

NW56

EA - NORTHWEST LEAPS

56

local environment agency plan

WEAVER/DANE CONSULTATION REPORT OCTOBER 1997



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Kingfisher House, Goldhay Way,
Orton Goldhay,
Peterborough PE2 5ZR



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Weaver/Dane Key Details

• Total Area	1423 km ²
• Population	c.500,000
• Administrative Details	
District Councils	
Vale Royal	Chester
Congleton	High Peak
North Shropshire	Crewe & Nantwich
Halton	Macclesfield
	Newcastle-under-Lyme
	Warrington
	Staffordshire Moorlands
• Water Resources	
Largest Abstraction (at Brunner Mond, Northwich)	165,478 m ³ /day
Average Annual Rainfall	716 mm
Number of River Level only Measuring Stations	3
Number of River Level & Flow Measuring Stations	7
Number of Raingauges	25
• Flood Protection	
Length of Designated "Main River" Watercourses (Maintained by the Environment Agency)	619.4 km
• Water Quality	
Length of classified river and canal	623.8 km
• Fisheries	
Length of trout fishery	93 km
Length of coarse fishery	187 km
• Conservation	
Number of Sites of Special Scientific Importance (SSSI)	81
Number of Sites of Biological Importance (SBI)	412
• Heritage Sites	
Number of Scheduled Ancient Monuments (SAMs)	30
Number of Conservation Areas	12
<i>NB These figures are for designated sites located near to "main river" & therefore, do not include all sites within the area boundary.</i>	
• Integrated Pollution Control/Radioactive Substances	
IPC sites	21
Authorised Processes	49
RAS Authorisations	7
Registrations	33
• Waste Regulation	
Number of licensed sites	63
Number of registered exempt sites	114
Number of registered carriers of waste	375

The Environment Agency

Kingfisher House, Goldhay Way, Orton Goldhay,
Peterborough PE2 5ZR.

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**ENVIRONMENT
AGENCY**

memo

To ~~Michelle Doyle, Lincoln~~
~~Rona Chellew, Lincoln~~
~~John Maccac, Ipswich~~
Sarah Robson, Ipswich
Jenny Waterworth, Ipswich
~~James Cook, Lincoln~~
John Leach, Lincoln *HL*
Lesley Woolnough, Public Relations
~~Paul Dowie, Technical Planning~~
Return to Ann Binks

From Ann Binks

Ext. 4460

Our ref AHB/L/GEN

Your ref

Date 29 January 1998

WEAVER/DANE - CONSULTATION REPORT NORTH WEST REGION

The above named LEAP is attached for your information, stolen inspiration or criticism.
Please pass quickly, if you've not the time to peruse, pass to the next person on the
distribution.

Have highlighted the things that catch my eye.

Regards.

ANN H BINKS
Assistant Technical Planner

Your comments:

*↳ v. well produced document.
wish we had the resources to do
this.*



VEHICLE ANALYSIS

Dial

DATE

31-12-97

CLIENT

280

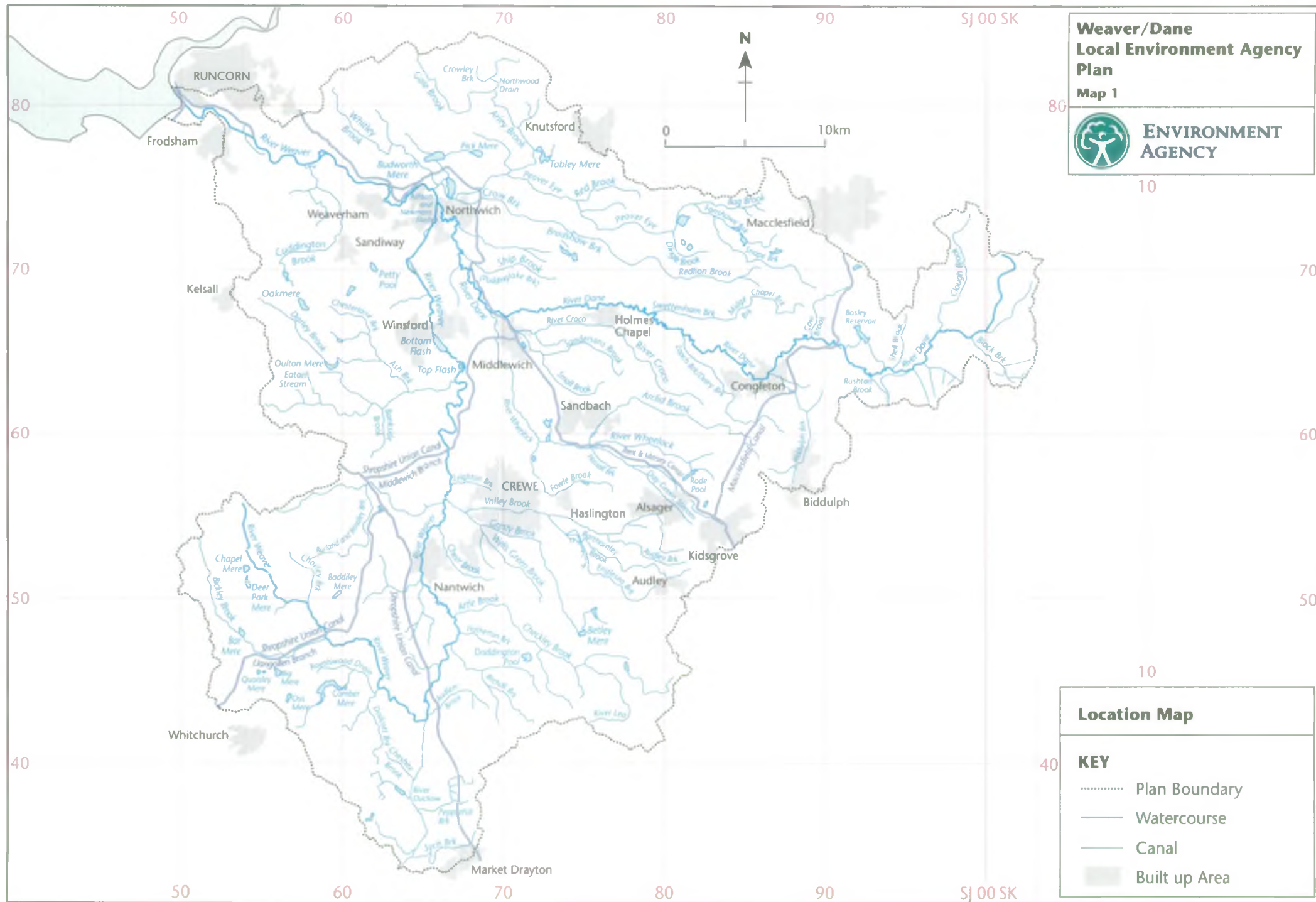
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PAGE

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Div.	Cost Centre	Registration No.	Personnel No.	Contract		Average Annual Mileage	Lifetime Expenditure							P.P.M.			M.P.G.	
		Vehicle Description	Drivers Name	Estimated			Maint.	Tyres	Fuel & Oil	Non-Maint.	Car Hire	Other	Total	Act.	Bud.	High	Act.	Sys.
				Age	Mileage													
0	3223	L8900EW MAESTRO 2.0 VAN	000000NA BEARER	84 49	100000 49052	12012	1310.15	36.73	0.00	330.77	0.00	0.00	1677.65	6.67	0.00		0.00	45.19

ENVIRONMENT AGENCY
ANGLIAN REGION
5 FEB 1998
BRIGHTON



Foreword

Thank you for taking an interest in the Local Environment Agency Plan (LEAP) for the Weaver/Dane area. A LEAP is the Environment Agency's integrated local management plan to identify and assess, prioritise and solve local environmental issues related to the Agency's functions, taking into account the views of local customers. This Consultation Report forms the first stage of the Plan. The objective of the Plan is to produce a local agenda of integrated actions, for improvement of the environment. It details the duties and responsibilities of the Agency and presents our commitment to developing closer partnerships to the benefit of the local environment.

The Consultation Report has been prepared and produced over the last 12 months and identifies practical environmental issues within the Weaver/Dane area. It provides the focus for the Agency's actions and provides a framework for consultation and liaison with new and existing partners. It seeks to influence and involve public and business communities, these elements being essential to secure success. The Weaver/Dane LEAP is one of many plans created by various organisations which all aim to improve the environment. The Agency recognises these plans and the role that other organisations play, and seeks to develop an integrated and holistic strategy to secure local improvement and contribute to the overall environmental goal of sustainable development.

The Agency is the competent authority for managing and regulating the water environment, for regulating waste, major industrial processes and contaminated land. We have duties to protect and enhance biodiversity in everything we do, to protect landscape and heritage and to promote inland navigation and recreation. A LEAP is not a Plan for managing all matters related to the environment because we only have the competence and authority to plan for those matters which are part of our statutory responsibilities. However, it is our role to use LEAPs to influence others to plan and act in ways that support our Environmental Strategy.

We look forward to hearing your views which will help us to produce an Action Plan to improve the environment in the Weaver/Dane area. The consultation period is from 1st November, 1997 until 1st February, 1998.

George Ager
Area Manager
South

Your Views

We hope that this report will be read by everyone who has an interest in the environment. Your views will help us to finalise the Action Plan.

- Have we identified all the problems within the area of the Plan?
- Have we identified all the uses?
- Are there any issues you would like to highlight?
- What do you think about the options proposed?
- We would appreciate your views.

If you have any comments or would like to discuss any matters arising from this Plan, please contact:

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Environment Planner
Environment Agency
North West Region
South Area Office
Mirwell House
Carrington Lane
SALE
M33 5NL

Tel: 0161 973 2237
Fax: 0161 973 4601

All comments should reach us by 1st February 1998

This report is intended to be used widely and may be quoted, copied or reproduced, provided that the extracts are not quoted out of context and that due acknowledgement is given to the Environment Agency.

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vision

for the local environment

*The vision of the Environment Agency is
"A better environment in England and Wales
for present and future generations"*

Our long-term vision of the Weaver/Dane Plan area is of a healthy and diverse environment, managed in an environmentally sustainable way, balancing the needs of those who live, work and visit the area.

Our vision is :



of an area where watercourses are valued as important habitat and landscape features, allowed to flow unconstrained through natural flood plains, bordered by green corridors of land. This would lead to the development of a wide variety of natural river features such as earth cliffs and meander belts, encouraging nestling Kingfishers and Sandmartins and would add to existing river features already highly valued, for example, stretches of the River Dane have been designated as a Site of Special Scientific Interest by virtue of the river features created by its' natural flow;



of partnerships which lead to successful outcomes for Local Biodiversity Action Plans so that the variety of our native plants and animals is increased. More native black poplars would be planted to complement existing trees within the Weaver Valley, healthy populations of native white clawed crayfish would spread from existing territories within tributaries of the Dane and Weaver with otters successfully recolonising and thriving, in clean rivers bordered by natural trees and vegetation. Black poplars and dragonflies have been indicated as particular issues in the Weaver/Dane area and may be used as performance measures of environmental improvement;



where the Cheshire Meres and Mosses and the present mosaic of ponds and wetlands are recognised and protected as an asset for future generations. There would be a balanced ecosystem, sufficient to support the maximum population of fish for the available habitat throughout the Plan area and enhance the biodiversity of species and habitats in all areas;



of continuous environmental improvements which are driven by local communities and which build on successes of enterprises such as the Weaver Valley Initiative. New partnerships established and existing relationships enhanced to create recreational activities, such as long distance footpaths, with transportation links from urban areas;



of addressing the industrial legacy and working in partnership to solve environmental problems in a sustainable manner. Where users and developers respect the water resources to maintain rivers and aquifers preventing water shortages and environmental issues within the PLAN area, especially pollution prevention and efficient use of water to reduce all aspects of pollution. The elimination of fly-tipping, preventing pollution, reducing the risk of flooding to people and properties while maintaining a visually attractive environment.



Bosley

Together,
we can make a difference
to our environment.



Overview of the Weaver/Dane area

The Weaver/Dane LEAP area is defined by the rainfall catchment of the River Weaver and the River Dane. The Weaver rises to the east of the Peckforton Hills, a sandstone outcrop on the western perimeter of the Cheshire Plain, and flows 85 kilometres from its source to its confluence with the Manchester Ship Canal and Mersey Estuary, just north of Frodsham. Its main tributaries are the River Dane, which joins the Weaver in the centre of Northwich and the River Wheelock which joins the River Dane in Middlewich.

The area is mainly of prime agricultural land but also includes the towns of Crewe, Congleton, Northwich, Sandbach, Winsford and parts of Runcorn. The main industry is the chemical industry which originated around the brine fields of Northwich and ICI at Runcorn. Recreation is also important within the area, especially riverside walks, angling and canoeing. The radio-telescope at Jodrell Bank dominates the low-lying landscape of the Cheshire Plain and the Weaver basin.

Many Sites of Biological Importance (SBIs) and Sites of Special Scientific Interest (SSSIs) are found in the area along with important species and habitats. The Cheshire Meres and Mosses are an internationally important group of still waters and a legacy of the last ice age. There are also thousands of ponds within the area. Together, these habitats support a variety of species and habitats.

The River Weaver drains an area of low lying rich agricultural land on the Cheshire Plain. Initially, the Weaver flows in a southeasterly direction until it reaches its confluence with the River Duckow, after which point it changes its course to flow north towards Northwich. At Runcorn, the Weaver enters the Manchester Ship Canal and its flow into the River Mersey is controlled by a battery of large sluices at Weston Point. At certain tides, water from the estuary can flow into the Ship Canal at Eastham and this affects the water level in the Weaver. Tidal influence is experienced as far upstream as Dutton Locks. The River Weaver is navigable for boats up to 500 tons, as far upstream as Winsford. Since 1880, the Weaver downstream of Winsford has been canalised. The locks on the canalised section are the responsibility of British Waterways. The Weaver was originally made navigable to accommodate the salt trade of Winsford and Northwich.

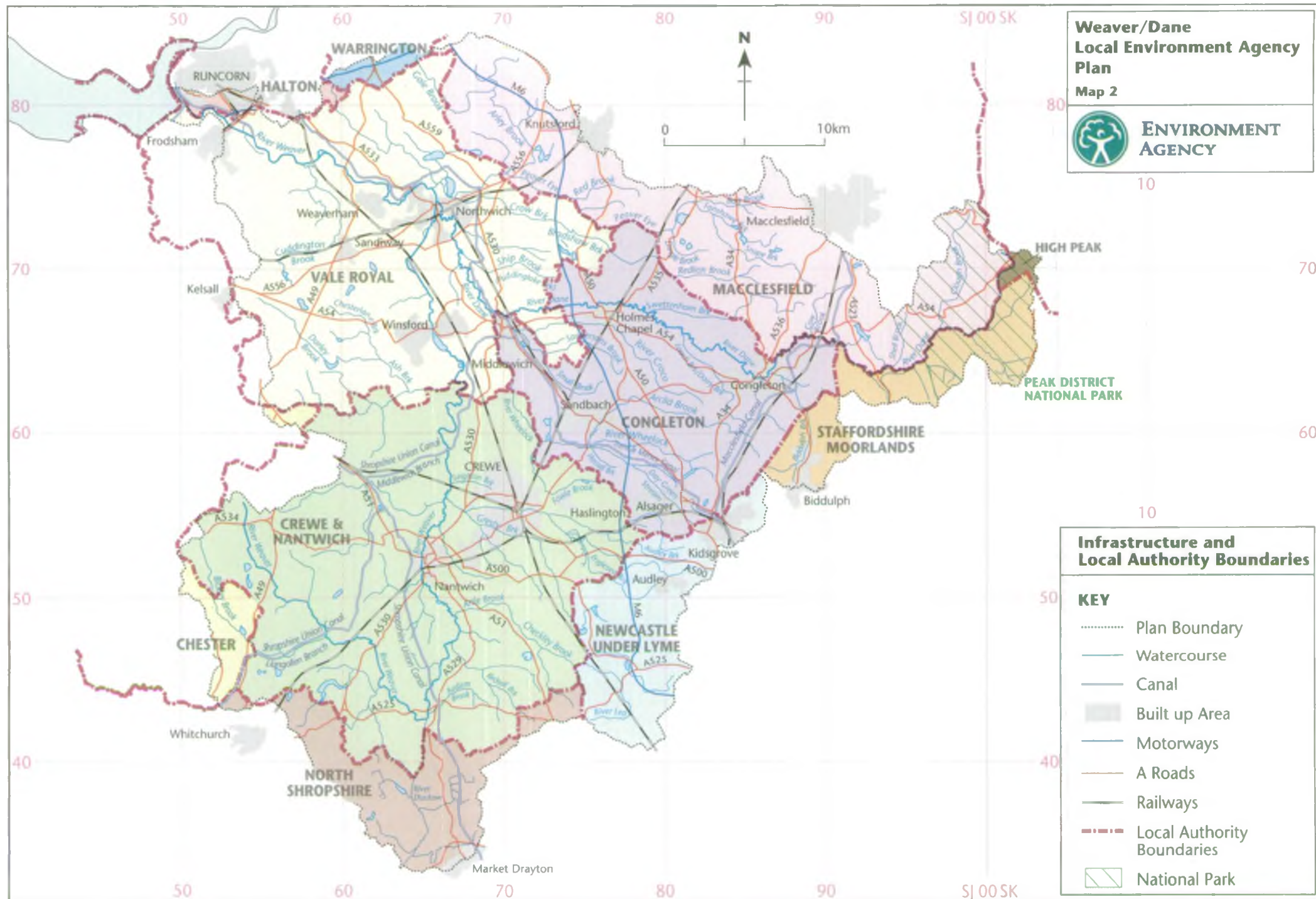
The River Dane is the principal tributary of the Weaver and rises on the edge of the Peak District National Park. It is one of the most natural rivers in England, being swift flowing in its upper reaches and meandering along its flood plain. The greatly meandering course of the river has a variety of flows, features of erosion and deposition, and acts as natural means of reducing the speed of the river flow overall by increasing its length. The course of the Dane in places is constantly changing and is known to have reverted to former self cut channels over a cycle of 70 years.

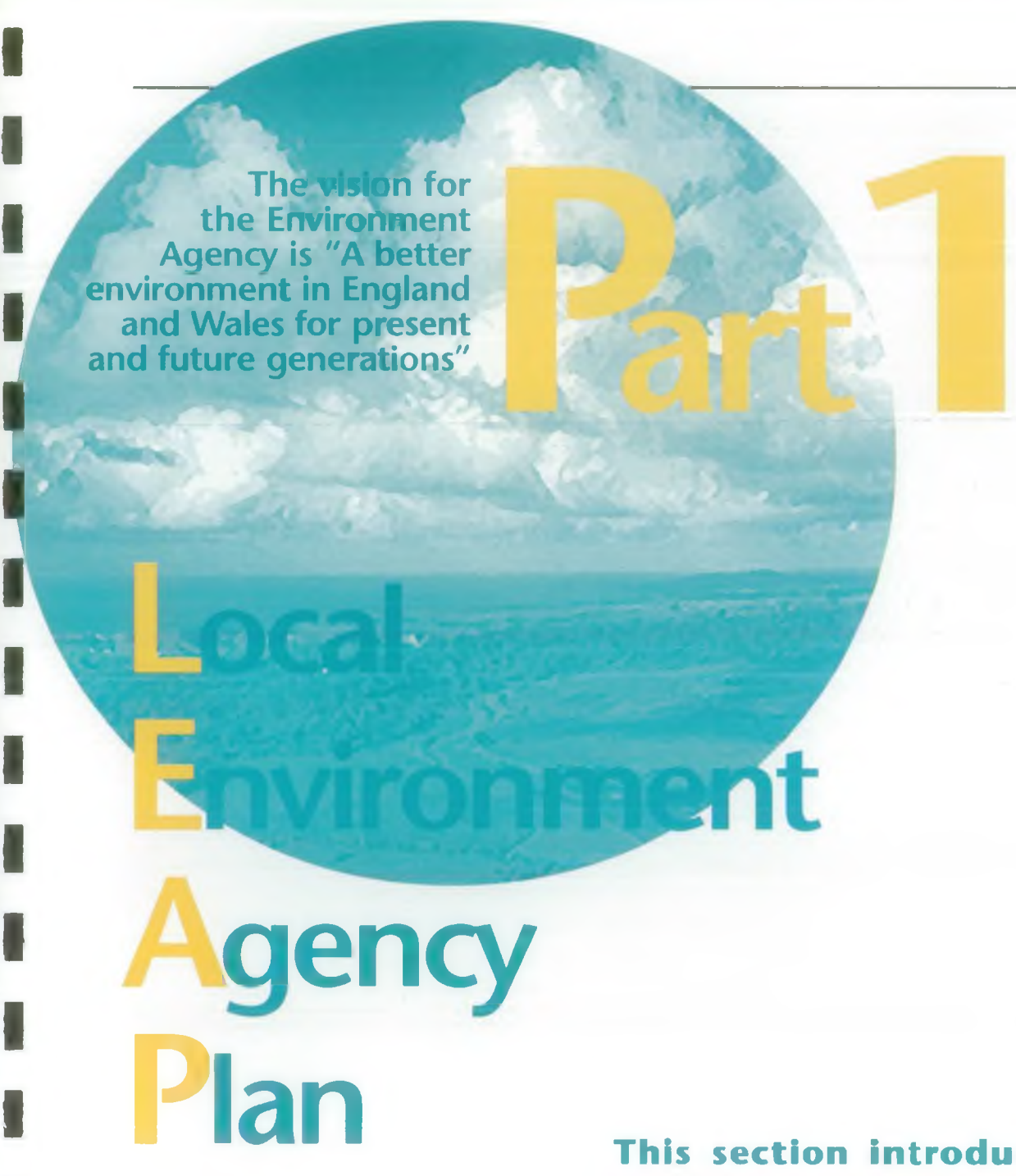
Farming is intensive on the Cheshire Plain. Although pollution problems from farms have improved in recent years, agricultural effluents continue to pose a threat to the health of the Weaver, Dane and their tributaries. Spillages from farm effluents can have a devastating effect, sometimes killing tens of thousands of fish and harming the invertebrate life on which they feed. In recent years, farming in Cheshire has become more intensive with large dairy herds. Potential problems arise from the storage of slurry and dairy waste associated with this type of farming and the production of silage. For example, silage liquor (the liquid produced when farmers compress cut grass for winter feed) is around 300 times more polluting than raw sewage. Cattle slurry and milk are also highly polluting. Environment Agency staff work closely with farmers in the area to identify practical solutions to environmental problems. Our aim is to prevent, rather than cure, pollution.

The flat, low-lying landscape of the area has been formed by ice, then river erosion since the last ice age, ten thousand years ago. The resulting landscape is characterised by extensive high quality sand deposits. These are now of considerable value as building materials and for use in the foundry and glass-making industries. Underlying this, running along a north-south axis and broadly following the river valleys of the Weaver and Dane, are Britain's most extensive salt deposits. These have been known and worked since Roman times and provided the source of brine which led to the rapid growth of the chemical industry in the late 19th and early 20th centuries.

The main industries of the area are chemicals, now centred in the north of the Weaver valley, and vehicles, centred on the towns of Crewe and Sandbach. Employment in both these industries has declined significantly over the last three decades, but this corridor of industrial activity, together with associated brine extraction activities has left a legacy of industrial dereliction and contamination. Remedial action has reduced the risk of subsidence and cleared the worst of the dereliction, but problems of contamination remain and continue to pose potential threats to health and the pollution of groundwater.







The vision for the Environment Agency is "A better environment in England and Wales for present and future generations"

Part 1

Local Environment Agency Plan

This section introduces the Environment Agency and the process of Local Environment Agency Planning (LEAPs).

There is a description of the Plan area together with issues and options to resolve them.



the Environment Agency

The Environment Agency is a non-departmental public body established by the Environment Act in 1995. We are sponsored by the Department of the Environment.

The Agency's overall aim of protecting and enhancing the whole environment contributes to the worldwide environmental goal of Sustainable Development.

The Agency's objectives are to:

- deliver environmental goals without imposing disproportionate costs on industry or society as a whole
- achieve significant and continuous improvement in the quality of air, land and water, actively encouraging the conservation of natural resources, wild flowers and wildlife
- maximise the benefits of integrated pollution control and integrated river basin management
- provide effective defence and timely warning systems for people and property against flooding from rivers and the sea
- achieve significant reductions in waste through minimisation, re-use and recycling and improve standards of disposal
- manage water resources to achieve the proper balance between the needs of the environment and those of abstractors and other water users
- secure, with others, the remediation of contaminated land
- improve and develop salmon and freshwater fisheries
- conserve and enhance inland and coastal waters and their use for recreation
- maintain and improve non-marine navigation
- develop a better informed public through open debate, the provision of soundly based information and rigorous research
- set priorities and propose solutions that do not impose excessive costs on society.

To achieve these objectives, the Agency must work with, or seek to influence central government, local government, industry, commerce, farming, environmental organisations, riparian owners, and the general public.

Successful management of the environment requires consideration of a wide range of interests and requirements which may sometimes be in conflict. The Agency will manage the environment through an integrated approach to our duties and responsibilities, which are:

- pollution prevention and control
- waste management
- management of water resources
- flood defence
- improvement of salmon and freshwater fisheries
- conservation
- navigation





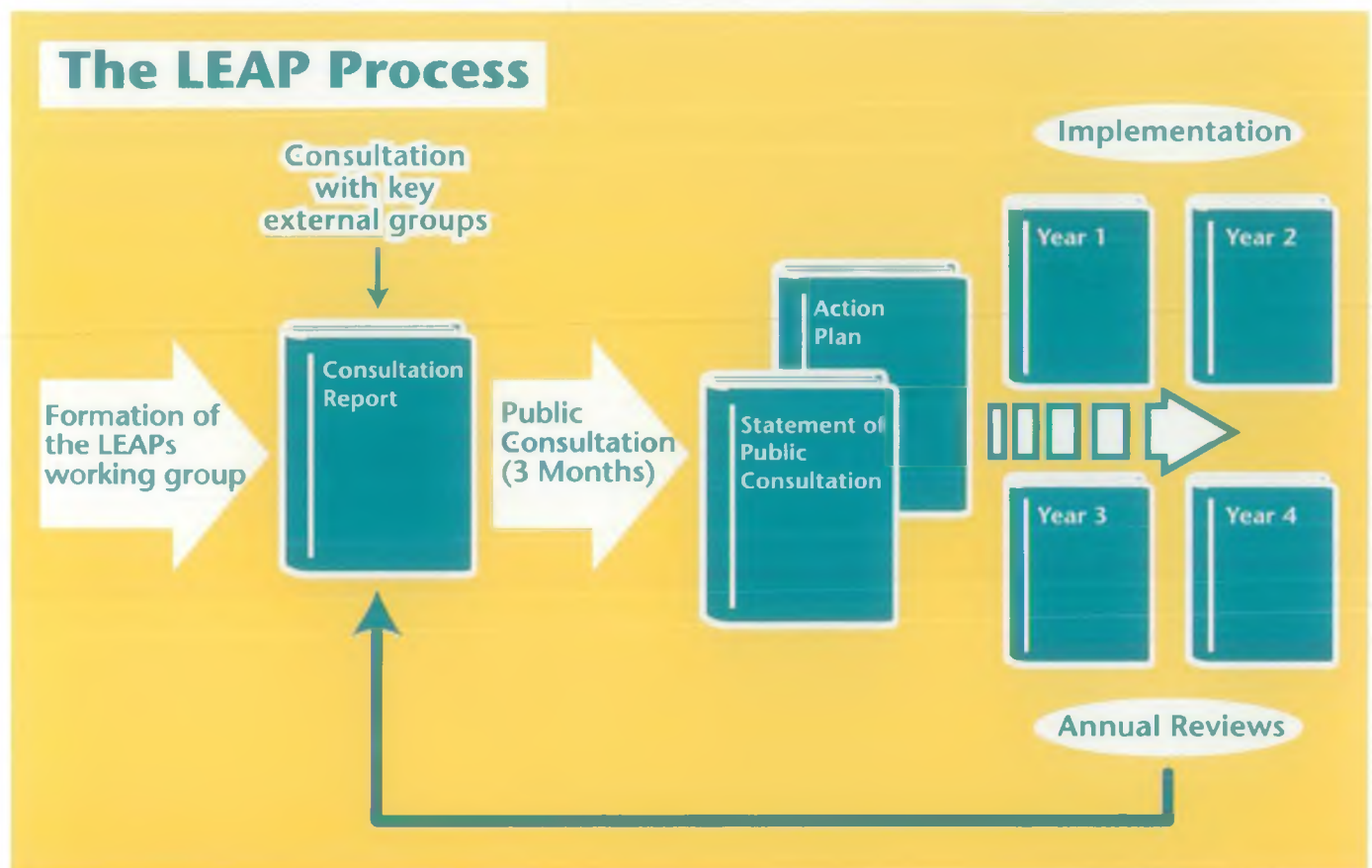
A Local Environment Agency Plan (LEAP) is the Environment Agency's integrated local management Plan for identifying and assessing, prioritising and solving local environmental issues related to the Agency's functions, taking into account costs and benefits, and the views of the Agency's local customers. The outcome of the process is a local agenda of integrated action for environmental improvement to optimise benefit for the local environment.

We are committed to covering England and Wales with the LEAP consultation process by the end of 1999. This will involve the publication of a consultation report for each LEAP area and will result in approximately 130 reports, nationally, by that date. LEAPs are produced by Area based teams in close consultation with key partner organisations and Area Environment Groups. There are seven LEAPs to be produced in this Area office, the Weaver/ Dane being the third.

This Consultation Report is the first stage of the LEAP process outlined below, and has been written after consultation with key partners (see Partnership section). The Environment Agency is not the only organisation who regulates the environment, and the contents of this Report reflects this. LEAPs are not intended to provide a level of strategic information and assessment required to support local authority planning.

The production of the LEAPs involves three key stages:

- The Local Environment Agency Plan Consultation Report
- The Local Environment Agency Plan five year Action Plan
- An Annual Review for the life of the Action Plan



The LEAP Process

- **Consultation Report**

The LEAP Consultation Report is a broad view of the area covered by the Plan, its associated natural resources and the activities and uses that put pressure upon them. It is prepared as a basis for open consultation. The Consultation Report identifies a vision for the Plan area and the issues which need to be addressed, together with options to solve them, in order to make progress towards it. The report is followed by a three month period of public consultation.

- **Action Plan**

The Action Plan moves forward from consultation and consolidates the issues identified during consultation and the vision for the Plan area. It provides a policy framework for the management of the area and short term action towards achieving the vision. The Action Plan covers a five year period.

- **Annual Review**

The Annual Review provides a snapshot of progress towards delivery of the Action Plan. The LEAP process is a live, interactive process, so the Annual Review is an opportunity to update, reschedule or bring in new actions which have arisen in the interim. There are four Annual Reviews, then the process is repeated with a new Consultation Report. Twenty-three specific issues have been identified in the Weaver/ Dane area. They have evolved from assessing the current state of the area and the activities within it, then comparing these with the objectives and vision. To enable us to progress from the current state and fulfil our objectives, a number of issues are identified. The issues may be solved in a number of ways. These are listed as options under each issue.



Issues & Options

This section details specific issues that have been identified in the Plan area. The issues have been written by the Agency with a multi-functional viewpoint. The issues are all within the Agency's responsibility. The options to resolve the issues have been discussed with our partners where appropriate.

Introduction to Local Issues

Twenty-three specific issues have been identified in the Weaver/Dane area. They have evolved from our assessment of the current state of the local environment and the activities within it. We have then compared these with our objectives and vision. To progress from the current state and fulfil our objectives, a number of shortfalls have been identified which we consider are issues that need to be addressed. The issues could be resolved in a number of ways and we have listed a number of options under each issue; either one option or a combination of options may be the best way forward to resolve the issue. A "do nothing" option has also been highlighted where appropriate, to ensure a full assessment of the situation will be made.

The LEAP is an on-going, live process, therefore, there may be more issues added during the five year life-span of this Plan, while others may be resolved. The issues identified are not the only environmental problems within the area, but they are all concerns for which the Agency has responsibility. Each issue has been set out to give a background to the problem, comments on the effect that the problem has and examples of where it occurs. The table contains the possible options to resolve the issue, the organisations responsible and the benefits and disadvantages for choosing each option.

Local knowledge of Agency staff, together with comments received during early consultation with key organisations who have an interest in the environment, were used to highlight the issues.

There may be other problems within the area which need to be addressed, but they may be outside the responsibility of the Agency. Problems, such as these, may be mentioned in the supporting text in Part II of this document. Where appropriate, and through our partnership links, and liaison role, the Agency will endeavour to advise on these issues with the relevant responsible bodies.

The following issues are those which have been identified for the Weaver/Dane LEAP. They are not in any order of preference or priority. They are set out in a manner which may be taken forward to the future Action Plan, for their resolution. The purpose of this Consultation Report is to highlight problems in the area and gain your opinions so that we can assess whether or not we are tackling the concerns of people who live and work in the area. We would like your comments as to the preferred options for addressing the issue, or whether there are other options that have not been considered. We would also like to hear from you whether you could work with us towards resolving these problems.

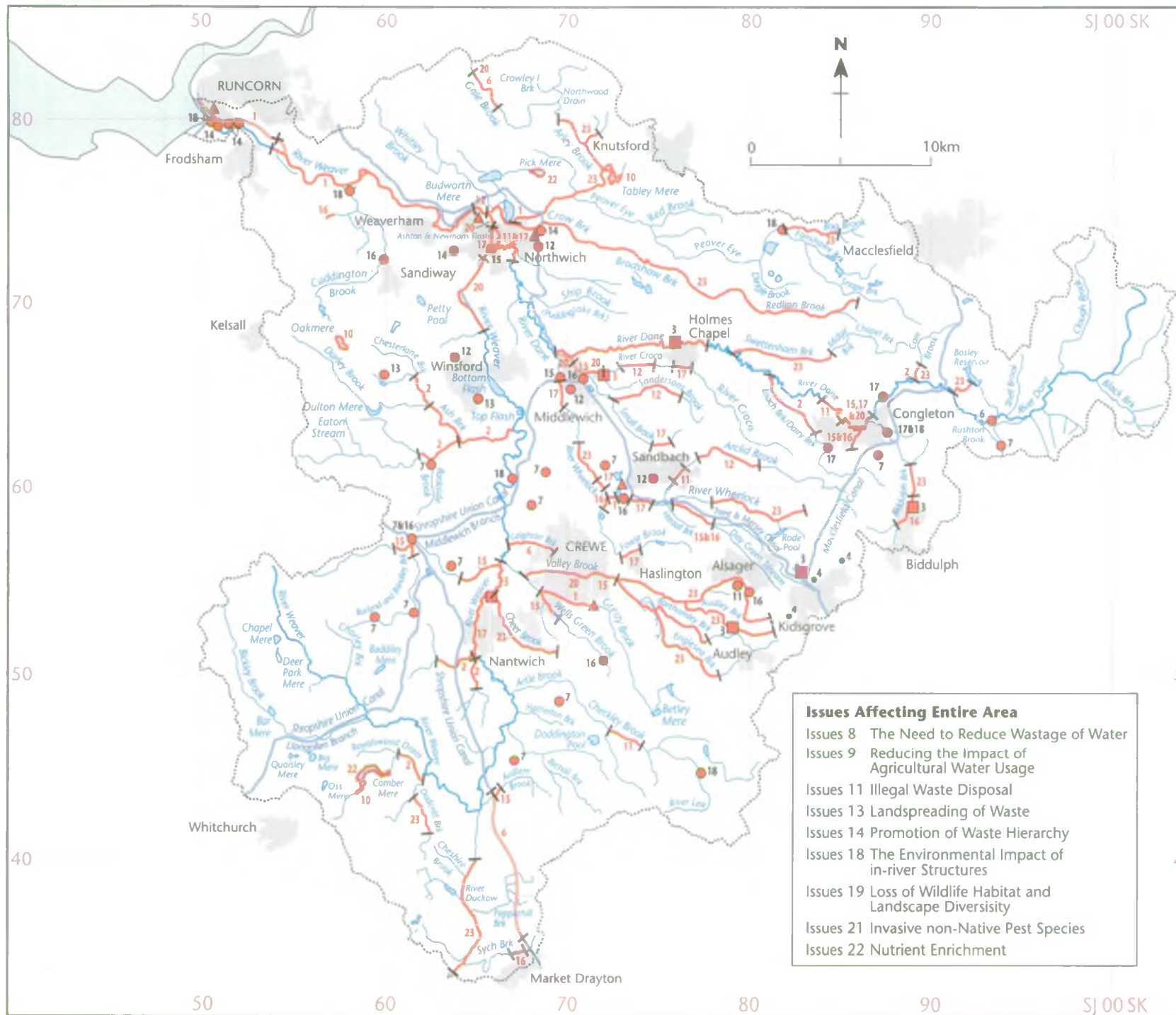
A three month consultation period follows this document during which we will try to raise the awareness of the Plan, consult widely, and gather views other than our own. The findings will assist the Agency in drawing up an Action Plan, with time-scales and costs, that we can work to, with other responsible parties, over the next five years.

List of Issues

PAGE	ISSUES	TOPICS
19	Issue 1	Adverse impact of industrial discharges on river water quality
23	Issue 2	Impact of agricultural activities on river water and habitat quality
27	Issue 3	Adverse impact of discharges from sewage treatment works on river water quality
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List of Issues cont'd...

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56	Issue 16	Culverts causing flood risk and loss of habitat
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63	Issue 19	Land use and landscape changes leading to the loss of wildlife, habitat and landscape diversity
66	Issue 20	Channelised watercourses creating loss of habitat and amenity
68	Issue 21	Invasive non-native pest species
70	Issue 22	The impact of nutrient enrichment on aquatic communities
72	Issue 23	Lack of sustainable fish populations



Weaver/Dane Local Environment Agency Plan

Map 3



ENVIRONMENT
AGENCY

Location of Issues

KEY

- Plan Boundary
- Watercourse
- Canal
- Built up Area
- 17 — Stretch of appropriate Issue
- 11 Location of appropriate Issue
- 1 NWW Ltd STW
- Sewer Overflow
- ▲ Trade Premises

Issues Affecting Entire Area

- Issues 8 The Need to Reduce Wastage of Water
- Issues 9 Reducing the Impact of Agricultural Water Usage
- Issues 11 Illegal Waste Disposal
- Issues 13 Landspreading of Waste
- Issues 14 Promotion of Waste Hierarchy
- Issues 18 The Environmental Impact of in-river Structures
- Issues 19 Loss of Wildlife Habitat and Landscape Diversity
- Issues 21 Invasive non-Native Pest Species
- Issues 22 Nutrient Enrichment

Issue 1

ADVERSE IMPACT OF INDUSTRIAL DISCHARGES ON RIVER WATER QUALITY

Background

Much of the industry found within the Weaver and Dane area has developed as a result of the large natural salt deposits located within the area. Salt extraction is undertaken by New Cheshire Salt near Northwich, Salt Union near Winsford and British Salt near Middlewich. Methods used include direct mining, solution mining and pumping from wild brine springs. Saline discharges from these works can have a detrimental impact upon the river water quality.

At sites such as the Brunner Mond complexes around Northwich, the ICI complex at Runcorn and Hays Chemicals works between Middlewich and Sandbach, the extracted salt is used in a number of chemical processes. The trade effluent discharges from these and other sites within the area can have a significant detrimental impact upon the river water quality.

Effects

- Elevation of ammonia, suspended solids and pH levels
- Reduction of dissolved oxygen levels
- Potential releases of toxic, persistent or bioaccumulatory substances
- Reduction or elimination of aquatic fauna and flora
- Impact upon fish populations
- Water discolouration

1. Failures to achieve the proposed River Quality Objectives

Wade Brook (A530 Lostock to Wincham Brook) Witton Brook (Wade Brook to Weaver)

Discharges from the Brunner Mond complex at Lostock have a significant detrimental impact upon the water quality in these stretches. Although considerably improved over recent years, the quality is so bad that neither achieves the lowest River Quality Objective of RE5. As a consequence no short-term objective has been set and both the proposed long-term RQOs of RE4 have significantly failed. Accordingly, the aquatic life is poor, with no invertebrate or fish species recorded during recent surveys. The water quality in these stretches may act as a barrier to migratory coarse fish and eels thus preventing them from reaching the good quality water upstream.

The very high levels of total ammonia found in both stretches is almost four times greater than the standard required to comply with RE4. High pH values are also seen in both reaches, such that on occasions it can be greater than 11. In contrast, upstream of the Lostock site, Witton and Wade Brook are both of good quality and comply with their long-term objectives of RE2. Also affecting these stretches, although to a much lesser extent than Brunner Mond, are discharges from the Zeneca Resins works and four unsatisfactory storm sewer overflows. The Brunner Mond Lostock site is regulated via a combination of Water Resources Act, 1991 discharge consents and Environmental Protection Act, 1990 Integrated Pollution Control (IPC) Authorisations.

River Weaver (100m u/s ICI Winnington o/f 11 to Navigation overflow)

Similarly, "bad" quality is encountered downstream of the Brunner Mond site at Winnington, where again water quality fails to achieve RE5, and no short-term objective has been set. The proposed long-term RQO is RE4 and is significantly failed. The total ammonia levels in this stretch, though again high, are only marginally above the standard required for RE4. Along with direct discharges to the Weaver in this stretch from the Winnington site, a significant factor in the failure to meet the objective is the poor water quality contributed to the Weaver by Wade Brook, as reported above.

Poor water quality continues down the Weaver, with the stretches;

River Weaver (Navigation overflow to Weston Canal)

River Weaver (Weston Canal to Sutton Weir)

River Weaver Frodsham Cut (Quality Survey Limit (QSL) to Weaver)

all significantly failing to achieve their proposed long-term River Quality Objective of RE4 as a consequence of elevated ammonia levels. The poor water quality in these stretches is predominantly due to the bad quality upstream associated with the discharges from the Brunner Mond sites. Also affecting the Navigation overflow to Weston Canal stretch, although to a much lesser extent, are discharges from North West Water Ltd's Northwich, Weaverham and Acton Bridge Sewage Treatment Works (STWs). The stretch from the Weston Canal to Sutton Weir is also affected by discharges from the ICI complex at Runcorn.

Options	Responsibility	Benefits	Disadvantages
1. Improve the quality of discharges to the aquatic environment from the Brunner Mond sites at Lostock and Winnington in line with IPC Authorisations. Revise discharge consents where appropriate.	Brunner Mond, Environment Agency.	<p>Advancement towards achieving the proposed River Quality Objectives.</p> <p>Improvement in the aquatic ecosystem, aesthetic quality, amenity value and fisheries potential.</p>	<p>Cost to Brunner Mond.</p> <p>Difficulty in finding appropriate technology to treat the complex effluent produced at these sites.</p>

2. Failure to comply with EC Directives

Trent and Mersey Canal at Crows Nest

Hays Chemicals chlor-alkali plant is authorised to discharge mercury, a List I substance within the EC Dangerous Substances Directive. Discharges are made to the Trent and Mersey Canal. Before 1994 the Environmental Quality Standard (EQS) monitoring point was located at Bridge 165, and the mercury EQS was breached. Rather than being due to current discharges from the site, it was thought that the breach was caused by releases of mercury, which have accumulated over time in the sediment, being re-suspended by passing boat traffic. In early 1994 the discharge point was relocated upstream such that in subsequent years the new EQS point (Trent and Mersey Canal at Crows Nest) has complied with the mercury standard laid down in the Directive. Mercury contamination in the canal around the old discharge point however is still an issue.

Options	Responsibility	Benefits	Disadvantage
1. Continue to monitor the extent of mercury contamination in the Trent and Mersey Canal around Bridge 165.	Environment Agency.	Determine full extent of re-suspension problem.	Options may not be practical or feasible within economic constraints.
2. Investigate remedial options.	Hays Chemicals Ltd, Environment Agency.	Reduce historic contamination.	

River Weaver at Sutton Weir

The ICI complex at Runcorn is authorised to discharge a number of substances contained within List I of the EC Dangerous Substances Directive:

mercury, carbon tetrachloride, chloroform, hexachlorobenzene, hexachlorobutadiene, trichloroethene, tetrachloroethene, trichlorobenzene, 1, 2-dichloroethane.

Effluent discharges from the ICI complex are made to the Weston Canal. The Environmental Quality Standard (EQS) monitoring point is located at Sutton Weir on the River Weaver immediately downstream of the confluence with the canal. Breaches of the EQS for 1, 2-dichloroethane. in 1994 and 1996 have been recorded as a consequence of discharges from the ICI works. The EQS for dissolved copper was also exceeded during 1996, possibly as a consequence of discharges from the ICI complex, although unidentified upstream sources could also be responsible. The ICI works are regulated by a number of IPC Authorisations.

Options	Responsibility	Benefits	Disadvantage
1. Reduce discharges of 1, 2-dichloroethane to the Weston Canal.	ICI, Environment Agency.	Compliance with the environmental quality standards laid down in the EC Dangerous Substances Directive.	Cost to ICI
2. Investigate source of copper responsible for the EQS failure.	Environment Agency.	Improvement in the aquatic ecosystem, aesthetic quality, amenity value and fisheries potential. Improved understanding and potential for improvement.	

3. Other impacts

Weston Canal at Runcorn

Discharges from the ICI complex at Runcorn have a number of significant impacts upon the water quality within the Weston Canal. Salinity in the canal is high due to inputs from ICI's waste brine treatment plant effluent and power station cooling water. Additional sources include tidal intrusion via the Manchester Ship Canal, and inputs from the River Weaver as a consequence of saline discharges such as those from the Brunner Mond sites around Northwich. Recent monitoring surveys have shown that the canal water column is stratified as a consequence of the subtle density differences associated with the various brine strengths.

A number of ICI's discharges are caustic and the calcium salts which precipitate in the canal fall to the bed. The canal sediments are further contaminated by the settling of suspended mercury discharged in the waste brine effluent.

In an attempt to mitigate this contamination the sediments are currently dredged and disposed of in a safe manner. Eventually a new stripping and incineration plant will be built at the ICI complex which will reduce the levels of many of the organic substances presently discharged into the canal.

Option	Responsibility	Benefit	Disadvantage
1. Reduce saline discharges impacting upon the Western Canal	ICI, Brunner Mond, Environment Agency.	Improvement in the aquatic ecosystem, aesthetic quality, amenity value and fisheries potential.	Solution such as diverting the discharge to the Mersey or Manchester Ship Canal may only move the problem elsewhere.

Valley Brook at Gresty Road, Crewe

Occasional oil pollution problem due to discharges from the rail track complex and Weston Road Industrial Estate. Recent improvements to the drainage arrangements in this area have had some benefit.

Flash Brook at Rookery Bridge, Sandbach

Measurable levels of an agricultural herbicide manufactured by United Phosphorus Ltd, Sandbach, have been recorded at the site in Flash Brook. The invertebrate fauna recorded in the brook is accordingly restricted. Improvements in site drainage have recently been made, including stopping contaminated surface water drains from discharging to Flash Brook.

Option	Responsibility	Benefit	Disadvantage
1. Continue to monitor extent of pollution, investigate sources and assess effectiveness of improvements.	Environment Agency.	Improvement in the aquatic ecosystem, aesthetic quality, amenity value and fisheries potential.	May be infeasible within economic constraints to identify and remedy pollution problems.

Issue 2

IMPACT OF AGRICULTURAL ACTIVITIES ON RIVER WATER AND HABITAT QUALITY

Background

Large areas of the Weaver are intensively used for agriculture, which is predominantly dairy farming, although there is also some sheep, pig and arable farming. Beef and cattle are also important in the Dane area.

Detrimental effects upon the water quality in agricultural areas can occur from both point source and diffuse pollution inputs. Animal wastes are particularly organically rich and levy a high biochemical oxygen demand (BOD) on surface waters. Point source pollution, from silage clamps, slurry tanks, yard and parlour drains, can occur because of inadequate storage, structural defects or poor management practices. Diffuse pollution occurs as a consequence of applying fertilizers and slurries to farmland. Nutrients can subsequently enter watercourses by being washed off the land during rainfall or by slowly leaching through the ground. Farm Regulations, introduced in 1991, concerning the storage of silage, slurry and agricultural fuel oil, are enforced by the Environment Agency. Codes of Good Agricultural Practice for the protection of Water, Land, Soil and Air have been produced by MAFF.

