitrate Sensitive Areas lie within a Nitrate Vulnerable Zone (NVZ), (explained below), and the four NVZs within the plan area have associated NSAs.

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:

* Designate 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/l 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 50 mg/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, NVZs have been established. These are areas in which any rain draining through the soil is thought to contribute to the water drawn through 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 a 95% confidence limit 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 that passed similar tests.

The zones were put out to public consultation in 1994, any comments received were answered and 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 of 1995. The boundaries of the NVZs were published in 1996.

The measures to be taken in the NVZs ('the action plan') have been put out for public consultation and are likely to be in line with the MAFF 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 these zones.

NVZs are statutory areas and when the scheme is implemented prior to December 1999, adherence to the action plan will be compulsory. These programmes will replace the current NSA voluntary scheme. The Agency will continue to monitor nitrate levels in groundwater and will redefine Nitrate Vulnerable Zones as appropriate.

State of the Area

The quality of groundwater in the Stour catchment is generally good, particularly in the areas underlain by the Sherwood Sandstone Group. However, the eastern part of the area is underlain by the Coal Measures within which groundwater quality can be affected naturally by the minerals in the strata and by chemical changes induced by the closure of coal mines.

Certain areas yield poor quality water as a result of contamination related to urban and industrial development. The accumulation of waste from widespread industry in the upper reaches of the catchment has created large tracts of contaminated land, which can result in the pollution of groundwater due to the leaching of contaminants.

Potable groundwater quality is also at risk in the areas of the public water supply abstractions at Kinver, Hinksford, Tom Hill, and Wildmoor (which includes the abstraction at Hagley), (see Map 6, page 22) where the Sherwood Sandstone has insufficient natural protection against contamination by nitrates leaching from agricultural sources. These areas have been designated by the Agency as Nitrate Vulnerable Zones (see Issue 3, page 37).

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 no new development is built which would be at risk from flooding and that existing flood risks are not increased by development. Where re-development occurs, the Agency seeks to reduce flood risk by close liaison with Local Planning Authorities. In March 1997, the Agency published "Policy and Practice for the Protection of Floodplains", which sets out flood defence policies and the reasons behind them. 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 (see Appendix 4, page 161). The following targets are used:-

* The actual SoS of rivers should meet their target SoS for the land use band (see Appendix 4).

* 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 operate 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 Area

Regulation

Pressure for development in the flood plain is usually associated with urban areas. The growth of the West Midlands conurbation means that there is constant pressure on the floodplains of the River Stour and Smestow Brook in particular.

In the town of Kidderminster, advice is given to developers and the Planning Authority, Wyre Forest District Council, regarding minimum finished floor levels. However, the flooding risk is likely to considerably reduce if the Kidderminster Town Centre development takes place. The removal of existing restrictions to flow under the Brintons carpet factory will enable a substantial improvement to flood flow capacity of the Stour to be made (see Issue 8, page 46).

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 (see Appendix 4, page 161). There are also many individual sites where flooding problems occur.

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 1997 (now under Section 105 of the Water Resources Act 1991). The flooding problems identified within the area of this LEAP are shown on Map 11 (page 93) and are listed in Table 23 (page 149). 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 ie. that the scheme is technically feasible and economically and environmentally viable.

Flood Warning

In this area, only the River Stour in Kidderminster is covered by a flood warning service. The service aims to provide two hours warning of serious flooding in the town. The flood warning reach is shown on Map 11 (page 93).

Table 23 River Stour and Tributaries Flooding Problems (1997 Survey)

Code No	Watercourse	Location
DUDLEY METROPOLITAN BOROUGH COUNCIL		
2-92-310-1	**River Stour** & Coalbournbrook	SO 894 850 to SO 888 859
2-92-310-5	**Mousesweet Brook**	SO 935 856 to SO 955 876
2-92-310-6	Holbeche Brook	SO 925 905 to SO 883 906
2-92-310-7	Wordsley Brook	SO 907 876 to SO 893 868
2-92-310-10	Stepping Stones Brook	SO 909 835
2-92-310-11	Dawley Brook	SO 886 894
2-92-310-12	Penn Brook	SO 908 947
2-92-310-13	Gospel End Brook	SO 909 936
2-92-310-14	Unnamed	SO 898 822
2-92-310-15	Tributary of the River Stour	SO 891 865
2-92-310-16	Tributary of the River Stour	SO 898 828
SANDWELL METROPOLITAN BOROUGH COUNCIL		
2-92-410-1	**Mousesweet Brook**	SO 935 856 to SO 955 876
SOUTH STAFFORDSHIRE DISTRICT COUNCIL		
2-99-610-5	**Smestow Brook**	SO 855 926 to SO 861 905
2-99-610-6	**Wom Brook**	SO 891 944 to SO 855 920
2-99-610-7	**Warstones Brook**	SO 873 951 to SO 865 925
2-99-610-9	Penn Brook	SO 908 947
2-99-610-10	Gospel End Brook	SO 909 936
2-99-610-11	**River Stour**	SO 860 849 to SO 853 829
2-99-610-12	**Smestow Brook**	SO 856 918
2-99-610-13	**Smestow Brook**	SO 855 925
2-99-610-14	**Smestow Brook**	SO 837 953
2-99-610-15	**Warstones Brook**	SO 867 937
2-99-610-16	Unnamed	SO 861 958
WOLVERHAMPTON METROPOLITAN BOROUGH COUNCIL		
2-92-710-2	Smestow Brook	SO 871 983 to SO 874 985
WYRE FOREST DISTRICT COUNCIL		
2-87-910-3	**River Stour**	SO 828 775 to SO 828 758
2-87-910-4	**Blakedown Brook**	SO 877 788
2-87-910-5	Barnett Brook	SO 895 762
2-87-910-6	Tributary of the River Stour	SO 823 818 to SO 821 812
2-87-910-10	**River Stour**	SO 813 708
2-87-910-11	**River Stour** and tributary	SO 829 794 and SO 829 792
2-87-910-12	**River Stour**	SO 840 805

The wording in bold in the table represents flooding problems on main rivers.

6.3 Wildlife and Amenity

6.3.1 Fisheries

The Agency's principal aim is:

* to maintain, improve and develop fisheries.

Targets

The fisheries targets for the Stour are:

* To maintain existing fish habitats in the catchment and where possible complement improvements in water quality with appropriate fishery habitat development.

* To maintain an abundance of cyprinids and, where water quality permits, trout which is related to the expected carrying capacity of the physical environment.

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

State of the Area

Habitat Quality

Much of the Stour is physically suitable to support trout and coarse fish. In some of the towns that the river flows through there are canalised sections enclosed by brick and concrete but generally the river channel is relatively natural with a predominantly gravelly substrate. Water quality is the limiting factor as far as the fish populations are concerned with significant amounts of treated effluent entering the watercourses at various points in the upper catchment and rendering the water unsuitable for many species of fish.

Water Quantity

Low flow problems occur in the West Midlands Stour catchment and pose a potential threat to some of the more sensitive fish populations. The Philley Brook, which contains one of the few remaining trout populations in the catchment suffers from excessive abstraction and had experienced frequent dewatering as a result of illegal impoundment until appropriate legal action by the Agency alleviated the problem. 'Licences of Right' to abstract form the brook still exist and could cause continued problems. The provision of a borehole at the upstream end of the brook could well be of great benefit to the protection of this important trout population.

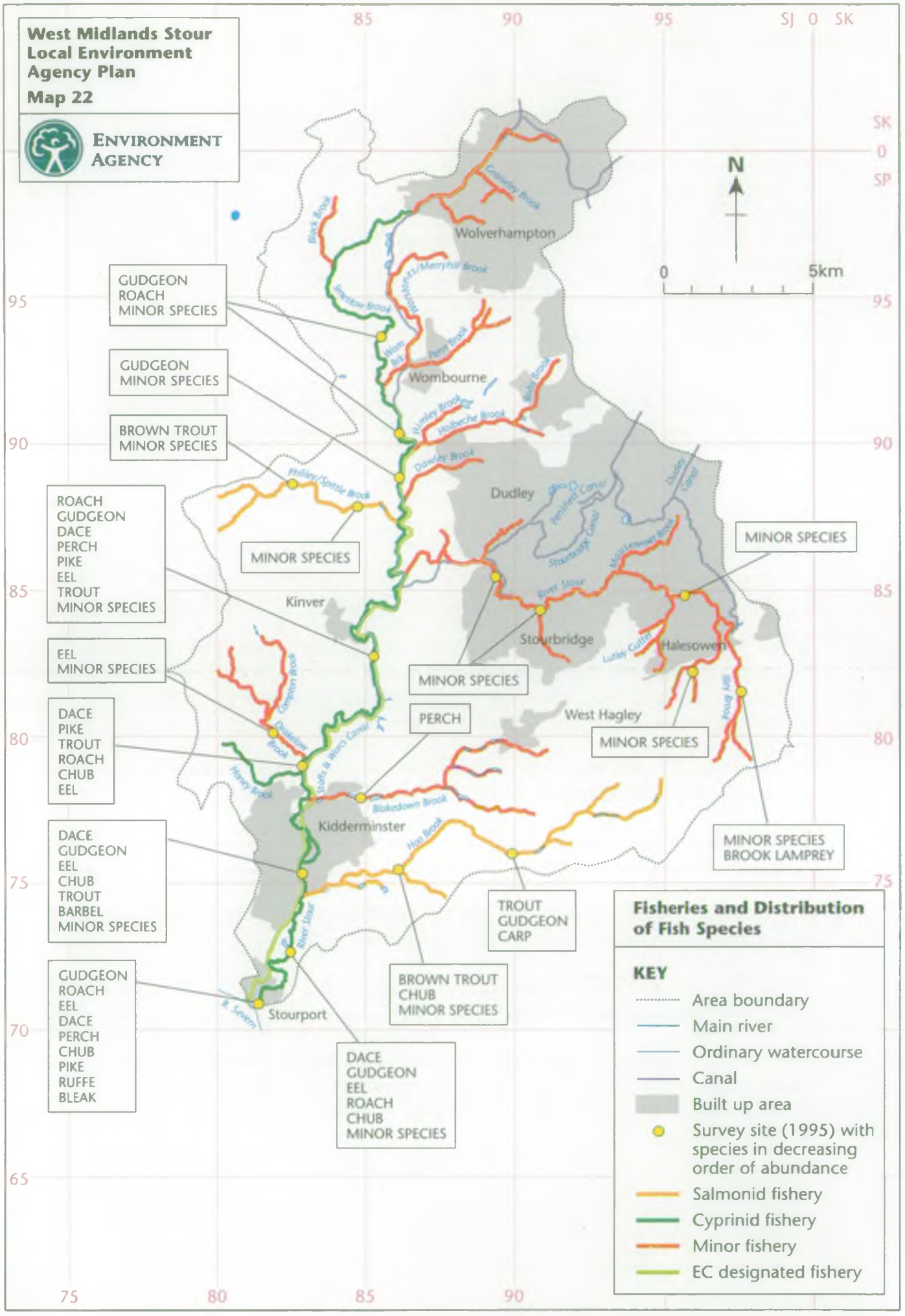
Stock Levels

Stock levels are monitored by electric fishing surveys carried out at twenty sites on the River Stour and tributaries. The most recent survey was in 1995 when it was found that fish abundance at eight of the sites had increased since the 1991 survey and had declined at five. Distribution of trout in the catchment had also increased since 1991, with the species caught at Kidderminster for the first time since surveys began.