The impact that farm drainage has upon the water quality is reflected in the detrimental effect it has upon the aquatic biota. The water quality can become unsuitable to sustain populations of coarse fish, such that in extremes only pollution-tolerant stickleback and stone loach remain. Similarly the invertebrate community becomes restricted to species tolerant of high organic loadings, such as worms and midge larvae.

Many waterside fields are utilised right up to the banks of watercourses, and this has a detrimental effect upon the quality of available habitat. There is potential to improve the wildlife value of river corridors by creating or leaving uncultivated strips. These strips could be fenced off to allow natural vegetation to re-establish, or they could be seasonally grazed or left as tall unmanaged grassland. The habitat created would be suitable for butterflies or small mammals. Banks protected by vegetation are also more stable thus reducing erosion and, therefore, possible damaging siltation downstream. The Sustainable River Management Project is a collaborative venture started in 1997, between the Environment Agency and the Farming and Wildlife Advisory Group (FWAG). The project aims to assess the environmental impacts of the management practices mentioned above. Farmers can be compensated for the loss of land in creating waterside strips.

Uncultivated strips also provide benefits to the water quality by reducing the likelihood of sprays and slurries falling directly into watercourses, and by acting as buffers to nutrient enriched runoff.

Effects on watercourse

- Increase in organic load
- Elevation of biochemical oxygen demand
- Reduction of dissolved oxygen levels
- Eutrophication
- Reduction or in extreme cases, the elimination, of aquatic flora and fauna
- Impact upon fish populations
- Development of algal blooms
- Growth of organically-related fungus
- Reduced habitat quality
- Increased erosion of banks and consequent excessive siltation of the channel

1. Failures to achieve the proposed River Quality Objectives

Loach Brook (QSL at A534 to River Dane)

Marginally fails to achieve the proposed short-term RQO of RE4, as a consequence of intermittently high BOD levels in the watercourse. This is reflected by the lack of coarse fish and in the invertebrate life, which consists solely of groups tolerant to organic pollution. Farm drainage constitutes the principal impact upon this reach, although discharges from a mineral extraction site and one unsatisfactory storm and emergency sewer overflow may also have an effect. The long-term objective for this stretch is also RE4.

Cow Brook (QSL at Manor House Lake to River Dane)

Marginally fails to achieve the proposed short-term RQO of RE4, as a consequence of intermittently high BOD levels in the watercourse. Biological surveys indicate that groups tolerant of organic pollution increase in abundance periodically and growths of sewage fungus are common. Similarly, coarse fish species are generally absent. Farm drainage constitutes the principal impact upon this reach. The long-term objective for this stretch is also RE4.

Ash Brook (QSL at Salterswell to Darley Brook)

Marginally fails to achieve the proposed short-term RQO of RE4, as a consequence of intermittently high BOD levels in the watercourse. Fish species are restricted to organic pollution-tolerant sticklebacks and stone loach. Farm drainage constitutes the principal impact upon this reach, although a number of small private STWs and two unsatisfactory emergency overflows may also have an effect. This stretch also significantly fails the proposed long-term RQO of RE2.

Wettenhall Brook (Oulton Brook to Ash Brook)

Significantly fails to achieve the proposed RQO of RE4, as a consequence of intermittently high BOD levels in the watercourse. The diversity of invertebrate and fish species is restricted due to organic pollution. Farm drainage constitutes the principal impact upon this reach. This stretch also significantly fails the proposed long-term RQO of RE3.

Edleston Brook (QSL at Railway to Weaver)

The water quality in Edleston Brook is so bad that this stretch fails to achieve the lowest RQO of RE5. Consequently no short-term objective can be set and the proposed long-term RQO of RE2 is significantly failed. All organic and ammoniacal parameters are high, with one particularly prominent BOD result of 390 mg/l recorded. No fish species were found during the most recent fisheries survey. Farm drainage constitutes the principal impact upon this reach.

Baddington Brook (QSL at Austerson Tributary to River Weaver)

Significantly fails to achieve the proposed RQO of RE4, as a consequence of intermittently high total ammonia and BOD levels in the watercourse. Aquatic life is restricted to invertebrate species tolerant to organic pollution. No fish species were found during the most recent fisheries survey. Farm drainage constitutes the principal impact upon this reach. The effect previous farm campaigns have had in improving the water quality in this stretch now appears to be waning. The long-term objective for this stretch is also RE4.

Sales Brook (QSL at A530 Newhall to Barnett Brook)

Significantly fails to achieve the proposed RQO of RE4, as a consequence of intermittently high total ammonia levels in the watercourse. The diversity of aquatic life is accordingly restricted. Farm drainage constitutes the principal impact upon this reach. This stretch also significantly fails the proposed long-term RQO of RE2.

2. Failures to comply with EC Directives

Ash Brook (Chester Lane/Barley Brook to Weaver)

This stretch is a designated cyprinid fishery under the EC Freshwater Fish Directive. During 1996 it failed to comply with the directive as a consequence of three exceedences of the total ammonia standard, although evidence from fisheries surveys suggest there is a sizable cyprinid population. Farm drainage constitutes the principal impact upon this reach.

Options	Responsibility	Benefits	Disadvantages
1. Undertake farm campaigns to identify and prioritise point source pollution problems.	Environment Agency.	Establishment of farm specific action plans and reduce pollution incidents.	Problems may already be known and solutions to problems may be economically unviable.
2. Promote adoption of Codes of Good Agricultural Practice and Farm Waste Management Plans. Develop and undertake improvements designed to reduce organically enriched drainage.	Farmers, MAFF, NFU, FWAG, Environment Agency.	Reduction in diffuse and point source pollution inputs. Advancement towards achieving the proposed River Quality Objectives. Improvement in the aquatic ecosystem, aesthetic quality, amenity value and fisheries potential.	Cost to farmers.
3. Identify and target watercourses where uncultivated strips would be beneficial through initiatives such as the Sustainable River Management project.	Environment Agency, farmers, landowners, local authorities, MAFF, FWAG, Wildlife Groups.	Improved habitat quality and buffering against erosion, spray drift and runoff. Increased visual amenity and recreational value. May lead to reduction in maintenance costs.	Reduction in cultivated land.
4. Stock with fish as the water quality becomes suitable for coarse fish populations (RE4).	Angling clubs.	Development of coarse fishery.	Restocking cost.

Issue 3

ADVERSE IMPACT OF DISCHARGES FROM SEWAGE TREATMENT WORKS ON RIVER WATER QUALITY

Background

The scale of sewage treatment provisions within the Weaver area is extremely varied. At the upper end of the scale are a few large North West Water Ltd sewage treatment works (STWs) which serve the major towns such as Crewe, Northwich, Congleton, Sandbach, Winsford, Middlewich, Nantwich, etc. Besides these, North West Water has approximately another sixty small STWs serving the smaller towns and villages. The rural nature of the remainder of the area means that large areas are unsewered, and hence at the bottom end of the scale there are a great number of private sewage treatment works, typically either small package plants or simple septic tanks serving hotels, public houses, and residential properties.

Effects on watercourse

- Increase in organic load
- Elevation of biochemical oxygen demand
- Reduction of dissolved oxygen levels
- Presence of sewage fungus
- Unpleasant odours
- Foam and colour problems
- Eutrophication and excessive weed growth
- Reduction in diversity of aquatic fauna and flora
- Impact upon fish populations

1. Failures to comply with EC Directives

River Dane (Salterford Bridge to Croxton Bridge)

This stretch is a designated cyprinid fishery under the EC Freshwater Fish Directive. No failures of the directive have so far been reported, however, under the current consent conditions at North West Water Ltd's Holmes Chapel STW there is capacity, which if taken up, would result in the Directive being failed. Consent conditions at the works are therefore due to be tightened, and improvement work carried out under the AMP2 programme (see 2.4 Effluent Disposal), in order to maintain future compliance with the Fish Directive.

Options	Responsibility	Benefits	Disadvantage
1. Tighten consent conditions at Holmes Chapel STW in line with the requirements for complying with the EC Freshwater Fish Directive.	Environment Agency.	Compliance with the standards laid down in the EC Freshwater Fish Directive.	Cost to NWW Ltd.
2. Undertake improvements programmed in AMP2 to reduce the organic and ammoniacal loads discharged.	NWW Ltd.	Improvements in the aquatic ecosystem, aesthetic quality, amenity value and fisheries potential.	

River Weaver (Below Shrewbridge to Valley Brook)

This stretch is a designated cyprinid fishery under the EC Freshwater Fish Directive. During 1996 it failed to comply with the Directive as a consequence of two exceedences of the total ammonia standard. The most significant source of ammonia contributing to this failure is the effluent from North West Water Ltd's Nantwich STW, Beambridge pumping station and storm tanks.

Options	Responsibility	Benefit	Disadvantage
1. Review consent conditions at Nantwich STW in line with the requirements for complying with the EC Freshwater Fish Directive.	Environment Agency.	Advancement towards complying with the standards laid down in the EC Freshwater Fish Directive.	Cost to NWW Ltd. Improvements may not be high enough priority to secure AMP3 investment.
2. Secure the AMP3 (see 2.4 Effluent Disposal) investment necessary to reduce the organic and ammoniacal loads discharged.	Environment Agency, NWW Ltd.		

2. Eutrophication

Nutrient enrichment of waters within the Weaver and Dane area, as well as being attributable to farm drainage, is also associated with discharges from a number of STWs. There is evidence, for example, of eutrophication within the River Wheelock area as a consequence of high orthophosphate discharges from North West Water Ltd's STWs. Kidsgrove Stream downstream of Kidsgrove STW, Day Green Stream downstream of Alsager STW and the River Wheelock downstream of Sandbach STW all have high orthophosphate concentrations. The EC Urban Wastewater Treatment Directive requires that water bodies be designated as "sensitive areas" should they be found to be eutrophic or if in the near future they may become eutrophic if protective action were not taken. STWs serving a population equivalent of more than 10,000 which discharge to a sensitive area are required to provide some additional nutrient removal.

Options	Responsibility	Benefit	Disadvantage
1. Pursue designation of appropriate water bodies as "sensitive areas"	Environment Agency.	Lowering of trophic status and associated improvement in aquatic ecosystem, aesthetic quality, amenity value and fisheries potential.	Cost to NWW Ltd. Improvements may not be high enough priority to secure AMP3 investment.
2. Secure the AMP3 investment necessary to undertake nutrient removal from qualifying STW discharges.	Environment Agency, NWW Ltd.		

3. Other Impacts

- a) Effluent discharges from North West Water's Middlewich STW have a significant organic and ammoniacal impact upon the water quality in the River Croco (Middlewich STW to River Dane). The stretch complies with the proposed short-term RQO of RE5, but significantly fails to achieve the long-term RQO of RE4. The failure is as a consequence of high BOD, high total ammonia and low dissolved oxygen levels in the watercourse. Additionally, the watercourse downstream of the STW discharge is showing signs of eutrophication, with conspicuous weed growth. Fish species are restricted to pollution-tolerant sticklebacks. Also affecting this stretch of the River Croco, although to a lesser extent, is the poor water quality which joins from Sanderson Brook, and discharges from one unsatisfactory emergency and storm sewer overflow.

- b) Effluent discharges from North West water's Audley STW have a significant organic and ammoniacal impact upon the water quality in Audley Brook (Audley STW to Mill Pool). The stretch complies with the proposed short-term RQO of RE4, but significantly fails to achieve the long-term RQO of RE3. The failure is as a consequence of high BOD, high total and unionised ammonia, and low dissolved oxygen levels in the watercourse. No fish species were found during the most recent fisheries survey. Consent conditions at the works are currently relatively lax (BOD 40, suspended Solids 60) and do not include an ammonia limit.
- c) Effluent discharge from North West Water's Kidsgrove STW have a significant localised impact upon Kidsgrove Stream. The flow within the stream gives little dilution of the sewage effluent and sewage litter can often be a problem. No fish species were found during the most recent fisheries survey. The receiving stretch (Kidsgrove STW to Day Green Stream) currently complies with the proposed short and long-term RQO's of RE3, although the sampling point is located some way downstream of the works.
- d) North West Water's Biddulph STW has a significant localised impact upon Biddulph Brook. There is conspicuous sewage fungus growth and unpleasant odour downstream of the works. No fish species were found during the most recent fisheries survey. The receiving stretch (Biddulph STW to River Dane) currently complies with the proposed short-term RQOs of RE4, but fails to comply with the long-term RQO of RE3 and the sampling point is located some way downstream of the works. Consent conditions are currently lax (BOD 50, Suspended Solids 80) and do not include an ammonia limit.

Options	Responsibility	Benefits	Disadvantages
1. Collate necessary information and formulate bid to secure the AMP3 investment necessary to reduce the organic and ammoniacal loads discharged from Middlewich, Audley, Kidsgrove and Biddulph STWs.	Environment Agency.	Secure funding for improvements as a first step towards achieving the proposed River Quality Objectives.	Improvements at these works may not be high enough priority to secure AMP3 investment. If investment is not secured the water quality may stay the same or worsen.
2. Consider recommending refusal to any further development proposals connecting to these STWs until improvements are made.	Environment Agency, local planning authorities.	Prevent further deterioration of unsatisfactory situation.	Potential development embargo until improvements have been undertaken.

Issue 4

IMPACT OF DISCHARGES FROM COMBINED SEWER OVERFLOWS ON RIVER WATER QUALITY

Background

In part of the area, mainly the urbanised areas, foul and surface water drainage is conveyed to sewage treatment works together in combined sewers. To prevent flooding during a storm conditions, relief combined sewers (CSOs) are provided on the sewage network. These are designed to operate only during heavy rainfall, ie: when adequate dilution should be available in the receiving watercourses.

The increase in residential and commercial development over recent years has resulted in greater flows in the sewage system. In areas with old combined sewers there is often inadequate capacity to deal with this additional flow. Consequently CSOs operate more frequently and during less severe storms.

The satisfactory performance of sewer overflows is a requirement of the EC urban Wastewater Treatment Directive. Improvements are agreed with North West Water Ltd and set out in an Asset Management Plan (AMP).

Effects

- Increase in organic load
- Elevation of biochemical oxygen demand
- Reduction of dissolved oxygen levels
- Presence of sewage fungus
- Unpleasant odours
- Aesthetic impact due to presence of sewage solids and sanitary materials

1. Failures to achieve the proposed River Quality Objectives

Valley Brook (QSL at Parrot's Drumble to Lower Foxley)

Significantly fails to achieve the proposed short and long-term RQOs of RE3 as a consequence of intermittently high BOD and total ammonia levels in the watercourse. The impact on this reach of one unsatisfactory CSO contributes to the objective failures. This overflow is scheduled to be improved by North West Water Ltd, before 2000, as part of AMP2. Discharges from Jamage Industrial Estate also have a detrimental impact upon this stretch.

2. Other impacts

Two unsatisfactory CSOs have a significant localised impact upon Kidsgrove Stream above Kidsgrove STW. The flow within the stream provides only minimal dilution for storm sewage discharges and sewage debris impacts upon an area of high amenity. Both overflows are programmed for improvement, before 2000, as part of AMP2.

Option	Responsibility	Benefits	Disadvantage
1. Improve the performance of unsatisfactory combined sewer overflows.	NWW Ltd.	<p>Advancement towards achieving the proposed River Quality Objectives.</p> <p>Improvement in the aquatic ecosystem, aesthetic quality, amenity value and fisheries potential.</p>	Cost to NWW Ltd.



Issue 5

IMPACT OF CONTAMINATED SURFACE WATER DISCHARGES ON RIVER WATER QUALITY

Background

Most developments built in the last 30 years are drained by two separate systems. One conveys uncontaminated surface water runoff and discharges into a local watercourse, whilst the other takes foul water to a sewage treatment works.

Problems with this system can occur when foul drainage is incorrectly plumbed into the surface water drainage system. Where dual manholes occur, damage to the dividing wall or blockages in the foul sewer, can result in foul drainage entering the adjacent pipes. Additionally, contaminated liquids can occasionally be poured down wrong drains. All of these situations result in the contamination of the surface water drainage system which can have a significant impact upon receiving watercourses into which it is discharged.

Effects

- Increase in organic load
- Elevation of biochemical oxygen demand
- Reduction of dissolved oxygen levels
- Presence of sewage fungus
- Unpleasant odours
- Aesthetic impact due to presence of sewage solids and sanitary materials

Examples

Examples of watercourses where contaminated surface water discharges have been identified as having localised impact are:

- a) River Weaver at Deans Clough, Winsford
- b) Tributary of the River Weaver at Knights Garage, Winsford
- c) Rilshaw Brook at Winsford
- d) Gresty Brook at Weston Industrial Estate, Crewe
- e) Valley Brook at Macon Way, Crewe
- f) River Weaver at Barony Surface Water Sewer, Nantwich
- g) Tributary of Valley Brook at Woodland Avenue, Crewe
- h) Tributary of River Weaver at Queens Drive, Nantwich
- i) Tributary of River Weaver at Aston, Nantwich
- j) Howty Brook at Moss Road, Congleton
- k) River Croco at Brooks Lane, Middlewich
- l) Loach Brook at West Heath, Congleton
- m) Biddulph Brook at Braddocks Hay, Biddulph
- n) Tributary of Kidsgrove Stream at Butt Lane, Kidsgrove
- o) Tributary of Kidsgrove Stream at Clough Hall Lake
- p) Bosley Brook at Bosley STW

Options	Responsibility	Benefits	Disadvantages
1. Identify and prioritise contaminated surface water problems.	Environment Agency, local authorities, NWW Ltd.	Establishment of site specific action plans to tackle the problems.	Cost to local authorities and NWW may not be feasible within economic constraints to identify all contamination sources.
2. Undertake work to correct wrong connections and tackle dual manhole problems.	Local authorities, householders, NWW Ltd.	<p>Advancement towards achieving the proposed River Quality Objectives.</p> <p>Improvement in the aquatic ecosystem, aesthetic quality, amenity value and fisheries potential.</p>	Cost to local authorities, householders and NWW Ltd.



Issue 6

ADVERSE IMPACT ON RIVER WATER QUALITY DUE TO UNDETERMINED POLLUTION SOURCES

Background

In some cases the root cause of the water quality failing to comply with an EC Directive or achieve a River Quality Objective is not fully understood. Investigative work may therefore need to be undertaken in order to gain a better understanding of the reasons behind them.

1. Failure to achieve the proposed River Quality Objectives

Leighton Brook (QSL at Frank Webb Lane to River Weaver)

The water quality in this stretch fails to achieve the lowest River Quality Objective of RE5, and consequently no short-term objective has been set. The long-term RQO of RE4 is significantly failed. The poor quality is due to permanently high total ammonia and intermittently high BOD levels in the watercourse. The principal impact upon this reach is probably leachate from an old landfill site. However, this is difficult to determine because the brook runs under the site in a culvert. Other potential pollution sources include an industrial discharge, industrial estate runoff, dairy farm drainage, road runoff and discharges from one unsatisfactory storm sewer overflow.

Gale Brook (QSL at Appleton STW to Lodge Lane)

Marginally fails to achieve the proposed RQO of RE4, as a consequence of high total ammonia and low dissolved oxygen levels in the watercourse. Biological sampling has highlighted a very restricted fauna. Identified impacts upon this reach include dairy farm drainage, motorway runoff, discharges from an industrial estate and a number of small private STWs, however none of these are particularly significant. The proposed long-term RQO for this stretch is also RE4.

Option	Responsibility	Benefits	Disadvantages
1. Investigate the sources of pollution responsible for the failures to achieve the proposed River Quality Objectives.	Environment Agency.	<p>Advancement towards achieving the proposed River Quality Objective.</p> <p>Improvement in the aquatic ecosystem, aesthetic quality, amenity value and fisheries potential.</p>	<p>May not be possible to definitively identify pollution sources.</p> <p>May not be feasible within economic or legislative constraints to remedy a solution.</p>

2. Failure to comply with EC Directives

River Dane at Hug Bridge

Failed during 1995 to comply with the standards laid down in the EC Surface Water Abstraction Directive. The failure was due to three exceedences of the hydrocarbons standard, one exceedence of the phenols standard and one exceedence of the mercury standard. Apparent exceedences of the colour, dissolved iron and barium standards were also recorded, but derogation of these standards was permitted due to naturally ochreous runoff and abandoned mine discharges upstream. The cause of this compliance failure is difficult to determine because there are no obvious pollution sources upstream. A possible cause is the contamination of the sample during sampling, but this requires further investigation.

Compliance with the Directive was achieved in 1996, with exceedences only against the waived colour and barium standards.

Shropshire Union Canal (Market Drayton to Whitchurch Road Bridge, Audlem)

This stretch is a designated cyprinid fishery under the EC Freshwater Fish Directive. During 1996 it failed to comply with the Directive as a consequence of two pH results exceeding the permitted standard. There are no obvious pollution sources discharging to this reach. It is possible that the high pH values are due to algal activity. However, this requires investigation.

Options	Responsibility	Benefits	Disadvantages
1. Investigate the sources of pollution responsible for the EC Directive failures.	Environment Agency.	Better understanding of the reasons behind the EC Directive failures.	May not be possible to definitively identify pollution sources.
2. Investigate and review sampling procedure to eliminate possible sample contamination.	Environment Agency.	Advancement towards complying with the Directive standards.	May not be feasible within economic or legislative constraints to remedy.

Issue 7

LOCALISED WATER POLLUTION DUE TO LACK OF RURAL SEWERAGE

Background

The lack of sewerage systems and associated sewage treatment works within rural areas has resulted in a multitude of private septic tank and small treatment plant discharges. The Agency is generally against the proliferation of such systems because a single, large sewage treatment plant typically performs more efficiently than multiple, small plants because of the better flow and load balance. Agency monitoring is also much simpler.

Significant localised pollution can occur in areas where a number of discharges are concentrated, or when plants are poorly maintained. Improvement can be achieved by promoting the provision of public sewers or first-time rural sewage treatment with North West Water Ltd, local authorities, developers, etc.

Examples

Congleton area	-	Moss Road, Congleton; Rushton Spencer; Somerford
Crewe area	-	Balterley; Barthomley; Basford; Bradfield Green; Cox Bank; Hankelow; Oakhanger; Onneley; Minshull Vernon
Nantwich area	-	Baddiley; Barbridge; Bridgemere; Burland; Faddiley; Hatherton; Hunsterton; Poole; Reaseheath; Stapeley
Sandbach area	-	Hassal Green; Malkins Bank; Oakwood Lane, Moston; Smallwood; Warmingham
Winsford area	-	Wettenhall

Options	Responsibility	Benefits	Disadvantage
1. Provision of public sewer under Section 101A of the Water Industry Act, 1991.	NWW Ltd., local authorities.	Reduced impact of existing and future discharges due to improved treatment efficiency.	Cost to NWW Ltd.
2. Provision of first-time rural sewage treatment works.	NWW Ltd., local authorities.	Improvement in the aquatic ecosystem, aesthetic quality, amenity value and fisheries potential.	

Issue 8

THE NEED TO REDUCE WASTAGE OF WATER

Background

Water is supplied into the public water supply system to meet demand generated by North West Water Ltd. customers, and losses through leakage from the distribution network, so that more water is used than is necessary.

Historically water has been a cheap commodity for industry and an unlimited, uninterrupted supply is viewed as a right by domestic consumers. These factors, together with the domestic charging scheme has resulted in little recognition of its true value. By introducing waste minimisation and demand management measures, the need for water can be reduced.

The level of leakage losses from distribution and trunk mains systems and customer supply pipes varies across the North West Region, depending on the length of pipe, number of connections and the age of the system. Significant reductions in the level of leakage have been made in recent years but there is still room for further improvements.

The leakage from the distribution system means that the system has to be 'oversupplied' to ensure that a secure supply of drinking water is provided for customers. This 'extra' water has to be abstracted from surface reservoir and groundwater sources affecting other users and the environment as a whole.

The Environment Agency has stated that water companies should achieve economic levels of leakage before any new abstraction licences are granted.

Across the region, North West Water Ltd are committed to reducing leakage by 250MI/d by the year 2000, and are reducing leakage by a programme of mains refurbishment, improved management of mains pressure, improved leakage detection, public awareness campaigns and a telephone "Leakline". They are also repairing mains on the customers side of the boundary without charge.

Effects

Depletion of water resources in other areas with associated effects on the environment.

Examples

Increased environmental degradation in droughts and lower minimum flows at all times.

Options	Responsibility	Benefits	Disadvantages
Combination of:			
1. Reduce total leakage to economic levels.	North West Water Ltd.	Leakage reduced. More effective use of resources.	Cost. Not a total solution.
2. Reduce domestic demand.	General public. Environment Agency. North West Water Ltd.	Reduced demand.	Cost. Not a total solution.
3. Reduce total leakage to economic levels and reduce domestic demand.	North West Water Ltd. General public. Environment Agency.	Leakage reduced. Reduced demand. More effective use of resources.	Cost. Not a total solution.
4. Introduce waste minimisation initiatives	Environment Agency. North West Water Ltd. Industrial users	More effective use of resources. Reduced demand.	Cost. Not a total solution.
5. Monitor effectiveness of demand management measures.	Environment Agency. North West Water Ltd.	Identifies whether implemented measures are reducing leakage & demand.	
6. Do nothing.			Alternative sources may be required. Increased environmental degradation in droughts

Issue 9

REDUCING THE IMPACT OF AGRICULTURAL WATER USAGE

Background

Agriculture is a prime user of both surface and groundwater for irrigation and other farming practices. Irrigation is the most critical of agricultural uses as it is consumptive and demand is at its highest in summer when river flows are low and the impact on the watercourse is greatest. The licensing system balances the needs of the environment with those of the abstractor to minimise any environmentally damaging effects.

Agricultural demand is a feature of the whole area. Effects may be localised but the impact varies from year to year depending on crop rotation and agricultural practices.

The river as a fishery and SSSI, its natural flow regime and the possibility of derogation of current abstraction licence holders, means that further summer consumptive licences are unlikely to be granted within the Dane area.

The agricultural use of water can be managed in several ways to reduce the volumetric and temporal demand for water:

- Efficient use of water and use of most effective irrigation techniques.
- Irrigation scheduling to optimise the use of water and crop yields.
- Night-time irrigation to reduce evaporation losses.
- Sharing of developed resources
- Use of storage (normally filled in winter) to avoid abstraction when river flows are low.

Options	Responsibility	Benefits	Disadvantage
1. Promote the efficient use of water resources in agriculture	Environment Agency Farming community MAFF, NFU	Reduction in demand for water, increasing its availability for other users and the environment.	Funding
2. Encourage winter storage	Environment Agency MAFF, NFU	Abstraction of water in times of plenty. Reduced environmental impact of water abstraction. Licence may not be granted for summer abstraction	

Options	Responsibility	Benefits	Disadvantages
3. Adopt more efficient irrigation techniques.	Farming community, MAFF, NFU	Reduced demand, effective use of water optimal yields. Reduced pumping and metered supply costs	Cost
4. Use public water supplies (NWW Ltd.)	Farming community, NWW Ltd.	Remove pressure of abstraction on the environment to another site	Pressure on other water resources. Cost to farmer



Dairy Calf

Issue 10

INADEQUATE DATA FOR MONITORING WATER LEVEL CHANGES

Background

Many habitats are adversely affected by changes in water level, the effect being particularly significant in the shallow lakes and meres of the Weaver area. The meres and wetland sites in the area have no baseline data to monitor the effects of abstraction, drought and mining on water levels. Meres are often designated for their marginal flora, and a small change in water level may have a significant impact on the area of marginal vegetation that is permanently wetted. Additionally, falls in water level enable increased light penetration within the water body, increasing the likelihood of algal growth. These factors combine to result in a change of the ecology of the site.

Assessing the impact of external influences on water levels in these habitats is currently qualitative as there is very little empirical data for analysis.

Baseline data would be used when formulating Water Level Management Plans (WLMP) and for addition to the Still Waters Database held by the Environment Agency. The Agency would then be able to assess detrimental impact of future changes in water level.

Effects

The Agency cannot provide qualitative evidence of impact due to water level change as it cannot separate variables that are influencing change within the ecosystem.

Examples

Difficulty has been experienced separating the environmental impact of drought from other influences due to lack of comparative data at sites such as:

Oakmere
Tabley Mere
Hatchmere
Combermere



Options	Responsibility	Benefits	Disadvantages
1. Install equipment to obtain water level data from wetland and mere sites.	Environment Agency	Provision of baseline information to assess the detrimental influences due to future water level changes.	Cost
2. Seek information from third parties	Environment Agency Local interest groups	Provision of baseline information to assess the detrimental influences due to future water level changes.	Cost
3. Do nothing	Environment Agency	None	Possible threat to ecological value of designated sites

Issue 11

ADVERSE IMPACT OF LITTER AND ILLEGAL WASTE DISPOSAL ACTIVITY ON LAND AND INTO WATERCOURSES

Background

In common with many other areas, there is a significant problem of illegal waste disposal activity, including "fly-tipping". This occurs particularly in the urban areas, but can also be a problem in the more rural localities. Wastes are deposited on all kinds of open sites, including waste ground and derelict premises, car parks, verges, alleyways into watercourses and even on the public highway.

The wastes concerned typically include building and demolition wastes, household materials such as normal domestic refuse, garden and DIY wastes, and unwanted furniture and domestic appliances. Hazardous chemical wastes are also abandoned from time to time. Other items commonly found in affected watercourses include derelict cars and shopping trolleys. The quantities involved range from single bin bags of household waste to multiple lorry loads of building wastes, the total number of incidents reported for 1995/6 being over 800 for fly-tipping on land alone.

As well as the obvious detriment to amenity wherever it occurs, fly-tipping often brings the risk of environmental pollution, physical injury or damage to health, and where a river is involved it often leads to an increase in the likelihood of flooding to roads and property.

Those who dispose of wastes illegally fall into a number of categories. Some seek to profit through the illegal disposal of wastes, or to avoid the charges or inconvenience of using proper disposal routes. Organised fly-tipping is invariably concerned with maximising profit for those concerned and is carried out as a 24 hours a day, 7 days a week business, without regard for health, the environment or amenity. At the same time, some householders seek to avoid the personal inconvenience of travelling to "civic amenity" sites or waiting for their opening hours, or they may fly-tip because they are either unaware of the local waste collection services or they fail to meet their needs.

Householders may also be unaware as to the problems caused by household chemicals and may either fly-tip these with other waste, or alternatively bury them or pour them down the drain. Domestic fly-tipping tends to occur at sites where waste has already, or historically, been dumped.

The Agency's Waste Regulation Enforcement Team helps to control illegal waste disposal activity, both by direct observation and inspection, and as a result of information received from members of the public and reputable contractors. The team undertakes to investigate all incidents made known to it, and where possible to take action. A variety of control measures is available, ranging from discussion and persuasion through enforcement notices and, ultimately, action in the courts.

The Agency can serve removal notices for waste deposited on land where the occupier of the land is known to have been responsible, or it can carry out the removal of such wastes itself and seek to recover its costs. It also has certain powers of enforcement on both main river and ordinary watercourses. In the former it also has permissive powers to undertake works, although these powers do not extend beyond the riverbank. Therefore waste problems are tackled by the Agency's officers on main rivers and by Water Watch and Stream Care on all rivers and canals.

The introduction of a landfill tax from October 1996 was intended to encourage more sustainable alternatives to landfill, but there are fears that this increased cost will encourage fly-tipping. This situation will continue to be monitored.

Effects

Detriment to local amenities
Risk of environmental pollution
Risk of physical injury and harm to health
Regular and costly maintenance is required to remove debris from watercourses
Loss of capacity of watercourses
Blockages in watercourses, and thereby flooding
Encourages further tipping

Examples

Although widespread and difficult to predict, there are particular examples of organised fly-tipping on land in the area around:

Marbury Lane / Old Warrington Road in Northwich
A number of vacant industrial plots in the Crewe area.

As much of the area is rural there is also the problem of sporadic fly-tipping, often by the public, on verges and down country lanes etc.

In addition to the land based "blackspots" above, several stretches of water are affected including:

Artle / Checkley / River Lea	Madeley
Valley Brook and tributary	Alsager and Crewe
Wistaston/Gresty Brooks	Crewe
Wells Green Brook	Crewe
River Dane	Northwich, Congleton
Arclid Brook	Sandbach
Howty Brook	Congleton

and generally in urbanised areas.

Options	Responsibility	Benefits	Disadvantages
1. Prompt regular clearance of fly-tipped material, attempt to recover costs. Possible use of litter collection teams, particularly in water environment.	Environment Agency, local authorities, landowner, Tidy Britain Group, conservation and other voluntary groups, Stream Care.	Effects of fly-tipping reduced or removed. Immediately increased aesthetic and amenity value.	Cost. Unclear responsibilities. Must be ongoing to be effective.
2. Better information and publicity on proper disposal and facilities available, particularly for difficult and hazardous wastes.	Environment Agency, local authorities, Waste Disposal Authorities, Water Watch, Mersey Basin Trust.	Encourage awareness and better practice. Reduce effects of fly-tipping.	Cost. Diverse responsibility.
3. Local initiatives to discourage illegal activity.	Environment Agency, local authorities, residents, community groups, schools, Water Watch, voluntary groups, police.	Encourage awareness of problems caused and increase perception of the value of watercourses. Increase sense of local 'ownership'. Reduce effects of fly-tipping.	Cost. Diverse responsibility. Initiatives must be ongoing to be effective.
4. Control of access to problem sites.	Environment Agency, local authorities, landowners.	Discourage use of particular sites.	Cost. Problem may move elsewhere. Reduced recreational and amenity value.
5. Greater priority to enforcement activity.	Environment Agency, local authorities, police.	Better control and deterrent effect through increased awareness. Reduce effects of fly-tipping.	Cost and resources.

Options	Responsibility	Benefits	Disadvantages
6. Better provision of local public household waste sites and collection services for problematical household wastes.	Local authorities.	Encourage proper disposal of bulky household waste.	Planning consent. Cost.
7. Installation of debris screens.	Environment Agency, local authorities, landowners	Large amounts of water-borne litter would be removed from rivers, with a resultant improvement in visual amenity.	Increased obstruction to flow, with increased flood risk. Maintenance costs. Increased liability for screen owners.
8. Ensure that development does not contribute waste (e.g. solid obstructions, site chemicals) or other materials (e.g. suspended solids) to watercourses.	Construction industry, Environment Agency, local authorities, Water Watch, landowners and occupiers.	Reduced blockages, flood risk and maintenance costs.	Cost. An ongoing process which needs to be built into normal working practice.

Issue 12

ADVERSE IMPACT OF CONTAMINATED AND DERELICT LAND ON THE ENVIRONMENT

Background

The salt and chemical works of this part of Cheshire also gave rise to a range of other heavy industries, many of which no longer survive and some of which leave a legacy of contaminated land. The salt industry itself has resulted in localised brine contamination of land and watercourses, and has also caused subsidence at the surface, creating depressions which in turn have filled with water and produced 'flashes,' notably in the Moston, Winsford and Northwich areas. It has also resulted in large quantities of lime wastes, the lime slurry being pumped into huge beds where it is allowed to dry out leaving a surface feature which barely supports life. Such beds are found in the Northwich, Winsford, Middlewich, Lostock and Sandbach areas.

There are also 97 known closed landfill sites, a number of which are producing landfill gas. However, there may be older (ie. pre-1974) tips which were not controlled by licensing and which have not yet been identified. In all there is a total of over 650 hectares of land identified as being derelict and potentially contaminated in the area, the bulk of which (over 450 hectares) being as a result of industrial activity.

Cheshire County Council has produced a "Derelict Land Strategy" which covers the matter of contaminated land and details a number of partnerships working on the problem.

Redevelopment of land provides an opportunity for remedial work on contaminated sites, and the Agency works closely with local authorities, developers, and other organisations to ensure that where possible the environment is protected and improved by redevelopment. However, whilst some sites can be addressed by redevelopment, this has not proved enough to make more than small inroads into this widespread problem. In some cases serious pollution is occurring and a more pro-active approach is required, and this work has already been started, for example, in the community forest scheme in the Anderton/Marbury area. The local authority has been very active over recent years and much has already been achieved.

Full remedial works on contaminated land in general are likely to cost substantial sums of money. Progress is likely to depend on government policy, and in particular on availability of funding, and where this has been available good progress has been made (over £4m has been provided from central government in recent years and schemes include the community forest, remedial work along the Weaver at Winsford and at derelict saltworks at Wincham).

The Environment Agency operates in accordance with the provisions and duties of the Environment Act, 1995. Duties for the Agency and the local authorities include the identification, regulation and remediation of contaminated land. The Agency will have responsibility for Special Sites, following their confirmation by local authorities. Those are sites which pose a threat of serious harm or pollution, or present aspects which the Agency may have expertise in dealing with. The Agency is committed to working closely with local authorities to tackle this problem and achieve environmental improvement to reclaim land for beneficial use.

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Dealing effectively with contaminated land makes unusually heavy information demands. We use historic information relating to pollution incidents, industrial processes, historic and illegal tipping. The management of information and its exchange with local authorities is an important ongoing task to enable the Agency to fulfil its strategic role.

Effects

The particular effects of contamination resulting from salt workings are characterised by areas which do not support typical ecological systems, and these areas of land inevitably drain into local water systems which are similarly 'dead'.

Contaminated land causes degradation of water quality, particularly where direct discharges to surface waters are causing acute pollution. Chronic pollution will also be occurring from more diffuse discharges. However, these problems may not be identified where they are masked by other polluting input occurring elsewhere.

Public health issues, including landfill gas, can cause problems such as damage to crops and vegetation. There are hazards like asphyxiation and explosions in confined spaces. This has engineering and cost implications for developers.

Examples

Lime beds at Winsford, Middlewich, Lostock and Sandbach
Railway works at Crewe
River Weaver around Northwich
Forge Brook
Sanderson's Brook and River Croco around Middlewich
Arclid Brook
Leighton Brook

Options	Responsibility	Benefits	Disadvantages
1. Prevent further contamination of land by control of current processes	Environment Agency, local authorities, Health and Safety Executive, occupiers, developers.	Cost effective. good housekeeping. Efficient use of resources.	Investment required in pollution prevention and infrastructure.
2. Promote and advise on redevelopment.	Environment Agency, local authorities.	Assist restoration. Land brought into beneficial use.	Pressure for high value after uses which may conflict with other considerations.
3. Undertake detailed investigations and develop a data base of contaminated sites.	Local authority, Environment Agency, site owner, developer, polluter.	Enable a more strategic and pro-active approach. Determine required degree of decontamination and identify suitable remedying technique.	Resources required to manage substantial information needs. Cost.
4. Initiate and co-ordinate action over sites.	Landowner, local authority, Environment Agency. All interested bodies in public and private sector.	Most serious problems can be tackled. Improved coordination of action and communication of concerns.	Cost and Public Funding. Time.
5. Remediation of sites.	Landowner, polluter. local authorities, Environment Agency, English Partnership.	Improvements in environmental quality. Potential of the site for beneficial use may be greatly enhanced. Improved aesthetic appeal and recreational and amenity value.	Cost

Issue 13

ENSURING THE BENEFICIAL EFFECTS OF LAND-SPREADING OF WASTE UNDER THE WASTE MANAGEMENT LICENSING REGULATIONS 1994

Background

In May 1994 the above regulations clarified the legal position in respect of the land-spreading of waste. Detailed in the regulations were a range of exemptions from the need to hold a waste management licence and these included, the spreading on agricultural land of up to 250 tonnes per hectare per year of a variety of controlled wastes. In such cases the operator needs to register with the Agency the intention to spread, and the spreading must be beneficial to agriculture or produce an ecological improvement.

Commonly spread wastes under this exemption are paper pulp, dredgings, textile waste, septic tank sludge and blood and gut contents from abattoirs (NB: only from those which slaughter cattle under the threshold age for BSE control purposes). The area produces a particularly large volume of paper pulp waste from industry in Vale Royal, and given the proximity of agricultural land, spreading is an attractive option.

There have been concerns over the dosing of land with such wastes. In addition to the potential for runoff into drainage channels and so on, there is the matter of whether real benefit accrues when such wastes are spread. It now falls within the remit of the Agency to determine whether it does.

Effects

Poorly operated and controlled spreading may lead to immediate runoff incidents, and thereby create a risk of damage to watercourses, to adjacent land or even directly to public health; for example there has been a recent incident, albeit in another area, where runoff of abattoir waste has run onto the highway. A more long-term and less easily quantifiable effect of repeated spreading may be an impact on groundwater quality.

Examples

For obvious reasons the areas affected are the rural, agricultural parts of the area, and the practice of land-spreading is becoming increasingly common, with contractors paying landowners for the right to spread on their land. For example there have been over a hundred spreadings of abattoir waste on land in the area since introduction of the regulations in May 1994, with land around Winsford and Little Budworth being popular.

Options	Responsibility	Benefits	Disadvantages
1. Confirm the scale and impact of land-spreading activities in the area	Environment Agency	Improved control over potentially polluting activity	Manpower cost
2. Monitor actual spreading activities more rigorously using multi-functional teams	Environment Agency	Improved control over potentially polluting activity	Manpower cost

Issue 14

NEED TO PROMOTE WASTE HIERARCHY

Background

Much of the background to this issue is provided in the introduction to waste regulation matters above. The Agency has roles in educating, providing information and statistics, but also in forming 'on-the-ground' partnerships with appropriate interest groups so as to promote the waste hierarchy and ultimately deliver the UK's commitment to that part of the Earth Summit agreement.

Effects

Failure to reduce waste output will lead to increasing pressure on landfill and alternative disposal options, which are in any event unpopular and have significant environmental impacts. One effect of high waste production will inevitably be high disposal costs, and a knock-on effect of that is likely to be continuation of the problem of fly-tipping. Effective outlets for recycling will also have a downward influence on fly-tipping.

Options	Responsibility	Benefits	Disadvantages
1. Create working relationships with interest groups	Environment Agency, Groundwork, business links, pressure groups, local authorities	Waste minimisation and therefore reduction in wasted resources. May be knock-on effect of reducing quantities fly-tipped.	Diversity of external groups Manpower costs
2. Educate public and others as to the benefits of moving up the waste hierarchy	Environment Agency, local authorities	Waste minimisation and therefore reduction in wasted resources. May be knock-on effect of reducing quantities fly-tipped.	Diversity of external groups Manpower costs

Issue 15

POOR ACCESS TO WATERCOURSES LEADING TO DIFFICULTIES FOR MAINTENANCE WORKS, RECREATIONAL ACTIVITIES

Background

There is poor access to watercourses at many locations in the area for regular flood defence maintenance and emergency works and for recreational activities. Access to watercourses in urban areas is often complicated by walls, fences and residential or industrial property being too close to the watercourse.

Where people cannot walk along a watercourse it can become neglected and undervalued, particularly in urban and semi-urban areas. As well as looking unattractive, development to the bank top leaves no habitats for wildlife. Linear green space along watercourses can act as a buffer against damaging activities as well as being used for recreational and maintenance access.

The Environment Agency has duties under land drainage bye-laws, to control works and development within 8m of the top of the bank on Main Rivers ("Main River" is explained in the Glossary, Appendix 6). The construction of suitable access to, and along, currently inaccessible watercourses is required to reduce maintenance costs, and to improve the Agency's response to flooding. These works may be access ramps or tracks.

Effects

Reduced efficiency in maintenance of watercourses in residential areas.
Access to blockages unavailable or difficult in flood situations.
Uneconomic use of resources to carry out maintenance works.
Irregular but extensive maintenance of watercourses.
Poorly maintained stretches of watercourse reduce overall standards of flood protection.
Lack of amenity use of watercourses
Unattractive and undervalued watercourses.

Examples

Audlem Brook - Audlem
Burland/Brindley/Rookery Watercourse - Barbridge
River Croco - Middlewich
River Dane - Congleton
Wells Green Brook - Crewe
Howty Brook - Congleton
Malkins Bank / Lawton Brook - Wheelock/Hassal
Valley Brook and Tributary - Crewe
General areas within Crewe and Congleton.

Options	Responsibility	Benefits	Disadvantages
1. Providing, encouraging and enforcing access strips along watercourses through the development control process and land drainage consents.	Environment Agency, local authority, riparian owners, developers.	Provides access to watercourses for maintenance works. Provide buffer strips along watercourses. Improves access at no extra cost to Agency.	Objections from riparian land owners and developers. Security of waterside properties reduced. May increase risk of tipping and littering. Access structures can be visually obtrusive. Cost and resource implications of enforcement.
2. Purchase of specialised maintenance equipment to work in restricted areas.	Environment Agency.	May enable more efficient working.	Cost. Specialised equipment may not be fully utilised.
3. Identify where public access improvements to watercourses are desirable and encourage the creation and extension of linear parks/footpaths.	Environment Agency, local authority, landowners.	Improves the public perception of the value of the water environment. Allows public more access to enjoy rivers and the water environment.	Land take. Maintenance. Security of waterside properties.
4. Do nothing		No immediate cost.	Poor utilisation of resources. Increased flood risk. Loss of amenity value.

Issue 16

CULVERTS CAUSING FLOOD RISK AND LOSS OF HABITAT

Background

Many watercourses have been enclosed in culverts, which lie beneath roads, tips, fields and buildings. Within the area there are over 50 culverts totalling approximately 7.6km in length. Many of these, in particular long culverts through urban areas, are prone to blockages, which leads to flooding.

Culverts are a barrier to wildlife. The lack of light and unnatural bed is inhospitable to fish, aquatic plants, invertebrates and mammals such as otters and water voles. Moreover, a fragmented river corridor with artificial gaps in open water, bank-side and valley habitats has less identity and is vulnerable to further abuse.

Detection of pollution is difficult in urban areas where long culverts with multiple connections are common. There is an increased risk of wrong connections into the surface water system.

The provision of debris screens on culverts, and regular maintenance to remove debris from the channels has reduced the risk of serious flooding incidents. Additionally, the regular inspection of culverts and the removal of obstructions ensures the protection of property against flooding due to blockages. Ownership is not always easy to determine, nor is it easy to enforce the clearance of debris screens or culverts when the owner has been identified. Therefore, under its permissive powers, the Environment Agency inspects and clears debris screens within the area, on a priority basis, as resources allow.

In order to maintain existing flood defence standards and protect existing river corridor features the Agency's policy is to object to any new culverting of watercourses except for access purposes and in special circumstances. The Agency also requests that existing culverts are removed and landscaped to be an attractive water feature when sites are redeveloped. Although it can be difficult and expensive to open culverts when they are deep underground, especially if a valley has been tipped with waste, there are culverts that could be opened for the benefit of wildlife and the local environment. The most suitable culverts are those that flow through uncontaminated green space where the new channel could meander naturally and be landscaped attractively.