Map 22 (page 152) shows the location of the sampling sites and lists the species of fish present in decreasing order of abundance (number). The confluence with the Smestow Brook marks a dramatic change in fish populations with extremely poor numbers of minor species (stoneloach, sticklebacks, gudgeon) above this point and reasonable to good populations of angling species (roach, dace, perch, pike, chub and, at one site, barbel) below. A solitary carp weighing 3.1 kilo was captured on the Hoo Brook but is thought to have been introduced from a local ornamental pool.

Numbers of trout on the River Stour itself were low but the presence of trout at Whittington, Wolverley and Kidderminster indicates some improvement in water quality in the lower part of the river over the last five years. On the Hoo Brook trout populations had more than doubled at both sites. On the Philley Brook trout numbers had doubled at the upstream site since 1991, but there was still an absence of trout from the lower site on the brook. This is probably due to periodical severe flow reductions linked to historic abstraction rights, rendering this part of the brook uninhabitable by fish.

A survey of the Staffs. & Worcs. Canal in March 1997 from Oxley to Stourport revealed continuing recovery from the 1994 pollution incident which caused extensive fish mortalities in the upper part of this length of canal. Fish abundance is still considerably lower than pre-pollution estimates in the affected stretches but is higher than in the immediate post-pollution survey. Further downstream towards Stourport the fish populations are still sound but here too there were generally fewer fish than in previous samples.


West Midlands Stour Local Environment Agency Plan
Map 22
Environment Agency
SJ 0 SK
SK 0 SP
N
0
5km
Wolverhampton
Wombourne
Dudley
Kinver
Stourbridge
Halesowen
West Hagley
Kidderminster
Stourport
GUDGEON ROACH MINOR SPECIES
GUDGEON MINOR SPECIES
BROWN TROUT MINOR SPECIES
ROACH GUDGEON DACE PERCH PIKE EEL TROUT MINOR SPECIES
MINOR SPECIES
EEL MINOR SPECIES
DACE PIKE TROUT ROACH CHUB EEL
DACE GUDGEON EEL CHUB TROUT BARBEL MINOR SPECIES
GUDGEON ROACH EEL DACE PERCH CHUB PIKE RUFFE BLEAK
DACE GUDGEON EEL ROACH CHUB MINOR SPECIES
BROWN TROUT CHUB MINOR SPECIES
TROUT GUDGEON CARP
PERCH
MINOR SPECIES
MINOR SPECIES BROOK LAMPREY
Fisheries and Distribution of Fish Species
KEY
Area boundary
Main river
Ordinary watercourse
Canal
Built up area
Survey site (1995) with species in decreasing order of abundance
Salmonid fishery
Cyprinid fishery
Minor fishery
EC designated fishery

6.3.2 Conservation

The Agency's 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.

Targets

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

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

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

* 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 and features of archaeological, architectural, engineering or historic interest are preserved.

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

* To encourage the development of riparian buffer zones 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 area and obtain additional information on the distribution and abundance of such species.

* To maintain, and where necessary restore, ground and surface water quality and levels so that sensitive wetland ecosystems are protected.

The Agency is developing targets for species and habitats of conservation concern. These relate to the targets for key wetland species as identified in the UK Biodiversity Action Plan. The Agency is responsible for a number of water related species and habitats set out in this LEAP.

State of the area

The main influence on the catchment continues to be the pressure from intensive land use. At the same time the large population need access to green spaces, and careful planning is crucial to ensure that the needs of both people and wildlife are met. An increase in the acceptance and understanding of urban nature conservation over the last fifteen years has meant that many of these issues are now being addressed. The general lack of habitat gives any green area an importance that it may not otherwise be afforded, this also means that these areas, such as derelict land and manicured parks, all have a great potential in nature conservation terms. Green corridors are of particular importance to wildlife. Their importance is highlighted in the Black Country Nature Conservation Strategy compiled and published by all the Local Authorities in the area and English Nature. There is still much collaborative work to do, particularly in the sphere of influencing private developers. (See Issue 18, page 60).

Further environmental degradation, such as fly tipping and vandalism, occurs throughout the urbanised area (see Issue 6, page 42).

The over abstraction of groundwater from the Sandstone aquifer across the catchment is of major concern (see Issues 4 and 5, pages 38 and 39). The effects of this are most pronounced in the tributaries and associated pool system of the Hoo and Blakedown Brooks. The desiccation of these sites is leading to a loss in continuity of the ecological corridor as well as a general degradation in habitat. Windmill Pool has disappeared completely and at others rank vegetation, such as nettles, is invading what was once prime wetland habitat.

Biodiversity

Otters, water voles and great crested newts as well as marshland habitats are all highlighted in the UK Biodiversity Action Plan. Issue 15 (page 56) sets out the Agency's proposed approach to these and other species.

Otters

Recent evidence shows that otters (*Lutra lutra*) are moving back into the Stour area, evidence has been found in and around the Kidderminster area and at Stourport. Whilst water quality, a lack of food, disturbance and urban development are still limiting factors in their recolonisation many of the smaller tributaries provide highly suitable habitat.

Great Crested Newts

These are present in considerable numbers in the catchment with concentrations at Fens Pool in Dudley where their protection is ensured by the Local Authority, English Nature and a local wildlife group.

Water Voles

Water voles (*Arvicola terrestris*) are present in the catchment and are thriving particularly near the Smestow Brook in Wolverhampton and on the canal network. Protecting existing populations may therefore be particularly important.

Marshland

A number of factors ranging from development, lowered ground water levels, flood alleviation and changes to the traditional management regimes, have contributed to a general degradation and drying up of these areas. The Agency, in conjunction with other bodies, has been carrying out a range of works on Puxton and Stourvale, Wilden marshes, which are all SSSIs, and Spennells Valley, aimed at restoring these areas to their former value (see Issue 15, page 56).

Water Vole

Pollarding at Puxton Marsh, Kidderminster

6.3.3 Recreation

The Agency's principal aim is:

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

Targets

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 targets set must therefore take account of these conflicts and 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 recreational duties.

When implementing this broad strategy in the West Midlands Stour 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, to places of natural beauty and to buildings, sites of archaeological, architectural, engineering and historic interest.

* To encourage the development of footpath access.

* 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.

State of the area

Full recreational use of the water environment is restricted by the poor water quality. There are some opportunities for angling and sailing but, in relation to the large population of the area, these sports are generally poorly catered for. Water related recreation facilities for the disabled are limited.

The Agency actively supports joint initiatives such as the Stour Valley and Wom Brook walks. Access in the urbanised areas of the West Midlands Stour is often difficult (see Issue 17, page 59) and the Agency recognises that there are sometimes conflicts between different users of these areas.

British Waterways and the Inland Waterways Association have programmed many restoration schemes for the canals in the area, some examples are given in Section 5.16 (page 117), these will play a vital role in helping to improve the recreational use of the area and protect its cultural heritage.

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 so, to protect or enhance the environment, taken as a whole, as to make the contribution towards attaining the objective of achieving sustainable development"

A summary of the guidance given to the Agency by Government on contributing to sustainable development is set out below (Source: *An Environmental Strategy for the Millennium and Beyond*, Annex 1):

- Because the environment is shared, collective action is necessary;
- Decisions should be based on the best possible scientific information and analysis of risks;
- Where there is uncertainty and potentially serious risks exist, precautionary action maybe necessary;
- Ecological impacts must be considered, particularly where resources are non-renewable or effects may be irreversible;
- Cost implications should be brought home directly to the people responsible - the "polluter pays" principle;
- A holistic approach should be taken to environmental objectives;
- A long term perspective should be taken;
- Biodiversity should be conserved and enhanced and natural heritage protected;
- A contribution should be made to protecting the global atmosphere;
- The scope for reconciling the needs of the environment and those of development with regard to regulated organisations should be investigated;
- Close and responsive relationships with the public, local authorities, and other representatives of local communities should be developed;
- High quality information and advice should be used by the Agency and provided to others; and
- Judgements will have to be made about the weight to be put on these factors in particular cases.

In order to address the points set out above the Agency will use its statutory powers and work in 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:

Water Quantity and Quality

Rainfall
Rainfall is measured by 7 daily gauges. They are read by observers who send returns to the Agency on a monthly basis for data quality control and archiving. This information is sent to the Meteorological (MET) Office, at one site the information goes direct to the MET Office. In addition, there are 2 automatic raingauges capable of measuring rainfall intensity, these can be contacted by the computer-based forecasting system which is based at our Head Office in Solihull.

River Levels and Flows
Levels are continuously recorded at 5 sites, flows can be derived at 2 sites and there is 1 multipath ultra sonic gauge. These sites have telemetry 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.

Monitoring Associated with Alleviation of Low Flows (ALF) (Blakedown)
Involvement with monitoring low flow conditions in the Blakedown area extends to 6 permanent data loggers monitoring ground and surface water levels.

Groundwater Quantity and Quality - Observation Boreholes
A network of 62 observation boreholes is maintained to monitor groundwater levels, primarily reflecting the regional importance of the Sherwood Sandstone aquifer.

The area has significant aquifers used extensively for abstraction and samples are taken by the Agency from a network of 17 groundwater chemistry monitoring sites. Groundwater samples are also taken at monitoring boreholes around waste disposal sites.

Surface Water Quality - Chemical monitoring
Water Quality samples are taken on a monthly basis from a network of 72 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.

The table below sets out the water quality criteria used to determine the RE Class for a particular stretch of river (see Section 6.2.2)

Table 24 Water Quality Criteria relating to the RE Classification

Class	Dissolved Oxygen % saturation 10 percentile	BOD (ATU) mg/l 90 percentile	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/lCaCO$_3$	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	-	-	-	-	-

Table 25 GQA Chemical Grading for Rivers and Canals

Water Quality	Grade	Dissoloved Oxygen (% saturation) 10-percentile	BOD (ATU)[1] (mg/l) 90 -percentile	Ammonia (mgN/l) 90-percentile
Very good	A	80	2.5	0.25
Good	B	70	4	0.6
Fairly good	C	60	6	1.3
Fair	D	50	8	2.5
Poor	E	20	15	9.0
Bad	F[2]			

[1] as suppressed by adding allyl thio-urea
[2] ie. quality which does not meet the requirements of grade E in respect of one or more determinands

Surface Water Quality - 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 29 sites, which are generally matched with chemical sampling sites. In addition, planned catchment surveys are carried out at a lower frequency as well as work to investigate poor routine site results and post-pollution incident impact assessments.