Effects

History of blockages and flooding, particularly long culverts in urban areas
Fragmentation and loss of river habitats.
Regular maintenance or de-silting of culverts required.
Regular clearance of screens required.
Difficulty in clearing debris from culverts.
Difficulty in investigating and detecting pollution
Increased risk of wrong surface water connections
Prevention of fish migration

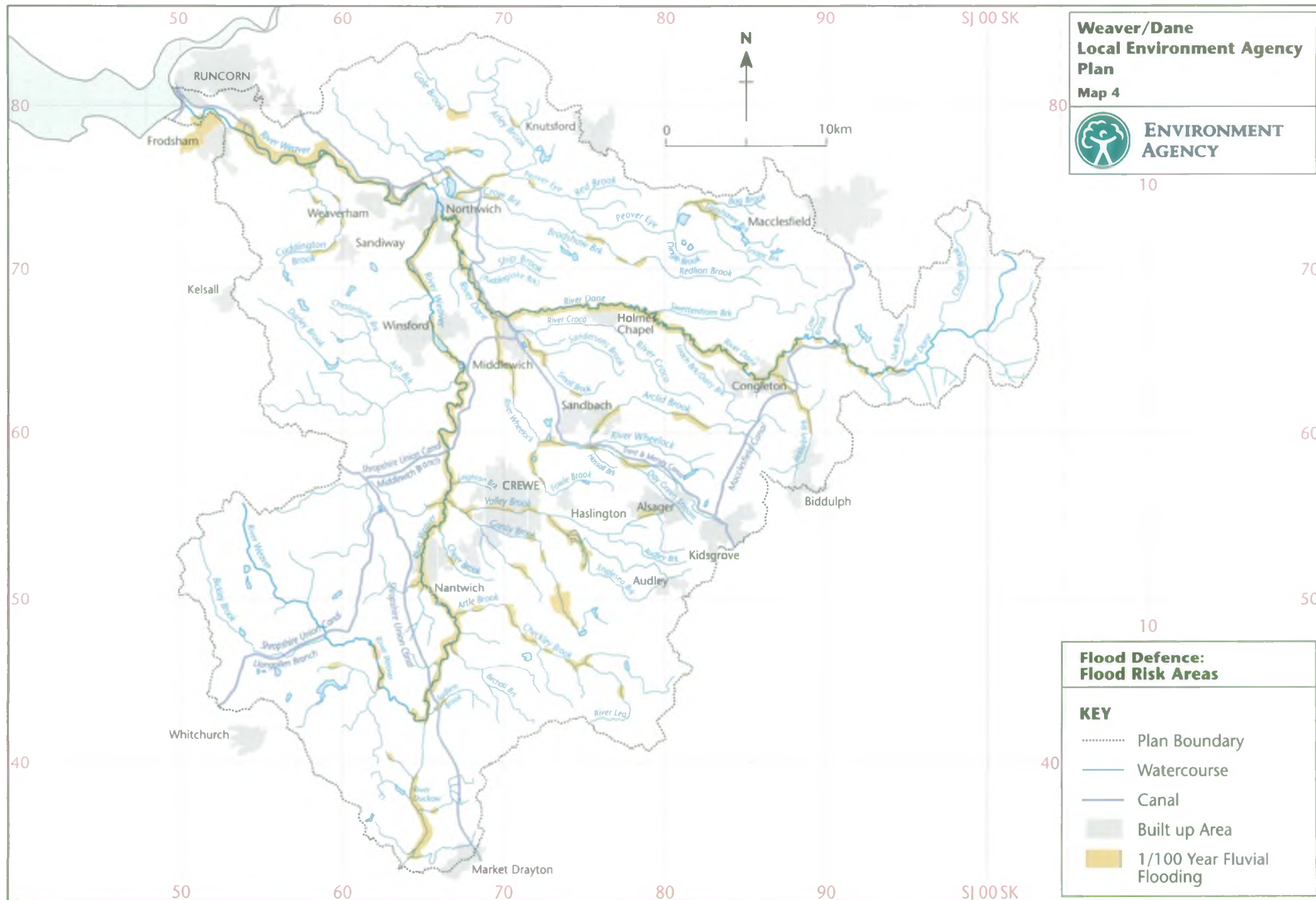
Examples

Wells Green Brook - Shavington
Howty Brook - Congleton
Malkins Brook/Lawton Brook - Wheelock/Hassall
River Croco - Middlewich
Burland/Brindley/Rookery Watercourse - Barbridge
Arclid Brook - Zan/Canal Culverts
Biddulph Brook - Biddulph
Cliff/Cuddington Brook - Bryn
Sanderson's/Small Brook - Middlewich
Valley Brook and Tributary - Crewe, Alsager
River Wheelock - Elton/Elworth Area
Sych Brook - Market Drayton
Basford Brook - Crewe
Congleton town centre

Examples of watercourses where culverted sections may be suitable for opening up:

Day Green Stream, Malkins Bank

Options	Responsibility	Benefits	Disadvantages
1. Gather information on all culverts. Identify possible river restoration schemes, to remove existing culverts when opportunities arise.	Environment Agency, local authority, developers, riparian owners.	Increased knowledge of the problem and priorities established. Ready to bid for funding.	Cost and availability of resources.
2. Promote and carry out a policy that existing culverts should be removed wherever possible and restored to open river corridors.	Environment Agency, local authority, developers, riparian owners, Groundwork Trusts.	Watercourse restored to a more natural state. Increased amenity and recreational value. Likely improvement in maintenance and flood protection. Improved pollution detection. Reduced liability for maintenance.	Cost. Restricts and available for development.
3. Where appropriate, installation of debris screens and telemetry on culvert entrances.	Environment Agency, local authority, riparian landowners.	Reduced risk of blockages within culverts. Improved response to blockages. Increased safety for public.	Increased obstruction to flow with increased flood risk. Maintenance costs. Increased liability for screen owners.
4. Do nothing		No direct cost.	Culverts would deteriorate with increased risk of flooding, therefore greater long-term expenditure.



Issue 17

PROPERTIES AT RISK OF FLOODING

Background

It is a key objective of the Agency to;
"reduce the risk of floodingfor people and property from rivers and the sea".

A number of existing urbanised regions within the LEAP area have been highlighted as being vulnerable to potential flooding from rivers and watercourses failing to reach the target level of flood protection (see Map 4).

In order to meet this objective, supplementary to general maintenance work, we have permissive powers to build new flood defences. Any potential flood defence scheme must be proved to be technically, environmentally and economically viable.

In parallel with the existing threat of flooding, there also exists the increasing pressure to continue the development of the area.

Effects

Properties at risk of flooding, including potential flooding, from inadequate or breached flood defences.

Potential threat to life and property.

Examples

Arclid Brook - Sandbach
River Croco - Holmes Chapel
River Dane - Northwich, Congleton, Colley Mill, Havannah Cottages
Dane in Shaw Brook - Buglawton
Fowle Brook - Haslington
Hollingworth Clough Brook - Bank Vale Mill
Loach / Dairy Brook - Congleton
Sanderson's/Small Brook - Middlewich
Valley Brook and Tributary - Crewe
River Weaver - Northwich, Nantwich
River Wheelock - Middlewich, Warmingham, Wheelock

Options	Responsibility	Benefits	Disadvantages
1. Investigate the known flooding problems and report on the technical, economic and sustainability of it's potential solution.	Environment Agency, MAFF, local authority, developers, riparian owners.	Increased knowledge of the problem and establish priorities. Preparation to bid for funding.	Cost and availability of resources.
2. Reduce flows into the river from development by reducing inflows, storing waters or providing alternative routes for flood flows.	Environment Agency, local authority, developers, riparian owners.	Reduction in flows entering watercourses which have limited available capacity. Reduced flood risk.	Cost. Land take. Liability of future maintenance.
3. Install other means of stormwater control, such as swales, attenuation ponds or storage.	Environment Agency, local authority, developers , Highway Agency.	Protection of aquatic ecosystem and prevention of water quality deterioration. Improvement to the aesthetic and amenity value and fishery potential.	Cost of installation, maintenance and additional land requirement.



Issue 18

IN-RIVER STRUCTURES CAUSING FLOOD RISK, RESTRICTION OF FISH MIGRATION AND REDUCED RECREATIONAL USE

Background

Control of water level and regulation of discharge are sometimes necessary for the purposes of irrigation, water conservation, flood alleviation, as means of harnessing power to drive mill machinery and in conjunction with locks for the purposes of navigation.

Most of the structures found in the Weaver/Dane area are designed to hold water upstream. These are generally considered to degrade the environment.

Structures, such as weirs and sluices, can cause major obstructions to the migration of fish and recreational users such as canoeists.

If fish are restricted from free movement within the river system they are unable to migrate to their spawning areas. This will reduce spawning success and hence sustainability.

Weirs, sluice gates, locks, culverts and bridges are also vulnerable to silt deposition. This can create a potential flooding problem and also reduce the extent of suitable fish habitats. Silt deposits can collect, covering coarse gravels upstream, thereby reducing the spawning area available to fish. This is particularly important for brown trout and dace within the Weaver area, which rely on these gravels for spawning. A loss of these areas will inevitably lead to a reduction in spawning success and sustainability.

Deposition of silt in poorly designed man-made urban channels and culverts also reduces the watercourse capacity, thereby increasing the risk of flooding.

New structures in the watercourse are discouraged. However, the replacement of existing weirs is sometimes necessary especially when a structure is unsafe. Where possible, new structures should incorporate fish passes (bypass channels) and canoe passes to reduce the impact.

Effects

Restriction of fish migration

Restriction and dangers to recreational users

Debris collection resulting in poor aesthetic appearance and potential flooding

Disruption to natural river flow process

Regular heavy maintenance works causing extensive disruption of watercourses.

Examples

River Weaver - Church Minshull
 Dane in Shaw Brook - Buglawton
 Artle/Checkley/River Lea - Madeley
 Bag/Snape Brook - Chelford
 Cliff Cuddington Brook - Acton Bridge
 Sutton Weaver - Bradley Orchard
 River Wheelock - Middlewich

Options	Responsibility	Benefits	Disadvantages
1. Investigate and collate information on the existing structures, assessing the full impact on recreational, canoeing, fishing, and flood defence activity. Prioritise and carry out possible river restoration / enhancement schemes.	Environment Agency, Local authority, riparian owners, British Canoe Union, Sports Council, Angling clubs British Waterways	Increased variety benefits wildlife, fish and recreational users. More attractive watercourses. Improved aesthetic and amenity value. Reduced risk of flooding.	Possible extra cost.
2. Carry out works to return channels to more natural section.	Environment Agency, Local authority, riparian owners British Waterways.	Cost saving due to reduced maintenance costs. Allows development of natural habitat. Improved channel capacity.	Cost of carrying out works. Land take. Insufficient space in urban areas.



Issue 19

LAND USE AND LANDSCAPE CHANGES LEADING TO THE LOSS OF WILDLIFE, HABITAT AND LANDSCAPE DIVERSITY

Background

A diversity of natural features, such as meanders, riffles, pools, emergent vegetation and bankside cover within wide river corridors, ponds and wetland habitats, woodlands, trees, hedgerow and hay meadows are required to sustain viable populations of a wide range of wildlife species and maintain the landscape character of the Weaver/Dane area. There has been a serious loss of these habitats and a consequent reduction in species diversity and landscape character in the study area. Biodiversity is a word that became popular after the Rio Earth Summit. It is used to describe the variety of living organisms on earth.

Local authorities, land-use and environmental organisations will, in future, be compiling Local Biodiversity Action Plans which will highlight targets for specific habitats and species. The Environment Agency will be in a key position to influence many of these targets since a number of Action Plans will be concerned with wetland and aquatic species.

Until these are ready to be implemented there is a need to continue to protect and improve existing habitats to sustain these important populations.

By creating new habitats and removing threats to existing habitats, species will be encouraged to achieve their target distribution and status.

The conservation of biodiversity will be a key indicator of the successful implementation of sustainable management in this area.

Effects

Loss of local landscape character and visual amenity.
Loss of valuable wildlife habitats and biodiversity.
Reduction in populations of important species.

Examples

The Cheshire Meres and Mosses are of international importance for nature conservation and are important features of the landscape. They are particularly important for aquatic plants like saw sedge and marsh fern; insects, especially dragonflies like the white-faced darter and hairy dragonfly; molluscs; and birds like pochard and shoveler.



Semi-natural rivers have been allowed to maintain a natural course allowing for natural processes of erosion and deposition. They are important landscape features and of high ecological value, providing areas of rich wildlife habitat. Good examples of such rivers in this area are the River Dane, stretches of the River Weaver and tributaries such as Checkley Brook. Some areas of the River Weaver and River Dane have been designated as Areas of Special County Value for Landscape. Such rivers are threatened by the pressures of development and insensitive management practices such as straightening, culverting and tipping of material along banksides.

Ponds are an attractive landscape feature as well as providing habitats for a wide range of flora and fauna. In this area their density is exceptionally high compared with any other area in Britain. However, they have suffered a major decline: in 1870 there were 41,500 ponds in Cheshire but by 1992 there were only 16,728. The great crested newt, which is listed in Annexes II and IV in the EEC Habitats Directive, occurs in several ponds throughout the area. Many ponds also have good populations of other amphibians and dragonflies.

Hedgerow and stream-side trees are a particular feature of this area. However, due to increases in field sizes, stock grazing, felling for flood defence purposes and a lack of planting there have been significant losses of trees, hedgerows and broadleaved woodland cover. Since 1947, Cheshire has lost 66% of its hedgerows, and the oak population, which is a significant landscape feature in the area, is old and will need the planting of 6,550 trees per year to sustain itself. Such losses have a tremendous effect on the area in this predominantly agricultural landscape.

Native black poplar, the most endangered native timber tree species in Britain, is present in isolated patches or as individual trees within the study area, principally along the Weaver Valley. They are of high landscape value, growing close to water in lowland areas and adjacent to agricultural areas.

Signs of otters have been found within the Weaver and Dane areas. Suitable habitat for this species does exist and should be retained and enhanced along riverbanks to encourage the spread of existing populations from adjacent catchments such as the Rivers Dee and Severn.

Water voles have been recorded within the Dane and Valley Brook areas. Their numbers could be increased by sensitive management of streams and ditches. However, increases in the number of mink may limit population numbers.

The freshwater white-clawed crayfish is found within the Dane, Weaver and Valley Brooks but numbers are threatened by loss of habitat, water pollution, competition from non-native crayfish and crayfish plague.



Options	Responsibility	Benefits	Disadvantages
1. Undertake a baseline survey of habitats and species and establish an appropriate programme of on-going monitoring.	English Nature, local authorities, wildlife trusts, Environment Agency.	Increased knowledge of existing habitat and species.	High resource requirement.
2. Carry out works to return channels to more natural section.	English Nature, wildlife trusts, local authorities, Environment Agency, FWAG, RSPB, BTO, specialist local groups.	Allows a more structured approach to conservation management. Encourages species to reach their target distribution.	High resource requirement.
3. Undertake tree planting in association with existing initiatives, project work and planting schemes.	English Nature, wildlife trusts, Mersey Forests, Countryside Stewardship, local authorities, Environment Agency, FWAG.	Improvement in landscape quality, local amenity and recreational value. Meeting DoE targets for tree planting within the community forest. Protects and encourages the spread of target species.	
4. Work in Partnership with other organisations to protect and promote the restoration of vulnerable landscape features, eg: hedgerows, ponds, Cheshire Meres & Mosses, Natural river valleys.	Environment Agency, FWAG, ADAS, MAFF, CPRE, wildlife trusts, English Nature, local authorities.	Preserves landscapes quality. Provides habitat for a wide range of threatened species eg: barn owl, skylark, wild flower meadows.	Requires compensation for change in agricultural practises.

Issue 20

CHANNELISED WATERCOURSES CREATING LOSS OF HABITAT AND AMENITY

Background

Many watercourses in this area have been artificially straightened, deepened and shortened. Land next to urban watercourses has often been developed in the past, right to the bank top. Banks have been reinforced or re-profiled to prevent natural erosion, silt deposition and meandering. Rural watercourses have been modified to create more land for agriculture and to drain land more effectively.

The Environment Agency, through its activities as a statutory consultee, works to retain those stretches of watercourse and river corridor which have a natural variety of features, for example, a meandering course, gravel shoals, riffles and pools, bankside trees, woodlands, wetlands and grasslands. We also seek to retain open watercourses and integrate buffer zones in new development sites to retain existing features of interest and promote opportunities for enhancement.

It is possible to enhance some of the degraded watercourses by, for example, tree planting, creating wet margins, planting water plants, re-instating riffles and pools or raising bed levels. In some areas it may be appropriate to restore meandering, semi-natural watercourses with flood plain habitats. This would involve considerable earth moving and requires uncontaminated and undeveloped adjacent land.

Effects

- Artificially straightened watercourses reduce the physical variety in the channel, banks and adjacent land. This reduces potential habitat for wildlife, including fisheries, due to the loss of meanders, vegetated and unvegetated marginal habitats, shoals, riffles, pools, eroding banks, terraces, oxbows and valley landforms and there is less biodiversity due to a lack of bankside trees and plants, marginal and channel vegetation.
- They are less attractive watercourses for people to enjoy. Aesthetically, they are uninteresting, are less valued and need to be heavily maintained to retain their straight uniform profile.
- The loss of natural watercourses and bankside vegetation, including trees, reduces the landscape quality of an area and devalues its cultural heritage. Where development has taken place very close to the bank top, people may not even know a watercourse exists.

Examples

Weaver Navigation
 Sections of the Dane in Congleton town centre
 Valley Brook at Crewe
 R. Croco in Middlewich
 Wade Brook
 Witton Brook
 Gale Brook

Options	Responsibility	Benefits	Disadvantages
1. Identify stretches suitable for enhancement and restoration.	Environment Agency, local authorities, Groundwork Trusts, landowners, Mersey forest, Forestry Authority, Weaver Valley Initiative, British waterways.	Be able to prioritise, appreciate full scale of problem and most effective way of addressing it.	Extent of contaminated land. Cost
2. Implement enhancement and restoration schemes.	Environment Agency, local authorities, Groundwork Trusts, landowners, Mersey Forest, Forestry Authority, Weaver Valley Initiative, British waterways, developers.	Improve wildlife value of river corridors. Restore landscape character of area and increase visual amenity, recreational value and fisheries potential.	Cost. Extent of contaminated land. Unpredictability of funding sources. May increase maintenance costs. Will require additional land take.
3. Protect existing semi-natural rivers and streams such as the Dane.	Environment Agency, local authorities, riparian owners developers, English Nature.	Protect important features and habitats.	

Issue 21

INVASIVE NON-NATIVE PEST SPECIES

MINK

Background

Mink escaped or were released from fur farms in the 1920s. Many have successfully bred in the wild and the population is thriving. By the late 1980s, mink were recorded all over the country.

Evidence of feral mink was found throughout the Weaver/Dane area during the Cheshire Otter Project Survey.

Effects

The increase in mink numbers is one factor which may be linked to the decline of water vole populations. They also prey on ground nesting birds.

NON-NATIVE PLANT SPECIES

Background

Many foreign plants were introduced to Britain in the 19th century, mainly for ornamental purposes. A few grow very strongly in the wild and have come to dominate riverbanks. Japanese knotweed and Himalayan balsam are widespread in this LEAP area, particularly where land has been disturbed. Giant hogweed has also been reported at several localities within this area.

Effects

Non-native plant species pose problems of bank erosion and destruction of valuable plant communities. They readily and effectively shade out other vegetation and on river banks the loss of ground cover including grasses often results in bank stability problems. During the winter non-native species die back, exposing bare earth which is often subjected to erosion at time of high flow.

Giant hogweed is a dangerous plant when it comes into contact with human skin. The sap causes severe irritation, swelling and painful blistering. Even light contact through clothing can cause problems. This may pose a health risk hazard for the general public undertaking recreational pursuits nearby.

Options	Responsibility	Benefits	Disadvantage
1. Assess current problem areas for mink and study effects on water vole populations.	Environment Agency, Wildlife Trusts	Collection of evidence to best advise outside agencies.	
2. Investigate the extent of Japanese knotweed, Himalayan balsam & Giant hogweed in the area.	Environment Agency, local authorities, Ranger Services, landowners, British Waterways.	Scale of problem identified and control programme initiated where required. Possible health risks for recreational users will be reduced.	Large area to cover.



Giant hogweed

Issue 22

THE IMPACT OF NUTRIENT ENRICHMENT ON AQUATIC COMMUNITIES

Background

There are many lakes and ponds in the Weaver/Dane area which are thought to be suffering from enrichment problems. This causes eutrophication (see Glossary, Appendix 6) which in turn is leading to high productivity. It is generally believed that eutrophication is a normal feature of lakes as they gradually silt up, but the addition of nutrients of human origin speed up this process causing serious problems for the plants and animals in the water bodies.

Algal blooms are a common feature of eutrophic lakes and may reach nuisance proportions.

Effects

- Some species produce toxins which, if swallowed or come in contact with skin, can cause adverse health reactions in humans.
- Animals may consume algal scum leading to severe illness or death.
- Adverse impacts on recreation, especially for water-based activities such as canoeing, sailboarding, angling and rowing where direct contact with the water is frequently unavoidable.
- Impact on abstraction such as treatment costs.
- Aesthetic appearance.

It is important that eutrophic conditions are monitored to assess the full impact of nutrients on the waters. In addition, steps should be taken to prevent an increase in nutrient loads to lakes, ponds and flowing waters.

Options	Responsibility	Benefits	Disadvantages
1. Continued chemical monitoring programme of selected Cheshire Meres as part of a still water strategy.	Environment Agency.	Data collection to assess the impact of nutrients on still waters.	Resource implications.
2. Monitor freshwater macrophytes and presence of blue-green algae as appropriate.	English Nature, Environment Agency.	Data collection to indicate the effect of eutrophication on population trends. Owners of waterbodies informed of presence of blue-green algae.	Cost. Guidelines on assessment of results are still evolving.
3. Reduction of nutrient loads to still and flowing waters.	Possibly NWW Ltd., as a requirement of EC Urban Wastewater Treatment Directive.	Diversity of aquatic plant species maintained. Reduced incidence of development of blue-green algal blooms which affect water quality and aesthetic and amenity value. Compliance with EC Urban Waste Water Treatment Directive.	Cost.

Issue 23

LACK OF SUSTAINABLE FISH POPULATIONS

Background

The area contains river stretches which maintain high quality sustainable fisheries. Good examples of these are found in the lower Weaver, downstream of Bottoms Flash, in the River Dane and stretches of the Peover Eye. There are, however, some river stretches where fish populations are restricted due either to poor water quality or to habitats being denuded by siltation.

Effects

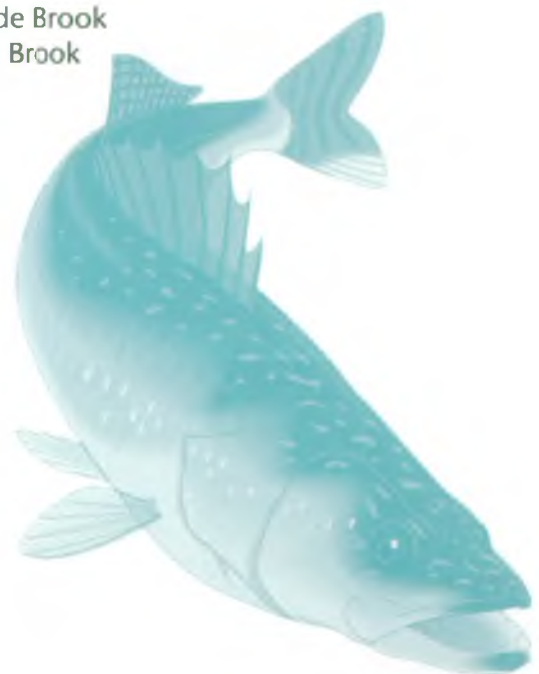
Because of high organic loading, fish populations are excluded altogether or are restricted to minor species such as stone loach or sticklebacks.

Siltation due to high suspended solids reduces the quality of the habitat available, particularly in the small upstream channels.

Examples

Upper reach of the River Duckow
Dodcott Brook
Cheney Brook
Valley Brook
Audley Brook
Englesea Brook
Gresty Brook
Swill Brook
Leighton Brook
Kidsgrove Stream
Biddulph Brook (upper stretches)
River Croco (lower reach)
Cow Brook

Bosley Brook
Swettenham Brook
River Wheelock (downstream of Sandbach)
Red Lion Brook
Bradshaw Brook
Crow Brook
Cogshall Brook
Arley Brook
Tabley Brook
Forge Brook
Wade Brook
Bag Brook



Options	Responsibility	Benefits	Disadvantages
1. Monitor and stock isolated stretches with fish, if necessary, as water quality improves sufficiently to maintain a self-sustainable fish population.	Environment Agency, Angling Clubs.	Development of a fishery.	Cost.
2. Do nothing.		No cost.	Lack of fish population and amenity value.



Fishing - Weaver Navigation Winsford



protection through partnership

**This section provides
supporting information
on joint initiatives and
partnerships between the
Agency and others.**

Introduction

General

Much of the day to day work of the Agency is aimed at protecting the environment through education, prevention and environmental improvement.

This important work does not feature in the LEAP because the Plan is primarily intended to address environmental problems and these are highlighted as issues in this Consultation Report. Much of this routine work is undertaken by the Agency to fulfil its duties and responsibilities. Examples include routine inspection at landfill sites to ensure licence conditions are being complied with, anti-poaching activities by Agency bailiffs, routine river sampling to detect trends in water quality and site visits to factories/sewage works etc. to ensure discharge authorisations are being complied with.

However, the Agency recognises that it is not the only body operating in the field of environmental protection and improvements and that our responsibilities often overlap with those of other organisations.

Where appropriate, the Agency will work with partners to achieve environmental protection and improvements. Much of this co-operation is carried out daily between officers in the field and does not require any formal setting up. Examples include negotiation between Agency inspectors and representation of individual companies over programmes of investment to improve environmental performance, or assistance afforded by the Police in difficult enforcement action. However, in some cases the Agency does get involved in more formal partnerships and some of those which are relevant to this LEAP area are outlined below.

Weaver Valley Initiative

The Weaver Valley Initiative (WVI) aims to create a working partnership of public, private and voluntary sector organisations between Winsford Flashes and the rivers' confluence with the Manchester Ship Canal. Partnership is the key to the WVI and partners of the Initiative include: Cheshire County Council, Environment Agency, Special Landscapes Project, Mersey Basin Trust, Vale Royal Borough Council, British Waterways, Cheshire Wildlife Trust, ICI, and Brunner Mond. The valley has many rich wildlife and landscape features as well as unique heritage and industrial archaeology. It also provides opportunities for recreation, access and sympathetic re-development. The Agency works closely with the WVI and has representatives on the steering group, education groups and a Project Officer.

A Project Officer post, part funded by the Agency, has provided a focus and allowed co-ordination of the many activities and publicity of the Initiative within the valley. The appointment of the Project Officer has acted as a stimulus for many groups and organisations, leading to numerous valuable projects within the area.

The Agency provides financial assistance to many projects within the Initiative area. Projects supported have involved the community, raised awareness and improved the valleys assets. These have included the production of a leaflet to publicise the Weaver Valley Initiative, creation of a wildflower meadow and a dragonfly interpretation panel at Anderton Nature Park, a Pollution Action Pack produced by Vale Royal Environment Network, creation of a sensory trail in Hobhey Wood, Frodsham, nest boxes, tree planting and litter-picking equipment for the Winsford Anglers, and tree planting at Owley and Furey Woods.

Other projects which are being planned include Weaver Environmental Arts Project which hopes to encourage interest in the valley through artist workshops and events; education projects, including many local schools, to identify the resources available in the valley and how they can be used by the students in the area.

The partnership of the Weaver Valley Initiative has provided a focus for the valley in Vale Royal and has allowed many local people to become involved.

British Waterways

British Waterways is a key partner for the Weaver area, especially concerning the Weaver Navigation. Please refer to the chapter on Navigation, Section 2.10.

Local Agenda 21

Agenda 21 is a global action plan for the 21st century, produced at the Rio Earth Summit in 1992. It brings together economic, environmental and social concerns into a "blueprint" for a more sustainable way of life for everyone.

Local authorities across the world were seen as the focus for promoting and encouraging local community action and were charged with producing a **local Agenda 21**. Local government in the UK has overwhelmingly accepted this challenge with 70% of local authorities now committed to participating in the process.

The Agency is committed to encouraging more sustainable lifestyles for all, through our work and in partnership with others. We are also keen to develop closer relationships with local communities. Playing our part in local Agenda 21 helps us to achieve this and we are already involved in advising a number of local Agenda 21 groups on the state of their local environment.

In the Weaver/Dane area, the Agency is involved in Cheshire's Sustainability Forum and task groups and Vale Royal's Round Table. The Agency has also helped Halton in the establishment of its waste minimisation club and Environment Forum.

Local Agenda 21 in the Weaver/Dane Area

Cheshire CC

A sustainable Cheshire Forum, with associated task groups, has produced Cheshire's Agenda 21 Strategy and Action Plan and Cheshire's Environmental Measures (indicators for sustainability).

Chester City Council

Established environment forum 1990 which includes businesses, voluntary organisations and authority; to be re-launched as LA21; has a number of topic groups, two focus groups (women and youth) and pilot village LA21 (Tarvin). Attempting to bring together information from groups to produce action plan.

Congleton BC

Congleton has produced a blueprint for their area which is designed as stages on a journey towards sustainability including all the consultation, actions and strategies which have contributed so far. This has been circulated to every home in the Borough.

Crewe and Nantwich BC

Crewe and Nantwich BC has been through the local Agenda 21 co-ordination and consultation phases and are now ready to publish its findings.

Halton BC

Halton has only recently started the process of local Agenda 21. It has had success in reaching the business community through the development of a waste minimisation club. It is now setting up an Environment Forum for the Borough to widen the community participation in the process.

Macclesfield BC

Macclesfield is assessing its authority's environmental performance topic by topic. It has sent out a leaflet/questionnaire to key groups to identify local Agenda 21 issues for the area, with and have had a good response from the business community so far. The objective is for the authority to be "clearing house" for enquiries and issues raised.

Vale Royal BC

Vale Royal launched its "A Vision for Vale Royal" in April 1997. This is a collection of issues important to the local community, with actions for addressing them. Vale Royal arrived at their vision through extensive community participation, including several Round Tables, a Community Conference in Frodsham and a "local" local Agenda 21 in Weaverham. Vale Royal's "vision" featured in the United Nations Conference on Environment Development (UNCED) submission to the United Nations General Assembly in June 1997.

Warrington BC

Warrington launched its LA21 in October 1995 and has eleven Round Tables including crime, health, women, youth, pollution, waste. Warrington has also established community groups for consultation. "Visions" from all the Round Tables were collated to make a LA21 strategy, from which a draft LA21 document was launched in March 1997. The final document and video were produced July 1997.

Other local authorities

Within this LEAP boundary there are parts of other local authorities: High Peak, Newcastle-u-Lyme, North Shropshire, and Staffordshire Moorlands. These have not been included because they are outside the Agency's administrative boundaries in the North West.

Other partners (This list is not exhaustive)

- Agricultural Advisory Service (ADAS)
- Angling clubs
- British Canoe Union
- British Trust for Ornithology (BTO)
- Brunner Mond
- Businesses
- Canoe clubs
- Cheshire Wildlife Trust
- Commission for the Protection of Rural England (CPRE)
- Community groups
- Construction industry
- Countryside Commission
- Countryside Stewardship
- Developers
- Dock and Harbour Boards
- Emergency Services
- English Nature
- English Partnership
- Farmers
- Farming and Rural Conservation Agency (FRCA)
- Farming Wildlife Advisory Group (FWAG)
- Forestry Authority
- General public
- Groundwork Trusts
- Hays Chemicals
- Health and Safety Executive
- Higher Education
- Highways Agency
- Householders
- Imperial Chemical Industry (ICI)
- Industry
- Landowners
- Local authorities
- Local interest groups
- Ministry of Agriculture, Fisheries and Food (MAFF)
- Mersey Basin Trust
- Mersey Forest
- National Farmers Union (NFU)
- North West Water (NWW) Ltd.
- Police
- Power generators
- Ramblers
- Ranger services
- Recreation groups
- Residents
- Riparian owners
- Royal Society for the Protection of Birds (RSPB)
- Schools
- Specialist groups
- Sports Council
- Stream Care
- Tidy Britain Group
- Universities
- Voluntary groups
- Walkers
- Waste Disposal authorities
- Water Watch
- Wildlife groups

Sustainable Development

Background

In simple terms, sustainable development can be seen as balancing the need to protect and enhance the environment with achieving economic stability and social justice. The United Nations Environment Programme definition of sustainable development is:

"improving the quality of human life whilst living within the carrying capacity of supporting ecosystems."

At the UN Conference on Environment and Development (the Earth Summit), held in Rio de Janeiro in 1992, leaders and representatives from over 150 states met to reach a global agreement on how the concept of sustainable development could be translated into action plans. Its main products were:

- Agenda 21 - a global action programme for sustainable development;
- the Climate Change Convention - to tackle global warming by reducing emissions of greenhouse gases;
- the Biodiversity Convention - for worldwide species and habitat protection; and
- the Forestry Principles - for the management and conservation of the world's forests.

The UK Government responded to the Earth Summit with its own *"Sustainable Development - the UK Strategy"* (1994) in which it identified the UK's contribution to global pressures on the environment, such as climate change and the loss of biodiversity. It lays down policies and principles for the UK's future role in achieving global sustainable development.

The Environment Agency and Sustainable Development

The Environment Agency is committed to contributing to sustainable development, through our work and in partnership with others. This is captured in our vision which is:

"a better environment in England and Wales for present and future generations".

The Agency has received guidance from Ministers on how it should make its contribution. This includes:

- taking a holistic approach to the protection and enhancement of the environment;
- taking a long-term perspective;
- conserving and enhancing biodiversity and protecting natural heritage;
- contributing to the protection of the global atmosphere;
- investigating the scope of reconciling the needs of the environment with those of development;
- striving to develop close and responsive relationships;
- providing high quality information and advice.

Clearly, the most important contribution to sustainable development made by the Agency will be through our core work, for example the continuing regulatory activities. However, sustainable development is the responsibility of everyone, and the Agency recognises that it is one part of a diverse community, including members of the public, industry, local authorities and non-governmental organisations, that must work together to achieve it.

Biodiversity

Background

At the Rio Earth Summit in 1992, the UK was one of 150 countries to sign up to the Convention on Biological Diversity, one of a suite of agreements drawn up around the central concept of sustainable development.

"BIODIVERSITY: THE VARIETY OF LIFE.

Biodiversity is all living things, from the tiny garden ant to the giant redwood tree. You will find biodiversity everywhere, in window boxes and wild woods, roadsides and rain forests, snow fields and seashore."

Biodiversity: The UK Steering Group Report 1995

In 1994, the UK Government published its UK Biodiversity Action Plan as a framework document laying out the government's proposals for protecting biodiversity in the UK. Through this plan, a UK Steering Group was established to develop targets for rare and vulnerable habitats and species, and provide guidance at a local level.

This group reported in December 1994 with 116 Species Action Plans and fourteen costed Habitat Action Plans.

The Environment Agency's Role.

The Environment Agency was given the specific role of contact point for twelve species and one habitat but is identified as sole or partner organisation for 100 actions in 60 other action plans.

Local Biodiversity Action Plans (LBAPs) are seen as an essential method through which the UK targets can be achieved, by translating them into effective action at a local level. **LEAPs** are seen as a key mechanism for identifying the actions the Agency needs to take at a local level to deliver its contributions towards individual species and habitat action plans.

Key Species for the Area include otters, water voles, great crested newts, freshwater white-clawed crayfish, floating water plantain. These species are included on the short list of Globally Threatened/Declining Species contained within the UK Biodiversity Action Plan. Other key species which are locally rare include barn owls, bats, white-faced darter dragonfly, hairy dragonfly, lesser silver water beetle and black poplars. The Cheshire Wildlife Trust has drawn up LBAPs, often in association with the Environment Agency, for the majority of these species. Key habitats include reedbeds, meres and mosses, ponds and flashes.

The **otter** population of the UK is slowly recovering from its 1950's decline as highlighted by the national otter surveys of 1985 and 1993. Although otters were once common and widespread in Cheshire, habitat removal and pollution contributed to a decline in the local population, and otters have been absent from most of their original range for some time. The Environment Agency has drawn up a Species Action Plan for the otter.

In 1995, the Cheshire Wildlife Trust (CWT) were commissioned to carry out the first phase of a project to assess the status of the otter in Cheshire. Signs of otter presence were recorded on the Upper Weaver and Dane catchments. It is thought that otters are likely to recolonise Cheshire rivers from Dee catchment to the west and Severn catchment to the south. As a result of this work, the Environment Agency has worked in partnership with the CWT to

construct a number of artificial otter holts throughout the county to encourage recolonisation. (There is a demonstration holt at Hockenhull Platts on the River Gowy, Lower Mersey LEAP Area).

The CWT have recently completed work on Phase 2 of this survey, part-funded by the Environment Agency to produce The Weaver Catchment Survey, which looked at the distribution of water vole and mink, as well as otter, within the area. Information has been provided which aims to help safeguard suitable wetland sites for water voles and otters and areas for enhancement have been suggested.

Recovery of the otter population may be prevented by lack of suitable habitat, limited food resources, pollution, disturbance (particularly from increased recreational activity), road deaths, and drowning in fyke nets if not fitted with otter guards. Small numbers of animals present in an area will be extremely vulnerable to these limiting factors but if these can be addressed, populations may slowly recover.

The otter is listed on Annexes II and IV of the EC Habitats Directive (EC/92/43), Appendix II of the Bern Convention and Appendix 1 of CITES and is classified by the International Union for the Conservation of Nature (IUCN) as "vulnerable". The otter is also listed under Schedule 5 & 6 of the Wildlife and Countryside Act, 1981.

The **water vole** favours backwater streams, ponds and canals and was once common and widespread in lowland Britain. However, it has suffered a significant decline in numbers and distribution as highlighted by the national survey of 1989-1990. Changes in land-use and drainage practices, increased use of pesticides, predation by mink, waterside developments and human disturbance are all thought to have contributed to this decline. In 1996, the Environment Agency and Oxford University began a two year study of water voles and the reasons for their decline. The water vole is also the subject of a collaborative study by The Wildlife Trusts and Newcastle and Oxford Universities started in 1997.

There are historical records of water voles within this study area relating mainly to the Dane catchment and Danes Moss although recent records relate to the Weaver area. Initial surveys of water voles have been carried out as part of The Weaver Catchment Survey 1996/1997, produced by the CWT but more work is needed before results can be produced. There is a need to establish the distribution of water voles within this area in order to safeguard sites.

Water voles are now protected under schedule 5 of the Wildlife and Countryside Act, 1981.

The **great crested newt** is an internationally important species of conservation concern. It is protected under Annex IIa and IVa in the EU Habitats and Species Directive and under Appendix II of the Bern Convention which is implemented in the UK by Schedules 5 and 9 of the Wildlife and Countryside Act. Distribution is widespread over this LEAP area and is determined by the location of clusters of suitable ponds. Suitable surrounding terrestrial habitat is necessary for feeding and for winter hibernation. The major threat is thought to be the loss and fragmentation of suitable aquatic and terrestrial habitat, due to natural succession, pollution, infilling, changes in agricultural practices and the spread of urban development into the agricultural fringe. Road schemes can also dissect pond clusters and affect the viability of great crested newt communities.

The **freshwater white-clawed crayfish** is the only native crayfish in the British Isles and is confined to areas with relatively hard, alkaline water. Although distribution within this study area is limited, native crayfish have recently been recorded from sites within the Dane, Weaver and Valley Brook areas. Preferred crayfish habitat includes streams and rivers without too much sediment and they are sensitive to pollutants which lower the oxygen level of water. They also require shelter through rocks, plants or tree roots or a bank to burrow in. Crayfish can form an important part of the diet of otters, fish, mink and some carnivorous insect larvae. A Species Action Plan is being formulated by the Environment Agency, and a revised crayfish leaflet will be issued in 1997.

A number of non-native crayfish have been introduced into the British Isles by the restaurant and aquaculture trade. These species have escaped into the wild and can represent a major threat to native populations through competition and through the spread of crayfish plague, a virulent disease spread by a fungus carried by the North American Signal crayfish. Precautions to avoid the spread include drying and disinfecting angling equipment, but native white-clawed crayfish are highly susceptible to it, and populations in southern England have been wiped out due to its spread.

Nottingham University has recently completed project work, funded by the Environment Agency, to assess the impact of non-native crayfish on freshwater ecosystems and to formulate a strategy for the conservation of the native species. A national database has also been set up to monitor the distribution of native and non-native species. At present, non-native crayfish within this area are confined within specialised crayfish fisheries. The Weaver LEAP area is important as one of the few areas where crayfish plague is absent and it is important that awareness of it is increased to prevent its occurrence.

The freshwater white-clawed crayfish is listed in Annexes II and V of the European Habitats and Species Directive. Designation of protected areas is required for species on Annex II, and the North West area is designated as a 'no go' area for non-native species. The Environment Agency has a responsibility to monitor populations of crayfish in all such protected areas. It is also listed under Appendix III of the Bern Convention and included in the IUCN Red Data List. It is listed under Schedule 5 of the Wildlife and Countryside Act, 1981 giving it protection against "taking and sale" in Britain.

Barn owls use river corridors for nesting and feeding, so it is vital to retain undisturbed corridors along watercourses and encourage habitat management to help this declining species. Numbers of barn owls within the LEAP area are extremely low. Threats to this species include loss of habitat and nest sites due to changes in agricultural land use practices and increased development, increased road traffic deaths, severe winters and rodenticide use. The Cheshire Barn Owl Action Plan has been produced by the Cheshire Wildlife Trust, in partnership with the Environment Agency. River valleys and ditches in the Weaver area are highlighted as potentially suitable habitat for barn owls and need to be enhanced and protected. It may be possible to alter the maintenance regime of specific areas of river corridor to increase the numbers of small mammals available as prey.

The barn owl is listed in the EC Birds Directive (79/409 /EEC) and Appendix II of the Bern Convention. The barn owl is also protected under Schedules 1 and 9 of the Wildlife and Countryside Act, 1981. It is also listed in the Red Data Book as a Special Category species.

Of the fourteen species of **bat** found in Britain, five are associated with watercourses. These are Daubenton's bat, Whiskered bat, Natterer's bat, Noctule and Pipistrelle. Bat populations generally are declining and the retention of mature trees with cracks or holes will help to provide roost sites, particularly in summer. The inclusion of special bat bricks in structures such as bridges and culverts can benefit Daubenton's bat, and these have been incorporated in the reconstruction of Barnton Tunnel, on the Weaver Navigation. Sites within the Weaver area have been included within national surveys conducted by the Cheshire Bat Group, but more information is needed to establish the status and distribution of bats within the area.

Bats are protected under Appendix II of the Bern Convention and under the European Habitats and Species Directive, 1992. Bats and their places of shelter are also protected under schedule 5 of the Wildlife and Countryside Act, 1981.

Dragonflies are sensitive to water pollution and can indicate the health of watercourses and wetlands, so they are important predators in aquatic ecosystems. The exact distribution of species within a river depends on substrate, rate of flow and fringing vegetation. Sheltered backwaters can be crucial breeding sites. The Cheshire Meres and canals have been identified as areas of general importance for dragonflies which could be seriously affected by changes in water regime or water quality. Many ponds in Cheshire provide important habitats for this species.

The **white-faced darter** is found within this LEAP area, with habitat in Cheshire supporting a significant population. Its preferred habitat includes shallow peaty pools with healthy sphagnum moss cover and areas of blanket bog with adjacent areas of heathland, heather or small trees for shelter. Such habitat is decreasing and threats to it include encroachment of birch scrub, lowering of water levels and water pollution. The Cheshire Wildlife Trust are producing an Action Plan for this species and are working with the Forest Enterprise on schemes to create additional habitat.

The **hairy dragonfly** is another important Cheshire species which has declined nationally with the loss of flood plain, drainage channels and ditches which are its preferred breeding habitat. Reedbed habitat is also favoured. It was absent from Cheshire until 1985, when there were several confirmed sightings in this study area. Records of sightings refer to the River Weaver near Vale Royal lock cut, and Hatchmere as being particularly valuable sites for this species.

The native **black poplar** is now considered to be the most endangered native timber tree in Britain and Cheshire is one of a few counties where relict populations of trees exist. Seedlings are rarely found due to a lack of female trees in the wild, and regeneration from seed is also hindered due to loss of suitable flood plain habitat. It is a large, majestic tree, forming an important landscape feature.

Action Plans for black poplar have been prepared by English Nature and the Cheshire Wildlife Trust, and the Environment Agency have formulated a set of Species Management Guidelines. A recent collaborative project between the Environment Agency and the Farming and Wildlife Advisory Group, (FWAG) sought to increase the distribution of this tree in Cheshire, focusing on areas of farmland adjacent to the River Weaver. It is hoped to continue this work, through partnership with other interested parties. In particular, more information is needed to establish the distribution and genetic variation of this tree within this area so that existing local populations can be protected and increased.

Reedbeds are wetlands dominated by stands of common reed where the water level is at or above ground level for much of the year. Many species rely completely or partially on reedbeds for food and shelter. Reedbed habitat is threatened by pollution, abstraction and poor management, it has therefore been included in the Biodiversity Habitat Action Plan programme. The aim is to halt the decline and begin to increase the total area of reedbed in the country. Small areas of reedbed can improve water quality and provide habitat for species associated with reedbed ecosystems, eg. aquatic warbler, otters, water vole. Habitat enhancement works have taken place at Owley Wood, Weaverham on the old course of the Weaver to improve the local area and attract further wildlife to the river.

Floating Water Plantain is found in some Meres in this area and the Environment Agency has contributed to a Species Action Plan for it. More information on its distribution is needed to ensure that sensitive sites are identified and protected through appropriate habitat management.

The Environment Agency promotes the retention and where appropriate, enhancement of pond and wetland habitats. This LEAP area is especially valuable due to the high number of ponds found throughout it. Recent projects include the creation of a number of scrapes and ponds within the Crewe Hall Estate, adjacent to Englesea Brook, carried out as a joint venture with the local landowners.

The biodiversity of some watercourses has been reduced as a result of industrial discharges, for example stretches of Wade Brook and Wincham Brook in the Northwich area. These have bad biological water quality and a hard layer of precipitated material has altered the natural channel habitat. It is unlikely that aquatic life will recolonise such stretches unless the channel habitat is restored as improvements in water quality are achieved. Local industry will be encouraged to restore the biodiversity of habitats where industrial processes have caused an adverse environmental impact.

Management of sites and habitats is needed to promote the conservation of these species. The Environment Agency's greatest direct influence on river habitats is through flood defence operations which can effect their essential environmental requirements. Opportunities exist for habitat restoration, particularly through Water Level Management Plans (WLMP).

A particular threat to natural biodiversity exists in the form of introduced non-native species which can often out-compete native species and could ultimately lead to their disappearance. Examples include the invasive Japanese knotweed and Himalayan balsam. These grow in dense stands and can shade out native vegetation, particularly along river banks. Bank erosion may then occur during the winter when plant growth dies back. Giant hogweed is a perennial plant which can grow up to 5m tall with leaves up to 1m across. Large volumes of sap can be produced by this plant which, on contact with the skin, cause severe irritation, swelling and painful blistering. Giant hogweed has been found in isolated spots in the Weaver area and it is important that the further spread of this plant is prevented.

Environmental Objectives

The overall objective is to retain or recreate natural rivers within open, continuous river corridors, which are as wide as possible, with a diverse range of habitats and physical features for people and wildlife.

This is to be achieved by :

- The retention of existing features of ecological interest.
- Actively promoting the enhancement and restoration of the river corridor wherever feasible/desirable.
- Seeking effective mitigation for any loss of features of ecological interest.
- Safeguarding the special conservation interest for which sites have been designated.

Environmental Requirements

Water Quality :

- Water quality should not deteriorate.
- Water quality improvement at some sites would enhance the existing conservation value.

Water Quantity :

- A variable flow pattern is required, where the monthly average flow reflects the established or natural flow conditions in the river.
- Hydraulic continuity between the river and its flood plain is required, where appropriate. The water should be retained at a high level where possible but particularly where wetlands occur. Spate flows should be allowed to inundate certain wetlands. This may be facilitated through WLMPs.

Physical Features :

- The conservation and enhancement of the diversity of natural river features, such as meanders, earth cliffs, areas of erosion and deposition, pool and riffle sequences and the presence of aquatic vegetation and marginal (water's edge) vegetation is essential.
- It is necessary to protect and enhance a diversity of river corridor habitats, including marshes, ponds, bankside trees and hedgerows, old channels, flood plain habitats, species-rich grassland and woodland.
- The cross section of the channel needs to be appropriate for the river flow pattern.
- Assistance with the promotion of less intensive farming in river corridors through incentives such as the Countryside Stewardship Scheme needs to be provided.

Air Quality

General

Air quality is an indicator of environmental quality. Air pollution can damage flora, fauna and buildings, and have significant effects on soil, water and climate. It can also cause serious problems for those people with asthma, bronchitis and other respiratory diseases.