Waste Management

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. 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 and outside the site is undertaken to detect any migration of gas from site and leachate contamination of surface and groundwaters.

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 19 sites on the main river and tributaries. The Staffs. & Worcs. Canal has also been monitored three times during the last five years. 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.

APPENDIX 3

Policy and Practice for the Protection of Groundwater

The Agency's "Policy and Practice for the Protection of Groundwater" provides advice on the management and protection of groundwater on a sustainable basis. This policy deals with the concepts of vulnerability and risk to groundwater from a range of human activities. It considers both source and resource protection, i.e. protection for the area which drains to the abstraction point (source) and protection for the total area of the aquifer irrespective of abstractions (resource).

It deals in particular with:-

* Control of groundwater abstractions.
* Physical disturbance of aquifers and groundwater flow.
* Discharges to underground strata.
* Waste disposal to land.
* Disposal of slurries and sludge to land.
* Contaminated land.
* Diffuse pollution.
* Unacceptable activities in high risk areas.

The implementation of the policy relies in part on the construction of a series of maps showing groundwater vulnerability (resource protection). In addition, source protection zones are being modelled to define the catchments of abstractions to ensure source protection.

In respect to resource protection the policy recognises three types of aquifer:-

Major Aquifers are highly permeable formations usually with a known or provable presence of significant fracturing. They may yield large quantities of water for public supply or other purposes.

Minor Aquifers can be fractured or potentially fractured rocks which do not have a high primary permeability, or other formations of variable permeability. Although these aquifers will seldom yield large quantities of water for abstractions, they are important for local supplies and in supplying base flows for rivers.

Non-Aquifers are formations with negligible permeability that are generally regarded as not containing groundwater in exploitable quantities.

These different aquifer types relate to the vulnerability of the groundwater resources to pollution and are used in conjunction with other information in the development of the groundwater vulnerability maps being published by the Agency.

The policy recognises three source protection zones:-

Zone I (Inner Source Protection): Immediately adjacent to the source area defined by a 50 day travel time from any point below the water table to the source (based on biological contaminant decay).

Zone II (Outer Source Protection): Area defined by 400 day travel time (based on the delay and attenuation of slowly degrading pollutants).

Zone III (Source Catchment): The complete catchment area of groundwater source.

The controls to be exerted on a given activity will be more stringent, the more vulnerable the resource and the nearer the source. These protection zones apply to major aquifers and to minor aquifers where the aquifer provides a critical resource.

APPENDIX 4

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 rather 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 (now DETR) 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 and where appropriate we will require measures to control surface water to be incorporated into the overall scheme.

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.

Table 26 Sandards 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 liaison meetings 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 (see Issue 9).

APPENDIX 5

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:

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 Hazardous Waste Directive (94/67/EEC)
List of Hazardous 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))
Integrated Pollution Prevention and Control Directive (96/61/EC)
Incineration of Municipal Waste Directive (89/369/EEC)

APPENDIX 6

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 7

Results of Informal Issues Consultation

During September 1997, all County, District and Borough councils in the LEAP area were contacted, together with representatives of over fifty other organisations who have an interest in the local environment. This pre-consultation exercise was designed to focus on key groups and organisations that were likely to have information on and ideas about the sort of environmental problems facing the area, and to give them an opportunity to comment on the issues the Agency see as important in the West Midlands Stour area. Twenty three of the ninety five consultees responded (24.2%). The members of the Area Environment Group sub-group for the Stour area were also consulted. The breakdown of responses received is given below.

Overall comments on the issues raised were supportive and the opinion from many of the respondees was that the issues list was comprehensive. However, some additional specific issues did arise from the consultation responses and these have been incorporated into the issues in Section 3, where appropriate. Many other more general points were also raised which have been included in other sections of the plan. The Agency is grateful for all comments received.

The main areas of interest were: environmental quality and improvements, in particular in terms of water quality, the impacts of development including water quality issues, contaminated land and support for deculverting of watercourses, problems relating to water resources especially low flows and the restoration and use of canals in the area for recreation/conservation.

Table 27 Number of Responses from Consultees within Categories

Classification of Consultees	Number of Consultees	No of Responses	Percentage Response
Local Authority Departments (including Local Agenda 21 Representatives) and Parish Councils	30	11	36.7%
Water Companies	3	1	33.3%
Environmental Organisations/Groups (including Landscape and Geology)	7	1	14.3%
Heritage Organisations/ Groups	8	2	25.0%
Nature Conservation Organisations/Groups	8	1	12.5%
Agricultural and Forestry Organisations/Groups	8	1	12.5%
Rural/Urban Re-development Groups	4	3	75.0%
Recreation and Fisheries Organisations/Groups	12	0	0%
Local Industry and Business Groups	6	0	0%
General Consultees	9	3	33.3%
Total	95	23	24.2%

Consultee List for the Informal Issues Consultation (September 1997):

Area Environment Group (Stour sub-group)
Association of Local Councils
Birmingham Angling Association
Black Country Regeneration Working Group
Bridgnorth District Council
British Canoe Union
British Trust for Conservation Volunteers
British Waterways
Bromsgrove District Council
Business Link (Dudley)
Business Link (Hereford & Worcester)
Business Link (Redditch & Bromsgrove)
Business Link (Wyre Forest)
Churchill & Blakedown Parish Council
CPRE (Worcester)
CPRE (Staffordshire)
Country Landowners Association (Worcs)
Countryside Commission (West Midlands)
Dudley Metropolitan Borough Council
English Heritage (West Midlands Team)
English Nature (Three Counties)
English Nature (West Midlands)
Forestry Authority
FRCA (Bristol)
FRCA (Wolverhampton)
FRCA (Worcester)
Friends of the Earth (Staffordshire)
Friends of the Earth (Wyre Forest)
GKN Sankey Angling Club
Groundwork Black Country
Heart of England Tourist Board
Hereford & Worcester County Council
Inland Waterways Association (Black Country & Worcestershire)
Kidderminster & District Angling Assoc.
Kinver Freeliners
Kinver Parish Council
MAFF (Worcs., Staffs & West Midlands)
Middleton Angling Association
National Farmers Union (West Midlands)
National Urban Forestry Unit
Otter Project Wales
Ramblers Association (Hereford & Worcester)
RSPB (Central England)
RSPB (North West England)
REPAC (Mrs P Perry)
RFAC (Mr G Ayres)
RFDC (J Dainty OBE)
Rural Development Commission
Salmon & Trout Assoc. (Shropshire & W. Mids)
Sandwell Metropolitan Borough Council
Severn Fisheries Consultative Council
Severn Trent Water Plc
Shropshire Wildlife Trust
South Staffordshire District Council
South Staffordshire Water Plc
Sports Council (West Midlands)
Staffordshire County Council
Staffordshire Wildlife Trust
Tern Fisheries
The National Trust (Mercia Region)
The National Trust (Severn Region)
Tomkinsons Plc.
Urban Wildlife Trust
West Midlands Umbrella Group
West Midlands Regional Forum of LA's
Wolverhampton Metropolitan Borough Council
Worcestershire Wildlife Trust
Wyre Forest District Council

APPENDIX 8

Environment Agency Leaflets and Information

Listed below is a selection of leaflets available from the Environment Agency. It is intended as a guide to the type of information available rather than as a complete list as new leaflets are being produced. It does not include policy documents or technical reports.

GENERAL INFORMATION
- A Guide to Information Available to the Public
- Guardians of the Environment
- 0800 Leaflet (Emergency Hotline)
- Customer Charter
- Corporate Plan Summary 1997/1998
- Annual Report and Accounts
- Complaint and Commendation Procedure
- Worldwide Web - State of the Environment
- The Environment of England and Wales - A Snapshot
- Green Shoots - Strategy for Environmental Education
- An Environmental Strategy for the Millennium and Beyond

WATER QUALITY/POLLUTION PREVENTION
- Blue Green Algae
- Identifying Freshwater Life
- 'How to Avoid' Pollution Series
- Making the Right Connection - Avoiding Water Pollution
- Designs that Prevent Pollution - Nature's Way
- Farm Waste Management Plans
- The Oil Care Code: a number of leaflets
- Pollution Prevention Guidelines (PPGs) : PPG1-PPG20
- Building a Cleaner Future
- Water Pollution Incidents in England and Wales - 1996 Report Summary
- Recovering the Cost of Pollution
- Accreditation Scheme for Spill Response Contractors
- Discharge to Controlled Water 1997-1998 Annual Charges
- Recommendations for Statutory Water Quality Objectives - the Worcestershire Stour Catchment
- Assessing Water Quality
- The Use of Licences to prevent pollution
- A Guide to Groundwater Vulnerability Maps
- A Guide to Sustainable Urban Drainage

INTEGRATED POLLUTION CONTROL (IPC) /RADIOACTIVE SUBSTANCES(RAS)
- Integrated Pollution Control Fees and Charges 1997/98
- Charging Scheme for Radioactive Substances Act Regulation 1997/98
- Integrated Pollution Control and You

WASTE
- What a Waste!
- Special Waste Regulations 1996 - How they affect you
- Classification of Special Waste
- Use of the Consignment Note
- Obtaining and Sending Consignment Notes
- Waste Regulation and You
- The Registration of Waste Carriers
- New Packaging Regulations - How do they affect you

- Clinical Waste
- Producer Responsibility Obligations 1997 (1st Ed, July 1997)
- Producer Responsibility Obligations (Packaging Waste) Regs 1997
- The Agency's Contribution to Sustainable Development Waste Minimisation

REGIONAL AND AREA INFORMATION

- Midlands Region Map
- Area Maps and Fact Sheets:
    - Upper Severn
    - Lower Severn
    - Upper Trent
    - Lower Trent
- Severn Bore and Trent Aegir 1997
- Partnership in Environment Protection
- Our Midlands Environment

FISHERIES CONSERVATION AND RECREATION

- Anglers and the Agency
- Rod Fishing Licences 1996/97
- Buyer Beware - Your Guide to Stocking Fish
- Fisheries News
- Fishing Guide 1997/98
- Conservation - Work in the Midlands Region
- Mink
- Understanding Buffer Strips
- Control of Invasive Plants Near Watercourses
- Have Fun, Have a Care (Water recreation information)
- Recreation Sites (Midlands)
- Enjoy Your Garden - Care for our Environment
- Conservation Designations
- Rod Fishing Bylaws
- The Severn Way
- Aquatic Weed Control Operation
- Phytopthora disease of Alder

FLOOD DEFENCE AND WATER RESOURCES

- Flood Warning Information: What to do if your property is at risk
- Flood Warning Information: Various rivers
- Schedule of Main Rivers
- Land Drainage Byelaws
- Water Abstraction Charges 1997/98
- Water Abstraction Can Cause Pollution
- Abstraction Licensing and Water Resources
- Spray Irrigation
- Making the most of your Spray Irrigation Abstraction Licence
- Water Alert - The Campaign for Water Conservation in England and Wales
- Information Sheets 1-23 - Flood Defence - various subjects
- Flood Defence Factsheet
- Application for Consent for works affecting watercourses and/or flood defences- Explanatory Notes
- Rivers and Wetlands - Best Practice Guidelines
- Defying the Disaster: Memories of the 1947 floods
- Safeguard the Environment: A guide for developers

Please contact Customer Services at your Area office for further information and to obtain these and other leaflets.