Air pollution may be in the form of gas or particulate matter. The dispersion of pollutants depends on wind direction and climatic conditions, so it does not respect administrative or hydrological boundaries. The impact of air pollution may be local (eg: particulate matter settling on nearby land) or may be global (eg: damaging the ozone layer).

It is vital that we protect the air since it affects the future health of mankind and the environment. Among the main air quality issues are acid rain, stratospheric ozone depletion, ground level ozone formation and global warming.

The Environment Act 1995 provides a framework within which local authorities have responsibility for the overall management of local air quality. The Act requires Government to publish a national strategy for air quality which sets a framework of standards and objectives for the pollutants of most concern to human health. The strategy includes a timetable for achieving quality objectives on the concentrations of benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, ozone, particulates and sulphur dioxide. The standards for these pollutants are given in Table 1 and their main sources in Table 2.

Table 1 : Pollutant standards under the National Air Quality Strategy

POLLUTANT	STANDARD		SPECIFIC OBJECTIVE to be achieved by 2005
	concentration	measured as	
Benzene	5ppb	running annual mean	the air quality standard
1.3 Butadiene	1ppb	running annual mean	the air quality standard
Carbon Monoide - CO	10ppm	running 8-hour mean	the air quality standard
Lead	0.5 $\mu\text{g}/\text{m}^3$	annual mean	the air quality standard
Nitrogen Dioxide NO ₂	150 ppb 21 ppb	1 hour mean annual mean	the air quality standard*
Ozone	50 ppb	running 8-hour mean	the air quality standard*
Fine Particles - PM ₁₀	50 $\mu\text{g}/\text{m}^3$	running 24-hour mean	the air quality standard*
Sulphur Dioxide - SO ₂	100 ppb	15 minute mean	the air quality standard*
ppm = parts per million; ppb = parts per billion; $\mu\text{g}/\text{m}^3$ = micrograms per cubic metre; * these objectives are to be treated as provisional.			

Table 2 : Main Sources of Pollutants

SOURCE	PM10	NO ₂	CO	SO ₂	LEAD	BENZENE	VOC	BUTADIENE
Transport	29%	59%	90%	5%	64%	68%	35%	77%
Combustion (industry)	35%	24%	3%	92%	4%	5%	2%	–
Chemicals & Fuels	–	–	1%	–	–	11%	25%	18%
Other Industrial	24%	14%	–	–	27%	16%	25%	–
Waste	–	–	1%	–	4%	–	–	5%
Domestic/Other	14%	3%	5%	3%	1%	–	13%	–

The National Air Quality Strategy was published in 1997 and outlines the steps that the Government is taking, and the measures it expects others to take, to see that objectives are met. The Agency will be working closely with local authorities to help achieve these objectives.

Local authorities will be required to review the present and future air quality against the standards and objectives. The Government will set air quality targets which should be achieved throughout the UK by the year 2005 and this will necessitate periodic reviews. Where standards are not being met (or are not likely to be met), an air quality management area ("Designated Area") can be declared, and an action plan produced to achieve improvement.

Monitoring of Air Quality

Air quality is monitored on a national basis by the Department of Environment and also by local authorities. As of 1995, there were 69 Automated Air Quality Monitoring Stations in the UK operated on behalf of the DoE to provide reliable and high quality measurements. As Table 3 shows, there are no stations within the Weaver LEAP area, but there are stations within close proximity. Monitoring data for these stations can be found in the DoE's publication; 'Air Pollution in the UK : 1995'.

Table 3 : DoE Automated Monitoring Stations

DoE NETWORK	PARAMETERS MEASURED	TOTAL U.K. STATIONS*	STATIONS IN LEAP AREA	NEAREST STATIONS OUTSIDE LEAP AREA
Urban	O ₃ , NO _x , SO ₂ , CO PM ₁₀	46	None	Manchester, Liverpool
Hydrocarbon	25 Species	12	None	Liverpool Speke
Rural	O ₃ , NO _x , SO ₂	16	None	Glazebury, Cheshire

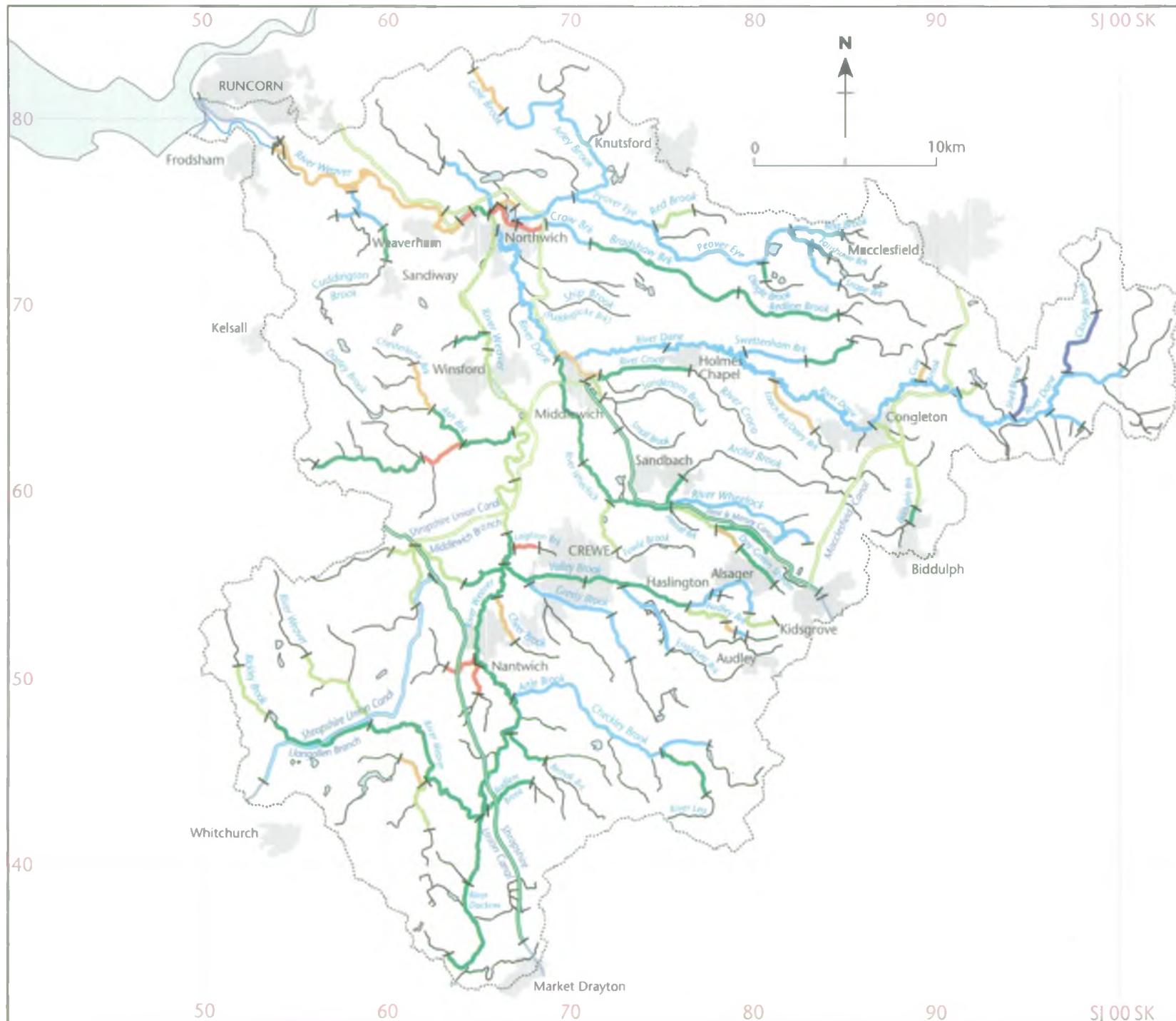
Note* some stations are co-located so total does not add up to 69.

The DoE also co-ordinates the monitoring of air pollutants as carried out by local authorities. There are six other monitoring networks as shown in Table 4.

Table 4 : Other Air Quality Monitoring Networks			
DoE NETWORK	TOTAL UK STATIONS	STATIONS IN LEAP AREA	NEAREST STATIONS OUTSIDE LEAP AREA
NO ₂ diffusion tube	1190	Yes	–
Smoke & SO ₂	222	Yes	–
Lead & multi-element	28	None	Greater Manchester
Acid deposition	32	None	Preston Montford, Shropshire Wardlow Hay Cop, Derbyshire
Rural SO ₂	29	None	Preston Montford, Shropshire
Toxic Organic Micropollutants (TOMPs)	4	None	Manchester

In addition, Halton Borough Council have a twin-beam optical monitoring system (OPSIS) which can provide continuous indication of air concentrations of SO₂, NO_x, ozone and volatile organic compounds in the Runcorn / Widnes area.

Air quality monitoring results can be obtained from the relevant local authorities. Data has been published in local authority State of the Environment reports and occasionally in specific air quality reports (eg: as produced by Halton Borough Council).



**Weaver/Dane
Local Environment Agency
Plan
Map 5**

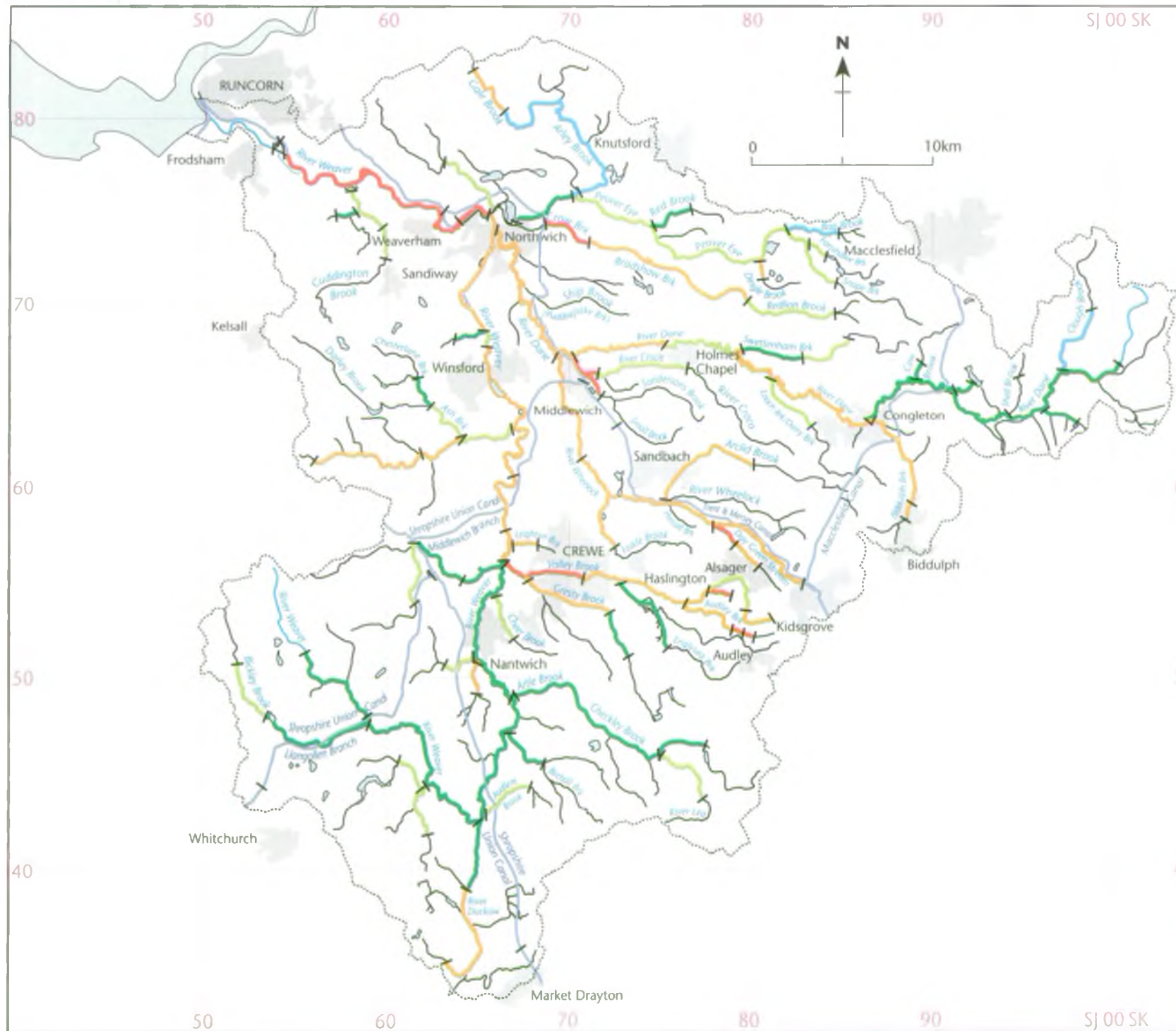


**ENVIRONMENT
AGENCY**

**General Quality
Assessment: Chemical
Grading 1996**

KEY

- Plan Boundary
- Watercourse
- Canal
- Built up Area
- A } Good
- B }
- C } Fair
- D }
- E Poor
- F Bad
- Unclassified
- Reach Boundary



**Weaver/Dane
Local Environment Agency
Plan**

Map 6



**ENVIRONMENT
AGENCY**

**General Quality
Assessment: Biological
Classification 1995**

KEY

- Plan Boundary
- Watercourse
- Canal
- Built up Area

Class:

- a Very Good
- b Good
- c Fairly Good
- d Fair
- e Poor
- f Bad
- Not Sampled
- Reach Boundary

Water Quality

General

The Environment Agency has duties under the Water Resources Act, 1991 and some EC Directives to monitor the water quality in controlled waters. Within the Weaver and Dane area this includes rivers and streams up to the quality survey limit (QSL), canals and some reservoirs. These obligations are achieved via comprehensive chemical and biological sampling programmes. This water quality information is held on a public register and can be obtained by contacting the Customer Services Department at the Sale office.

As detailed below, the water quality within the Weaver and Dane area is subject to targets set by both the Agency, as River Quality Objectives (RQOs), and by the European Commission (EC), as Directives. Failures to comply with these targets are detailed in the following maps or reported in the Issues and Options Section. As an accompaniment to these targets, the Agency's General Quality Assessment (GQA) classification scheme enables periodic assessments of the water quality within the Weaver and Dane area to be made.

General Quality Assessment

Map 5 illustrates the 1996 GQA chemical grades and Map 6 the 1995 GQA biological grades for the Weaver and Dane area. The Agency's GQA scheme is used to make periodic assessments of water quality in order to report trends, both over time and between different rivers in England and Wales. Different aspects of water quality are referred to as 'windows'. Currently the scheme reports using chemical and biological windows, while nutrient and aesthetics windows are still in development.

Chemical Window

The GQA grades shown in Map 5 suggest that the rivers and canals within the Weaver and Dane area are generally of good to fair chemical quality. Indeed 99.6% of the canal and 88.7% of the river stretches are classified as fair or better. Particularly good quality is found along the entire length of the River Dane and some of its tributaries, including two short stretches of grade A quality in Shell Brook and Clough Brook. Stretches of good quality are also found within the Wincham Brook, Valley Brook and Checkley Brook systems.

Poor chemical water quality is found in only 8.4% of classified river stretches including all of the River Weaver downstream of Northwich. Of the other stretches of poor water quality a number are found immediately downstream of sewage treatment works, for example the River Croco downstream of Middlewich STW and Audley Brook downstream of Audley STW. The poor chemical water quality found in 0.4% of canals is restricted to one stretch in the Trent and Mersey Canal, between Kidsgrove and the Macclesfield Canal.

The remaining 2.9% of classified river stretches contain water of bad chemical quality. This includes the Wade Brook, Witton Brook, Leighton Brook, Edelston Brook and Baddington Brook.

Biological Window

Aquatic invertebrates sampled routinely from all classified rivers provide a basis for the biological GQA grades. Like the chemical GQA grades, this is a six-tier system. However, the

two are not directly comparable since the biological classification is capable of detecting pollution which can be missed by chemical monitoring, and also of highlighting habitat degradation (see Appendix 4).

Monitoring of the watercourses was undertaken during 1995 and biological GQA grades are shown in Map 6. These indicate that the biological quality is fairly good in the upper reaches of the River Weaver and River Dane but typically poor in watercourses associated with the heavily urbanised areas such as Crewe, Alsager, Kidsgrove within the Valley Brook area, and Sandbach and Middlewich in the River Wheelock area. Bad biological water quality occurs around Northwich and extends in the River Weaver downstream to Runcorn. Quality is particularly bad within stretches of Wade Brook and Witton Brook in the Northwich area, where there is a complete absence of invertebrate life.

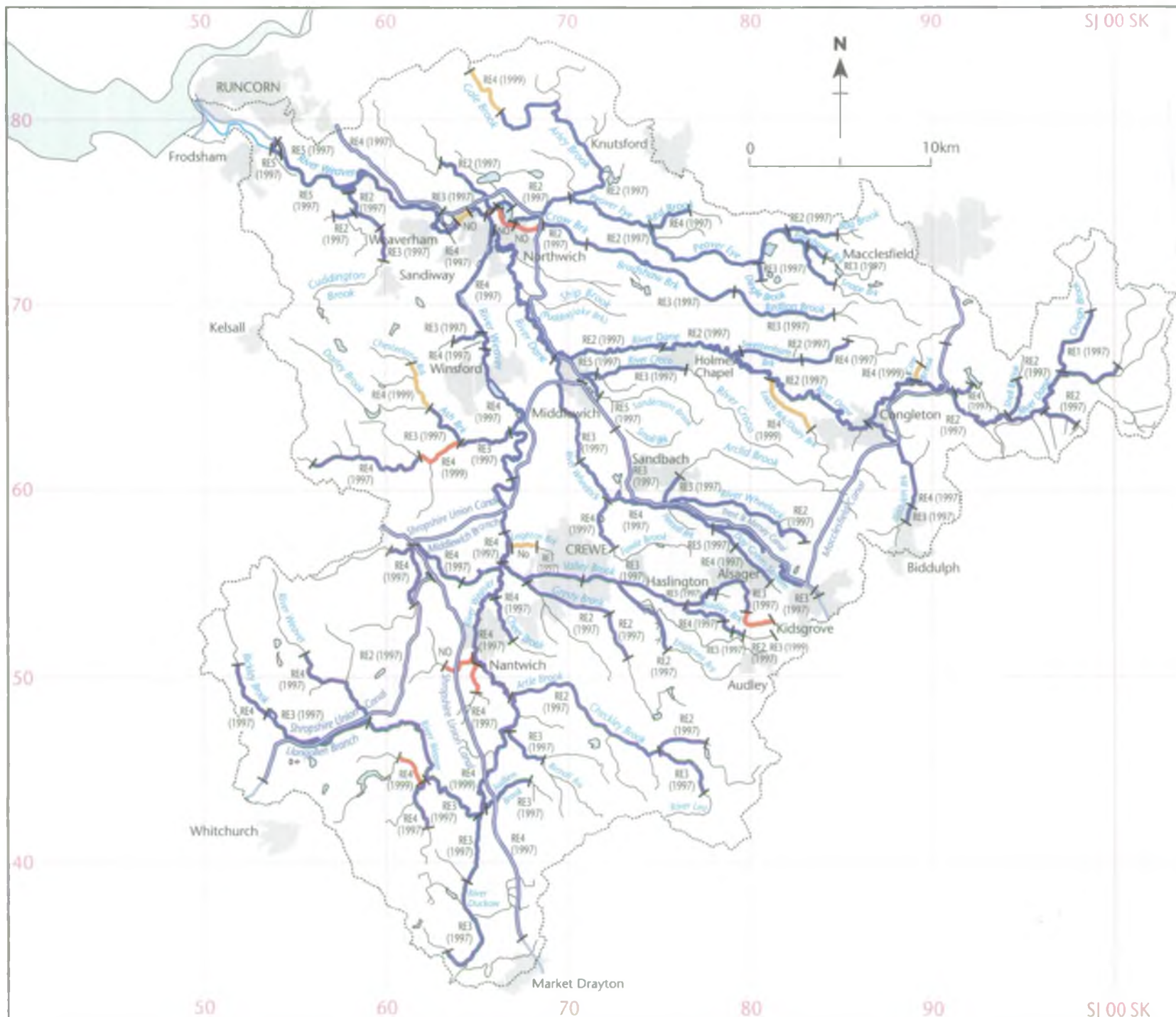
Poor biological water quality affected approximately 39% of river stretches sampled, with a restricted, pollution-tolerant taxa such as water hoglice, worms and chironomids (midge larvae). Fair biological quality was found in about 20% of rivers sampled dominated by species such as pollution-tolerant mayflies and shrimps. Fairly good biological quality extended along about 28% of sampled stretches dominated by mayflies, and caddis fly larvae, with a few stoneflies and a few more pollution-tolerant species such as shrimps. Approximately 5% of sampled river lengths were classed as good, comprising pollution sensitive taxa and 5% classed as bad dominated by pollution-tolerant species capable of utilising very low oxygen levels, or sometimes a low incidence of a few species indicating toxicity.

River Quality Objectives

The Agency has proposed strategic targets for water quality within the Weaver and Dane area known as River Quality Objectives (RQOs) which will be used to provide a basis for water quality management decisions. Ultimately RQOs for different water uses will be set, but currently, only the River Ecosystem (RE) scheme has been developed. This sets standards relating to the chemical quality requirements for different aquatic ecosystems. Details of standards are contained in Appendix 2 along with the proposed River Ecosystem RQOs for the rivers and canals within the Weaver and Dane area. These objectives will eventually become statutory targets, when notices are served by the Secretary of State for the Environment, giving them legal status. Short-term objectives are proposed, along with a date by which compliance will be achieved. These objectives must be achievable within a ten-year horizon of committed investment or by the actions of the Agency or others. Long-term objectives have also been proposed which reflect the achievable aspirations for the water quality. Achievement of these objectives may take more than ten years and require currently uncommitted expenditure.

Compliance with the short-term River Ecosystem RQOs, as shown in Map 7, is currently achieved by 94% of the classified river and canal stretches within the Weaver and Dane area. Of the remaining stretches, 2% marginal fail to comply and 2% significantly fail to comply with the short-term objective. Significant failures currently occur on stretches of Sales Brook, Baddington Brook, Valley Brook and Wettenhall Brook. In a further 1% of stretches the attainable short-term quality target falls below the lowest RE class such that no short-term objective can be set. This is the case in stretches of the River Weaver, Wade Brook, Witton Brook, Leighton Brook and Edleston Brook where the quality is currently below RES standard.

Map 8 shows compliance with the proposed long-term River Ecosystem RQOs, with 58% of stretches currently complying, 16% marginal failing and 26% significantly failing.



Weaver/Dane Local Environment Agency Plan

Map 7



ENVIRONMENT
AGENCY

Water Quality: Compliance with Proposed Short Term River Ecosystem RQOs

KEY

..... Plan Boundary

— Watercourse

— Canal

■ Built up Area

River

RE () Objective (date)

— Compliant

— Marginal Failure

— Significant Failure

— Unclassified

— Reach Boundary

No No Objective Proposed

Canal

RE ()

—

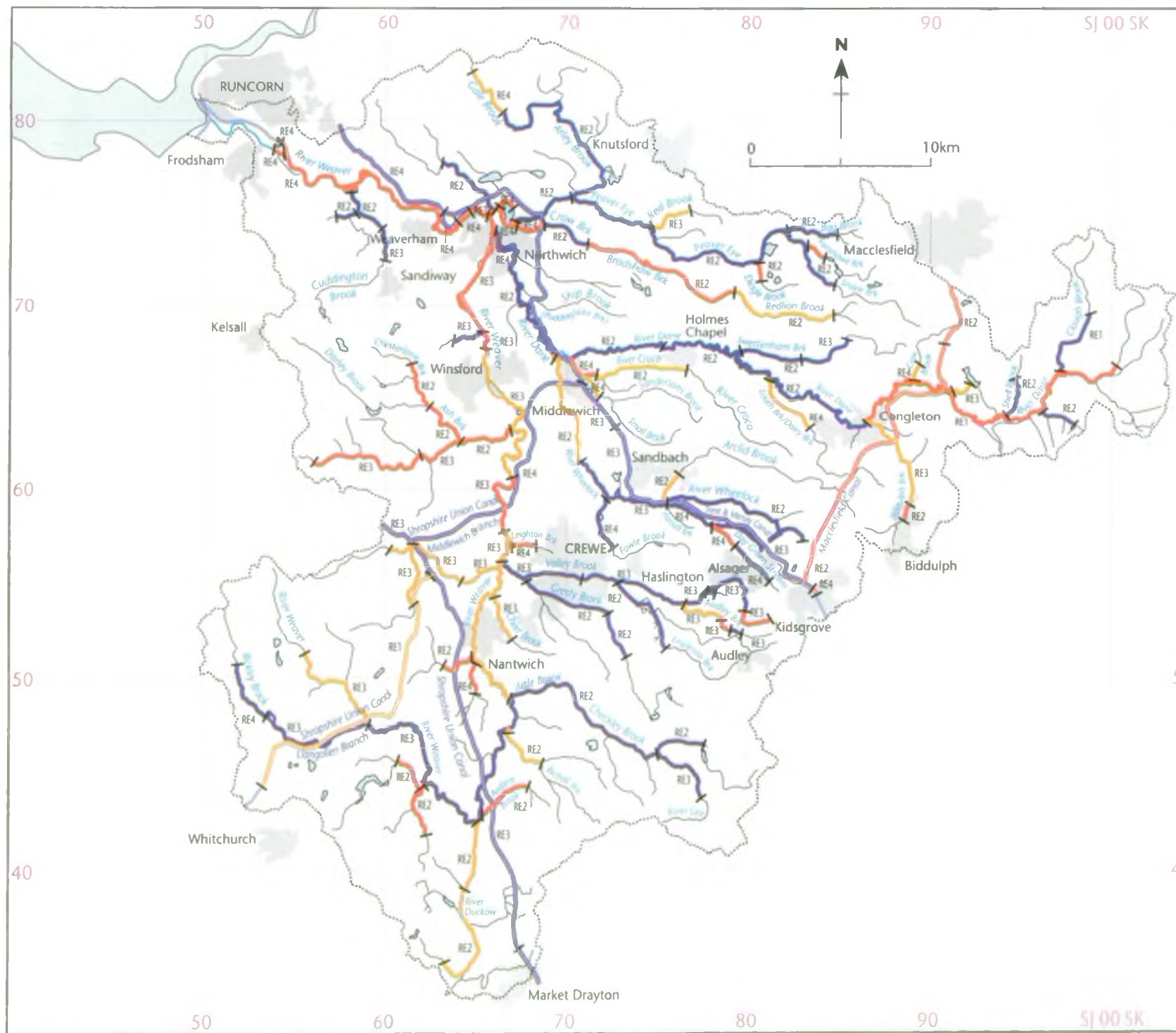
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Weaver/Dane Local Environment Agency Plan

Map 8



ENVIRONMENT
AGENCY

Water Quality: Compliance with Proposed Long Term River Ecosystem RQOs

KEY

- Plan Boundary
 - Watercourse
 - Canal
 - Built up Area
- | River | Objective (date) | Canal |
|--------|---------------------|--------|
| RE () | Compliant | RE () |
| RE () | Marginal Failure | RE () |
| RE () | Significant Failure | RE () |
| RE () | Unclassified | RE () |
| — | Reach Boundary | — |

EC Directives

There are several environmental Directives issued by the European Commission, designed to preserve, protect or improve the quality of the environment, which have water quality implications within the Weaver and Dane area. The Directives, which deal with different uses and risks to the water environment, contain standards for water quality which must be complied with:

Dangerous Substances Directive (76/464/EEC)

This Directive sets out the framework for measures to control water pollution caused by the discharge of certain toxic, persistent or bioaccumulatory substances. Subdivided into List I and List II substances, Member States are required to take steps to eliminate those in List I and reduce pollution by those in List II.

Implementation of the Directive within the UK involved establishing substance-specific concentration limits for surface waters, known as Environmental Quality Standards (EQSs). Authorisations permitting industrial and sewage discharges to contain any listed substances must include limits which ensure that the relevant EQSs are met.

Authorised discharges of List I dangerous substances into the Weaver and Dane area are made from the ICI complex at Runcorn, Zeneca Resins near Northwich, Crewe STW, Rolls Royce Motors at Crewe, Hays Chemicals between Sandbach and Middlewich, and Johnson Matthey at Kidsgrove. These sites, together with their associated EQS monitoring points, are shown in Map 9.

Freshwater Fish Directive (78/659/EEC)

This Directive is concerned with protecting or improving the quality of fresh waters in order to support fish life. Stretches of designated watercourse are categorised as either salmonid or cyprinid, depending on the quality of fish they are capable of supporting. Imperative and guideline standards are laid down for a number of appropriate chemical parameters.

As depicted in Map 9, there are twenty designated river stretches within the Weaver and Dane area, two of which are salmonid stretches. In addition, there are twelve canal stretches designated as cyprinid fisheries.

Surface Water Abstraction Directive (75/440/EEC)

This Directive specifies standards for the quality of surface water intended for drinking water abstraction. Abstractions for this purpose within the Weaver and Dane area are located on the River Dane at Hugbridge and at Hurleston Reservoir near Nantwich, as shown in Map 9.

Urban Wastewater Treatment Directive (91/271/EEC)

This Directive lays down minimum standards for the provision of sewerage collection systems and sewage treatment.

The Directive specifies secondary treatment for all treatment facilities serving population equivalents greater than two thousand by the year 2005. All relevant discharges within the Weaver/Dane area already meet this requirement. Higher standards of treatment are required for discharges to "sensitive" areas. Waters are designated as sensitive under a number of criteria; probably the most relevant to the Weaver/Dane area being if they are eutrophic, or may become so in the near future. There are currently no designated sensitive areas within the Weaver/Dane, but future designations are under review. Discharges arising from population equivalents of less than two thousand, must receive "appropriate" treatment by the year 2005.

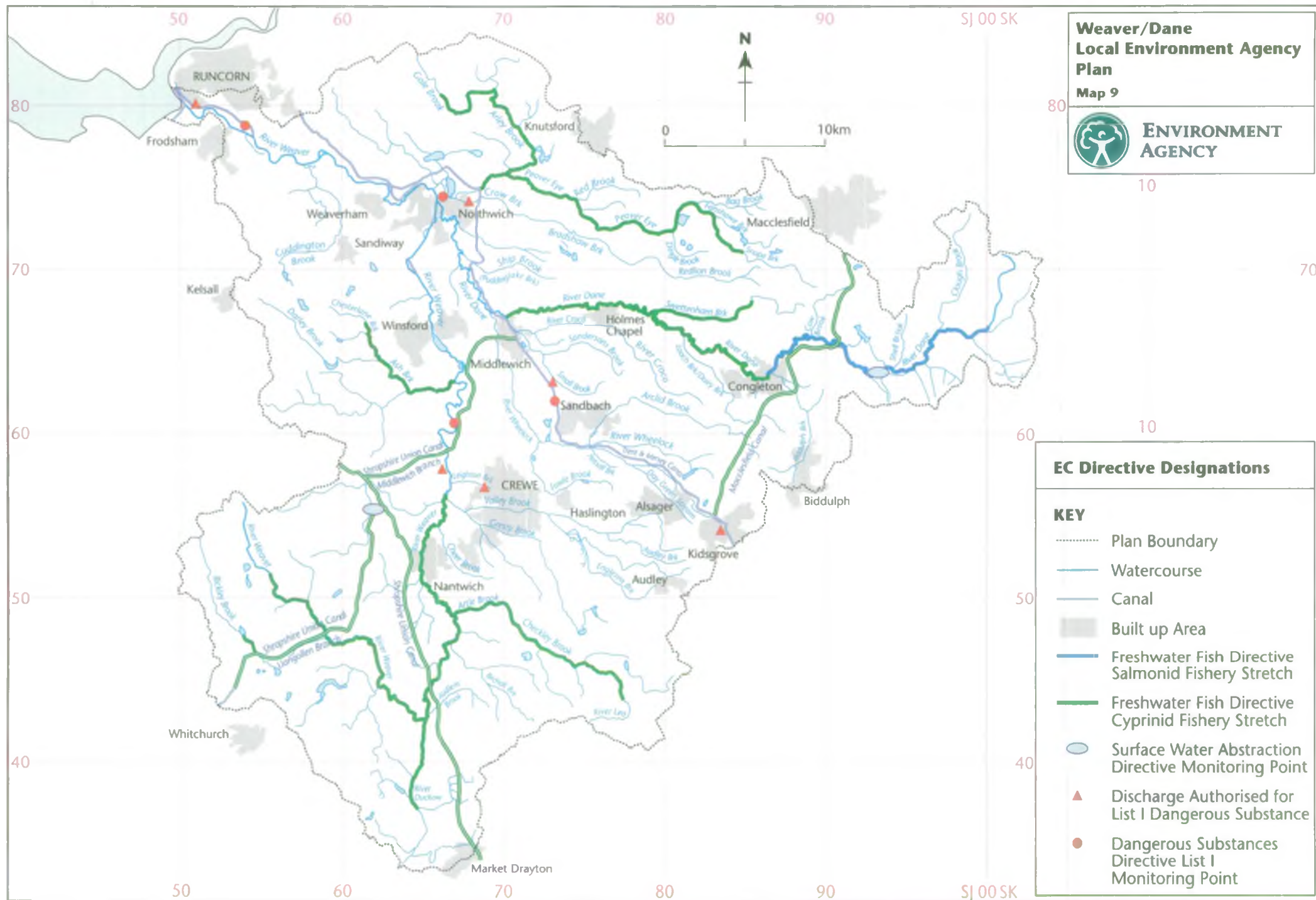
The Directive also requires that collecting systems (the sewerage network) are designed, constructed and maintained in accordance with the best available technology, not entailing excessive cost, specifically in relation to limiting the impact on receiving waters of storm and emergency overflows. There are over 200 storm and emergency overflows in the Weaver/Dane area.

Biological Classification

In order to provide a comprehensive picture of the quality of our rivers, different aspects of the water environment are looked at. These are referred to as "windows" because each offers a different perspective on the overall health of the river. Aquatic invertebrates, which are used to provide information for the "biological window", are sampled routinely from all classified rivers and provide a basis for the following classification system:

Class	Description (see Appendix 4 for full description)
a	- Very Good Quality
b	- Good Quality
c	- Fairly Good Quality
d	- Fair Quality
e	- Poor Quality
f	- Bad

Although this is a six tier system, similar to the chemically based RE classes, the two are not comparable since the biological classification is capable of detecting pollution which can be missed by chemical monitoring, and also of highlighting habitat degradation (see Appendix 3).





Part 2

Uses, Resources & Pressures in the Area

This section contains supporting information on the environment of the Weaver/Dane area. It focuses on the uses, activities and resources within the area, together with a description of the Agency's responsibilities and objectives.

2.1 Hydrology

General

The average annual rainfall for the Plan area, as shown on Map 10, varies from 700mm on the Cheshire Plain to 1250mm in the foothills of the Peak District. This variation is caused by the changes in topography, with minor variations due to the effects of local urbanisation. Rainfall is measured in the area by a network of raingauges, which form part of the Agency's national rainfall measurement network.

The pattern of rainfall throughout the year is shown in Figure 1 for the raingauge at Tiresford (NGR SJ556613). The highest and lowest monthly recorded totals are given to demonstrate the range of these monthly totals.

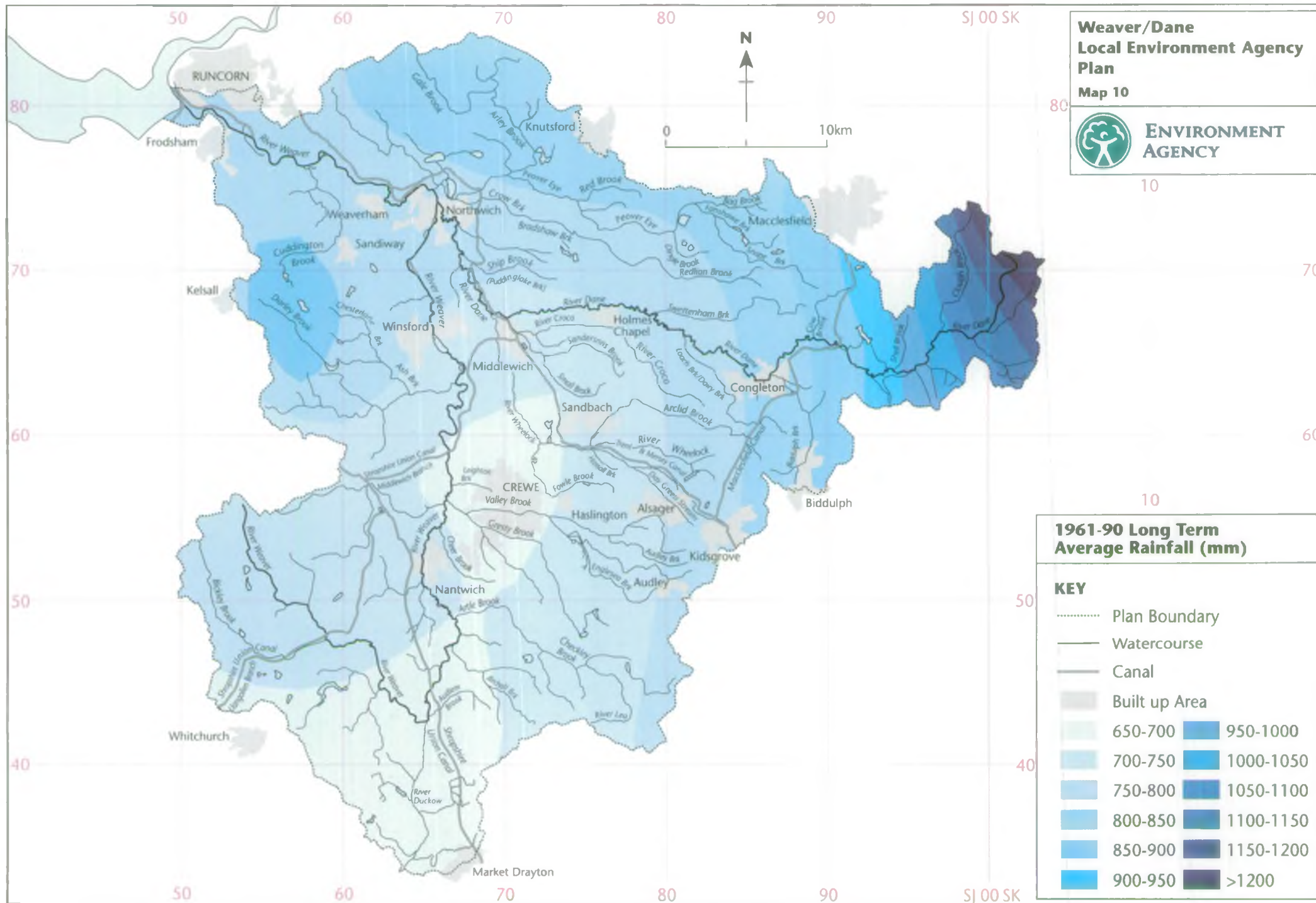
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean*	61	44	52	52	62	58	56	66	63	67	73	70
Max+	100.9	130.9	102.6	103.3	186.2	158.1	108.3	142.3	173.1	140.1	162.3	157.3
Min+	10.5	2.8	11.6	4.4	9.7	14.3	9.7	4.7	7.7	20	24	4.6

* 1961 - 90 Long-Term Average

+ Maximum & Minimum Recorded Monthly Totals 1961 - 95

Figure 1 Tarporley Tiresford Raingauge, NGR SJ556613

The effect of this rainfall varies with its intensity and the state of the area. Soil moisture deficit (SMD) is a measure of the "dryness" of the soil, and is expressed as the amount of rain (mm) required to bring the soil to a saturated state. Figure 2 shows the typical seasonal changes in SMD in the area brought about by weather conditions and evapotranspiration by plants. The SMD is generally high in summer and low in winter. Under the saturated winter conditions water drains from the soil and recharges the groundwater, raising the water table.



Soil Moisture Deficit (mm) 1993

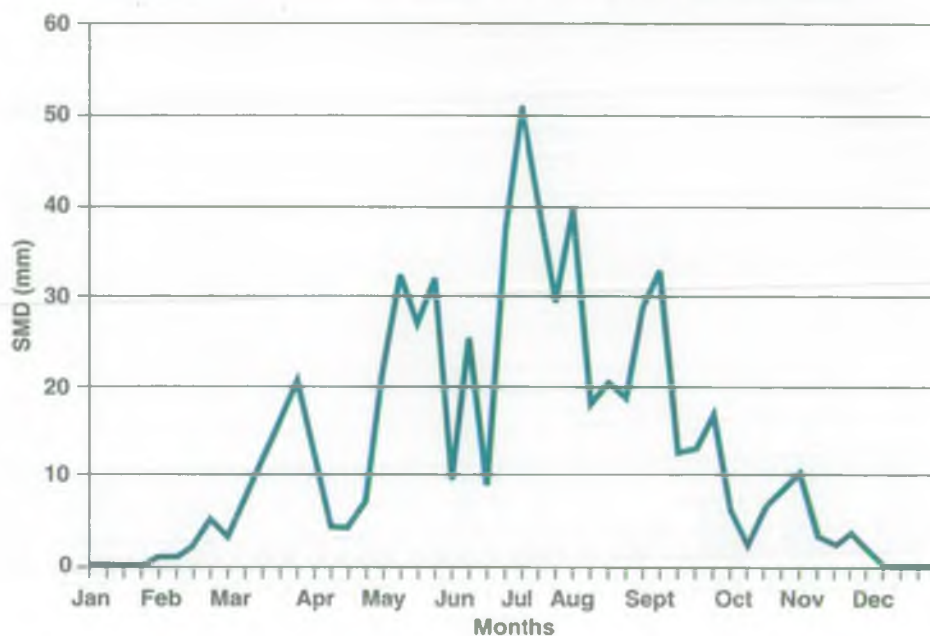


Figure 2 Soil Moisture Deficit

Rainfall, SMD and groundwater levels contribute to the natural variability of flow in a river. The flow from the river Weaver in to the Manchester Ship Canal is measured at Pickering's Cut gauging Station (NGR SJ57567625) which has an area of 1370 km². The measured average flow at this point (for 1993 - 1996) is 1344 ML/d. The flow in the river varies on a seasonal basis as shown in Figure 2. This gauging station is one of a network shown on Map11.

River Gowy, Bridge Trafford Monthly Daily Mean Flows (MI/d)

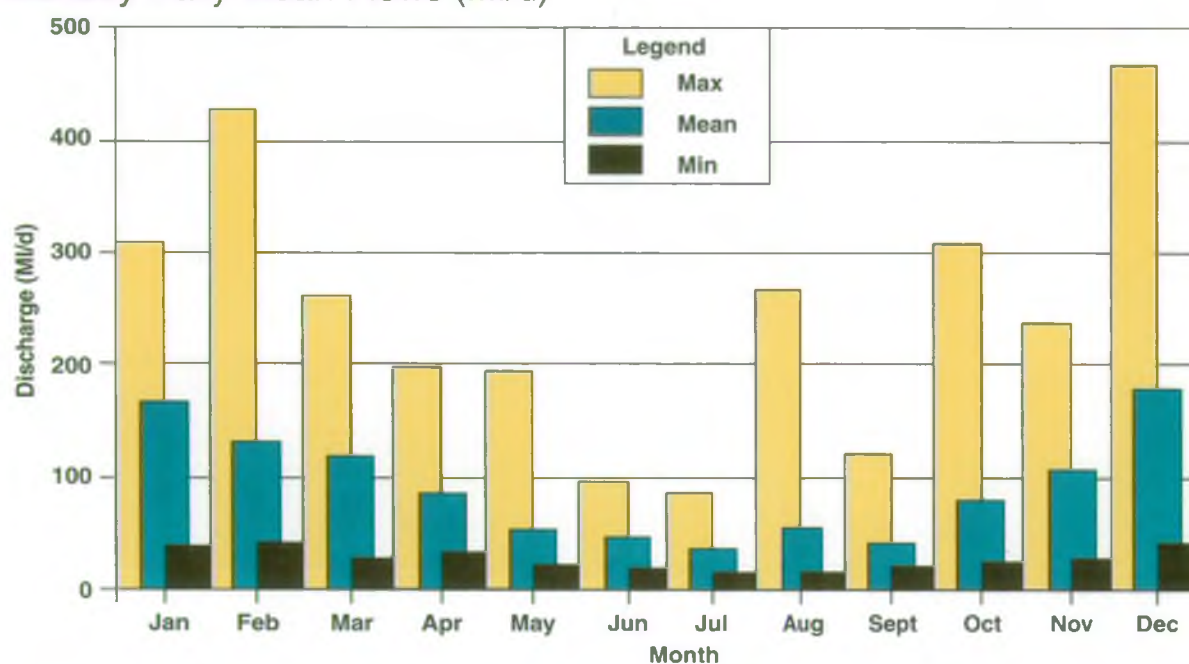
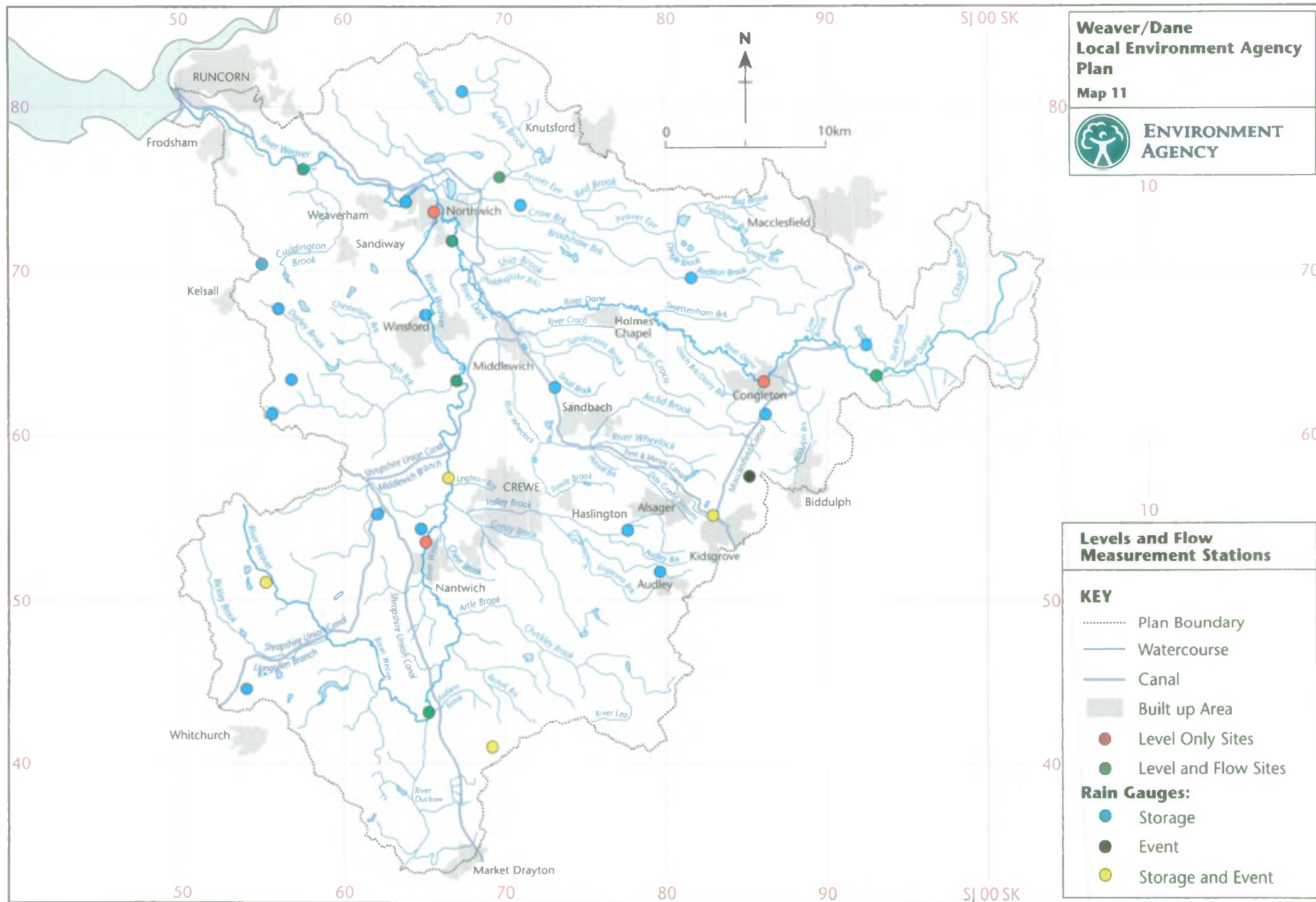
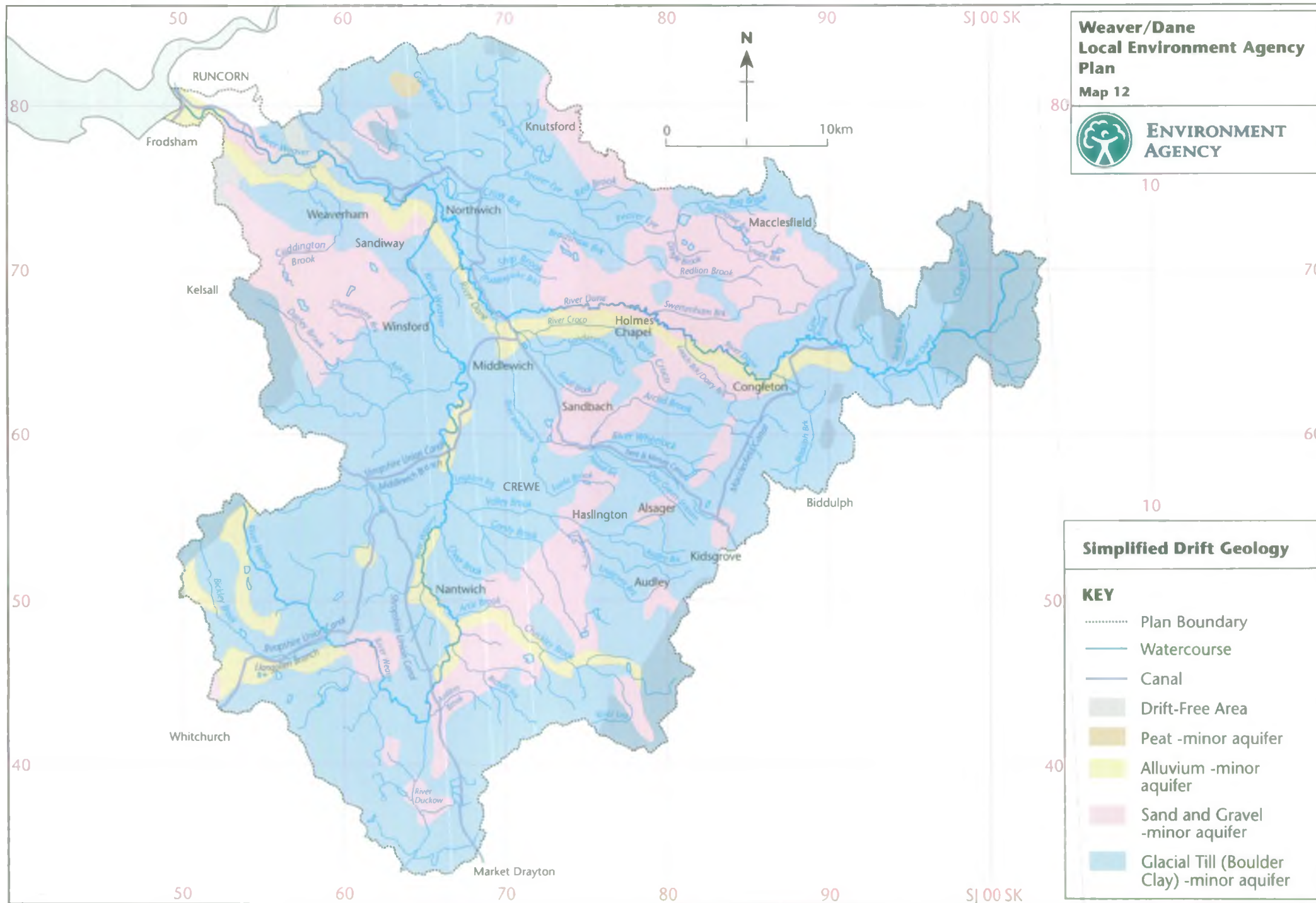


Figure 3 Mean Monthly Flow on River Weaver at Pickings Cut

* 1993 - 1996 Long-Term Average.