APPENDIX 9

Glossary

Abstraction	The removal of water from any source, either permanently or temporarily.
Abstraction Licence	A statutory document granted by the Environment Agency to permit removal of water from a source of supply. Section 38 Water Resources Act 1991.
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.
Alleviation of Low Flows (ALF)	The strategy for resolving environmental problems (eg caused by over-abstraction) in certain catchments.
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.
AOD (Above Ordnance Datum)	Land levels are measured relative to the average sea level at Newlyn in Cornwall. This average level is refered to as 'Ordnance Datum'. Contours on Ordnance Survey maps of the UK show heights in metres above Ordnance Datum.
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 (AMP)	Water Companies' Strategic Business Plans (see Section 3 Issue 1 and Section 6.2.2.1), part of the periodic review of water company charges.
Attenuation	Dilute or slow the spread of contamination or the speed of water flow.
Augment	The addition of water by artificial input. (Usually to "top up" low flows in summer by either groundwater pumping or via reservoir release.)
Baseflow	The proportion of river flow that is provided by groundwater discharge from an aquifer
Benzene	Air pollutant from fossil fuels released by vehicular traffic and by industry, carcinogenic. A target pollutant in the UK National Air Quality Strategy.
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.
1, 3 Butadiene	A gas derived mainly from the combustion of petrol and other materials. A carcinogenic and a target pollutant in the UK National Air Quality Strategy.

Carbon dioxide (CO_2)	Gas present in the atmosphere and formed during respiration, the decomposition and combustion of organic compounds (eg fossil fuels, wood etc). A greenhouse gas.
Carbon Monoxide (CO)	Gas formed by the incomplete combustion of fossil fuels. At very high exposures, prolonged exposure can be life threating. A target pollutant in the UK National Air Quality Strategy.
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.
Combined Sewer Overflow (CSO)	An overflow structure which permits a discharge from the sewerage system during wet weather conditions, and consists of both foul and surface water discharge.
Cone of Depression	The conical depression in the water table around a borehole produced by pumping from the borehole. The shape and extent of the cone depends on the rate of pumping, the length of time that pumping has continued and the hydraulic characteristics of the aquifer.
Consent (Discharge)	A statutory document granted by the Environment Agency to discharge effluent of specified quality and volume to a Controlled Water. Schedule 10 Water Resources Act 1991
Consent (Land Drainage)	An approval for specified structural works in, under or over a watercourse.
Controlled Waste	Industrial, household and commercial waste, as defined in UK legislation. Controlled waste specifically excludes mine and quarry waste, wastes from premises used for agriculture, some sewage sludge and radioactive waste.
Controlled Water	All rivers, canals, lakes, groundwater, estuaries and coastal waters to three nautical miles from the shore, including the bed and channel which may at some times be dry.
Culvert	Drain or covered channel carrying water across or under a road, canal etc.
Cyprinid fish	Coarse fish eg. Roach, Dace and Bream.
Dangerous Substances	Substances defined by the EC as in need of special control. This is because they are toxic, accumulate and condentrate in plants and animals, or do not easily breakdown into less dangerous substances. They are classified as List I or List II.
Demand Management	Activities to manage the amount of water required from a source of supply; includes measures to control waste and/or to discourage use.
Dry Weather Flow (Sewage)	For sewage works, this is calculated by adding the estimates of the domestic sewage discharge plus any industrial discharges plus infiltration into the sewer.
Dry Weather Flow (River)	For the river, this is taken to be what is known as the 95 percentile low flow (or Q95) which means the river is higher than the Q95 for 95% of the time.
EC Directive	A type of legislation issued by the European Community which is binding on Member States in terms of the results to be achieved but which leaves to Member States the choice of methods.
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 Quality Standard (EQS)	The concentration of a substance which must not be exceeded if a specific use of the aquatic environment is to be maintained.
Eutrophic	A description of water which is rich in nutrients. At worst, such waters are sometimes beset with unsightly growths of algae.

Evaporation	Water lost from a water body to air by a change in state from liquid to vapour.
Fauna/Flora	Animal life/Plant life
Ferme Ornee	Ornamental farm
Flood defences	Anything natural or artificial that protects against flooding, to a designed return period.
Floodplain	This includes all land adjacent to a watercourse over which water flows or would flow but for flood defences in times of flood.
Gauging station	A site where the flow of a river is measured.
General Quality Assessment (GQA)	A means of assessing and reporting environmental water quality in a nationally consistent and objective way.
Green Belt	A zone of countryside immediately adjacent to a town or city, and designated as Green Belt 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.
Habitat	The locality or environment in which a plant or animal species lives.
Hydrology	The study of water on or below the earth's crust.
Hydrometry	The measurement of water.
Hydrogeology	Branch of geology concerned with water within the earth's crust.
Integrated Pollution Control (IPC)	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.
Invertebrates	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, often from landfill sites.
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 were introduced from 1996 as a means of reducing those levels.
Nitrogen dioxide (NO_2)	An oxide of nitrogen produced by traffic and industry. This can have an adverse effect on human health ie. respiratory problems and is a target pollutant in the UK National Air Quality Strategy.
OFWAT	Office of Water Industry's Financial Regulator of Water Service Companies.

Ozone	Caused by a chemical reaction in sunlight, at lower levels in the atmosphere by oxides of nitrogen and volatile organic compounds reacting to form ozone. Affects the respiratory system. A target pollutant in the UK National Air Quality Strategy.
Particulates	Small particles of matter released from a number of sources which can affect the respiratory and cardiovascular systems. A target pollutant in the UK National Air Quality Strategy. PM_{10} - particles below 10μm.
Percolation	The descent of water through soil pores and rock crevices.
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.
pH	A measure of the acidity or alkalinity of a solution.
Potable water	Water of a quality suitable for drinking
Prescribed Flows	That flow which should not be artificially reduced if the riverine environment is to be protected.
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.
River Ecosystem Classification (RE)	See part of definition below for River Quality Objectives.
River Quality Objectives (RQO)	Water quality targets to secure specific formal minimum quality standards for specific stretches of water by given dates. A new component of these was introduced by "The Surface Waters (River Ecosystem Classification) Regulations 1994"; a classification scheme applied by the Agency to the rivers and watercourses of England and Wales.
Run Off	Water which runs off the surface of the ground, usually after heavy or prolonged rainfall.
Salmonid Fish	Game fish eg. trout and salmon.
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.
Sewage	Liquid waste from cities, towns and villages which is normally collected and conveyed in sewers for treatment and/or discharge to the environment.
Sewerage	System of sewers usually used to transport sewage to a sewage treatment works.
Sewage Treatment Plant (STP)	A private treatment plant capable of producing effluent to a higher quality than a septic tank, suitable for discharge to soakaway or watercourse.
Site of Special Scientific Interest (SSSI)	A site given a statutory designation by English Nature or the Countryside Council for Wales because it is particularly important, on account of its nature conservation value.
Sludge	The accumulation of solids from treatment processes. Sludge can be incinerated or spread on farm land.
Slurry	Animal waste in liquid form.
Soakaway	System for allowing water or effluent to soak into ground, commonly used in conjunction with septic tanks.

Source control	Techniques to dispose of surface water, other than to a watercourse or sewerage system, in order to reduce storm surchages and pollution.
Storm Sewage Discharges	The discharge of untreated sewage in times of heavy rainfall and high flows .
Sulphur dioxide (SO_2)	A gas which dissolves in water to give an acidic solution, can lead to acid rain affection ecosystems and water quality. Irritant when inhaled and may cause breathing difficulties. A target pollutant in the UK National Air Quality Strategy.
Surface Water	Water collecting on and running off the surface of the ground.
Sustainable Development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Sustainable Management	The interpretation of the principles of sustainable development at a local/regional level within the boundaries of national and international political, economic and environmental decisions.
Telemetry	River leves, rainfall, temperatures etc. are recorded on data loggers connected to the telephone network. Information from the recording sites can be automatically accessed by computer from a central point.
Trade Effluent	Effluent derived from a commercial process/ premises.
Transfer Station	Waste disposal facility where waste is collected prior to transport to final disposal point.
Transpiration	Water taken up and lost by plants from thier leaves.
Water table	The natural level of underground water.
Wetland	An area of low lying land where the water table is at or near the surface for most of the year leading to characteristic habitats.
Winter Storage Reservoir	Reservoirs built by farmers to store water during the winter months when it is "plentiful" for re-use during the summer.
1:10 Year Drought/Flood	A drought/flood event with a statistical probability of occurring once in a ten year period (other periods may be specified in a similar way).

UNITS

ppm	parts per million
ppb	parts per billion
mtpa	million tonnes per annum
$\mu g/m^3$	micro (10^{-6}) grammes per cubic metre (cumec)
$\mu g/l$	micro (10^{-6}) grammes per litre
mg/l	milli (10^{-3}) grammes per litre
kilotonne	= 1000 tonnes

Length	10mm = 1cm (equivalent to 0.394 inches) 100cm = 1m (equivalent to 39.37 inches) 1,000m = 1km (equivalent to 0.621 miles)
Area	$10,000m^2$ = 1ha (equivalent to 2.47 acres)
Flow	1,000l/s = $1m^3/s$ (equivalent to 35.31 cubic seconds (cusecs)) $1,000m^3/d$ = 11.6 l/s (equivalent to 0.41 cusecs) Ml/d = Megalitres per day, 1 Ml/d = 11.6 l/s

Reference from Section 2, Overview
Burritt, E., *Walks in the Black Country and its Green Borderland* (1868; republished by the Roundwood Press, 1976).

MANAGEMENT AND CONTACTS:

The Environment Agency delivers a service to its customers, with the emphasis on authority and accountability at the most local level possible. It aims to be cost-effective and efficient and to offer the best service and value for money.

Head Office is responsible for overall policy and relationships with national bodies including Government.

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For general enquiries please call your local Environment Agency office. If you are unsure who to contact, or which is your local office, please call our general enquiry line.

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0645 333 111

The 24-hour emergency hotline number for reporting all environmental incidents relating to air, land and water.

ENVIRONMENT AGENCY
EMERGENCY HOTLINE
0800 80 70 60

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