+ Maximum & Minimum Monthly Averages 1980 - 1995.





2.2 Hydrogeology

General

With the exception of the Carboniferous hills in the east, the bedrock of the Weaver area is almost entirely covered by drift deposits, mainly of glacial origin. This comprises mostly Boulder Clay, although extensive sheets of sands and gravels are present in the east and west, interbedded with the clay.

The River Dane rises on the higher ground formed by relatively hard, erosion-resistant grits and interbedded shales of the Carboniferous Millstone Grit Series. To the south, Coal Measures strata are present; these are predominantly shales with some thin sandstones and coal seams. The Triassic Sherwood Sandstone is classed a 'major aquifer', but is only present in a narrow strip along the Carboniferous boundary (extending from Audley to Market Drayton), as a small isolated basin at Rushton Spencer on the River Dane, and in the extreme west around Delamere. The majority of the area is underlain by mudrocks, the Mercia Mudstones, also of Permo-Triassic age (these include the salt deposits which occur from Nantwich, north to Winsford) and a small area of younger Lias mudstones, west of Market Drayton. Alluvial deposits occur within the flood plains of the rivers Weaver and Dane.

The Carboniferous Sandstones tends to act as individual 'minor aquifers' separated by the lower permeability shales/mudstones.

Where present, glacial clay will restrict rainfall recharge and also provide some protection against pollution from surface activities. Conversely, the more permeable sands and gravel deposits act as minor aquifers in their own right, as well as providing potential pathways for recharge and contamination. They can contribute a significant component on baseflow to watercourses which have cut into them, for example along parts of the Dane valley.

2.3 Water Abstraction

General

Through the 1995 Environment Act the Agency has statutory duties and responsibilities relating to the planning and management of water resources.

It is specifically responsible for licensing, and enforcing, abstractions made from water held in natural underground storage and from all surface waters above the tidal low water mark. The responsibility for public water supply in the plan area lies with North West Water Ltd.

The Agency also has a consultee role regarding applications for planning permission. This means that the Agency's views and advice are given on applications which can affect the demand for, or quality of, water resources.

The Agency's water resources activities are also influenced by certain EC Directives which have bearing on the quality of water resources for public water supply and other purposes.

Surface Water Usage

Within the plan area there is an abstraction of 10Ml/d for public water supply on the River Dane at Hug Bridge.

There are two significant industrial abstractions in the area, one on the Dane at Ravenscroft and the other on the Wincham Brook. There are a number of other abstractions in the area, though the majority are small agricultural users. These abstractions are shown on Map 14.

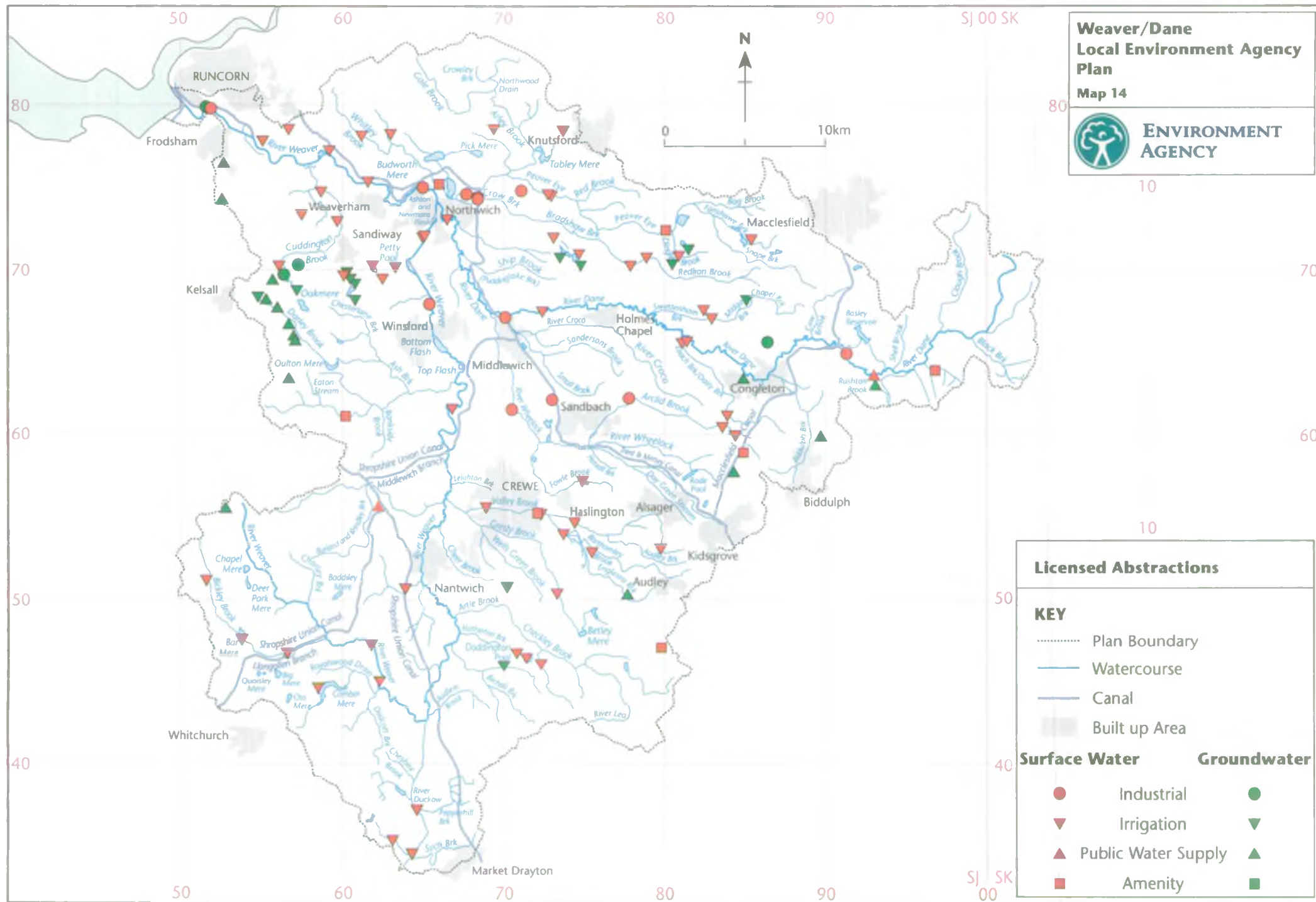
During periods of hydrological stress, spray irrigators have a significant impact on the watercourses. Though, individually, the licensed quantities are not large in volume, the effect of a large number of irrigators abstracting at the same time is significant. Within the Area there are 63 spray irrigation licenses.

Groundwater Usage

In general, the total quantity of groundwater abstracted within the Weaver area is low because of the predominance of low-permeability 'non-aquifers': the Mercia Mudstones and overlying Boulder Clay.

The Carboniferous sandstones are capable of supporting small scale agricultural and domestic supplies and are used for such in areas remote from the mains water system. An example of water being supplied in this way is in the area around Wincle, Dane Valley. In addition, groundwater is abstracted for public water supply via boreholes at Mow Cop, south of Congleton (from the Millstone Grit Series), and at Biddulph (from Coal Measures).

The Sherwood Sandstone is exploited for public supply at Rushton Spencer in the east, Audley in the south and Delamere in the west. In contrast, the low permeability Mercia Mudstones are, at best, capable of yielding only very limited quantities of groundwater, and the quality is likely to be poor (saline). The resources of the Rushton Spencer aquifer unit are fully committed to North West Water Ltd's existing licensed public supply sources.



2.3 Water Abstraction

The extensive sand and gravel deposits store and can yield significant quantities of groundwater. This is used for spray irrigation in parts of the area. North West Water Ltd. have licensed spring sources at Forge Lane, Congleton, which discharge from the glacial sands.

Groundwater Quality

Ground waters found in the Carboniferous strata tend to have relatively high dissolved iron contents, especially in old underground mine workings, such as those in the Kidsgrove area.

The major Permo-Triassic Sandstone and superficial sand and gravel aquifers generally contain high quality groundwater except in rural areas where extensive application of fertilisers gives rise to nitrate problems (part of the area, underlain by the West Cheshire aquifer, falls within a designated Nitrate Vulnerable Zone (NVZ)).

Any groundwater associated with the brine deposits in the centre of the area is expected to be saline.

Groundwater Protection

The Agency's Policy and Practice for the Protection of Ground water encompasses two principle initiatives: definition of Groundwater Protection Zones (GPZs) and national mapping of groundwater vulnerability at 1:100,000 scale.

GPZs have been defined for all of the public supply boreholes within the area. This work is now being extended to other critical potable sources >50 Ml/d, including North West Water Ltd's Forge Lane springs at Congleton.

Ground water Vulnerability Maps covering the area are available from HMSO (Sheets No.16: West Cheshire, and No. 17: Derbyshire & North Staffs).

Although susceptibility of the major aquifer to nitrates is reduced by extensive glacial drift cover, there are areas where drift is absent and nitrate shows a rising trend in public water supply. This has resulted in designation of an area of approximately 20km² to the east of Kelsall as an NVZ under The Protection of Water Against Agricultural Nitrate Pollution (England and Wales) Regulations 1996 (No.888). These regulations enforce EC Directive (91/676/EEC), the Nitrate Directive. Other potential areas are under consideration elsewhere in the area pending assessment by the Government under the four yearly review which is required by the Regulations.

Agriculture has the potential to adversely affect groundwaters used for drinking-water supply. Fertilisers for crop production and organic wastes from livestock farms can result in nitrates being leached into aquifers with the result that levels rise above the 50 mg/l limit for human consumption. In the Plan area there is concern over the rising nitrate levels in some parts. In 1990 Nitrate Sensitive Areas (NSAs) were set up as pilot scheme areas around public water supply boreholes affected by rising levels of nitrates in local aquifers. The NSA schemes aim to reduce the amount of nitrate-rich fertilisers and wastes applied to agricultural land and therefore reduce the levels of nitrate leaching into the groundwater below. Following the success of the ten pilot NSAs at reducing nitrate leaching, the Government introduced a new NSA scheme in 1994 consisting of a further 22 NSAs under the EC Agri-Environment Regulation. The ten pilot areas have now been integrated into this scheme to form a unified scheme consisting of 32 areas. There are no NSAs in the LEAP area but in 1996 an NVZ was designated near Kelsall and mandatory measures to control organic and inorganic fertiliser use in this zone will be introduced before the end of 1999.

2.4 Effluent Disposal

General

The disposal of domestic and industrial effluents is an important use of the watercourses within the Weaver and Dane area. Permitted discharges of this nature are regulated by the Agency via either a discharge consent issued under the Water Resources Act, 1991, or as part of an Integrated Pollution Control Authorisation issued under the Environmental Protection Act, 1990. When determining applications to discharge, the Agency sets conditions appropriate for protecting other uses of the receiving water.

In some cases the consents set by predecessor bodies and inherited by the Agency do not adequately protect the aquatic environment. The tightening of such consents is addressed where possible, however, there are often significant financial, technological or other constraints. Capital expenditure by the Water Service Companies for example is constrained by the Asset Management Plan (see below).

Map 15 shows the location of the effluent disposal sites within the Weaver and Dane area. Continuous discharges of effluent are made from STWs and trade effluent treatment plants. Impacts on the receiving watercourses arising from these discharges can be seen in Issue 3 and Issue 1 respectively. Additionally intermittent discharges are made from the sewerage network (see Issue 4) by storm overflows, during periods of heavy rain and from pumping stations during emergencies, such as pump failures and blockages.

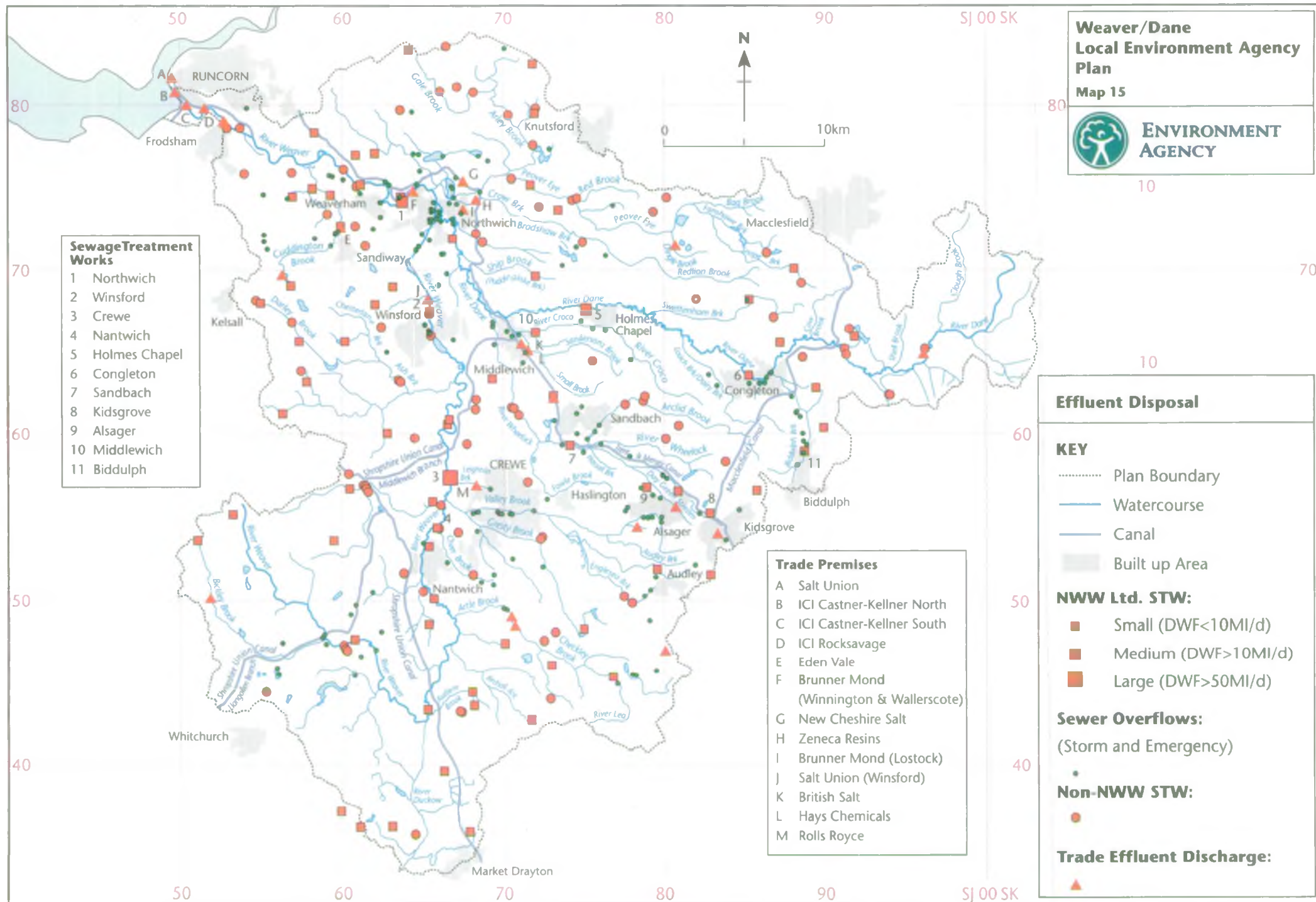
Local Perspective

The Water Service Company operating within the plan area is North West Water Ltd. They operate approximately seventy STWs which treat and discharge domestic and trade wastewater into the Weaver and Dane area. Sizeable STWs are located at Crewe, Middlewich, Nantwich, Northwich and Winsford.

Houses and businesses remote from the sewage network may have a small private sewage treatment plant which discharges to a watercourse. Alternatively they may have a cess pit or septic tank from which the discharge soaks away into the ground. The rural nature of much of the Weaver and Dane area means there are over a hundred private STWs plus a vast number of septic tanks. Watercourses in areas where there are groups of septic tanks can occasionally suffer localised pollution problems (see Issue 7).

There are some twenty industrial premises within the area which have their own treatment facilities which discharge directly to a watercourse rather than to a sewer.

There are over one hundred and thirty storm overflows and over one hundred emergency overflows on the sewerage network which discharge intermittently to the Weaver and Dane area.



Asset Management Plan

Water Service Company capital expenditure is negotiated in talks between the Agency, the Office of Water Services, the Department of the Environment and the Water Services Association. The agreed programme of work is referred to as an Asset Management Plan (AMP). The Agency is involved in targeting investment towards environmental improvements, including water quality improvements. Priority for these is currently given to schemes necessary to meet or maintain existing EC and domestic statutory obligations such as the Urban Wastewater Treatment and the Freshwater Fish Directives. Non-statutory schemes are also considered if they are necessary to maintain or improve river water quality and produce positive cost-benefit arguments.

Under AMP2, which governs the expenditure for the period 1995 to 2000, the following improvement programmes within the Weaver and Dane area have been, or will be, undertaken:

1. Madeley STW-Discharges to a designated cyprinid fishery on the River Lea. Tertiary treatment facilities have been added in order to ensure compliance with the EC Freshwater Fish Directive. Consent conditions have been considerably tightened and an ammonia condition added.
2. Holmes Chapel STW-Discharges to a designated cyprinid fishery on the River Dane. Improvements be undertaken in order to ensure compliance with the EC Freshwater Fish Directive.
3. Six unsatisfactory sewer overflows are programmed for improvement.

AMP3 will detail expenditure planned for improvements which will be undertaken during the period 2000 to 2010. Initial prioritisation of schemes and cost-benefit analysis is already being undertaken.

2.5 Waste Management

General

Waste is produced by every household, business and industry. The safe handling, treatment and disposal of waste is essential to the health and wellbeing of the environment and the community, and it is the remit of the Agency to ensure that waste does not cause pollution of the environment, harm to health or serious detriment to amenity. It does so by assessing the types and quantities of waste produced, by registering and monitoring its carriage of waste and by licensing and monitoring its treatment and disposal.

One of the outcomes of the 'Rio Earth Summit' (1992) was the identification of the UK's strategy for sustainable development, which was published in 1994. Part of this strategy included publication of the Government's paper "Making Waste Work", and this sets out clear roles for the Agency in accomplishing the aims of causing less waste to be produced, to improve re-use and recycling performance and to dispose of waste using methods which are the least impactful on the environment.

The key areas of the Agency's role in waste regulation are summarised briefly as follows.

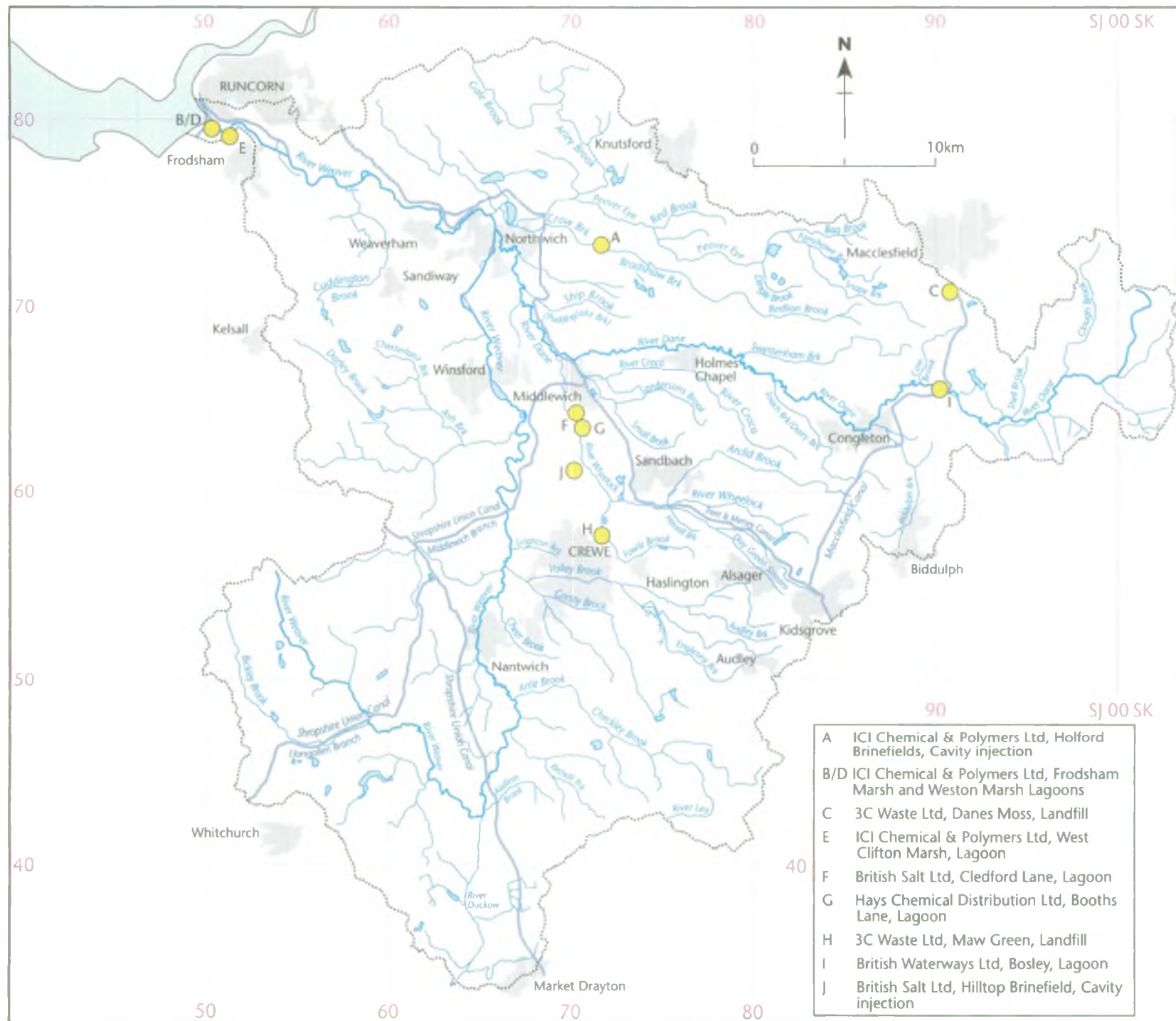
Waste Management Licensing

A licensing system for waste management sites was first introduced in 1976, with modifications coming in 1988 and again in 1994, so that licences are required for landfill sites, transfer stations, treatment plants, and processing and storage facilities, including scrap metal yards. The Agency is responsible for issuing and enforcing these licences, and for registering the various activities which are exempt from the need for a licence, and for ensuring that applicants are "fit and proper" persons to hold a licence. This depends upon technical competence, financial capability, and any convictions for relevant offences.

An application for a licence, containing details of the proposed operation, must be made in writing to the Agency, who will consider it and seek comments from a range of consultees. Planning permission is also usually required for the development of a waste management facility. Subject to these provisions, and provided the applicant is a fit and proper person, the Agency must issue a licence unless it is satisfied that rejection is necessary in order to prevent pollution of the environment, harm to human health, or in certain cases, serious detriment to the amenities of the locality.

The Agency will, however, attach conditions to a licence, relating to site preparation, infrastructure and operation, pollution control and completion, monitoring and records. Failure to comply with any condition of a licence is an offence.

The Agency has a duty to ensure compliance with licence conditions, and that the prime objectives of the licensing system are being achieved. This involves making frequent inspections of licensed facilities, and taking enforcement action if necessary. The Agency also has a duty to assess all licences for compliance with the EC Directive on groundwater protection (80/68/EEC) and many of the licences in the area are undergoing such reviews. Licences can be surrendered only when the Agency is satisfied that no future pollution is likely.



Weaver/Dane Local Environment Agency Plan

Map 16



**ENVIRONMENT
AGENCY**

- A ICI Chemical & Polymers Ltd, Holford Brinefields, Cavity injection
- B/D ICI Chemical & Polymers Ltd, Frodsham Marsh and Weston Marsh Lagoons
- C 3C Waste Ltd, Danes Moss, Landfill
- E ICI Chemical & Polymers Ltd, West Clifton Marsh, Lagoon
- F British Salt Ltd, Cledford Lane, Lagoon
- G Hays Chemical Distribution Ltd, Booths Lane, Lagoon
- H 3C Waste Ltd, Maw Green, Landfill
- I British Waterways Ltd, Bosley, Lagoon
- J British Salt Ltd, Hilltop Brinefield, Cavity injection

Significant Waste Disposal Sites (Licensed)

KEY

- Plan Boundary
- Watercourse
- Canal
- Built up Area
- Licensed Sites

Special Wastes

Certain wastes are regarded as being particularly difficult or dangerous to dispose of, and are subject to additional controls. 'Special Waste' controls were first introduced in 1981, and a new set of regulations came into force on 1 September 1996. The definition of Special Waste is complex, but typical examples include acids, alkalis, industrial solvents, oils, pesticides and pharmaceutical compounds. The regulations require waste producers or carriers to inform the Agency of the intention to dispose of a consignment of Special Waste, and a consignment note tracking system then provides confirmation that it has been disposed of at a site licensed to receive it.

Transfrontier Shipment of Wastes

The movement of wastes between different countries for disposal or recovery has generated much concern in recent years. Legislative controls were introduced in 1988, to regulate the movement of hazardous wastes within, into and out of the EC. In 1994, the UK Transfrontier Shipment of Waste Regulations came into effect, relating to the movement of all wastes for recovery and disposal. There are no sites accepting such wastes in the LEAP area.

Registration of Waste Carriers

With certain exceptions, all persons transporting controlled waste in the course of their business, or in any other way for profit, must register with the Agency. Registration can be refused or revoked under certain circumstances.

These provisions are an integral feature of the Duty of Care system, which requires persons to take all reasonable steps to ensure that waste is contained, handled and disposed of safely. In particular, waste must be transferred only to authorised persons (such as registered carriers or holders of waste management licences), and such transfers must be documented. The objective is to assign a clear responsibility for waste at every stage from point of origin to place of final disposal, in order to avoid environmental pollution or harm to human health.

Enforcement

The Agency's enforcement role derives from the fact that any person who fails to comply with any of the regulatory provisions outlined above is committing a punishable offence. In practice, the most obvious result of illegal waste disposal activity is fly-tipping, which can give rise to public health risks, environmental pollution and detriment to amenity. A variety of control measures is available, ranging from discussion and persuasion through enforcement notices and, ultimately, action in the courts.

Landfill Consultations

Planning Authorities are required to consult the Agency on planning applications for developments within 250 metres of existing or former landfill sites. The purpose of this is to ensure that new developments are not exposed to known environmental hazards from landfill sites. The Agency will also supply information directly to developers and others about particular landfill sites, or carry out searches for landfills in the vicinity of specified locations.

Sustainable Waste Management

The objectives, which came out of the Rio Earth Summit in 1992 and which are defined in the Government's paper "Making Waste Work", are:

- To reduce the amount of waste that society produces.
- To make the best use of waste.
- To minimise the risks of immediate and future environmental pollution and harm to human health.
- To increase the proportion of waste managed by the options towards the top of the waste hierarchy.

The waste hierarchy ranks different waste management options to give a broad indication of their relative environmental benefits and disadvantages - Reduction, Re-use, Recovery (including recycling, composting and energy recovery), and finally Disposal.



Figure 4 Waste Hierarchy

The Government propose a five point plan to achieve these aims - regulatory, market-based, planning, promotion and data strategy. A range of 'actors and players' is involved - central government, local authorities, environmental trusts, the waste management industry, industry and commerce generally, the voluntary and community sectors, and householders.

The Environment Agency will also be a key player in the delivery of the strategy and its future development:

- through its regulatory functions in relation to wastes (including new responsibilities in relation to producer responsibility)
- through advice and guidance on good waste management practices and by sponsoring research
- through improved collection of data, especially by carrying out a national survey of waste arisings and facilities.

The Agency will provide relevant information to assist:

- waste collective authorities in their recycling plans, and in deciding their collection arrangements for household waste

2.5 Waste Management

- waste disposal authorities in determining their contracts, with an objective assessment of the environmental costs and benefits of the various options for dealing with household waste
- local planning authorities with the information they require for development plans

Although 'Making Waste Work' is a non-statutory document, the Environment Agency legislation creates a new duty for the Secretary of State to prepare a statutory waste strategy, and the Agency will have a key input into this.

Local

The LEAP area is predominantly rural and agricultural, although the main towns of Crewe, Congleton and Northwich all have an industrial base. Historically, the area has been one of the UK's most important centres for the chemical industry because of the extensive salt fields running north-south through the centre. Chemicals continue to be important, with major plants at Runcorn and Northwich, along with a number of smaller specialist chemical and pharmaceutical manufacturers. These industries are potentially polluting and there are a number of activities for which authorisation by the Agency is required, including licensed waste management facilities.

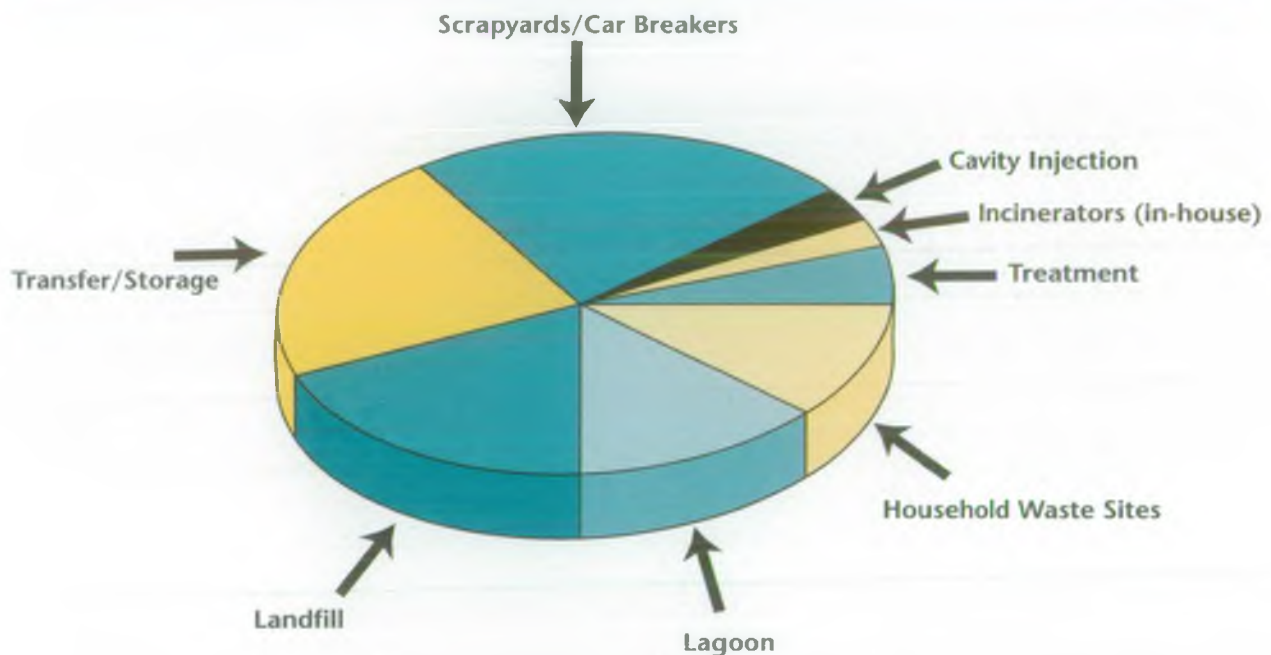
There is a general deficit of available landfill capacity in the North West, which means that waste management sites within the area are used for disposal of waste from Greater Manchester and Merseyside.

The area, therefore, has high levels of industrial waste production, and disposes of a large amount of domestic and commercial waste produced both within the area and outside. Consequently there is great need to manage and dispose of these wastes properly.

There are 63 of licensed waste management facilities in or very close to the area:

Figure 5

Waste Disposal Facilities



2.5 Waste Management

There are no municipal waste incinerators in the area, but there is an authorised hazardous waste incinerator at Ellesmere Port, situated 6 km from the Plan boundary. The two licensed incinerators are smaller scale units principally for in-house incineration of waste produced on site.

The use of cavity injection for the disposal of special (chlorinated) waste is unique in the country, and is again linked to the extraction of salt. The boreholes resulting from salt solution mining are backfilled with liquid and processing sludge waste, this being an acceptable method of disposal due to the low permeability of the salt crystalline structure surrounding the boreholes and the absence of groundwater. It is used as a national facility for the companies concerned, and there is debate concerning the future viability of this disposal option in terms of its sustainability.

The high water content of much of the chemical industry waste arising in the area means that lagoons are often the most practical and cost effective method of disposal, and several million tonnes of bulk industrial waste were lagooned in 1995-96. After a period of settlement, percolation and evaporation, the remaining solids are sometimes removed to landfill, but are normally left *in situ*. In common with borehole disposal of waste (above), this disposal option which does not incorporate any significant treatment of the waste, will be re-assessed to balance its lack of sustainability against the practicability of alternatives.

Of the landfill sites, a number are major facilities accepting large quantities of household, commercial and industrial waste, and a new facility near Crewe will shortly be in operation for the disposal of contaminated land. There are other sites which are licensed to accept a more restricted range of waste types, most commonly inert building and construction industry wastes. The total quantity of waste deposited at all licensed landfills in the area during the year 1995 - 96 was around 0.9 million tonnes.

There are also more than 100 closed landfill sites, many of which pre-date formal licensing controls under the Control of Pollution Act 1974. These are typically addressed when land is to be developed, and the Agency is consulted on all planning applications where development is to take place within 250m of such a site.

The transfer and storage operations are also variable in terms of size and operation. Many handle only inert building and construction wastes, whilst others handle a wider range of controlled wastes, or particular materials such as chemical or clinical wastes. These sites make a significant contribution towards materials recycling.

Two of North West Water Ltd's STWs in the area are licensed to accept a variety of chemical, food and oil based wastes directly from road tankers into the works. The third treatment facility listed is a road tanker washing plant.

The household waste sites are provided for local residents to deliver household wastes free of charge, and all have recycling facilities for wastes such as paper, plastic, oil and metal.

A large number and range of activities in the area are exempt from licensing control, the most significant being for various recycling activities, land reclamation, and the spreading of waste on agricultural land. The quantities of waste involved can be considerable, and the acceptability of spreading abattoir waste and large quantities of paper waste has been an issue. An accurate figure for the amount of wastes spread under these exemptions is not readily available, and the benefit to the environment which must accrue under such schemes could be better defined. (Issue 13)

The presence of major industry in the area gives rise to significant production of Special Waste, most of which is either dealt with by cavity injection or transported out of the area for treatment and disposal, much of this being in adjacent LEAP Plans. There are nine sites in the area licensed to accept and dispose of special wastes; none receives waste directly as a result of the transfrontier shipment of wastes (ie: from other countries).

In common with many other areas, there is a problem of illegal waste disposal activity which often results in fly-tipping. This is most prevalent around the areas of highest population density, when waste is often disposed of quickly by somebody who has been paid to dispose of it properly, but often too cheaply to be legitimate. There is also opportunist disposal by members of the public of smaller quantities in black bin liners and so on. This LEAP area is not one of the worst afflicted, but there are significant pockets of activity in the Crewe and Northwich areas (Issue 11). The Agency always takes enforcement action against fly-tippers where there is sufficient evidence to do so.

One of the measures introduced to counter the problem of fly-tipping is the Duty of Care imposed on producers of waste to ensure that their waste is passed only to an authorised person. Anyone wishing to carry waste from a producer (for profit) must register with the Agency, and the Agency has the power to refuse or revoke registrations should carriers be deemed unfit. The LEAP area has 375 such carriers registered, principally based in the towns.

The Cheshire 'Agenda 21' forum is a local authority grouping which is in place to implement locally those issues which were agreed at the Rio Earth Summit, and it has responsibilities for all the area covered by this LEAP. This involves all environmental matters such as energy use reduction, air quality, water quality and use, and also includes waste strategy. Part of the latter includes provision and improvement of household waste recycling sites, supporting industry waste minimisation initiatives and education. The Agency was involved in discussions which led to production of the forum's strategy document, and is also looking to become increasingly involved with local interest groups such as business links, groundwork and so on.

Industry already recycles large amounts of waste, either in-house as part of the process, or through the established reclamation industry, and an often overlooked portion of this is spoil and rubble arising from construction works. New 'producer responsibility' measures are being introduced to encourage businesses to reduce, re-use, recover and recycle waste materials, beginning initially with packaging materials.

2.6 Area Drainage, Flooding & Flood Alleviation

The Nature of Flooding

Rivers and watercourses can transfer only a limited quantity of water, and flooding occurs when the rivers' carrying capacity is exceeded. Flooding can be caused by extreme weather or problems associated with the river channel itself.

Watercourses of a similar nature can, however, respond differently to the same rainfall conditions due to variations in areas and land use. Localised flooding may also occur where watercourses become blocked at particular points such as bridges or inside culverts. Often the debris, which may include garden waste and other rubbish deposited on river banks, gathers at these points, which can be a major problem in urban areas. There is also a potential for flooding where either surface water drainage capacity is exceeded, or drains cannot are unable to discharge because of high water levels in the river.

When watercourses flood, water flows onto a 'flood plain'. These natural floodplains (which are as much a part of the river system as the channel that carries normal flows) provide extra capacity for the storage and continuation of flood water. This additional capacity is reduced if significant areas of floodplain are raised, embanked, or built upon. The loss of storage volume can lead to higher river levels and consequently it becomes impossible to alleviate flooding in all areas. The priority for flood alleviation lies in urban areas, as rural undeveloped floodplains should be allowed to maintain their natural role.

In 1946 the LEAP area experienced a major flooding incident. The flood affected the whole of the Weaver and Dane valleys and caused much damage to the town of Northwich. The area has since experienced flooding incidents in 1979, Congleton and Northwich, 1987, Congleton, and 1994, Northwich and Nantwich.

REGULATION

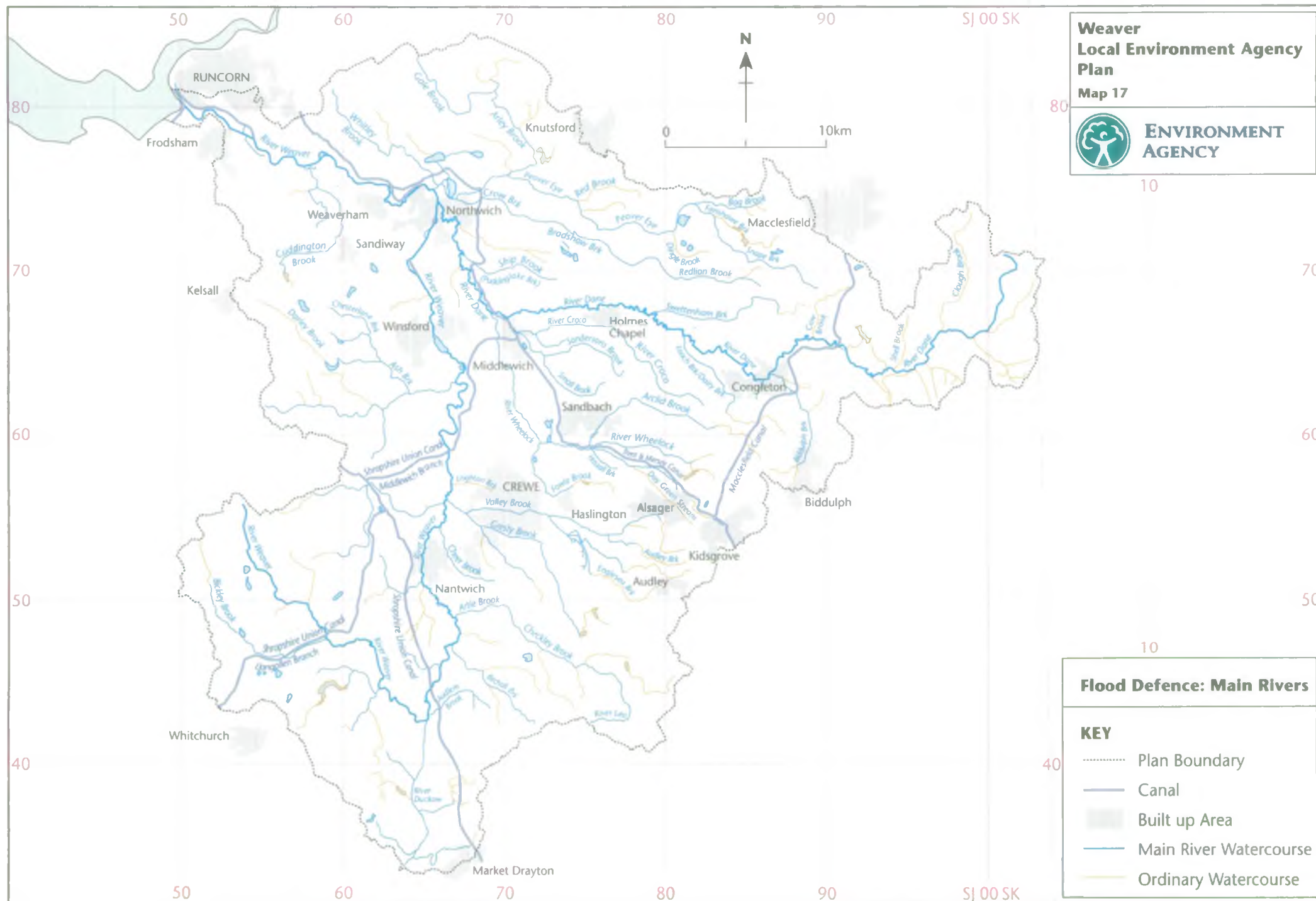
Main River

All watercourses are classified as either 'Main River' (which is defined on maps held by the Agency and MAFF) or 'ordinary watercourse' (sometimes called 'non-main river'). The Water Resources Act 1991 is the legislation that deals with main river and is supplemented by local bylaws. The Agency supervises all flood defence matters and has special powers to carry out or control work on main rivers and sea defences. However, these powers are permissive only and the Agency is not obliged to maintain or carry out works on main river. With a small number of exceptions the Agency arranges for all its functions relating to flood defence to be carried out by a Regional Flood Defence Committee.

- Total length of Main River 619.4km

Local authorities have similar permissive powers for flood defence on ordinary watercourses, also powers for protecting the coast from erosion by the sea. The appropriate legislation relating to ordinary watercourses is to be found in The Land Drainage Act 1991.

Although any proposal to revise main rivers is dealt with through a consultation and advertising process, the decision to main a river, or not, is made by MAFF.



Flood Risk Areas - DoE Circular 30/92 - Section 105 Surveys

Local planning authorities and the Agency are expected by the Department of the Environment in Circular 30/92, on Development and Flood Risk, to liaise closely on flooding and surface water runoff matters. The Agency is responsible under Section 105 of the Water Resources Act 1991 to produce maps showing the location and extent of areas at risk from flooding.

These maps show the natural flood plain areas, where flooding by a "main river" may occur at least once in one hundred years. The aim of the Section 105 flood plain mapping project is to place particular emphasis on those river reaches where future development is most likely. At the request of local authorities, various "non-main rivers" (or "ordinary watercourses") will also be investigated. In addition, the flood plains of other reaches will be plotted to improve the accuracy of existing maps.

The Agency aims to protect flood plain areas from development. Our national policy document on flood plain protection was published on 12th March 1997.

Development Control Practice

- **Land Drainage Consents:** 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, and such activities as the planting of trees and mineral extraction. On ordinary watercourses, consent is required only for building any structure that would affect the flow.
- **Surface Water Control:** Surface water runoff is likely to be increased because 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 later.

Further guidance on our development control policy is available as Development Guidance Notes issued by the Agency. More detailed information and guidance on Flood Defence Issues is available from the Agency's South Area Water Services and Regulation Section at Sale.

Water Level Management Plans

The Government has issued guidance on preparing WLMPs for SSSIs or other areas of high ecological or landscape importance. Where the Agency is the operating authority, it will liaise with English Nature to prepare a plan to ensure appropriate key water levels are safeguarded. WLMPs are to be prepared for the following sites within the LEAP area.

- **May '97** **Betley Mere - Completed in Draft**
- **July '97** **Bar Mere**
- **Feb '98** **Oulton Moss**
- **July '98** **Sandbach Flashes**

OPERATIONS

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 flood plain. 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 and transport networks. Such features are each allocated a financial value (based on potential losses resulting from 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 as a percentage that reflects the likelihood that during any year a flood event may occur which exceeds the amount for which protection is available, or should ideally be provided. For example, a standard of 2% means that, for any given year, the likelihood of flooding which significantly affects key land use features, is fifty to one 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 that do not meet their target standards.

Standards of service land use bands and targets			
Land Use Band	Description of typical land use	Target standard of protection (return period)	
		Fluvial	Saline
A	Urban	1:50-1:100	1:100-1:200
B	Lower density urban	1:25-1:100	1:50-1:200
C	Isolated rural communities	1:5- 1:50	1:10-1:100
D	Isolated properties/intensive farming	1:1.25-1:10	1:2.5-1:20
E	Low grade agricultural land	<1:2.5	<1:5

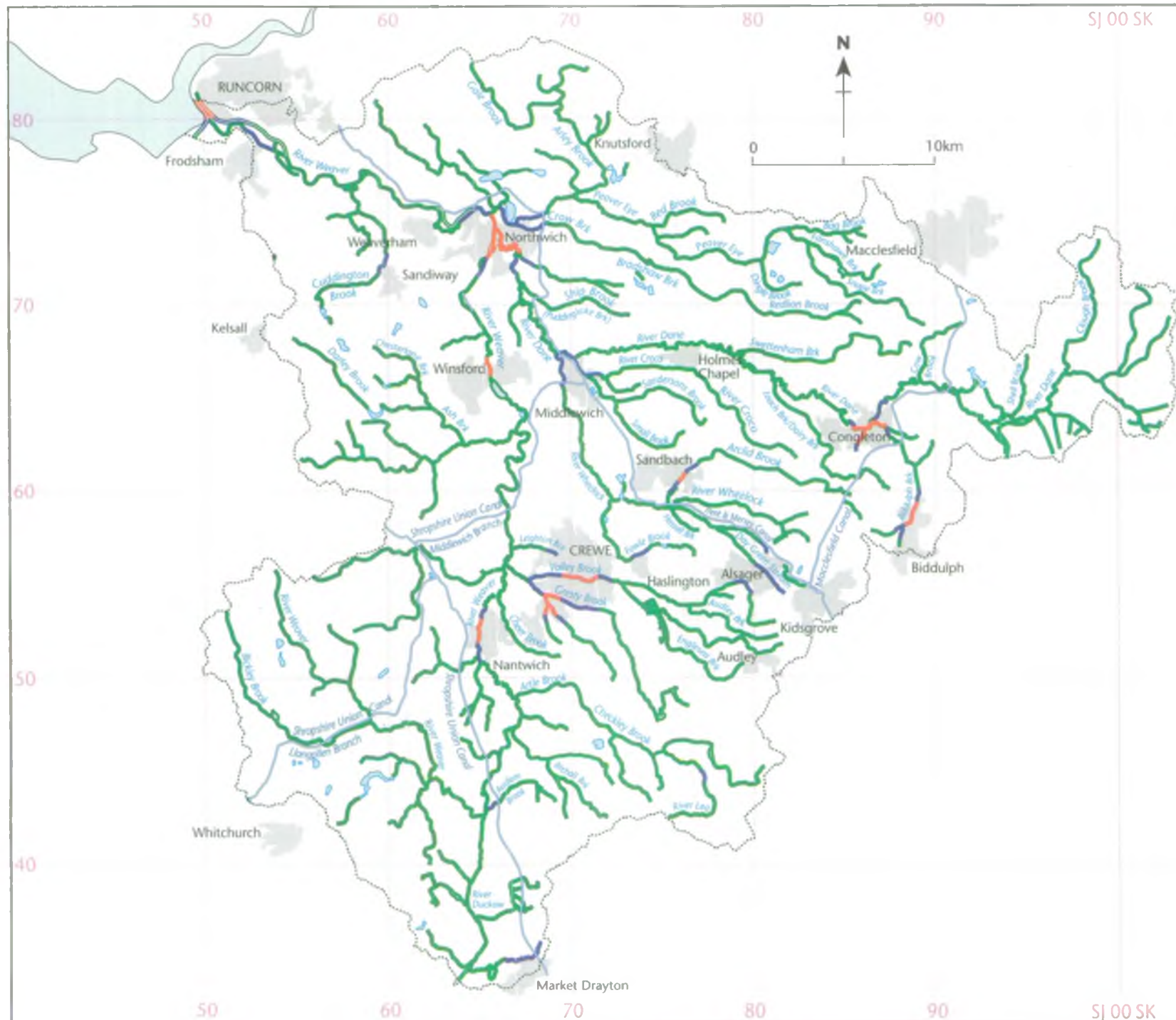
Figure 6

Routine Maintenance Regime

The Agency does not own watercourses, except in a few specific locations where flood defence structures have been constructed and it has retained ownership, for example, Church Minshull Weir on the Weaver. 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).

The Agency has permissive powers, on Main River (see Map 17 for 'Main River' watercourses), to undertake works and exercise 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 may include vegetation control, repairs to earth embankments and other flood protection structures, the removal of obstructions and blockages, and dredging.

In 1996 within the LEAP area the Agency made an annual allocation of £455,500 for routine maintenance works, with an additional contingency for unplanned urgent works.



**Weaver
Local Environment Agency
Plan
Map 18**



**ENVIRONMENT
AGENCY**

**Flood Defence: River
Corridor Land Use Plan**

KEY

- Plan Boundary
- Watercourse
- Canal
- Built up Area
- Urban
- Semi Urban
- Rural

Operational Maintenance

Includes the following aspects:

- **Pumping Stations:** The Agency maintains and operates one pumping station within the LEAP area at Sutton Weaver.
- **Debris Screens:** There are several screens in the area which require regular cleaning and inspection.
- **Culverts:** There are at least 55 major culverts totalling 7.3km in the Weaver Area. Those are prone to blockages or which may cause flooding are inspected by the Agency. Problems with culverts are encountered mainly in urban areas, but undersized or poorly maintained culverts through agricultural land may also cause flooding.
- **Weirs:** There are in excess of 154 weirs within the area, eleven of the 154 are classified as lifting weirs. Weirs control both water and river bed levels. There are many which have now deteriorated and require remedial work to ensure their long-term stability. Problems with debris accumulation behind the weirs have also been highlighted in this area.

Maintenance Problems - Illegal Tipping of Waste into Watercourses and on the Banks

Rubbish problems affecting main rivers across the area are being tackled, when reported or requested, by the Agency's Enforcement Officer, and the Agency sponsored Water Watch and Stream Care projects, who look after litter problems on other rivers and canals. Water Watch encourages local authorities, waterside businesses, schools, voluntary groups and local communities to get involved in clearing rubbish from rivers and canals and preventing the problem recurring.

Urban Channel Access

Several locations suitable for the construction of access ramps have been identified across the NW region, also in this area, which are being investigated for their suitability. Access within the urban areas of Crewe and Congleton is especially problematic but essential.

Emergency Response

At times of heavy rainfall the Agency's operational priorities are to check and operate water level control structures, and clear debris and identified obstructions where possible. Besides our flood warning role (information to follow) we also patrol defences, operate flood defence structures, remove blockages and carry out any emergency repairs needed.

District Councils have permissive powers to offer assistance during floods. This may include placing sandbags, moving possessions or even evacuating people. Each 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 can advise the public on what help may be available, and whether a charge will be made.

County Councils (or Unitary Authorities) 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.

Public surface water sewage systems are the responsibility of the local Water Company, who may sometimes use District Councils as their agents.

FLOOD WARNING

Flood Warning Responsibilities

The Agency recognises that irrespective of attempts to reduce the risk from flooding through the application of various policies and actions, flooding can occur and on occasion represents a risk to human life. Concerning public safety, we operate a flood forecasting service in the area. This uses rain gauge and river level data, radar and rainfall forecast data from meteorological agencies, and information from flood defence staff in the field.

Arrangements for warning have been agreed in consultation with local authorities and the emergency services.

Further information on this issue may be found in the Agency's Publication:
"Flood Warning Information: What to do if your property is at risk."

Flood Warning Standards of Service

The Agency operates a system of Flood Warning Standards of Service to ensure that timely warnings are issued, to the right people, at the right time. By defining lengths of river, or reaches, with common land use interests, those areas with a high population concentration can be treated as priority. It is our aim to provide a two-hour warning of the commencement of flooding wherever practicable.

Flood Warning Zones

Flood warnings, within the LEAP area, are disseminated to the general public via Radio Merseyside, the Environment Agency's Flood Call Line, AA Road watch, the Met. Office, and page 105 of Teletext. Warnings are passed to the relevant local authorities, police, utilities and the coastguard by the Environment Agency North West Regional Office at Warrington.

At present, we have one formal fluvial flood warning zone within the area covered by this LEAP.

- **River Weaver at Northwich**

Two informal flood warning zones where warnings may be issued to property at risk in extreme flooding conditions are:

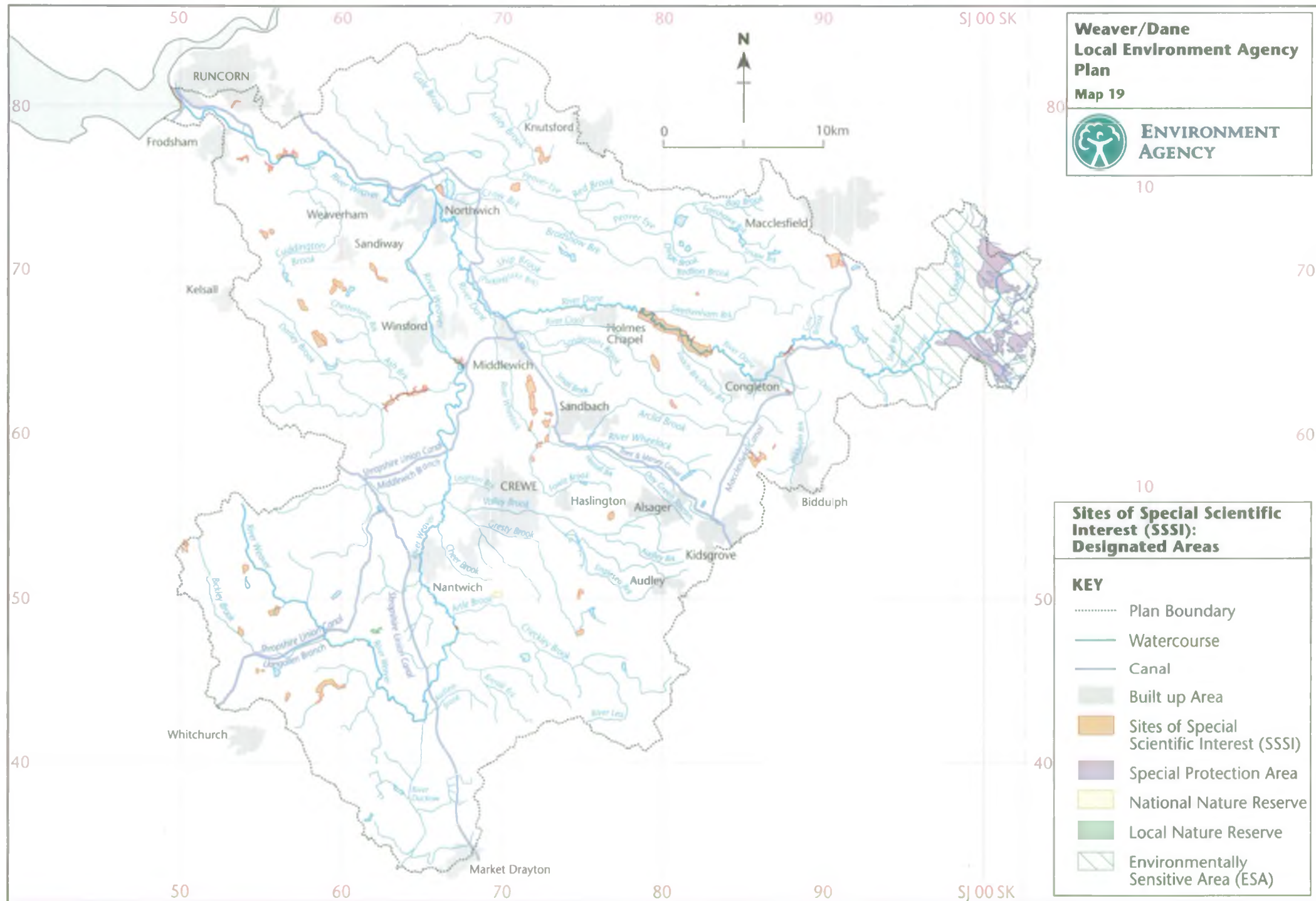
- **River Dane, Havannah Cottages at Congleton:** Flooding can occur at Havannah Cottages when high flows are experienced in the River Dane. A low bank and an old millrace combine to make this a vulnerable location in times of high flow.
- **River Weaver at Nantwich:** There is a risk of flooding from the River Weaver due to inadequate channel capacity. Approximately 28 properties are affected as the river comes out of bank over a length of 2.5km.

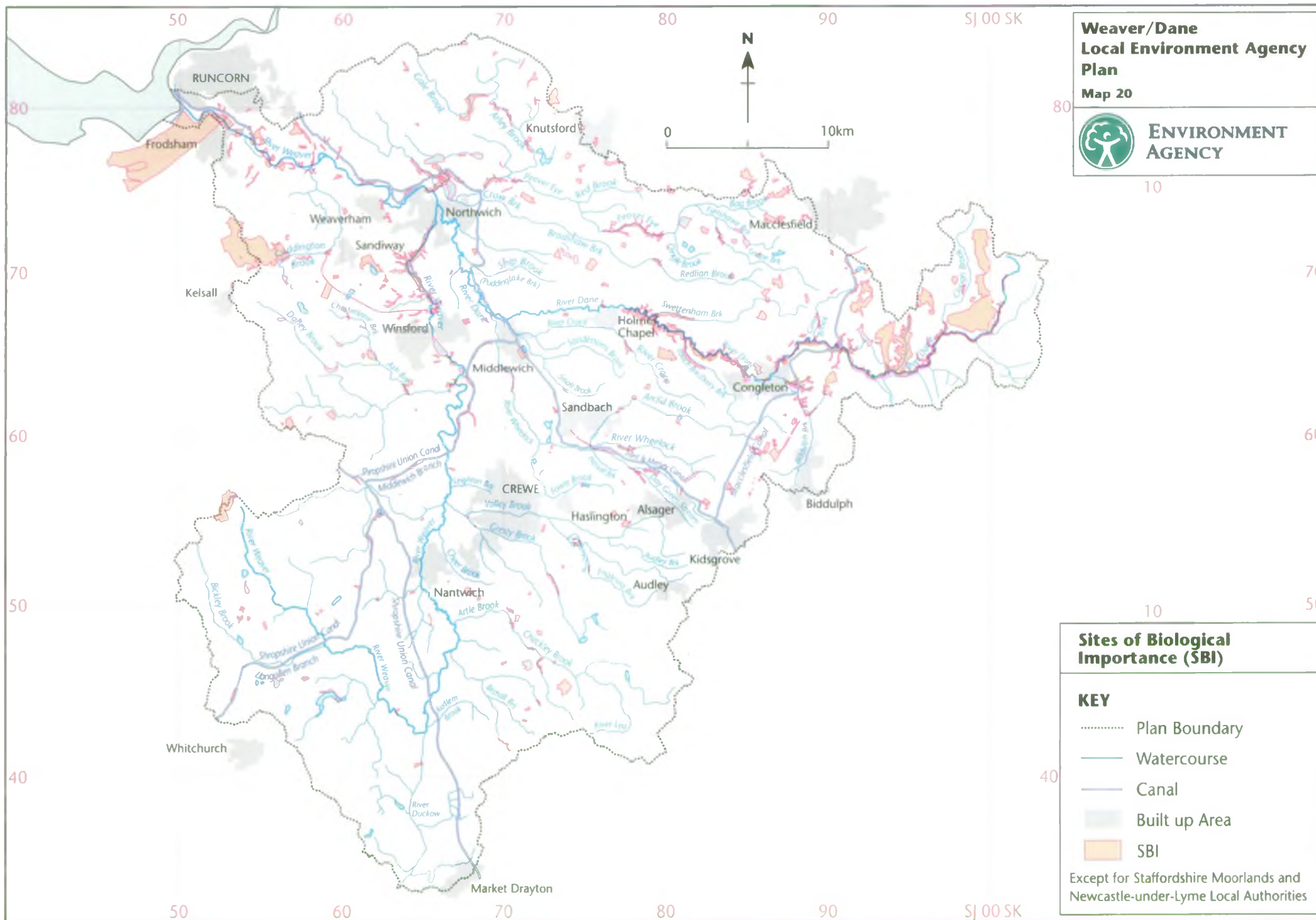
FLOOD DEFENCE CAPITAL SCHEMES

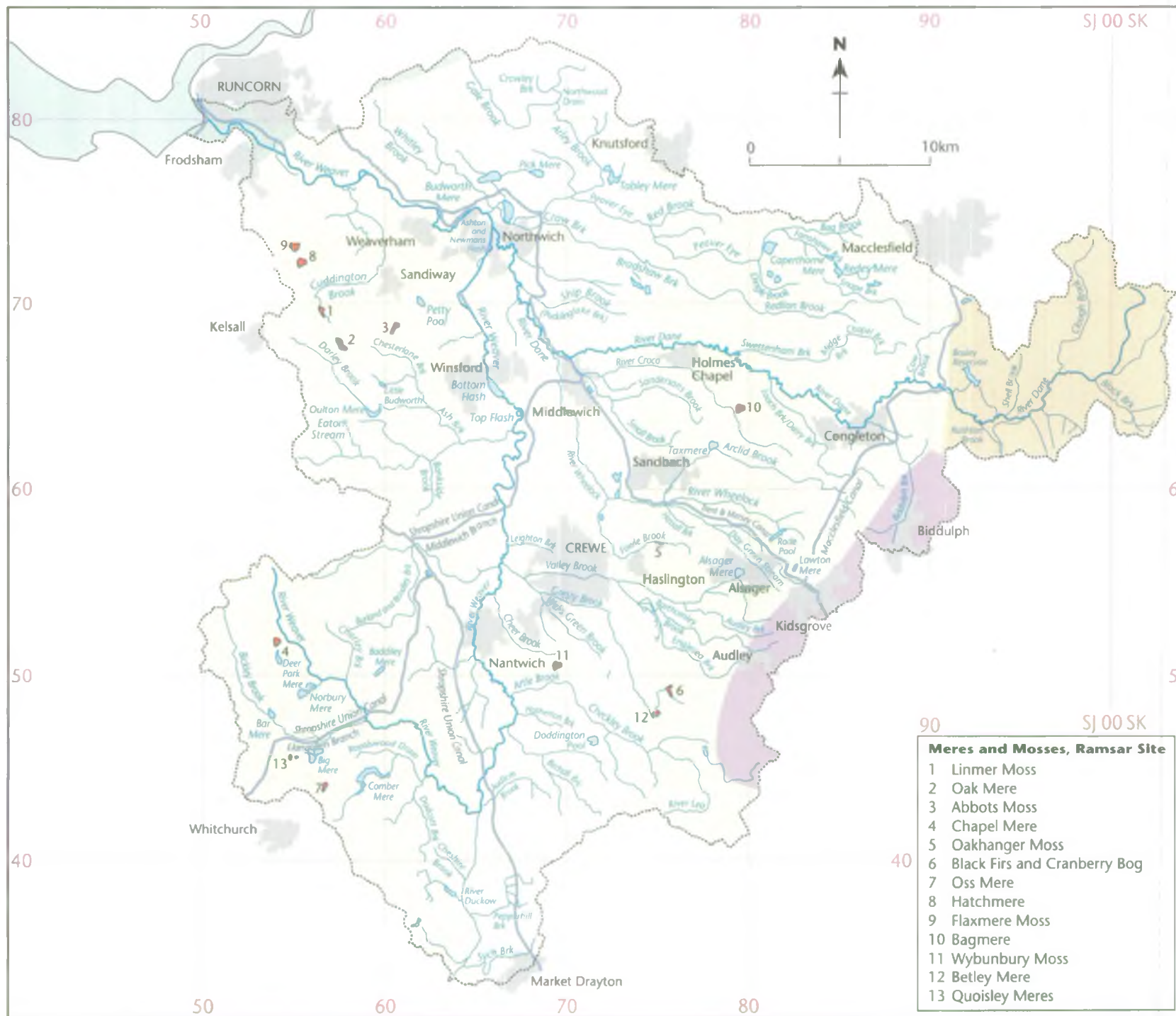
Besides general maintenance work, the Agency can build new flood defences if flooding is a serious problem in a particular area, and it is cost beneficial to do so. We usually build new defences only to protect built up areas from flooding. All schemes must be technically, economically and environmentally viable.

At present, our medium to long-term capital works programme contains the following flood defence schemes within the LEAP area:

Project Title	Planned Construction Date (proposed)
Dane in Shaw Improvements	1997-8
Church Minshull Weir	2004-5
River Dane, Congleton	2007-8
River Wheelock / Arclid Bk.	2007-8
Dane and Weaver Improvements	Later than 2007-8
Howty Brook, Congleton	Later than 2007-8







Weaver/Dane Local Environment Agency Plan

Map 21



**ENVIRONMENT
AGENCY**

Meres and Mosses

KEY

- Plan Boundary
- Watercourse
- Canal
- Built up Area
- English Nature Urban Mersey Basin Natural Area
- English Nature Meres and Mosses Natural Area
- English Nature South West Peak Natural Area
- English Nature Potteries and Churnet Valley Natural Area
- Meres and Mosses
- Ramsar Site

Meres and Mosses, Ramsar Site

- 1 Linmer Moss
- 2 Oak Mere
- 3 Abbots Moss
- 4 Chapel Mere
- 5 Oakhanger Moss
- 6 Black Firs and Cranberry Bog
- 7 Oss Mere
- 8 Hatchmere
- 9 Flaxmere Moss
- 10 Bagmere
- 11 Wybunbury Moss
- 12 Betley Mere
- 13 Quoisley Meres

2.7 Ecology

General

The Environment Agency has a duty to promote and enhance the conservation of the environment in all of its activities and those of third parties. It does this by assessing, minimising and mitigating the ecological impacts of its own maintenance and engineering schemes and influencing local authorities, developers and other bodies through the planning and regulatory system and general liaison. The Agency will seek to protect all designated sites, the wider countryside and all habitats of local importance associated with watercourses, ponds and wetlands and seek to influence outside organisations to protect terrestrial habitats of importance.

Local Perspective

There are numerous sites of international, national and local importance located within the area. There is one Ramsar Site, The West Midlands Meres and Mosses, designated under the Ramsar Convention to protect wetlands which are of international importance. There is also one proposed Special Area of Conservation (SAC), which includes Oakmere, Abbots Moss and Wybunbury Moss. Eighty-one SSSIs can be found in the area, one of which is also designated as a National Nature Reserve (NNR), Wybunbury Moss. The South Pennine Moors Special Protection Area (SPA), for the conservation of wild birds, lies to the north-east of the LEAP area.

On a more local level, there are 412 Sites of Biological Importance (SBIs) designated by the local authorities. These include habitats and species which are of County Value for Nature Conservation (CVNC). (Map 20)

The Environment Agency has a responsibility to protect and where possible enhance still waters in the region. A strategy is being formulated whereby sites may be prioritised for action and resources focused efficiently. A survey methodology is being designed to address the information needs of the region. A large database of information has been produced for sites larger than two hectares which will be updated to include those smaller in area.

Of particular importance within the Weaver area are the Meres and Mosses which lie within the boundaries of the Midland Meres and Mosses Ramsar designation and The Meres and Mosses Natural Area. This English Nature Natural Area profile will be published in 1997. Also in draft format is The Upper Mersey Basin Natural Area describing the open landscape of the Mersey Estuary at the downstream end of the River Weaver, internationally important for migratory birds; the Potteries and Churnet Valley Natural Area which covers the landscape to the south east of this LEAP area and the upper reaches of Dane-in-Shaw Brook, Audley Brook and Kidsgrove Stream; and the South West Peak Natural Area, covering the landscape of the Upper Dane.

The Meres have developed in hollows formed during the retreat of the last glaciers and are often associated with a variety of wetland habitat types which show natural progressions from open water through swamp and fen habitats to wet willow or alder woodland. The meres are particularly important for aquatic plants, insects, molluscs and birds which are dependant on open water habitats and fringing vegetation. Internationally and nationally important species are found at many of these sites. On the short list of Globally Threatened/Declining species are populations of pipistrelle bats, great crested newts and floating water plantain.

Mosses are bog communities which have developed in association with glacial hollows where peat build-up has produced acidic conditions. Some mosses form regionally important breeding pools for a diversity of invertebrates such as dragonflies, butterflies and spiders, and are also important for birds such as the short-eared owl and snipe.

The high nutrient levels found in many still waters result in blooms of blue-green algae. The Agency encourages schemes to reduce nutrient availability within these water bodies such as the creation of buffer strips, water quality improvements and bio-manipulation.

Water bodies of less than two hectares are defined as ponds. The Environment Agency is a partner in the Pond Life Project which aims to test a model for sustaining the pond landscapes of North West England. The Project has provided information on pond status and loss in recent years. It has also highlighted the importance of adjacent habitats, pond clusters and fragmentation of the landscape itself. It is thought that Cheshire has around 17,000 ponds, 10% of the total in England and Wales. Further loss of pond habitat must be prevented through planning and education.

The Agency is undertaking general river corridor surveys on many stretches of the area to identify habitats and species of importance. These are generally carried out in response to routine flood defence works, although some have been associated with fisheries surveys.

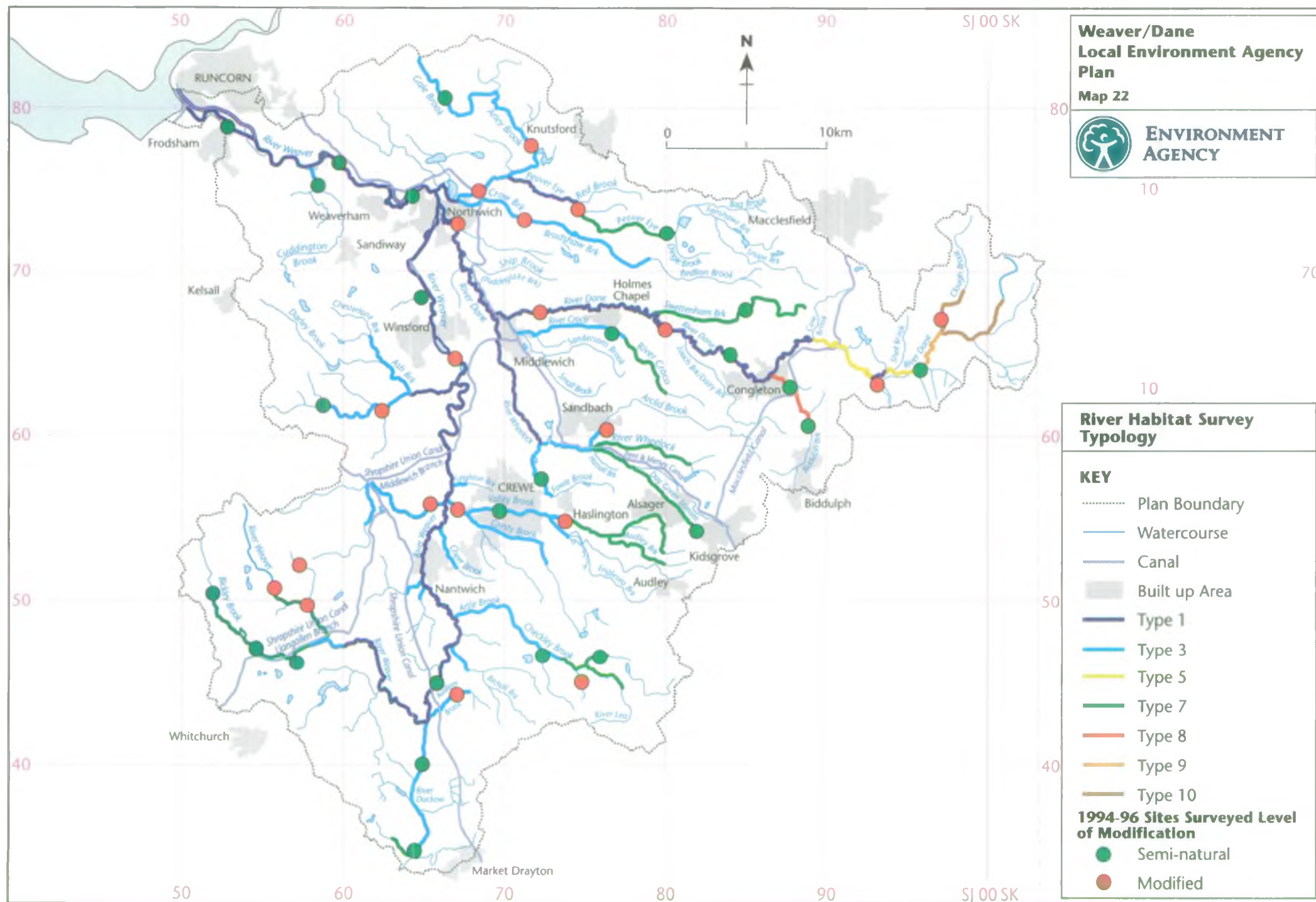
River Habitat Survey (RHS) is a new methodology which assesses the physical structure of watercourses based on 500m sample units. RHS enables us to attribute a typology to each section of river depending on its altitude, slope, distance from source and geology (Map 22). Forty-five sites have so far been sampled within the area. Seven of the eleven national types of river have been identified in the Weaver/Dane area:

Type 1: Low-altitude, low gradient rivers on drift geology. Much of the main rivers Weaver and Dane lie within this category. The flow is generally approximately laminar and channel features are rare. However, four reaches of the River Dane are designated as a SSSI of importance for fluvial geomorphology. Significant lengths of the River Dane are also designated as a grade A SBI due to the range of channel features which are present and which include meander belts, sequences of river terraces, flood plain, earth cliffs and oxbow lakes. The lack of any channel interference by man is a major contributing factor to the formation and preservation of these features. Such a range of channel features are not commonly found in type 1 rivers, and this emphasises the special nature of the River Dane and its associated habitat.

In 60% of the type 1 rivers surveyed in the area, some type of bank reinforcement was present. As much of the Lower Weaver is navigable, this may not seem surprising but it highlights the influence of man. The data from the surveys show a high occurrence of sand, silt and gravel substrate in this area compared with regional and national data.

Type 3: These are similar to type 1 but generally further upstream or smaller tributaries of type 1 rivers. Gravel is found at 85% of the type 3 rivers surveyed but sand and silt are common channel substrates also. Few channel features are present although small riffles are relatively common.

Type 5: Mid-altitude, low-gradient rivers on drift geology. These are generally smaller rivers on a low slope where gravel substrate predominates. Riffle-pool sequences are common in this type. Two small stretches of the Dane in the upper reaches are judged to be type 5.



Type 7: Mid-altitude, medium-gradient streams on drift geology. Small gravel-dominated streams which have few channel features. The flow type is generally approximately laminar or rippled. Many of the upper reaches of the Dane/Weaver tributaries fall into this category on the edges of the Cheshire Plain.

Type 8: Mid-altitude, steep-gradient streams on mixed geology. These are a mixed group with cobble/gravel substrate and riffle/approximately laminar flow type. Only Biddulph Brook falls into this category in the Weaver/Dane area. Biddulph Brook also exhibits a range of channel features in some reaches with braided channels and islands, earth cliff sections and shoals of deposited material.

Type 9: High-altitude, moderate-slope rivers on mixed geology. These are generally larger upland channels with a variety of slopes. Channel substrate is dominated by cobbles or less frequently by gravel/pebbles. Exposed boulders or bedrock are generally found in places. The flow is predominately riffle-pool.

Type 10: High-altitude, steep-slope streams on mixed geology. Small upland sites generally on lower slopes. Substrates are dominated by cobbles and gravel. Bedrock and boulders are rare, sand, silt and clay very rare. The flow type is generally riffle-pool with the channel flowing through open valleys. These sites represent lower energy upland streams. Both type 9 and 10 have a limited distribution being concentrated in the Pennines, Wales and Devon.

Map 22 also shows the sites surveyed in the area during 1994-96. At present they are described as semi-natural or modified. In future it is hoped that a Habitat Modification Score (HMS), will be given to sites indicating the extent of modification. Semi-natural is defined as a site with an HMS of 0-2. The scoring system is based on reinforcement, resectioning, embankments, culverts, artificial substrate, bridges etc. Of the 45 sites surveyed in this area, 25 have been defined as semi-natural, which is quite surprising considering the extent of development and agriculture in the area. Most of the 'semi-natural' sites are found on the upper reaches or on small tributaries in the area.

2.8 Fisheries

General

The Environment Agency has duties to maintain, improve and develop fisheries and to further the conservation of fish species. Fish populations are effected by the quality and quantity of water as well as by the availability of suitable physical habitat features. Fish are, therefore, important indicators of the overall health of the river.

The fisheries' function covers the maintenance of breeding populations of salmonid fish species (Game Fisheries), specifically brown trout in this area, and Coarse Fisheries.

Local Perspective

The Environment Agency undertake fish population surveys on all rivers within a rolling programme. The results of these surveys for this area, together with an indication of the species that might be expected, according to the habitat type, are shown on Map 23.

The fishery habitat available within the Weaver area varies from that suitable for non-migratory salmonids, that is, brown trout, in the upper reaches and many of its tributaries, to that more suited to coarse fish, for example, chub, roach and bream, found lower in the area.

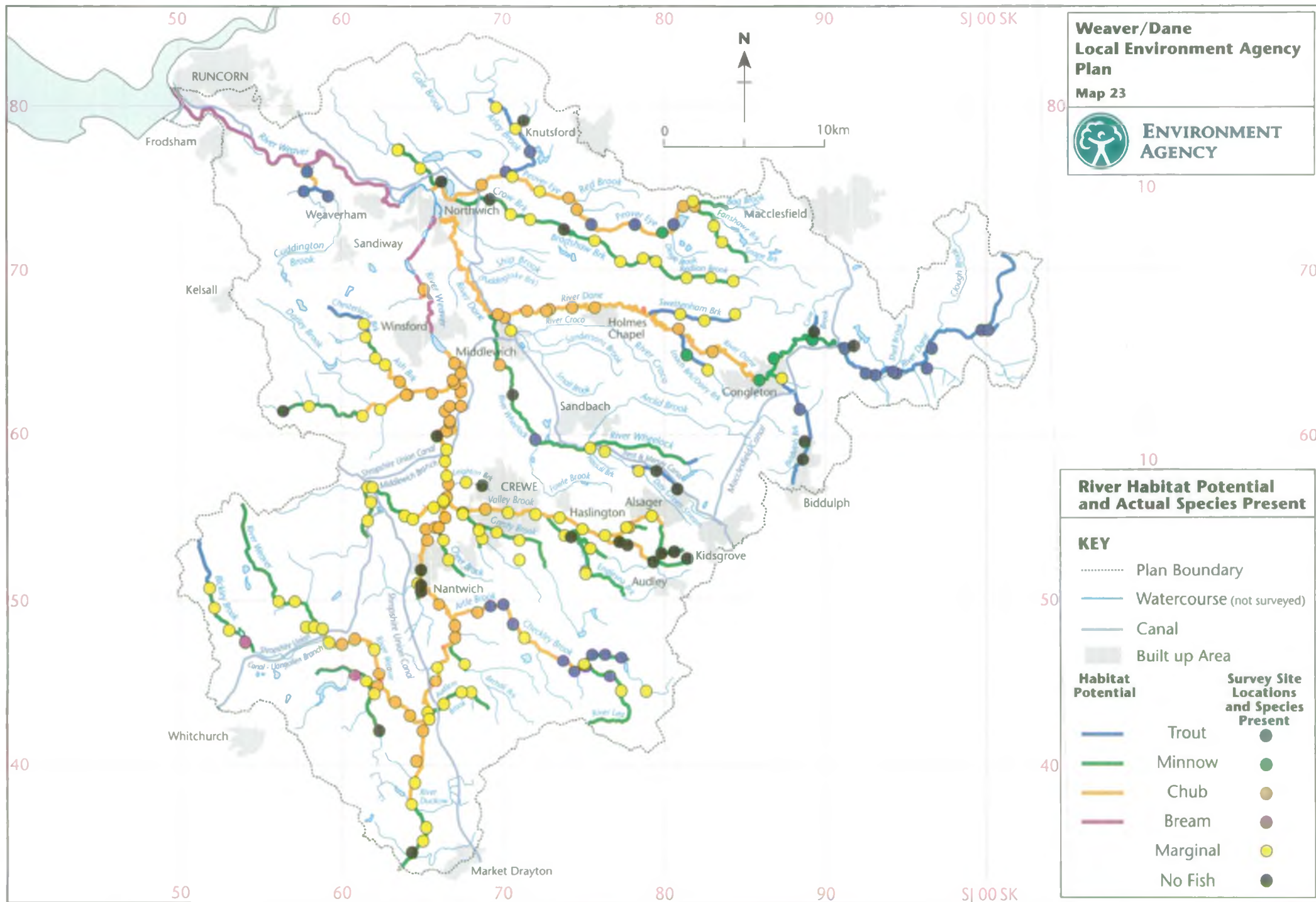
Downstream of Bottoms Flash near Winsford, the river habitat was originally an extensive chub type habitat with riffle and deep pool sequences. Where the flow has been regulated by the system of locks and weirs which make up the Weaver Navigation, it is classed as a bream type habitat (deeper and slower-flowing) all the way to Frodsham, where it flows into the Mersey estuary.

The upper reaches of the River Weaver downstream to Aston, supports only a marginal fishery, even though the habitat has the potential to support a salmonid fishery. From Aston downstream to Bottoms Flash, the river supports a good intermittent coarse fishery. Downstream of Bottoms Flash, survey work cannot be carried out as the river is too deep and wide in places. But from angling matches, we know that the main river from Bottoms Flash downstream to Winnington contains a high fish biomass comprising mixed coarse fish, for example, eels, roach, bream and pike.

From Winnington downstream to Acton Bridge the water quality in the past has been poor but has now improved sufficiently to allow the maintenance of large numbers of coarse fish in some reaches. Beyond Acton only marginal species are known to survive.

Most of the Weaver's smaller tributaries are supporting only marginal species in spite of the good habitat.

The upper reaches of the River Dane from where it rises to just below Bosley, are renowned as a trout fishery. In previous years, it was intermittently stocked with trout by the Environment Agency but is now mainly stocked by private clubs. As it travels through Congleton towards its confluence with the Weaver, it supports a good coarse fishery. The stretch between Congleton and Northwich is stocked by the Environment Agency with chub, dace and roach and is also an improving barbel fishery.



Most of the Danes smaller tributaries support only marginal species, in spite of the good habitat.

The Valley Brooks, Wincham Brook and Peover Eye systems, should by their physical nature, maintain a good mixed fishery, including brown trout in their upper reaches. However, due to poor water quality throughout the area only a marginal fishery exists within the river system. There are, however, three exceptions:

- A small coarse fishery exists downstream of Crewe Park which extends to the confluence of the Weaver.
- A small coarse fishery exists on a small tributary of Valley Brooks, near Radway Green, Alsager.
- Upstream of Lower Peover there is a good mixed fishery.

Environmental Objectives.

The overall objective is to develop and sustain a natural fish population appropriate to the area.

Environmental Requirements.

Water Quality:

- River stretches suitable for brown trout are to be maintained within the limits for pollutants as specified in the EC Fisheries Directive (78/659/EC) for salmonid fish, or by non-statutory River Quality Objectives (RQOs) and future Statutory Water Quality Objectives (SWQOs), whichever is appropriate.
- The remaining designated river stretches are to be maintained within the limits of pollutants as specified in the same EC Directive, but for coarse fish species, or by non-statutory RQOs and future SWQOs, whichever is appropriate.
- The estuary should be maintained within the limits for pollutants as specified in the same Directive for the passage of migratory fish.

Water Quantity:

- A flow regime is required where the monthly average reflects the natural flow conditions in the river.

Physical Features:

- A diversity of natural river features is required, to ensure a variety of habitat to maximise the production of fish populations, including riffle/pool sequences and weedbeds for feeding, spawning etc.
- The presence of bankside vegetation to provide adequate shade, cover and refuge.
- River maintenance operations must have a minimal impact on fish populations and enhance river habitat diversity where practical.
- Access by fish to all sections of river is necessary to sustain a viable population. The passage over or through obstructions is required.

2.9 Recreation & Amenity

General

The Cheshire Plain is a valued tourist attraction. Much of the region is relatively flat and open, a sharp contrast between the gently undulating hills offering in the extreme south west of the area near Peckforton, to the more rugged moorland landscape in the east towards Wildboarclough approaching the edge of the Peak District.

Recreational sites are widespread, offering a varied range of activities and facilities including walking, angling, cycling and bird watching, and many watersports such as canoeing and windsurfing.

Local perspective

There are numerous open recreational sites within the area. The larger country parks include Little Budworth Common (Country Park), Brereton Heath Country Park and Marbury Country Park situated on the banks of Budworth Mere. All the country parks offer the usual activities which include walking, picnicking, horse riding and bird watching. The smaller parkland areas, which are relatively open in character include sites such as Buglawton Park, Swettenham Hall Park, Cranberry Moss and The Mere at Alsager, and Rode Hall which is a designated English Heritage Site.

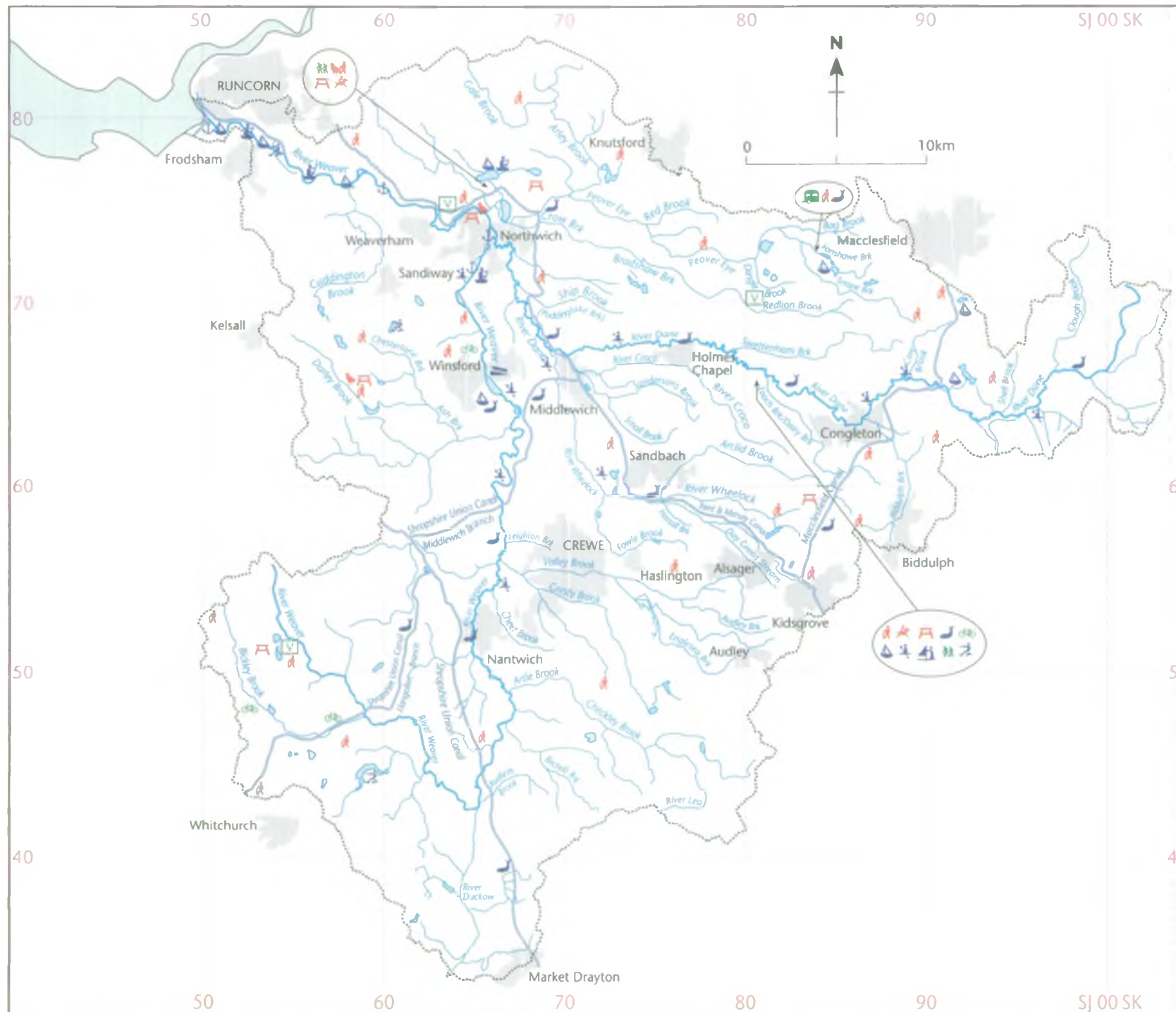
In addition to the country parks, there are numerous historic parks and gardens with facilities and activities including woodland walks, nature trails, picnic tables, coarse fishing lakes, activity days and formal gardens. These include Capesthorpe Hall, Arley Hall, Gawsworth Hall and Little Moreton Hall which is reputedly one of the best examples of a timber-framed house in this country and as a result is a designated Grade I listed building.

Anderton Nature Park, located between the Trent and Mersey Canal and the River Weaver, was formerly derelict land which has subsequently been reclaimed and is now public open space used for informal recreation such as walking. There are several ponds within the park, one of which is managed for conservation and is rich in dragonfly, damselfly, and fauna. The remainder are used for angling.

In addition to the stately homes, parks and gardens, there are numerous museums and industrial heritage centres in the region. These include the Nantwich Museum, the Railway Age in Crewe, the Salt Museum at Northwich, and the Anderton Boat Lift.

The first Anderton Boat Lift, designed by Sir Edward Leader Williams, an engineer for the Weaver Navigation Trustees, was completed in 1875. Its primary function was to form a physical link between the Trent and Mersey Canal and the River Weaver, to ease the transport of goods in the area, most notably salt. Unfortunately, canal water used in the hydraulic system was contaminated and caused irreparable damage to both the cylinders and pistons within the structure. A new lift was therefore built over the top of the original Victorian structure, and was finally completed in 1908. Trade on the waterways gradually declined and the use of the Lift by commercial boat traffic ended in the mid 1960s, although it was still used by pleasure boats until 1982, when it finally closed, again because of structural faults.

The Anderton Boat Lift Development Group was formed in 1986 to help sustain the issue of the restoration of the lift. In 1994 the Anderton Boat Lift Trust was formed to raise awareness



Weaver/Dane Local Environment Agency Plan

Map 24



**ENVIRONMENT
AGENCY**

Recreation and Amenity Sites Associated with Water

KEY

- Plan Boundary
- Watercourse
- Canal
- Built up Area
- 🎣 Angling
- 🚶 Walking
- 🐦 Birdwatching
- 🐎 Horse riding
- 🚤 Sailing
- 🏊 Water skiing
- 🚣 Canoeing
- 🏄 Windsurfing
- 🏕 Picnicking
- 🏠 Visitor Centre
- 🚢 Public Slipway
- ⚓ Boat Moorings
- 🚐 Caravan Park
- 🧭 Orienteering
- 🚴 Cycling
- 🚣 Rowing

of the lift and in February 1997, they submitted a £10 million bid for National Heritage Lottery funding to assist in the restoration project.

There is also the famous Jodrell Bank near Holmes Chapel, which is a science centre and arboretum. Visitors can view exhibitions on astronomy, space, earth, energy and satellites, and view the night sky in the Planetarium. The Sir Bernard Lovell Telescope located here is a Grade I listed building.

Footpaths

The Cheshire Plain/Weaver Valley is an area offering a wide variety of walks with many footpaths and rights of way available to the walker. These range from short walks on the relatively flat Cheshire Plains, to longer treks on the often more strenuous rugged terrain of the Peak Park fringe and the Sandstone Trail. This includes areas such as Wildboarclough and the famous Three Shire Heads where the counties of Cheshire, Derbyshire and Staffordshire meet, and the River Dane rises.

Of the longer distance trails the most notable in the area is the Cheshire Ring Canal Walk. This runs for approximately 97 miles along the varied towpaths of the Macclesfield Canal and the Trent and Mersey Canal within the area, and then also along the Bridgewater, Rochdale, Ashton and Lower Peak Canals.

Another well-known walk is the South Cheshire Way, stretching 34 miles from Grindley Brook, near Whitchurch to Mow Cop near Biddulph. It actually links the southern end of the Sandstone Trail, which just enters the area in the southwest corner, with the Mow Cop Trail in the east. The Mow Cop Trail is an extension of the Gritstone Trail and the Staffordshire Way. It is a shorter walk of nine miles stretching between Rushton Spencer, just south east of Congleton, and Mow Cop Castle from where the trail gets its name. The castle, built in 1750 by Randle Wilbraham, supported a beacon tower on its summit which was originally used to signal the approach of the Spanish Armada. At 1,000 feet above sea level, there are magnificent views across the Cheshire Plain. The area of Mow Cop, The Cloud and Timbersbrook is notably one of the best landscapes in Cheshire and as a result has been designated an Area of Special County Value for Landscape by Cheshire County Council (ASCV).

Slightly further north, running mainly along the River Weaver, is the Weaver Valley Way which is still being developed. There are two main stretches walkable; Saltersford Locks to Sutton Weaver Bridge which is approximately eight miles in length, and between Winsford Marina and Hunts Lock, Northwich, which is around five miles. Close by is the Whitegate Way which is a 6-mile walk from Cuddington to Winsford. Its path follows the track of the old railway line originally used to carry salt from Winsford mines. Along this route at Whitegate Station, there is a picnic area and toilet facilities, with good access for wheelchairs and pushchairs.

Cycling

There are many mapped cycle routes in and around the area which are used both for road-racing and for pleasure touring, including the Cheshire Cycleway which enters the area in the south west.

Groundwork Macclesfield and Vale Royal have plans to build a Weaver Cycleway route between Winsford and Northwich along the Weaver Valley, with the route eventually extending to reach Frodsham. Phase I, which is a 2 km stretch through the Weaver Parkway, Winsford, has recently been completed, and there are proposals underway for further phases to extend the cycleway upstream under the road bridge in the centre of Winsford, and then downstream through the valley.

Watersports

There are a number of canoeing clubs in the area, and numerous sites within the region where canoeing takes place, both along the canals and along stretches of many of the rivers. The Manchester Ship Canal however, prohibits recreation and prevents access from the Weaver to the tidal Mersey Estuary. However, the possibility of reconnecting the Bridgewater Canal to the Manchester Ship Canal using the old flight of locks is currently being considered. If this comes to fruition, it will enable pleasure craft from the Bridgewater Canal to enter the Weaver via the Manchester Ship Canal, and possibly help the regeneration of Runcorn Docks. Further up the River Weaver, canoe paddling takes place from Nantwich to the Weaver Navigation, and the Navigation itself is used for paddling and occasionally for canoe marathon races.

Much of the River Dane is canoed, one of the longer stretches being Congleton to Northwich. The Dane, between Eaton Bank Industrial Estate to the Congleton Park stretch with weirs, is also used for play and has, in the past, been used for Scout slalom competitions. Bosley to Congleton can also be paddled in reasonable water, as can the Danebridge to Hugbridge/Bosley stretch further upstream, when the river is in spate. On the River Wheelock, paddling occurs from the Ettiley Heath area to the river's confluence with the Dane. Some paddling also takes place above Church Minshull on the River Weaver, but this stretch is more often paddled from the village weir at this point.

The Amateur Rowing Association is the governing body for rowing in England, with eleven councils set up throughout the country to help promote, develop and organise the sport. There are two active open rowing clubs in the area, Runcorn Rowing Club, whose boathouse is on the Weaver Navigation at Rocksavage, Runcorn, and Northwich Rowing Club whose boathouse is on the River Weaver at Riverside, Northwich. Rowing requires long stretches of uninterrupted waterway, with a minimum length of approximately 1,000 metres. The longest rowing race in the North West is held by Runcorn Rowing Club on the Weaver between Acton Bridge and Frodsham. Short distance sprint regattas are also held by both clubs in the Spring, on their local water.

Sailing clubs are established on many of the reservoirs, flashes and meres in the area, such as Budworth Mere, Redesmere, Pickmere, Winsford Flash, Manley Lake, Sutton Reservoir and Bosley Reservoir. Boundary Water Park is used for windsurfing and also has a fishing centre, whilst waterskiing takes place at Combermere and also on the River Weaver at Frodsham and Nunsmere, near Sandiway.

The Weaver Navigation is used for boating and general amenity purposes. A number of societies are currently involved in helping to preserve, protect and improve the river and these include the Inland Waterways Association and the River Weaver Navigation Society. It is hoped that an audit of amenity facilities along the Weaver Navigation will be carried out in the near future.

Angling

Angling takes place along most of the canals and rivers in the area, and also on a vast number of the still waters.

The majority of canals in Cheshire are controlled by British Waterways. All are heavily fished for competitions, match fishing, and also for pleasure fishing with a wide range of coarse fish species being found throughout the whole season. The Trent and Mersey Canal is the most notable in the area for fishing, followed by the Shropshire Union and then the Macclesfield Canal. The Trent and Mersey is host to many of the big winter league matches, with up to 200 pegs being used per match.

The upper reaches of the River Dane are renowned as a trout fishery from its source to just above Congleton. In previous years, it was intermittently stocked with trout by the Environment Agency, but it is now mainly stocked by private clubs.

Below Congleton, the river becomes a coarse fishery, with a wide range of coarse fish present. The stretch between Congleton and Northwich is stocked by the Environment Agency with chub, dace and roach and is popular for the many large chub catches, as well as for the fact that it is an improving barbel fishery.

The upper lengths of the River Weaver are very narrow, especially above Audlem, and is becoming overgrown. Nevertheless, it does still act as a good spawning site for fish, despite the fact that there are possible problems in the area with agricultural pollution entering the river.

The Nantwich to Barnton/Northwich length holds a relatively large fish population, so stocking is undertaken only on an intermittent basis. This stretch is fished heavily with large fishing matches taking place along it, including the Greenall Whitley Match which has over 300 pegs. Pleasure fishing is also very popular.

The Lower Weaver is fished only occasionally, as from sporadic pollution and high salinity reduces the fish population.

Private stretches of Peover Eye are stocked with trout such as at Bate Mill, at Swan Green and near Millbank Farm, Over Peover. However, the only coarse fishery on this stretch is around the Northwich area which is controlled by Lymm Anglers.

Following recent improvements in water quality, stocking now takes place regularly, especially on the upper reaches of the River Wheelock above Warmingham. As a result, there has been increased interest shown by angling clubs to acquire the fishing rights.

There are thousands of ponds in the area which are mainly mixed coarse fisheries, controlled either by angling clubs or by private individuals. In addition, there are a large number of big Cheshire Meres, especially towards the south. These are chiefly controlled by angling syndicates and are renowned not only for the big bream catches, but also for the range of coarse fish they contain.

Trout fisheries in the area tend to be relatively small "put-and-take" day ticket fisheries, run by private individuals. However, some club-controlled waters do exist, for example, Westlow Mere at Congleton.

2.10 Navigation

General

The River Weaver was canalised in the mid-19th century to provide direct access to the sea for industrial sites along the Weaver corridor downstream of Winsford. In places, additional parallel stretches of the canal were constructed so that the river splits into the canalised section and the original course. A series of Acts from 1721 to 1945 made this canalisation possible.

The 1968 Transport Act defines the Navigation (the Weaver and the Weston Canal) from Winsford Bridge to Marsh Lock/Delamere Dock as a commercial waterway with specific obligations as to dimensional standards and liability to maintain water in the navigable channel at such levels as not to prejudice or harm adjacent land.

During canalisation, sluice gates and weirs were constructed along the river in order to maintain water levels for navigation purposes and control flood waters within the area.

Many bridges, locks and sluices along the Weaver Navigation are listed structures.

Legal Responsibilities of British Waterways and the Environment Agency

British Waterways (BW), as navigation operator, has responsibility for flood control/management along the navigable length of the river. This responsibility includes the operation of a series of 24 sluices, typically 4.5 metres wide and 3.5 metres deep, in five locations. These have traditionally been manually operated, although BW are at present in the middle of a major investment programme to update and automate them. In order to ensure the safety of ships, BW also control the operation of five major swing bridges which carry important public highways across the Navigation.

Under the provisions of the 1968 Transport Act, BW has a duty to make available the waterways for a variety of purposes (both leisure and commercial), has powers in respect of licensing of craft, charging for services and duties in respect of conservation of the environment and buildings.

Designation of the River Weaver and many of its tributaries as 'Main River' applies to the various navigation 'cuts' as well as to the natural river channel.

On the Weaver Navigation, the Agency is required to exercise a general supervision over all matters relating to flood defence, and also has statutory duties in respect of the management of water resources and fisheries, the control and prevention of pollution and the regulation of waste.

Infrastructure Description

BW dredge the Navigation to enable craft drawing 3.2 metres to pass between Weston Point and Anderton. From Anderton to Winsford the maximum draft of craft is 2.7 metres. Typical channel sections are trapezoidal with a top width of 40 metres, or 30 metres in artificial cuts. The longest craft to have used the Weaver (in 1985) had a length of 56 metres, a beam of 5.6 metres, a draft of 3.2 metres and carried 1050 tonnes. The total length of the Navigation is 31.5 kilometres, of which 18.5 is artificial cut/channel.

2.10 Navigation

The Navigation has five sets of locks, located at Marsh (near Runcorn), Dutton, Saltersford, Hunts and Vale Royal. All locations, except Marsh, have large locks 67 metres long, 12.25 metres wide and with a 4.5 metres depth over the cill, and small locks 67 metres by 7.6 metres by 4.5 metres.

Canalisation of the river has raised normal water levels at some locations so that culverted 'back drains' totalling 15 kilometres are needed to drain land adjacent to the Navigation.

Weston Point Docks, Runcorn, comprises substantial sandstone walls, bridges and lock gates.

Anderton Boat Lift once enabled boats to pass between the Weaver Navigation and the Trent and Mersey Canal. This structure, which is scheduled as an ancient monument, is likely to be restored within the next few years, although funding arrangements are uncertain.

Operation of the Navigation

Locks and bridges are operated for commercial craft seven days a week in the hours of daylight. Pleasure craft are generally confined to a conventional 40 hour week, with certain exceptions. All structures are operated by British Waterways staff and there is no self operation by customers.

Currently, there are only two commercial boats making regular use of the Weaver Navigation, so maintenance and capital replacement costs far outweigh revenue gained from boat licensing, land interests, recreation and other sources.

Maintenance

BW undertake routine maintenance and capital refurbishment and replacement of structures. The only means of access to carry out this work in many locations is by boat, hence the need for specialist plant.

The infrastructure of the Navigation has slowed flows in the river, leading to increased deposition of silts and sediments, which require dredging works. Frequency of this dredging is related to erosion of the banks of the Navigation due to boat traffic and silt which is deposited during flood flows, especially from the River Dane. Dredged material is normally deposited on BW's licensed tip site at Dutton, or spread on the banks.

BW's Regional Headquarters is located in Northwich town centre, across the River Weaver from its Waterway Office, where maintenance staff responsible for this and other waterways are based. In addition, the repair yard adjacent to the regional office is used for the construction of replacement lock gates and sluices and other miscellaneous work which includes plant and boat repairs.

2.11 Landscape & Heritage

General

The Environment Agency has a duty to conserve the natural beauty of inland and coastal waters and associated land, and to consider the need to protect and conserve buildings and objects of historic interest. Nationally important sites are included, as well as local sites of value.

Opportunities for improvement are achieved by the Agency working with local authorities and developers and in work undertaken as part of the Agency's capital and maintenance programmes.

Local Perspective

The area is centred on the eastern half of the Cheshire Plain. It is bounded on the western side by the Mid-Cheshire Ridge and on the east by the Pennines.

The Mid-Cheshire Ridge is a sandstone outcrop running north to south, reaching a height of 227 metres in the south at Rawhead. It is fairly heavily wooded, with both ancient semi-natural woodland and large commercial conifer plantations.

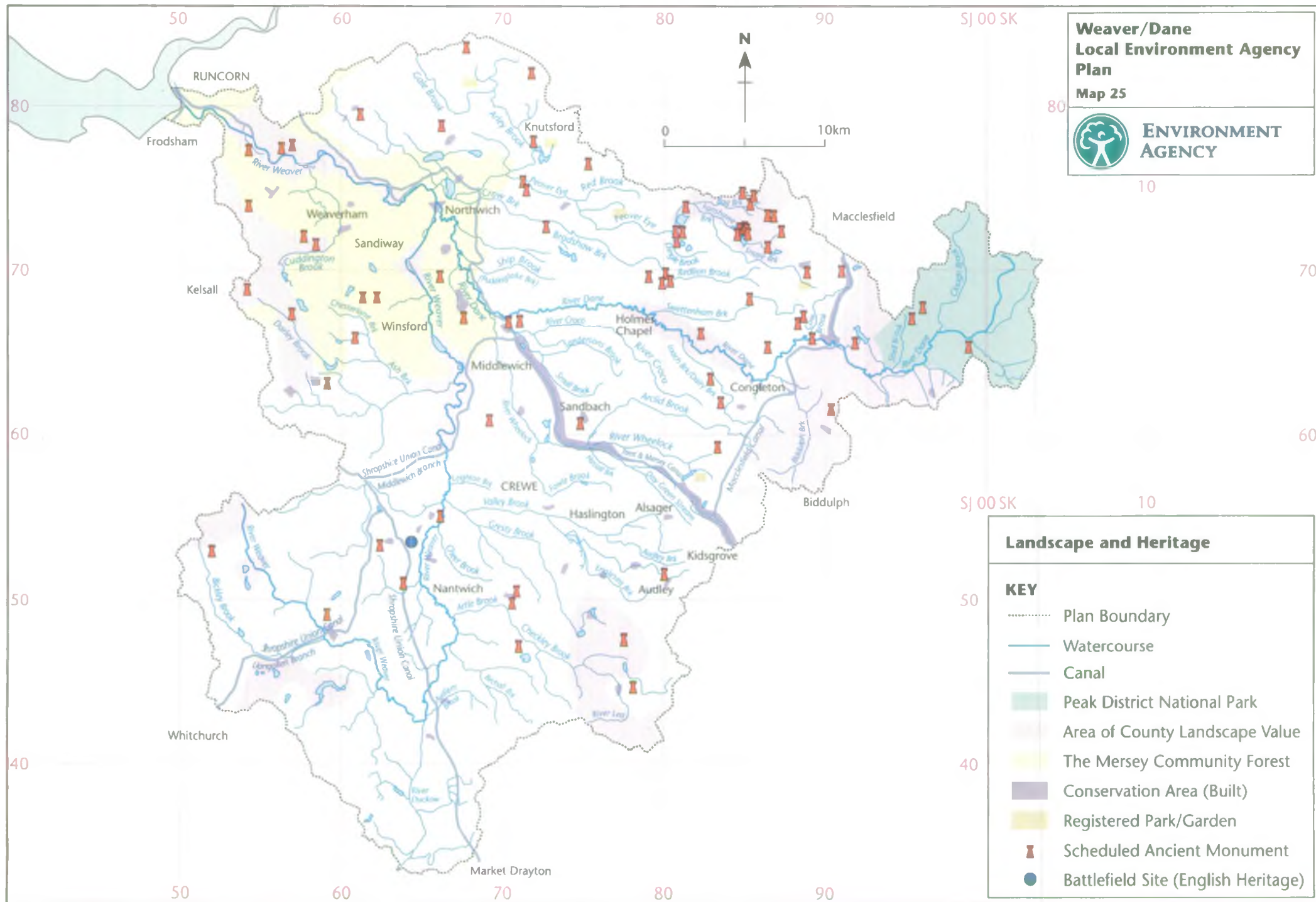
To the east are the Pennines, part of the Peak District National Park. This is a landscape of heather moorland, rough pasture, steep, often wooded, cloughs and dry stone walls.

In between these two areas of higher ground is the low-lying, gently undulating and predominantly pastoral Cheshire Plain. It is drained by two principal rivers, the Weaver and the Dane.

The Weaver rises in the shadow of the Mid-Cheshire Ridge at a height of 70 metres, and meanders gently north through an often wide river valley with small but steep sides, towards its confluence with the Manchester Ship Canal. As it flows north, its valley becomes better defined, its flood plain larger, and its valley sides more wooded, especially in the cloughs. The land is predominantly pastoral, with medium to large fields bounded by fences and hedges, with large mature oak trees in places. On its way north, it passes through the towns of Nantwich, Winsford, Northwich and Weaverham. Large stretches of the river have been canalised to make them navigable, which has led to long, straight, hard-edged sections of once actively meandering river.

The River Dane in contrast rises in the Peak District at a height of 450 metres. In its early stages it is a fast flowing mountain stream. When it enters the Cheshire Plain at Congleton it becomes more sluggish with many winding meanders similar in character to the River Weaver.

Although the area is overwhelmingly rural in character, industry has had an important impact around many of the towns, of which Crewe is the largest, also being famous as a railway interchange. Consequently, there has been much industrial development including train and carriage building as well as the production of Rolls Royce motors. However, it is the salt industry that has always been the most significant. The Romans mined salt here, and the number of towns with "wich" in their names bears witness to the importance of salt. Salt is still mined in the area today and many chemical, glass and soap industries have built up as a result since the Industrial Revolution.



Coupled with the growth of industry was a proliferation of transport systems, notably canals. To the north, all rivers drain into the Manchester Ship Canal rather than the River Mersey. The River Weaver, where it has been canalised north of Winsford to form the Weaver Navigation, has many associated structures of historical importance and landscape interest. These include grade two listed structures like the Dutton Locks and Sluice Gates, the Lower Dutton horse bridge, the Anderton Boat Lift and both swing bridges in Northwich. British Waterways is responsible for the upkeep of the swing bridges and has in place a planned programme of maintenance for them. There are also several branches of the Shropshire Union Canal, the Trent and Mersey Canal and the Macclesfield Canal.

Railways have also had an important impact especially around Crewe, which has left many examples of railway architecture, including the Dutton Viaduct.

The silk industry has been important in the east around Congleton, with many mills still remaining.

The area has a long history of settlement and contains many Scheduled Ancient Monuments including Norman Castles at Northwich and Frodsham and many moated medieval manor sites. There is a battlefield site near Nantwich. Many of the villages and old town centres have been designated as conservation areas.

There is thus a rich and diverse built heritage worthy of conservation, much of which has already been designated although, in an area of such lengthy industrial development there may well be many outstanding features yet to be identified.

There is also a rich "natural" heritage. Most of the area has been intensively farmed and this has put many of the characteristic features of the landscape under great pressure. Those that have not been destroyed as a direct result of agricultural development are suffering from neglect because of changing agricultural practices. There are thus many features in need of urgent action to save them.

Cheshire is famous for its Meres and Mosses, formed during the ice age and internationally important for their wildlife. Many of them occur in the west of the area. There is intense recreational pressure on them and a rise in nutrient levels has also led to changes in water chemistry.

Cheshire is also famous for its ponds which are often old marl pits. However, they are disappearing at an alarming rate. In 1870 there were 41,500 in Cheshire, but by 1985 there were only 17,000.

In a predominantly agricultural area, hedgerows are an important wildlife and landscape feature. However, since 1947, 66% of Cheshire's hedgerows have been lost. The Cheshire damson is a local feature of these hedges but is not being replanted in new hedges.

Mature trees are a particular characteristic of the Cheshire countryside. The oak population is old and without the planting of 6,500 oak trees a year it will not be able to sustain itself at its current level. Dutch Elm Disease has had a particularly dramatic impact around the River Dane. Black poplars are an endangered tree species characteristic of the Cheshire Plain, and need careful conservation and replanting.

The steep cloughs have provided a refuge for ancient semi-natural woodland. There is now the opportunity, with the Mersey Forest covering part of the area and the need to reduce agricultural outputs, to create more woodland.

Hay meadows, unimproved pastures, heaths and other semi-natural habitats have long been under retreat in this area. This should now be halted and opportunities for habitat recreation sought.

Environmental Objectives

The overall objective is to conserve and enhance the natural beauty and heritage of the area, including the riparian and wetland landscape character, and sites of historic and cultural importance.

This will be achieved by:

- the retention of existing landscape character and features
- seeking effective mitigation for any loss of landscape quality
- supporting initiatives to restore degraded landscapes
- liaison with the County Archaeologist regarding Environment Agency schemes in order to ensure the protection of sites of historical/archaeological/cultural importance
- supporting initiatives to conserve heritage features and important elements contributing to the built environment and its character
- supporting initiatives to provide interpretation as appropriate

Environmental Requirements

- Landscape character should be rich and diverse, reflecting local cultural heritage. Watercourses should be features which are pleasant to look at and walk alongside

Environmental Quality

- The landscape should be rich and diverse, free from litter and polluted watercourses

Physical Features

- Physical features should be in keeping with the local landscape, and may be natural or man-made in character.



Radio Telescope at Jodrell Bank

2.12 Urban Development

General

The Environment Agency is taking a pro-active role in the land-use planning system. We have recently published our national document, *Liaison with Local Planning Authorities 1997*, which explains our role and contribution to the land-use planning system.

Past development has had a major influence on shaping the area and the planning system plays an important role in protecting much of its special character. New development has to be carefully considered, to recognise potential adverse effects, as well as the benefits, it can have on the environment. We consider LEAPs are an important part of the on-going dialogue with LPAs to foster partnerships and identify issues, where environmental problems and potentials can be most actively pursued.

We consider the links between Development Plans and LEAPs is most important. Planning decisions have to be made in accordance with development plans unless material considerations indicate otherwise. The recognition of LEAPs in development plan preparation is essential, as certain LEAP issues, could have an impact on future land use planning.

Local Perspective: Links between LEAPs and Land-use Planning

Planning policy within the Plan area is guided by Regional Planning Guidance (RPG) for the North West Note 13, April 1996. This sets the strategic planning framework for the Region, highlighting development pressures and the development framework for such issues as the environment, the economy and housing etc. Paragraph 4.20 should now be revised to state:

"The Environment Agency is currently producing a series of Local Environment Agency Plans (LEAPs), which are intended to bring together the management of all our land and water based interests within individual areas. LEAPs are intended to provide an input to development plan policy formulation on issues such as water and sewage infrastructure, location of new facilities, waste disposal, flood plain and sea defence planning. Planning Authorities should have regard to LEAPs when formulating development plan policy."

The Plan area in planning terms is administered by a number of LPAs. These are:

Cheshire County Council
Chester City Council
Crewe & Nantwich Borough Council
Ellesmere Port & Neston Borough Council
Halton District Council
Macclesfield Borough Council
Congleton Borough Council
Vale Royal Borough Council
Warrington Borough Council
Peak District National Park
Staffordshire County Council
Staffordshire Moorlands District Council
Shropshire County Council
Newcastle-under-Lyme Borough Council
North Shropshire District Council

Each of these LPAs is in the process of preparing, or has in place, a development plan. Due to the Weaver/Dane boundary, only Congleton Borough Council is wholly contained within this Plan.

The Plan Area

We will be seeking to ensure urban regeneration proposals will bring about environmental improvement to degraded areas by highlighting and tackling environmental problems to ensure disused and derelict areas can be utilised and the aims of the Mersey Basin Campaign are achieved.

The Agency supports development plan policies and actions by LPAs which will protect and enhance the environment in accordance with our aims and objectives. To help LPAs formulate plan policy and minimise the potential for development to increase flood risk, the Agency has produced the document Policy and Practice for the Protection of Flood plains March 1997.

In addition, a number of groundwater vulnerability maps have been produced. These maps give a local perspective to national groundwater policy. District-wide indicative maps have been produced for certain LPAs. HMSO are currently printing Groundwater Vulnerability Maps on a wider scale, which are intended to increase awareness of those places where groundwater is most at risk. Those responsible for the planning of land will find them useful in learning about the potential impact proposals could have on groundwater. Ordnance Survey maps 16, 17, 21, 22 and 23 cover the Plan area.

Appendix 5 indicates the current state of development plan preparation within the area. The table highlights LPA development plan policies which protect our interests.

From the above, the Agency will seek to ensure the following policy objectives will be translated into all land-use planning policy. We will work with the LPAs to highlight where these issues may effect local areas.

Development Policy Objectives

Flood Defence

To discourage new buildings and land-raising in areas at risk from flooding, or where development could cause flooding elsewhere:

- by ensuring new development is not at risk from flooding and does not put other areas at risk;
- by encouraging the protection of watercourses so they can fulfil their principal functions and contribute beneficially to the environment;
- by encouraging continuous unobstructed areas adjacent to watercourses to ensure access for essential maintenance or flood flows;
- by encouraging the protection of existing flood defences to prevent interference with the ability of the Agency and other bodies to carry out flood control works and maintenance activities;
- by highlighting where surface water storage or regulation may be necessary for areas where increased rates and volumes of surface water runoff could cause or exacerbate flooding problems;

2.12 Urban Development

- by encouraging the protection and, where necessary, restoring effective flood flow conveyance and floodwater storage capacities of flood plains.

Water Quality

To protect and improve the quality of surface waters and groundwaters:

- by ensuring new development complies with the policy and practice for the protection of groundwater;
- by ensuring new development is served by satisfactory arrangements for the disposal of foul sewage, trade effluent and contaminated surface water;
- by encouraging, where there are sewage treatment capacity problems, new development to be phased to coincide with improvements to foul drainage infrastructure;
- by ensuring appropriate development complies with the Control of Pollution (Silage, Slurry, Agricultural Fuel Oil) Regulations 1991 and the MAFF Codes of Good Agricultural Practice for the Protection of Water, Soil and Air;
- by ensuring leachate and drainage is controlled and monitored from contaminated land sites;
- by ensuring surface water disposal systems are protected, maintained and wrong connections are avoided.

Water Resources

To protect and manage the amount of surface water and groundwater resources to achieve the right balance between the needs of the environment and those of abstractors.:

- By promoting the incorporation of suitable water efficiency measures;
- by ensuring development can be or will be served by an adequate means of water supply which will not adversely affect existing users, river flows, water quality, agriculture, fisheries, amenity or nature conservation.

Conservation and Enhancement of the Water Environment

To protect, conserve and enhance areas of aquatic value and other important elements of the water environment:

- By highlighting the areas of the water environment, including river corridors which are, or have the potential to be of value;
- by discouraging development which would have an adverse impact on the nature conservation, landscape, heritage, fisheries, recreation or amenity value of watercourses, ponds and wetlands or on the land physically and visually linked to them;
- by encouraging the siting of development away from river corridors;
- by seeking to ensure development proposals protect and enhance on-site aquatic features and if development is accepted because of overriding economic or social considerations, mitigation and compensatory measures are provided, to ensure no net loss to the environment;

- by encouraging, where opportunities arise, the restoration of river corridors which have been degraded by past development. This could include de-culverting certain watercourses.

Waste Disposal, Mineral Operations and Contaminated Land Sites

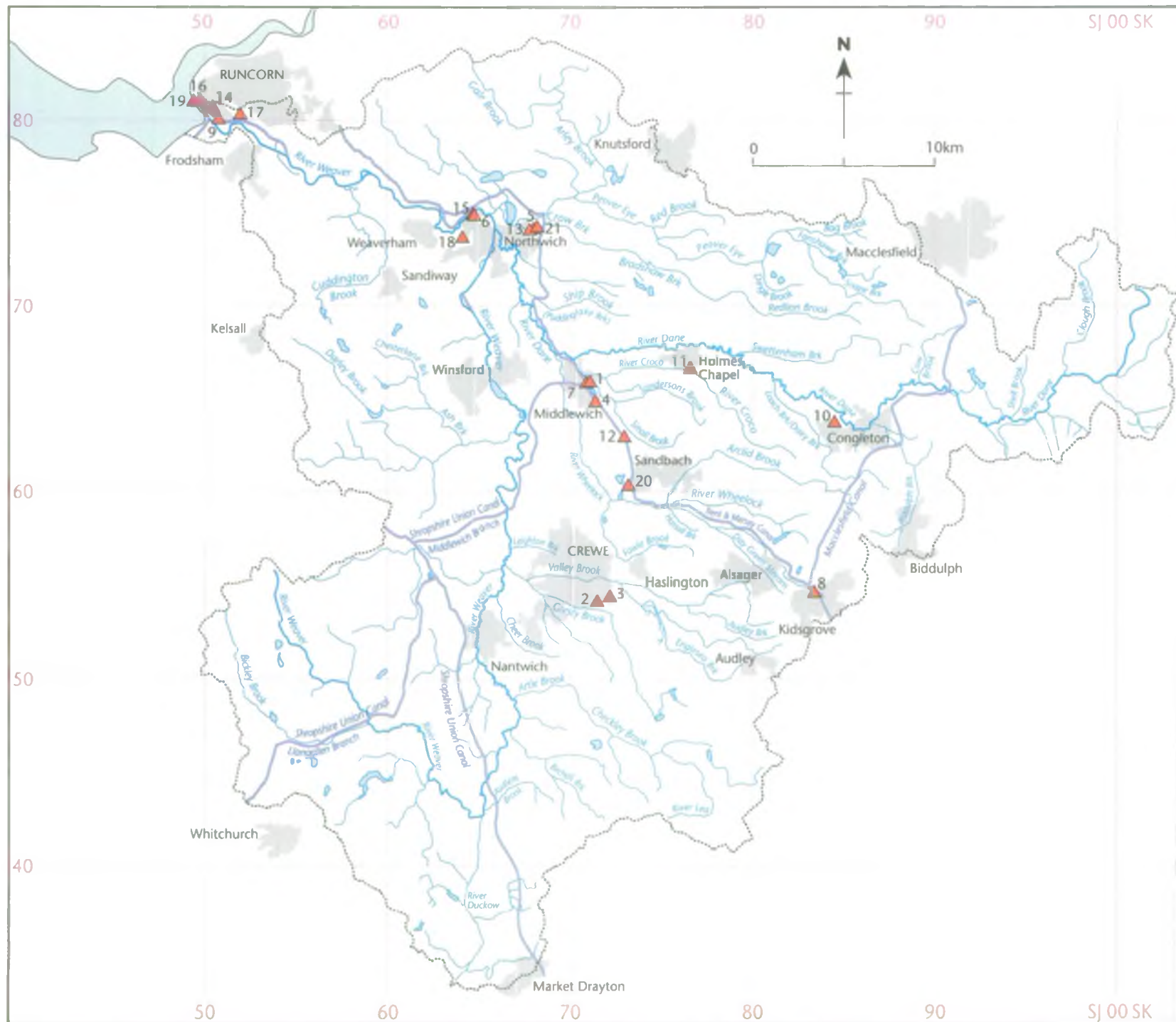
To ensure waste disposal, mineral operations and contaminated land redevelopment does not cause pollution or harm to human health:

- By ensuring there are adequate measures which will control and monitor water pollution and landfill gas,
- by encouraging compliance with the Government's National Waste Management Strategy;
- by encouraging the re-use of contaminated land sites where the degree and nature of the contamination has been assessed and appropriate measures to protect the environment incorporated.

Air Quality

To protect air quality :

- By ensuring certain development processes will not have an adverse affect on air quality.



Weaver/Dane Local Environment Agency Plan

Map 26



**ENVIRONMENT
AGENCY**

IPC Sites

- 1 BIP Organics Ltd
- 2 Boxmore Packaging
- 3 British Rollmakers Corp. Ltd
- 4 British Salt Ltd
- 5 Brunner Mond & Co Ltd
- 6 Brunner Mond & Co Ltd
- 7 Centre for Environmental Technology
- 8 Cookson Matthey Ceramics & Materials Limited
- 9 European Vinyls Corp. UK Ltd
- 10 FE Mottram (Non Ferrous) Ltd
- 11 Fisons Plc
- 12 Hays Chemicals
- 13 ICI Chemicals & Polymers Ltd
- 14 ICI Chemicals & Polymers Ltd
- 15 ICI Chemicals & Polymers Ltd
- 16 Mercury Recovery Services
- 17 Rocksavage Power Co Ltd
- 18 Nalco Ltd
- 19 Scottish Hydro Electric
- 20 United Phosphorous Ltd
- 21 Zeneca Limited

Integrated Pollution Control (IPC) Sites

KEY

- Plan Boundary
- Watercourse
- Canal
- Built up Area
- ▲ IPC Site

2.13 Integrated Pollution Control

General

The Agency enforces the system of Integrated Pollution Control (IPC) under Part 1 of the Environmental Protection Act 1990, as amended by the Environment Act 1995. IPC applies to the potentially most polluting or most technologically complex industrial processes which have the greatest potential to pollute.

Processes subject to IPC must be authorised by the Agency for releases to the three environmental media of air, water and land. IPC authorisations contain conditions which require the use of the Best Available Techniques Not Entailing Excessive Cost (BATNEEC) to prevent releases and, where that is not possible, to minimise and render them harmless. Where there are releases to more than one medium, BATNEEC should be used for minimising the pollution to the environment as a whole, to give the Best Practicable Environmental Option (BPEO).

Management Framework

Operators of prescribed processes require prior authorisation from the Environment Agency. The operator submits a detailed application that includes the following information:

- location where process will be carried out
- description of the process
- prescribed substances involved in the process
- description of the proposed pollution prevention and abatement techniques
- proposed arrangements for supervising, maintaining and monitoring the process

The application is sent to statutory consultees (such as MAFF and HSE) and the operator advertises the application in the local press. The public have 28 days in which to comment to the Environment Agency about the IPC application. The Environment Agency has to take due regard of all the consultation in determining the IPC application.

Authorisations issued under IPC contain conditions relating to process operation, release limits, release monitoring, and the reporting of actual releases. Regular inspections are undertaken to ensure compliance with these requirements. The frequency of inspection depends on the operator performance in terms of compliance and the pollution potential of the process. Any complaint about a particular site is promptly investigated and serious pollution events receive immediate attention. At least every four years the Environment Agency reviews these conditions in consultation with the operator in case they require updating in the light of experience or new knowledge.

Sometimes conditions set out in an authorisation are not complied with and standards required by inspectors are not maintained. In most cases the Agency deals with breaches of authorisation requirements by supporting operators' efforts to remedy their own failings. In cases where this approach does not succeed, the Agency will use its powers to issue Enforcement and Prohibition Notices. Prosecution is sometimes resorted to in cases where operators show persistent or flagrant disregard for public health and safety, or cause obvious environmental damage or nuisance.

2.13 Integrated Pollution Control

The system of IPC provides the public with good access to information and this can be viewed at the Agency's Warrington office and local authority offices. The Agency places the following items in public registers:

- application for authorisation
- representations from statutory consultees
- authorisations (including limits set on releases)
- monitoring information required by conditions of an authorisation
- any enforcement action or prosecutions taken by the Agency

In the Weaver LEAP area, 47 processes are regulated under IPC on 18 different sites, are shown on Map 26. IPC processes are grouped in the industrial belts around Runcorn and Northwich, and to a lesser extent around Crewe, Sandbach and Middlewich. The distribution of industry has been determined to a large extent by the Cheshire salt fields. Underground salt is extracted by a system of 'solution mining' and the resulting brine is used to produce pure salt. Brine is also used by local industries for the production of chlorine and sodium carbonate. Industrial activity has been carried out in the area for over 100 years and there are locations where land contamination is a significant issue.

Figure 7 gives some information on some of the more significant IPC processes in the area.

IPC SITE	DETAILS
ICI, Runcorn	One of the country's largest chemical manufacturing sites. Highly integrated processes produce some 2.4 million tonnes / year of products. A mercury based chlor-alkali plant produces chlorine, hydrogen, caustic soda, and sodium hypochlorite. Chlorine is sold directly and used on site to produce a range of chlorinated organic products (eg. EDC, perchloroethylene, trichloroethylene, chloromethanes). Sulphuric acid and hydrogen fluoride are also produced and used on site. Steam and electricity are generated by a gas fired boiler. A large combined heat and power station is currently being built by Rocksavage Power Limited to provide ICI with electricity.
EVC, Runcorn	Large scale production of vinyl chloride and PVC (as previously operated by ICI).
Brunner Mond, Winnington, and Lostock	Up to 1 million tonnes / year of sodium carbonate (soda ash) is produced by the ammonia-soda process which has been operated on these sites since 1873. Steam and electricity are generated by boilers firing on a combination oil, coal and gas. Powergen CHP Limited plan to build a large combined heat and power station at Wallerscote to serve Brunner Mond operations.
ICI, Lostock	Large scale production of chlorine in diaphragm cells.
Hays, Sandbach	Mercury based chlor-alkali plant producing chlorine, hydrogen, caustic soda and sodium hypochlorite. Also plants for hydrochloric acid and ferric chloride.

IPC SITE cont'd...	DETAILS cont'd...
Fisons, Holmes Chapel	Production of pharmaceuticals such as the inhaler "Intal".
BIP Organics, Middlewich	Small scale production of resins. Solvent recovery.
United Phosphorous Sandbach	Manufacture of organic herbicides.
British Rollmakers, Crewe	Manufacture of large iron castings.

Figure 7 Significant IPC Processes

Sulphur dioxide, oxides of nitrogen, volatile organic compounds (VOCs) and particulate matter are the most significant releases to the atmosphere from these processes that can affect local air quality.

There are significant releases of VOCs from the Runcorn operations of ICI and EVC, although these are to be addressed by three separate treatment schemes. All three schemes involve incinerators and there has been local concern at the potential release of dioxins into the environment. An Integrated Environment Agency project team has investigated dioxin releases and, in January 1997, published an Information Report which explains the topic in simple terms. It was generally well received and has aided public debate on the incinerators proposed for ICI and EVC. Consequently, Halton Borough Council has identified a need for more information on the health effects of local industry and is intending to co-ordinate a long-term local health surveillance study. This study will require co-operation from a number of organisations and the Environment Agency is committed to affording appropriate assistance.

Gas-fired power stations are being developed at several locations in the area, including Interger (Runcorn), Scottish Hydro Electric (for Salt Union, Runcorn), Scottish Hydro Electric (for ICI, Runcorn), Powergen (for Brunner Mond, Northwich) and Yorkshire Cogen (for Hays, Sandbach). There are also nearby developments just outside the Weaver/Dane LEAP area, at Fiddlers Ferry, Deeside and AES Partington. The Agency is aware of the potential impact of atmospheric nitrogen dioxide on ambient levels, especially in conjunction with increased emissions from traffic, and will give careful consideration to this topic when setting any emission limits.

2.14 Radioactive Substances

General

Radioactive substances are present in the environment as a result of both natural processes and man's activities. The uncontrolled or incautious use of radioactive substances can pose both immediate and long-term hazards. The Agency's objective is to regulate their use so that radiation doses to the environment are "As Low As Reasonably Achievable" (ALARA).

Radioactive materials and waste are widely used by industry, hospitals, and universities. The Environment Agency has sole responsibility for regulating the use of radioactive material and the disposal of radioactive waste under the Radioactive Substances Act 1993 (RSA93), as amended by the Environment Act 1995.

The aim of regulation under RSA93 is to protect the environment through controls on the keeping and use of radioactive materials, and controls on the accumulation and disposal of radioactive waste. These activities are subject to strictly controlled conditions and regular inspection, although some activities are exempted from the legal requirements of RSA93 because of low risk levels, for example, use of smoke detectors.

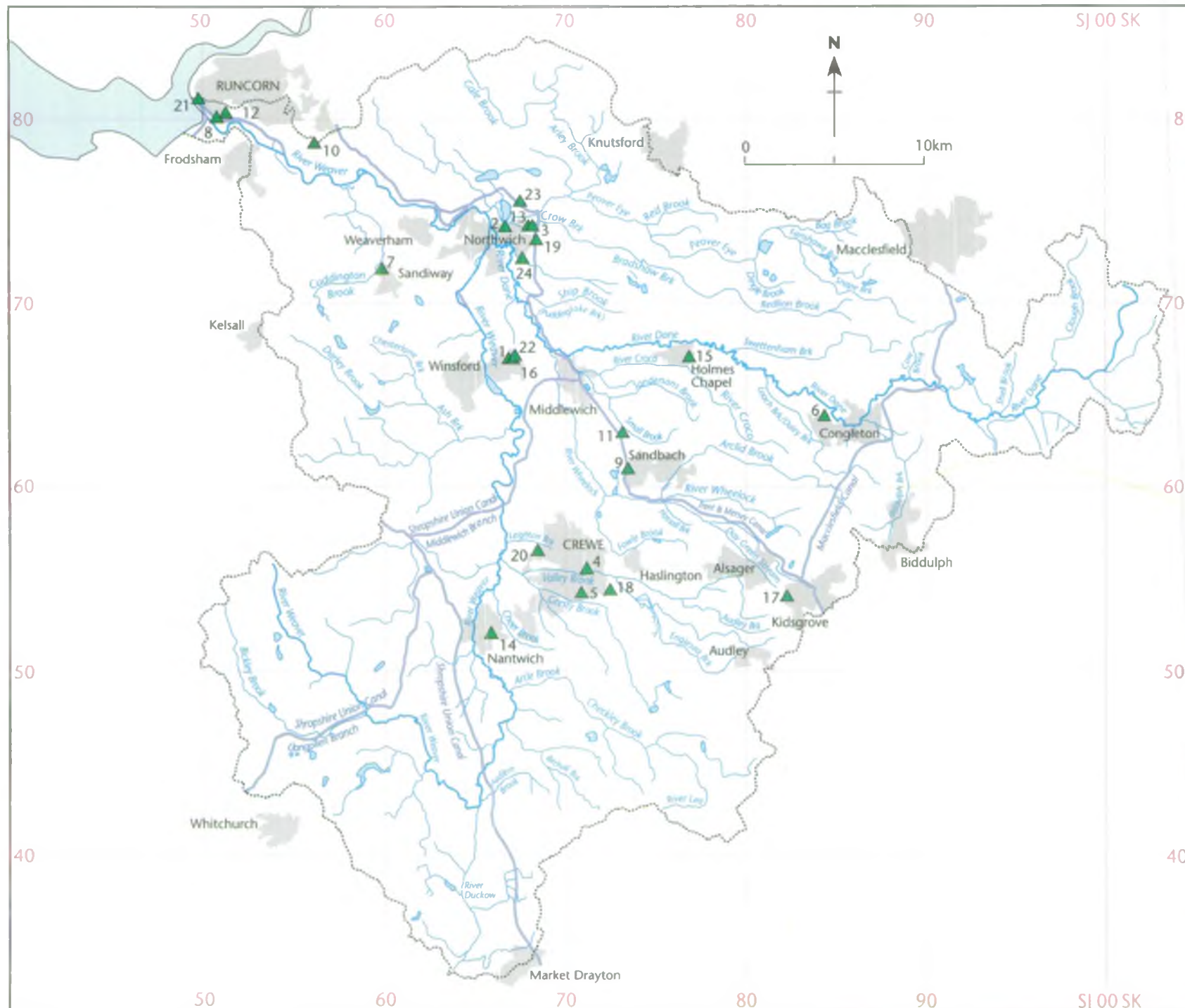
An operator of a site holding, or disposing of, radioactive waste needs Agency approval to carry on that activity. The Environment Agency is the body responsible for issuing registrations and authorisations in England and Wales. The operator submits an application that includes the following:

- location where operations will be carried out
- description of the operation
- radionuclides involved in the process
- description of the pollution prevention and abatement techniques
- arrangements for supervising, maintaining and monitoring the process

There is no statutory requirement for formal consultation. Nevertheless, if representation is made it is taken into consideration during the determination. Once the registration / authorisation is issued, the Agency has to make sure that operators comply with the pollution prevention and control standards it has laid down. The registration/authorisations are reviewed or modified in the light of experience or new knowledge.

RSA93 provides for public access to information and the Agency places the following information on the public register:

- a copy of the application for registration or authorisation
- a determination document (where relevant)
- copies of registrations / authorisations
- operators' returns of quantities of waste disposed of
- details of any enforcement action taken by the Agency



Weaver/Dane Local Environment Agency Plan

Map 27



**ENVIRONMENT
AGENCY**

RAS Sites

- 1 Autopress Composites Ltd
- 2 Barber GP Accident Repairs
- 3 Brunner Mond & Co Ltd
- 4 British Rail
- 5 British Rail Research
- 6 Burns Garages
- 7 Dale Farm Dairy Group Ltd
- 8 European Vinyls Corp. UK Ltd
- 9 Foden Trucks
- 10 Guinness Packaging
- 11 Hays Chemical Distribution Ltd
- 12 ICI Chemicals & Polymers Ltd
- 13 ICI Tracerco
- 14 James Edwards Limited
- 15 JSB Electrical Plc
- 16 KC Autos Limited
- 17 Makro Self Services Wholesalers Ltd
- 18 Polymer Engineering Ltd
- 19 Port Dredging Ltd
- 20 Rolls Royce Motor Cars Ltd
- 21 Salt Union
- 22 Taco Plastics Ltd
- 23 Trow (UK) Ltd
- 24 Zeneca Cambridge Research Biochemical

Radioactive Substances (RAS) Sites

KEY

- Plan Boundary
- Watercourse
- Canal
- Built up Area
- ▲ RAS Site

2.14 Radioactive Substances

In the Weaver/Dane LEAP area there are seven authorisations for the accumulation / disposal of radioactive waste and 33 registrations for the keeping and use of radioactive materials. Their location is shown on Map 27. The area has no nuclear facilities and no use of radioactive material in hospitals. The radiological impact of discharges is considered at application stage and discharges in this area have been assessed to have negligible impact.

Low level radioactive wastes have been historically sent to Witton Tip, Northwich for controlled burial. The disposal no longer occurs, but the Agency monitors the level of radioactivity in groundwater around the landfill and no adverse effects have been identified.

2.15 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 led 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 cattle housing has given way to cubicle housing, producing animal slurry, while silage has replaced hay as the major cattle fodder, so silage effluent has to be contained and spread on the land. In arable farming traditional pest control methods have been succeeded by the use of pesticides and herbicides, presenting new risks to the environment.

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

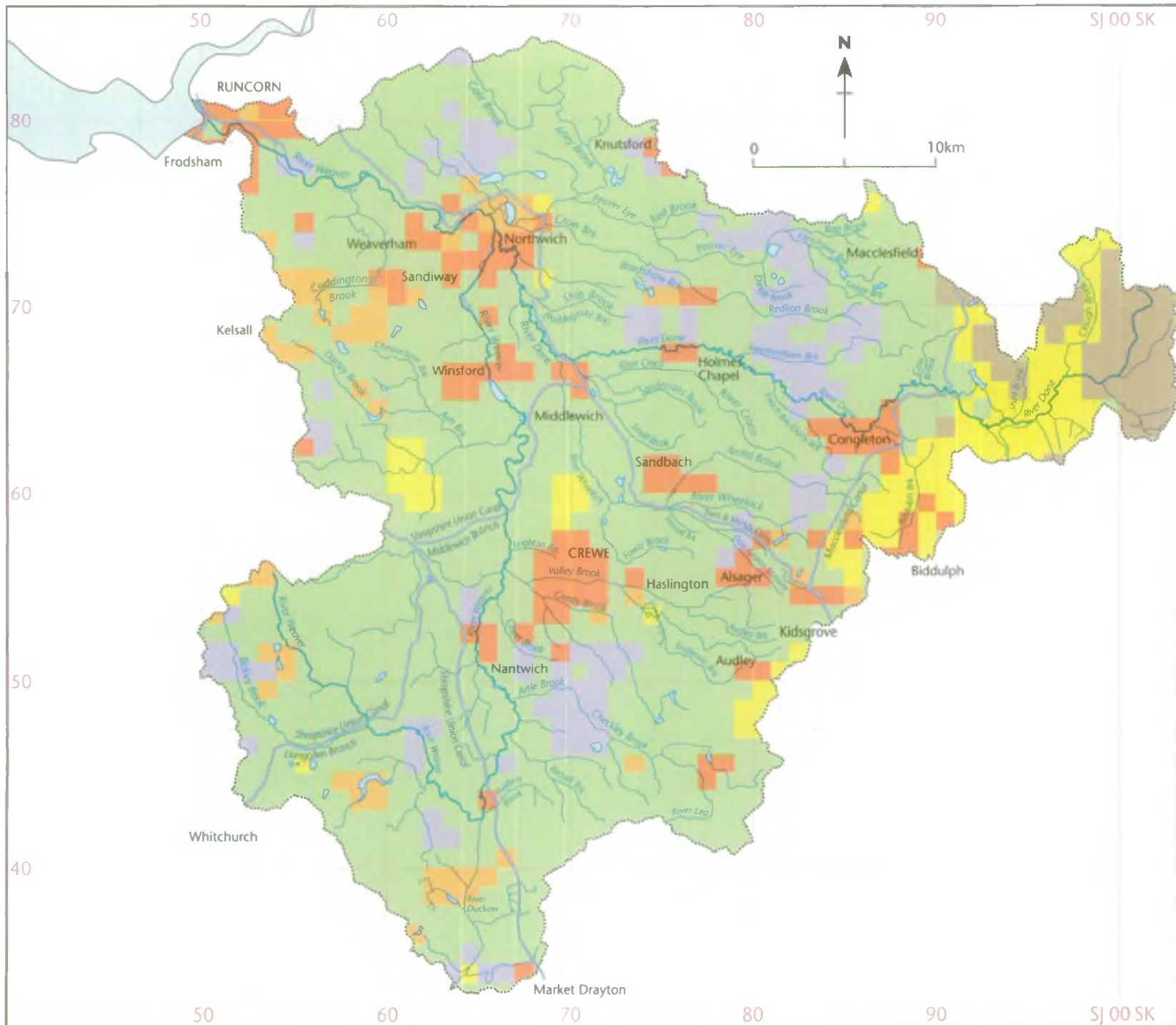
Legislation, grants and the increased availability of specialist advice have all been important factors in reducing the impact of farming on the environment and the Environment Agency, in conjunction with MAFF, will continue to play a central role in this process. Examples of the work of the Agency includes:

- Responsibility for enforcing the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991, which set down minimum standards for the design and construction of agricultural storage systems. In addition the Agency has a duty to regulate the abstraction of water for agricultural use.
- Carrying out a programme of farm visits both to identify sources of pollution and to offer advice to farmers, and work closely with farming groups and organisations.
- Promotion of initiatives such as MAFF's Codes of Good Agricultural Practice for the Protection of Water, Soil, Air and also Farm Waste Management Plans.

Local Perspective

Large parts of the Plan area are rural in nature and agriculture forms the economic base. The area receives slightly less rainfall than the average for England and has a climate favourable for agriculture. Much of the land in the area is moderate to good quality and supports a variety of agricultural uses as shown by Table 7. (Data supplied by MAFF)

Map 28 shows the Agricultural Land Use Classification (MAFF) for the area.



**Weaver/Dane
Local Environment Agency
Plan**

Map 28



**ENVIRONMENT
AGENCY**

**Agricultural Land
Classification**

KEY

- Plan Boundary
- Watercourse
- Canal

Agricultural Land

- Grade 1 or 2
- Grade 3
- Grade 4
- Grade 5

Non-Agricultural Land

- Land Predominantly in Urban Use
- Other Land Primarily in non-Agricultural Use

Dairy	1042
Cattle & Sheep	189
Pigs & poultry	61
Cropping	108
Horticulture	90
Mixed	32
Part-time	1350
Total	2872

Figure 8 Holdings by EC Farm Type (MAFF data 1995)

The number of holdings has shown a steady decrease since 1985, when the total was 3074 holdings. During this period dairy holdings have decreased by 219 farms, whereas beef cattle and sheep farms have increased by 91 holdings (an increase of almost 93%).

Dairy farms represent the single largest section of the industry within the area (Map 29), although MAFF data shows a decline of nearly 8% (over 8,000 dairy cattle) in livestock numbers between 1985 and 1995. During the same period, beef herd cattle numbers have risen by over 71%. Overall total cattle numbers ie dairy, beef, breeding herd, calves, etc have declined from 214,017 to 204,306.

While cattle numbers in the area have decreased in recent years, other sections of the livestock industry have expanded. The total number of sheep and lambs farmed has risen by 86% between 1985 and 1995 to a total of around 121,300, and the number of chickens reared for the table has risen over 50% to over 682,000. The pig section of the industry has however declined significantly by 25% from 1985-1995 to a total of around 53,400 pigs.

Crop production in the area has decreased slightly during the period 1985-1995, but still represents 20% of the total agricultural land use in the area, with over 22,000 ha devoted to this section of the industry. Cereal production accounts for some 64% of the land in crop production, with wheat and barley predominant. Of the other crops grown, potato production and maize is significant.

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

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

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

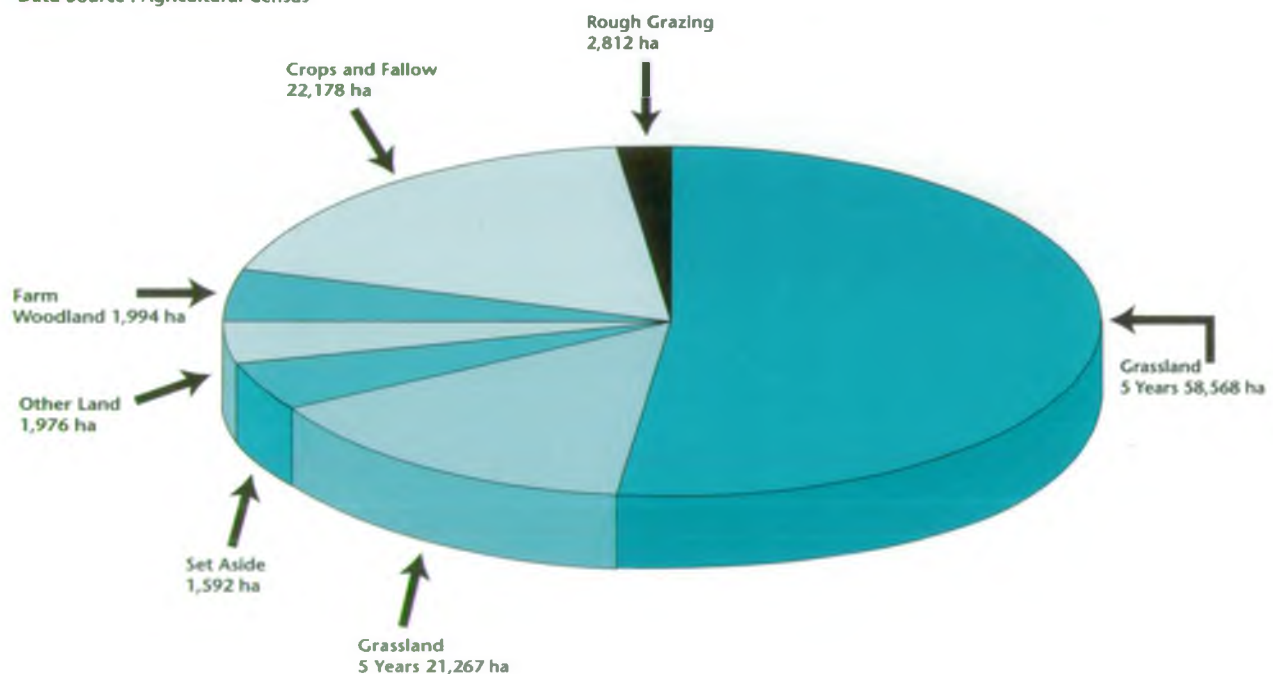
Of particular note here is the new umbilical system of spreading slurries, becoming common in part of the area. It can dispose of large volumes of waste onto fields in a short time, and therefore increase the risk of causing pollution incidents. The Agency is seeking to educate the users of such systems to employ good working practices to minimise pollution risk.

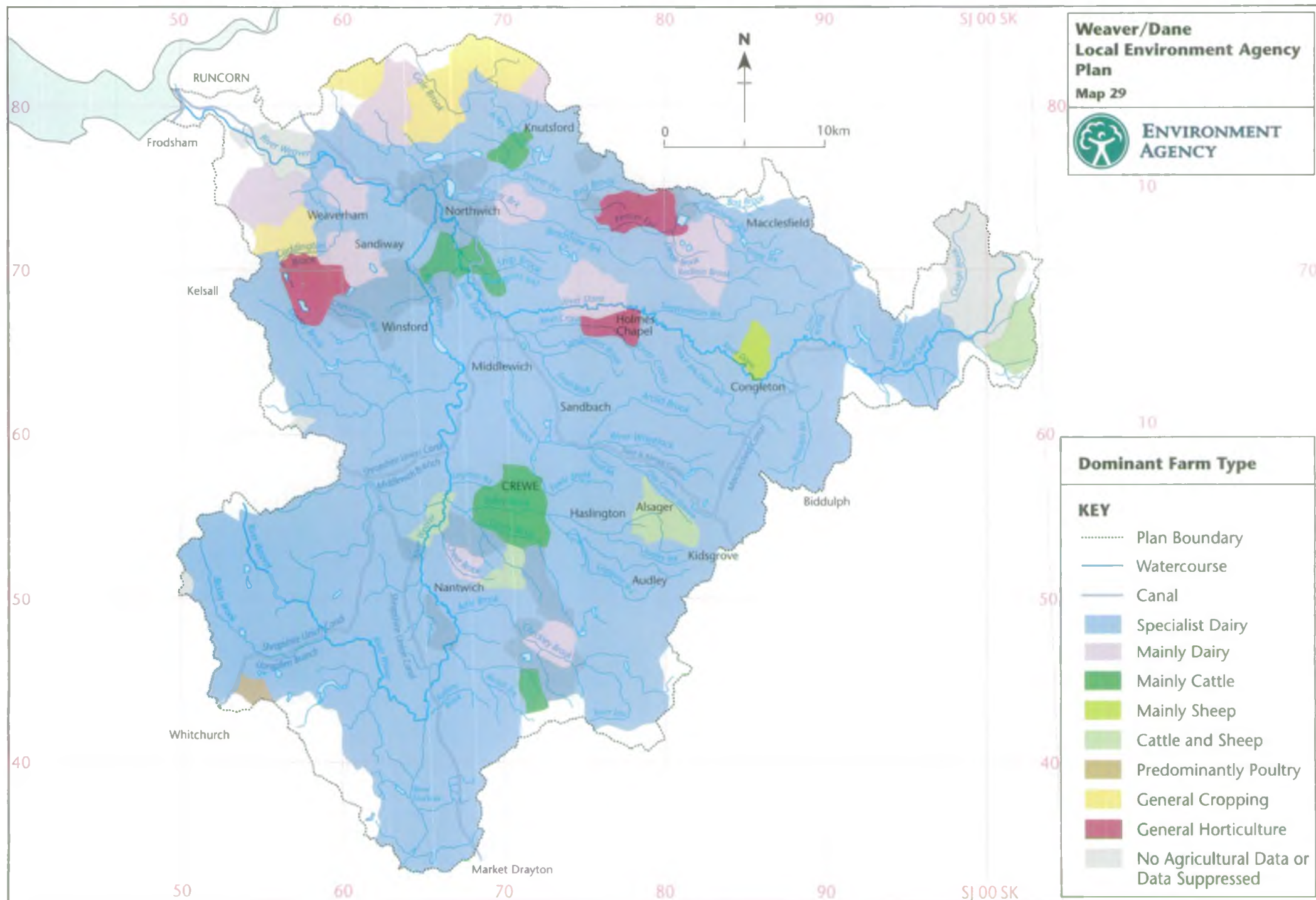
Grants provided by the Government through MAFF farm diversification schemes have helped many farmers to diversify into non-farming activities and the farm woodland in the area has increased by 20%, to just under 2,000 ha in 1995. Almost 1600 ha were devoted to set aside in 1995 out of a total agricultural area of over 110,000 ha. However, the agricultural employment census for the area shows a reduction in the workforce since 1985, a trend likely to continue although diversification into new opportunities such as tourism and alternative livestock production is likely to continue.

Figure 9

Agricultural Land-Use in Weaver & Dane LEAP 1995

Data Source : Agricultural Census





2.16 Industry

Role of the Agency

The Environment Agency has considerable powers to limit some of the most significant releases to air and water from industry. However, the Agency does not have control over all pollutant releases into the atmosphere and will need to work closely with other regulatory bodies to achieve improvements in air quality. It is envisaged that partnerships with national and local government, business, industry, and environmental groups will be needed to secure meaningful environmental improvements.

The Environment Agency has powers to regulate air quality principally by operating a system called Integrated Pollution Control (IPC) for certain industrial processes under Part I of the Environmental Protection Act (EPA90). Its objective is to develop an approach to pollution that considers releases to all media from industrial processes in the context of the effect on the environment as a whole. IPC processes are the potentially most polluting industrial processes and include such operations as power stations, steel works, chemical plants, and incinerators. There are approximately 2,000 such processes in England and Wales.

Role of Other Organisations

The local authority has primary responsibility for local air quality, but other organisations have some control on the release of air pollutants.

- Local authorities control emissions to air from thousands of industrial processes which are generally less polluting, on an individual basis, than those which the Agency regulates. These so called 'Part B' processes are prescribed under Part II of the Environmental Protection Act 1990 for air pollution control purposes only (eg. paint spraying, small boilers). Local authorities also have powers to deal with statutory nuisance from other sources (eg. smells from domestic and agricultural premises, smoke from outdoor cable burning) and to impose smoke control areas.
- Emissions from cars are controlled principally under the Road Traffic Act 1972 which regulates the construction of cars to meet certain emission limits, and is enforced by the Department of Transport. The MOT test includes an emission test and the police have powers relating to smoke from vehicles. The maximum permitted lead content of petrol has been significantly reduced over recent years and sales of unleaded petrol have been promoted by a European Directive.
- The release of fuel from aircraft and aircraft engine emissions are controlled under the Air Navigation Order 1986.

2.17 Mineral Extraction

General

Coals within the Carboniferous sequence have been worked in the past by underground methods around Biddulph and Kids Grove.

Extensive rock salt extraction has occurred in the centre of the basin, historically by uncontrolled 'wild brine pumping' and more recently by deep mining and controlled solution methods; this industry is currently centred on Winsford.

The sand and gravel deposits in the area represent important reserves for aggregate and glass manufacture, and are worked around Chelford, Congleton and Alsager in the east and Sandiway in the west. For any new proposal for sand and gravel abstraction, at the planning application stage, the developers will be required to demonstrate that there will be no unacceptable impact of extraction or dewatering on groundwater resources, surface waters or groundwater-dependent features of conservation interest.

Numerous small pits have been dug in the past into the Boulder Clay for brick making.



Appendices

APPENDIX 1

LONG-TERM RIVER QUALITY OBJECTIVES

The short-term objectives proposed in Appendix 2 must be achievable, by the date specified, as a result of committed expenditure or by the action of the Agency or others but the long-term objectives need not have action or expenditure planned to meet them, as they relate to the quality perceived as being ultimately attainable. Consequently, the water quality issues contained in the Issues and Options Section, which must be resolved within the lifetime of the plan, are restricted to failures to meet short-term River Ecosystem RQOs.

The stretches detailed below, while currently complying with the short-term objectives, fail to achieve the proposed long-term River Ecosystem RQOs. The issues behind these long-term failures will require future expenditure or action to bring about their resolution.

Failures to achieve the proposed long-term River Quality Objective due to industrial discharges

- a) Sanderson's Brook (QSL at British Salt Condensate to Croco)
Marginal fails to comply with RE4. Discharges, with high salinity and pH, from the British Salt lagoons at Middlewich have the most significant detrimental impact upon this stretch.
- b) Forge (Kidd) Brook (QSL at New Cheshire Salt to Witton Brook)
Significant fails to comply with RE4. Discharges, with high salinity and pH, from the New Cheshire Salt works near Northwich have the most significant detrimental impact upon this stretch.

Failures to achieve the proposed long-term River Quality Objective due to farm drainage

- a) Redlion Brook (Jodrell Bank to near Millgate Farm) - significant failure of RE2.
- b) Redlion Brook (QSL at Marton Bridge to Jodrell Bank) - marginal failure of RE2.
- c) Red Brook (QSL at Garland Hollow to Peover Eye) - marginal failure of RE3.
- d) Dingle Brook (QSL at Withington Green to Peover Eye) - significant failure of RE2.
- e) Fanshawe Brook (QSL at Capesthorpe to Snape Brook) - significant failure of RE2.
- f) Ash Brook (Wettenhall Brook to Weaver) - significant failure of RE2.
- g) Ash Brook (Darley Brook to Wettenhall Brook) - significant failure of RE2.
- h) Wettenhall Brook (QSL at Tarporley STW to Oulton Brook) - significant failure of RE3.
- i) River Weaver (QSL at Cholmondley Bridge to Marbury Brook) - marginal failure of RE3.
- j) Rookery Brook (Near Pool House to Weaver) - marginal failure of RE3.
- k) Rookery Brook (QSL at SJ602566 to Near Pool House) - marginal failure of RE3.
- l) Burland Stream (QSL at Burland to Rookery Brook) - marginal failure of RE3.
- m) Birchall Brook (QSL at Bridgemere Stream to Weaver) - marginal failure of RE2.
- n) Audlem Brook (QSL at Longhill to Weaver) - significant failure of RE2.
- o) River Duckow (Shavington Park to Weaver) - marginal failure of RE2.
- p) River Duckow (QSL at Moreton Mill Farm to Shavington) - marginal failure of RE2.
- q) Barnett Brook (QSL at Dodcott Grange to Weaver) - significant failure of RE2.
- r) River Dane (QSL at Gradbach to Biddulph Brook) - significant failure of RE1.
- s) Bosley Brook (QSL at Bosley Reservoir to Dane) - marginal failure of RE3.

Failures to achieve the proposed long-term River Quality Objective due to discharges from sewage treatment works

a) River Croco (Middlewich STW to River Dane)

Significant fails to comply with RE4 primarily due to discharges from North West Water Ltd's Middlewich STW.

b) Audley Brook (Audley STW to Mill Pool)

Significant fails to comply with RE3 primarily due to discharges from North West Water Ltd's Audley STW.

c) Biddulph Brook (Biddulph STW to Dane)

Marginal fails to comply with RE3 primarily due to discharges from North West Water Ltd's Biddulph STW.

d) Weaver (Crewe STW to Church Minshull Weir)

Significant fails to comply with RE3 primarily due to discharges from North West Water Ltd's Crewe STW.

APPENDIX 2 - River Ecosystem Classification - Water Quality Criteria

Class	Dissolved Oxygen (% sat) 10-percentile	BOD (mg/l) 90-percentile	Ammonia (mg/l as N) 90-percentile	Un-Ionised Ammonia (mg/l as N) 95-percentile	pH Lower limit as 5-percentile Upper limit as 95-percentile	Hardness CaCO ₃ (mg/l)	Dissolved Copper (µg/l) 95-percentile	Total Zinc (µg/l) 95-percentile
RE1	80	2.5	2.5	0.021	6 - 9	<10 >10 & <50 >50 & <100 >100	5 22 40 112	30 200 300 500
RE2	70	4	0.6	0.021	6 - 9	<10 >10 & <50 >50 & <100 >100	5 22 40 112	30 200 300 500
RE3	60	6	1.3	0.021	6 - 9	<10 >10 & <50 >50 & <100 >100	5 22 40 112	300 700 1000 2000
RE4	50	8	2.5	—	6 - 9	<10 >10 & <50 >50 & <100 >100	5 22 40 112	300 700 1000 2000
RE5	20	15	9.0	—	—	—	—	—

RE1 : Water of very good quality (suitable for all fish species)
 RE2 : Water of good quality (suitable for all fish species)
 RE3 : Water of fair quality (suitable for high class course fish populations)

RE4 : Water of fair quality (suitable for course fish populations)
 RE5 : Water of poor quality (which is likely to limit course fish populations)
 No Class : Water of bad quality (in which fish are unlikely to be present)

APPENDIX 3

Compliance with proposed short and long-term river ecosystem river quality objectives

Lower Weaver

Watercourse	Classified Stretch	Length (km)	Proposed short-term River Ecosystem RQO	Compliance	Proposed long-term River Ecosystem RQO	Compliance
River Weaver	Weston Canal to Sutton Weir	0.4	RE5, 1997	comp	RE4	significant fail
River Weaver	Navigation Overflow to Weston Canal	15	RE5, 1997	comp	RE4	significant fa
River Weaver	100m u/s ICI Winn o/f 11 to Navigation Overflow	1.1	No Objective	marg fail	RE4	significant fail
River Weaver	Witton Brook to 100m u/s ICI Winn o/f 11	1.3	RE3, 1997	comp	RE3	comp
River Weaver	Bogart Brook to Witton Brook	7	RE4, 1997	comp	RE3	significant fail
River Weaver	Winsford STW to Bogart Brook	2	RE4, 1997	comp	RE3	significant fail
River Weaver	Church Minshull Weir to Winsford STW	10.7	RE4, 1997	comp	RE3	marg fail
Frodsham Cut (Weaver)	QSL to Weaver	0.8	RE5, 1997	comp	RE4	significant fail
Cliff Brook	QSL at Grange Brook to Weaver	3.7	RE2, 1997	comp	RE2	comp
Crowton Brook	QSL at Kingsly to Cliff Brook	1.7	RE2, 1997	comp	RE2	comp

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Cuddington Brook	QSL at Lower Mill to Cliff Brook	2.2	RE3, 1997	comp	RE3	comp
Weaver Navigation	QSL at Flood Course to Weaver	3.4	RE4, 1997	comp	RE4	comp
Witton Brook	Wade Brook to Weaver	2.1	No Objective	significant fail	RE4	significant fail
Wincham Brook	Smoker Brook to Wade Brook	4	RE2, 1997	comp	RE2	comp
Wincham Brook	QSL at Siddington to Smoker Brook	21	RE2, 1997	comp	RE2	comp
Marbury (Cogshall) Brook	QSL at Whitley Brook to Witton Brook	4.5	RE2, 1997	comp	RE2	comp
Forge (Kidd) Brook	QSL at New Cheshire Salt to Witton Brook	1.2	RE5, 1997	comp	RE4	significant fail
Wade Brook	A530 Lostock to Wincham Brook	1.9	No Objective	significant fail	RE4	significant fail
Wade Brook	Near Millgate Farm to A530 Lostock	4	RE2, 1997	comp	RE2	comp
Redlion Brook	Jodrell Bank to near Millgate Farm	10	RE3, 1997	comp	RE2	significant fail
Redlion Brook	QSL at Maton Bridge to Jodrell Bank	5.4	RE3, 1997	comp	RE2	marg fail
Smoker Brook	Gale Brook (Lodge Lane) to Wincham Brook	14.9	RE2, 1997	comp	RE2	comp
Gale Brook	QSL at Appleton STW to Lodge Lane	4.3	RE4, 1999	marg fail	RE4	marg fail
Red Brook	QSL at Garland Hollow to Peover Eye	2.6	RE4, 1997	comp	RE3	marge fail
Dingle Brook	QSL at Withington Green to Peover Eye	1.2	RE3, 1997	comp	RE2	significant fail
Bag Brook	QSL at A34 to Snape Brook	3.2	RE2, 1997	comp	RE2	comp

Continued...

Fanshaw Brook	QSL at Capeshorne to Snape Brook	1.1	RE3, 1997	comp	RE2	significant fail
Bogart Brook	QSL at Bogart Brook to Weaver	1.6	RE3, 1997	comp	RE2	comp
Ash Brook	Wettenhall Brook to Weaver	3.9	RE3, 1997	comp	RE4	significant fail
Ash Brook	Darley Brook to Wettenhall	3	RE3, 1997	comp	RE3	significant fail
Ash Brook	QSL at Salterswell to Darley Brook	3	RE4, 1999	marg fail	RE2	significant fail
Wettenhall Brook	Oulton Brook to Ash Brook	3.4	RE4, 1999	significant fail	RE2	significant fail
Wettenhall Brook	QSL at Tarporley STW to Oulton Brook	7	RE4, 1997	comp	RE2	significant fail

Compliance with proposed short and long-term river ecosystem river quality objectives

Upper Weaver

Watercourse	Classified Stretch	Length (km)	Proposed short-term River Ecosystem RQO	compliance	Proposed long-term River Ecosystem RQO	compliance
River Weaver	Crewe STW to Church Minshull Weir	5	RE4, 1997	comp	RE3	significant fail
River Weaver	Valley Brook to Crewe STW	2.3	RE4, 1997	comp	RE3	marg fail
River Weaver	Checkley Brook to Valley Brook	9.2	RE4, 1997	comp	RE3	marg fail
River Weaver	Marbury Brook to Checkley Brook	21.4	RE3, 1997	comp	RE3	comp
River Weaver	QSL at Cholmondley Bridge to Marbury Brook	6.8	RE4, 1997	comp	RE3	marg fail
Leighton Brook	QSL at Frank Webb Lane to Weaver	2.2	no objective	marg fail	RE4	significant fail
Valley Brook	Macon Way to Weaver	5.7	RE3, 1997	comp	RE3	comp
Valley Brook	Audley Brook to Macon Way	6.2	RE3, 1997	comp	RE3	comp
Valley Brook	ROF Tributary to Audley Brook	1.8	RE3, 1997	comp	RE3	comp
Valley Brook	Lower Foxley to ROF Tributary	4.1	RE3, 1997	comp	RE3	comp
Valley Brook	QSL at Parrot's Drumble to Lower Foxley	3	RE3, 1999	significant fail	RE3	significant fail
Wistaston Brook	Crewe Hall Tributary to Valley Brook	5.5	RE2, 1997	comp	RE2	comp
Wistaston Brook	QSL at Weston Hall to Crewe Hall Tributary	2.9	RE2, 1997	comp	RE2	comp
Englesea Brook	QSL at Englesea Brook to Valley Brook	4.9	RE2, 1997	comp	RE2	comp
Audley Brook	Mill Pool to Valley Brook	4.2	RE4, 1997	comp	RE3	marg fail
Audley Brook	Audley STW to Mill Pool	0.6	RE5, 1997	comp	RE3	significant fail

Upper Weaver cont'd...

Watercourse	Classified Stretch	Length (km)	Proposed short-term River Ecosystem RQO	compliance	Proposed long-term River Ecosystem RQO	compliance
Rookery Brook	QSL at SJ602566 to Near Pool House	5	RE4, 1997	comp	RE3	marg fail
Burland Stream	QSL at Burland to Rookery Brook	3.8	RE4, 1997	comp	RE3	marg fail
Cheney Brook	QSL at Cheerbrook Bridge to Weaver	3.2	RE4, 1997	comp	RE3	marg fail
Edelston Brook	QSL at Railway to Weaver	1.8	no objective	significant fail	RE2	significant fail
Baddington Brook	QSL at Austerson Tributary to Weaver	1.2	RE4, 1999	significant fail	RE4	significant fail
Artie (Checkley) Br.	Lea to Weaver	11.3	RE2, 1997	comp	RE2	comp
Checkley Brook	QSL at Craddocks Moss Tributary to Lea	4	RE2, 1997	comp	RE2	comp
River Lea	QSL at Madeley to Checkley Brook	4.3	RE3, 1997	comp	RE2	significant fail
Birchall Brook	QSL at Bridgemere Stream to Weaver	3.4	RE3, 1997	comp	RE2	marg fail
Audlem Brook	QSL at Longhill to Weaver	3.8	RE3, 1997	comp	RE2	significant fail
River Duckow	Shavington park to Weaver	4.2	RE3, 1997	comp	RE2	marg fail
River Duckow	QSL at Moreton Hill Farm to Shavington	7.2	RE3, 1997	comp	RE2	marg fail
Barnett Brook	QSL at Dodcott Lane Grange to Weaver	4.1	RE4, 1997	comp	RE2	significant fail
Sales Brook	QSL at A530 Newhall to Barnett Brook	2.1	RE4, 1999	comp	RE2	significant fail
Bickley Brook	Bar Mere to Weaver	6.7	RE3, 1997	significant fail	RE3	comp
Bickley Brook	QSL at Egerton Bar Mere	4.3	RE4, 1997	comp	RE4	comp

Compliance with proposed short and long-term river ecosystem river quality objectives

Lower Weaver

Watercourse	Classified Stretch	Length (km)	Proposed short-term River Ecosystem RQO	compliance	Proposed long-term River Ecosystem RQO	compliance
River Dane	Croco to Weaver	15.2	RE2, 1997	comp	RE2	comp
River Dane	Holmes Chapel STW to Croco	6.9	RE2, 1997	comp	RE2	comp
River Dane	Swettenham Brook to Holmes Chapel STW	6.5	RE2, 1997	comp	RE2	comp
River Dane	Biddulph Brook to Swettenham Brook	15.4	RE2, 1997	comp	RE2	comp
River Dane	QSL at Gradbach to Biddulph Brook	24	RE2, 1997	comp	RE1	significant fail
River Wheelock	Church Lane Warmingham to Dane	7.3	RE3, 1997	comp	RE2	marg fail
River Wheelock	Kidsgrove Stream to Church Lane	6.5	RE4, 1997	comp	RE3	comp
River Wheelock	QSL at Odd Rode to Kidsgrove Stream	10	RE2 1997	comp	RE2	comp
Fowle Brook	QSL at Bradeley Hall to Wheelock	3.9	RE4, 1997	comp	RE4	comp
Arclid Brook	QSL at Dingle Lane Sandbach to Wheelock	1.9	RE3, 1997	comp	RE2	marg fail
Kidsgrove Stream	Day Green Stream to Wheelock	3.2	RE4, 1997	comp	RE4	comp

Compliance with proposed short and long-term river ecosystem river quality objectives

River Dane

Watercourse	Classified Stretch	Length (km)	Proposed short-term River Ecosystem RQO	compliance	Proposed long-term River Ecosystem RQO	compliance
Kidsgrove Stream	QSL at Kidsgrove STW to Day Green Stream	7.3	RE3, 1999	comp	RE3	comp
Day Green Stream	Alsager STW to Kidsgrove Stream	1.6	RE5, 1997	comp	RE4	significant fail
Day green Stream	QSL at Alsager to Alsager STW	2.4	RE4 1997	comp	RE4	comp
River Croco	Middlewich STW to Dane	1.7	RE5, 1997	comp	RE4	significant fail
River Croco	QSL at Alum Bridge to Middlewich STW	6	RE3, 1997	comp	RE2	marg fail
Sanderson Brook	QSL at British Salt Codensate to Croco	2	RE5, 1997	comp	RE4	marg fail
Swettenham Brook	Broomfield Farm to Dane	3.5	RE2, 1997	comp	RE2	comp
Swettenham Brook	QSL at Marton STW to Broomfield Farm	4.3	RE4, 1997	comp	RE3	comp
Loach Brook	QSL at A534 to Dane	4.3	RE4, 1999	marg fail	RE4	marg fail
Biddulph Brook	Biddulph STW to Dane	7.1	RE4, 1997	comp	RE3	marg fail
Biddulph Brook	QSL at Shaw Brook to Biddulph STW	0.4	RE3, 1997	comp	RE2	significant fail

Compliance with proposed short and long-term river ecosystem river quality objectives

River Dane

Watercourse	Classified Stretch	Length (km)	Proposed short-term River Ecosystem RQO	compliance	Proposed long-term River Ecosystem RQO	compliance
Cow Brook	QSL at Manor House Lake to Dane	1.2	RE4, 1999	marg fail	RE4	marg fail
Bosley Brook	QSL at Bosley Reservoir to Dane	1.8	RE4, 1997	comp	RE3	marg fail
Shell Brook	QSL at Mareknowles to Dane	2.5	RE2, 1997	comp	RE2	comp
Turners Pool	QSL at Turners Pool to Dane	2.1	RE2, 1997	comp	RE2	comp
Clough Brook	QSL at Cumberland Brook to Dane	5.1	RE1, 1997	comp	RE1	comp

Compliance with proposed short and long-term river ecosystem river quality objectives

Canals

Watercourse	Classified Stretch	Length (km)	Proposed short-term River Ecosystem RQO	compliance	Proposed long-term River Ecosystem RQO	compliance
Trent & Mersey Canal	Middlewich Branch to Preston Brook	29.1	RE4, 1999	comp	RE4	comp
Trent & Mersey Canal	Tetton to Middlewich	3.6	RE3, 1997	comp	RE3	comp
Trent & Mersey Canal	Thurlwood to Tetton	6	RE3, 1997	comp	RE3	comp
Trent & Mersey Canal	Macclesfield Canal to Thurlwood	6.3	RE3, 1997	comp	RE3	comp
Trent & Mersey Canal	QSL at Kidsgrove to Macclesfield Canal	0.6	RE5, 1997	comp	RE4	significant fail
Macclesfield Canal	Cowley to Trent & Mersey Canal	19.9	RE4, 1997	comp	RE3	marg fail
Shropshire Union Canal	Middlewich Branch to Rowton	18.8	RE3, 1997	comp	RE3	comp
Shropshire Union Canal	QSL at Market Drayton to Middlewich Branch	24.7	RE3, 1997	comp	RE3	comp
Shropshire Union Canal	From Middlewich Branch	15.8	RE4, 1999	comp	RE4	comp
Shropshire Union Canal	From Llangollen Branch	17.6	RE2, 1997	comp	RE1	marg fail

Biological Water Quality Monitoring

Although chemical analysis will accurately indicate the quality of the water at the time the sample was taken, pollution that happens between sampling visits will be missed. Biological surveys will detect this, because when living organisms have been killed by pollution it takes some time for their populations to recover. These changes in populations are detected and assessed via regular biological monitoring by Environment Agency Ecologists. Biological surveys can also reveal the effects of chemicals such as pesticides that are not routinely analysed or are present in concentrations too low to be detected, and the effects of habitat degradation.

Macro-Invertebrate Sampling

The biological scheme is based on groups (taxa) of macro-invertebrates (small animals including mayfly nymphs, damselflies, caddis-flies, snails, shrimps and worms and many others), found on the river bed. Macro-invertebrates are used because they:

- do not move far;
- have reasonably long life cycles;
- respond to the physical and chemical characteristics of the river;
- are affected by pollutants which occur infrequently and which are not measured by spot-sampling used in the GQA (chemical) scheme.

For biological assessment, species of macro-invertebrates are linked together into 85 taxa. These are given scores of 1 (pollution-tolerant taxa) to 10 (pollution-sensitive taxa). As different taxa respond differently to pollution, the presence of taxa sensitive to pollution suggests better water quality than for sites where only pollution-tolerant taxa are found.

By comparing taxa found in the sample with those expected if the river were pristine, rivers can be classified into one of six grades (a: very good to f: bad).

BMWP Score System

For the Biological Monitoring Working Party (BMWP) score system a numerical value is allocated to each invertebrate taxon based on its tolerance to pollution, from one (tolerant) to ten (sensitive). For example, most mayfly nymphs and caddis larvae score ten, water beetles five, snails three, and worms one. The Average Score Per Taxon (ASPT) for each sampling site is then calculated, as is the total number of invertebrate taxa present (known as TAXA).

ASPT and TAXA are themselves useful indicators of pollution status and can be used to detect and evaluate changes in quality at monitoring sites, as well as differences between similar sites on the same stretch of river, for instance when comparing conditions upstream and downstream of an effluent discharge to determine if it is having a detrimental effect.

RIVPACS

However, some types of river support richer invertebrate communities than others because of natural differences such as the nature of the stream bed, the flow rate, or geology. Index values obtained from different sampling sites, may therefore differ irrespective of water quality. The Environment Agency uses a computer programme known as the River Invertebrate Prediction And Classification System (RIVPACS) to take account of these natural differences, so that sites can be compared, in terms of their biological quality, between rivers of different types.

From a site's natural physical and chemical characteristics RIVPACS can predict the ASPT and TAXA values that a sample would have if the river was unpolluted and undisturbed. The difference between the value of an index derived from a real sample in relation to the value predicted by RIVPACS indicates the impact attributable to pollution or habitat degradation. These differences are expressed as the observed value divided by the predicted value and are known as Ecological Quality Indices (EQIs). These values have not been available for this document but will be included in future reviews.

If the EQI is approximately equal to or greater than one (i.e. the observed value matches the predicted value), the biological quality is satisfactory. If the value drops below one, progressively poorer biological quality is indicated.

APPENDIX 4

BIOLOGICAL CLASSIFICATIONS

Class Description

a: Very Good Quality

Biology similar to that expected for an unpolluted river of this size, type and location. High diversity of taxa, usually with several species in each.

b: Good Quality

Biology falls a little short of that expected for unpolluted rivers. Small reduction in pollution-sensitive taxa. Moderate increase in individual species in pollution-tolerant taxa.

c: Fairly Good Quality

Biology worse than expected for unpolluted rivers. Many sensitive taxa absent, or number of individual species reduced. Marked rise in individual species in pollution-tolerant taxa.

d: Fair Quality

Sensitive taxa scarce. Pollution-tolerant taxa present, some species present in large numbers.

e: Poor Quality

Biology restricted to pollution-tolerant species with some taxa dominant. Sensitive taxa rare or absent.

f: Bad

Biology limited to small number of highly pollution tolerant taxa such as worms, midge larvae, leeches and water hoglouse. These may be present in very high numbers. In the worst case, no life is present.

APPENDIX 5

ENVIRONMENT AGENCY INTERESTS AND LPA DEVELOPMENT PLAN POLICIES

The Agency will respond to planning applications and pre-enquiries on the above basis to ensure its interests will be reflected to minimise any adverse effects and gain environmental improvement. It seeks early discussion to development plan preparation so it can provide useful information and get an insight into the plan areas and their issues. Potential development constraints can also be discussed.

LPA Plan Policies which aim to protect the environment (their plan policy reference shown)						
Development Plan Name & Status	Air, Water Quality & Water Resources		Flood Defence	Fisheries, Recreation & Conservation		Minerals, Waste Disposal & Contaminated Land
Cheshire CC Adopted Structure Plan 2001	ENV2	ENV18	–	ENV12	TR9, 12	MWD 2, 5 MWD 19, 20
Congleton BC Post-Inquiry Deposit Local Plan	ECA2	ECA28	ECA29A	ECA8, 10	RT20	–
Crewe & Nantwich BC Post-Inquiry Deposit Local Plan	BE1, 4	NE16	BE4	NE11		–
Macclesfield BC Post-Inquiry Deposit Local Plan	DC17, 18, 20, 21		DC19	UC3		UM1.1, 1.2, 2.1
Vale Royal BC Deposit Local Plan Consultation	BE1, 2, 3	PE1, 2, 5	NE18, 19, 20	NE6,16,17,20	RT24, 25	P8 MW1, 3
Peak District National Park Deposit Local Plan	LC20		LC21, 22	LC18, 18		LC23,24 LM1 LW2,4,7,9,10
Newcastle-u-Lyme BC Adopted Local Plan May 1995	S3		S4	S5		–
Staffordshire Moorlands DC Post Inquiry Modification Local Plan	F5, F8		F6,	N18		–
North Shropshire DC Adopted Local Plan August 1996	D1 (e) (f)		D4	D4		D26
Chester CC Draft Consultation Local Plan	DENV1,	DENV72	–	DENV16, 19, 26, 27, 30		DENV75
Warrington BC Post Deposit Local Plan following public inquiry	DC1, 2	ENV20,22, 23,24,25	ENV10, 11	ENC1, 5 15, 16, 17		ENV18, 19
Halton BC Adopted Local Plan April 1996	P12	P2	GS12	NE3, 8	NE10, 13	P10

APPENDIX 6

GLOSSARY

ABSTRACTION LICENCE

A licence issued by the Environment Agency to abstract water. The maximum annual, daily, and hourly abstraction rates are normally set within the terms of the licence.

AQUIFER

A layer of underground porous rock which contains water and allows water to flow through it.

ARBORETUM

Botanical tree garden.

BED

The bottom of a river.

BED CONTROL

Stable river bed which limits the movement of bed materials.

BERM

A shelf at the base of a bank at normal flows which gives extra channel width in high flows.

CARR

Wet woodland composed of trees such as willow and alder, which is a successional stage between open water and dry woodland.

CHANNEL

A cutting in land along which a river flows.

CONFLUENCE

Point where two, or more, rivers meet.

CLOUGH

A small steep sided river valley.

COMPENSATION WATER

Water released from a reservoir to maintain the flow required in the river.

CULVERT

A man-made structure, for example a pipe, carrying a watercourse underground.

CYPRINIDS

The carp family of fish comprising some 200 freshwater species.

DEPOSITION

Where a river flows more slowly it may deposit gravel, sand and silt in its channel, often on the inside edge of bends or meanders.

DIFFERENT UNITS FOR FLOW MEASUREMENT

m³/s Cubic metres per second (cumec)

l/s Litres per second

Mld Megalitres per day

mgd Millions of gallons per day

Conversion Table

m ³ /s	Mld	mgd
0.012	1	0.224
0.06	5	1.12
0.12	10	2.24
0.24	20	4.48
0.6	50	11.2
1.2	100	22.4

DRIFT

Superficial deposits covering solid rock. Often deposited by rivers or by former glaciation in the form of Boulder Clay, peat or sands and gravels.

DRY WEATHER FLOW

It is a selected flow that is not exceeded for ten successive days, also referred to as a Q95 flow.

EUTROPHICATION

Enrichment of water by nutrients, causing an accelerated growth of algae and higher forms of plant life to produce an undesirable disturbance to the balance of organisms present in the water, and to the quality of the water concerned.

FAUNA

Animal life.

FLOODPLAIN

Mature stage of river. Flat or gently undulating landscape over which the river flows, which may flood.

FLUVIAL

Adjective of rivers.

FLY-TIPPING

Illegal dumping of waste.

FRESHWATER FISH

For the purpose of the Salmon and Freshwater Fisheries Act 1975, fish other than salmon, brown trout, sea trout, rainbow trout and char.

GEOMORPHOLOGICAL FEATURES

Physical features of a river, which include meandering (winding) channel, gravel beds and shoals, ox-bows, earth cliffs and river terraces.

HYDRAULIC CONTINUITY

The relationship between groundwater and surface water flow.

INVERTEBRATE

Animal without a backbone, for example insects.

LAGOON

An artificial pool for the treatment of effluent.

LEACHATE

Liquid containing material in solution, draining from the ground.

LOAD

A measure of the material carried by a river either in suspension or as dissolved material.

MAIN RIVER

Some, but not all, watercourses are designated as Main River. Main River status of a watercourse must first be approved by MAFF. The Environment Agency has the power to carry out works to improve drainage or protect land and property against flooding on watercourses designated as Main River.

MAJOR AQUIFER

Water bearing rocks which are capable of yielding significant volumes of groundwater due to its high permeability and porosity.

MARGINAL

At the water's edge.

MINOR AQUIFER

Water bearing rock of limited extent, capable of supporting medium/small abstractions.

NAVIGATION

Canal or artificial waterway.

NON-AQUIFER

Rock of low permeability containing little or no groundwater (may support very limited abstractions).

NUTRIENTS

Providing or contributing nourishment.

OCHRE

Iron based orange discolouration.

PASTURE

Semi-improved and improved grazed grassland.

POOL

A deep slowing flowing section of a river or stream.

PRECIPITATION

The total amount of water which falls as rain, hail, or snow expressed as mm or inches of rainfall over a specified period.

RETURN PERIOD

The frequency within which, on average, an event of a certain severity may be expected to return (expressed in years).

RIFFLE

A shallow, but fast flowing part of a river or stream.

RIPARIAN

Of, or on, the banks of a river.

RIPARIAN OWNER

Owner of land abutting a river or lake. Normally riparian owners own the bed of river to the mid point of the channel.

RIVER CORRIDOR

Stretch of river including its banks and the land close by.

SALMONIDS

Fish classified as belonging to the Salmon family, such as Salmon, Trout and Char.

SHOAL

A sand and/or gravel deposit at the edge of, or within, river channel.

STRATA

Layer of rock.

SPATE

Very high flows, usually associated with rain storms and often cause flooding. Spate flows naturally cleanse the river channel.

TERRACE

A raised flat area cut out of a hillside by the action of the river.

TOPOGRAPHY

Physical features of a geographical area.

TRANSFER STATION (Waste Disposal)

A licensed depot where controlled waste is stored and sorted for disposal or recycling.

WATER TABLE

The surface of a body of groundwater within the underground strata. The water table will fluctuate as a result of natural or artificial causes.

APPENDIX 7

ABBREVIATIONS

ADAS-Agricultural Advisory Service

ALARA-As Low As Reasonably Achievable

AMP-Asset Management Plan

AOD-Above ordnance datum

ASCV-Area of Special County Value

ASPT-Average Score Per Taxon

BAP-Biodiversity Action Plan

BATNEEC-Best Available Techniques Not Entailing Excessive Cost

BC-Borough Council

BMWP-Biological Monitoring Working Party

BOD-Biochemical Oxygen Demand

BPEO-Best Practicle Environmental Option

BTO-British Trust for Ornithology

BW-British Waterways

CC-County Council

CITES-Convention on International Trade of/in Endangered Species. (NB: of wild flora & fauna)

CPRE-Commission for the Protection of Rural England

CSO-Combined Sewer Overflow

CVNC-County Value for Nature Conservation

CWT-Cheshire Wildlife Trust

DoE-Department of the Environment

EC-European Community

EN-English Nature

EQI-Ecological Quality Indices

ESA-Environmentally Sensitive Area

EQS-Environmental Quality Standard

FRCA-Farming and Rural Conservation Agency
FWAG-Farming Wildlife Advisory Group
GMPTE-Greater Manchester Passenger Transport Executive
GPZ-Groundwater Protection Zone
GQA-General Quality Assessment
HMIP-Her Majesty's Inspectorate of Pollution
HMS-Habitat Modification Score
HMSO-Her Majesty's Stationery Office
HSE-Health and Safety Executive
ICI-Imperial Chemical Industry
IPC-Integrated Pollution Control
IUCN-International Union for the Conservation of Nature
LBAP-Local Biodiversity Action Plan
LEAP-Local Environment Agency Plan
LPA-Local Planning Authority
MAFF-Ministry of Agriculture Fisheries and Food
MBC-Metropolitan Borough Council
MCC-Manchester City Council
NFU-National Farmer's Union
NNR-National Nature Reserve
NRA-National Rivers Authority
NSA-Nitrate Sensitive Area
NVZ-Nitrate Vulnerable Zone
NWC-National Water Council
NWW Ltd-North West Water Limited
OP SIS-Optical Monitoring System
QSL-Quality Survey Limit
RE-River Ecosystem
RHS-River Habitat Survey

RIVPACS-River Invertebrate Prediction & Classification System

RPG-Regional Planning Guidance

RQO-River Quality Objective

RSA 93- Radioactive Substances Act

RSPB-Royal Society for the Protection of Birds

SAC-Special Area of Conservation

SBI-Site of Biological Importance

SMD-Soil Moisture Deficit

SPA-Special Protection Areas

SSSI-Site of Special Scientific Interest

STW-Sewage Treat Works (also referred to as Waste Water Treatment Works)

SWQO-Statutory Water Quality Objectives

TAXA-Taxa (river invertebrates)

TOMP-Toxic Organic Micropollant

UDP-Unitary Development Plan

UK-United Kingdom

UNCED-United Nations Conference on Environment and Development

VOC-Volatile Organic Compounds

WLMP-Water Level Management Plan

WML-Waste Management Licence

WRA-Water Resources Act

WVI-Weaver Valley Initiative

APPENDIX 8

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**ENVIRONMENT AGENCY
GENERAL ENQUIRY LINE**

0645 333 111


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

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