THE WARWICKSHIRE AVON CATCHMENT MANAGEMENT PLAN FINAL PLAN OCTOBER 1994

NRA

National Rivers Authority
Severn-Trent Region

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Front cover: River Avon at Warwick Castle

WARWICKSHIRE AVON CATCHMENT MANAGEMENT PLAN

FINAL PLAN

CONTENTS PAGE

LIST OF APPENDICES PAGE

AVON AREA RIVER NETWORK & SUB-CATCHMENTS

AVON SUB-CATCHMENTS

1 Upper Avon (above Sowe Confluence)
2 Sowe
3 Leam
4 Mid Avon (Sowe confluence-Bidford)
5 Stour (Warwickshire)
6 Arrow & Alne
7 Badsey Brook
8 Lower Avon (below Bidford)
9 Isbourne
10 Bow Brook

1 CATCHMENT VISION FOR THE WARWICKSHIRE AVON

The Avon Catchment, draining an area of approximately 2,900 km², is mostly rural in character with a population of over 900,000. The river, with its great natural beauty, is a major amenity and the local economy benefits greatly from the associated tourism.

The importance of the river, its tributaries and groundwaters as a source of water supply, requires the protection of the water resource from the effects of sewage effluent, industrial and agricultural pollution. The dominance of impermeable clays and mudstones in the geology of the catchment leads to fast run-off under heavy rainfall and low flows in summer. The Avon and its tributaries are prone to regular flooding, which is not confined to winter months. There are 13 flood alleviation schemes, 20 gauging stations and a flood warning scheme in operation to lessen the damage from floods.

The River Avon is recognised as an important coarse fishing venue and supports healthy populations of coarse fish and eels. These are dependent on the variety and quality of the habitat and quality and quantity of water present. The catchment is of high conservation value with 89 SSSI's, of which 55 are water dependent. The rivers are abundant in plant communities, birdlife is rich and the catchment generally provides excellent invertebrate habitat. As a recreational resource the catchment provides waterways for boating, sailing, canoeing and angling.

Key objectives will be:-

- To maintain and improve water quality and to safeguard the high environmental quality of the rivers used for drinking water purposes - River Avon upstream of Rugby, River Leam and River Severn downstream of the confluence at Tewkesbury.
- To reduce nitrate and phosphate input from sewage treatment works and agricultural sources such that the ecology of the river is closer to the natural state and to reduce the potential for blue-green algae formation.
- To ensure that present and future navigation and other recreational pursuits are environmentally acceptable.
- To ensure that the flow in the watercourses is not taken below an environmentally acceptable level by abstractions from the river or groundwater sources.
- To ensure that there is an agreed water resource strategy for the river and canal system which protects their ecology and established uses. This should allow for future development.
- To ensure that the river corridor and groundwater resources in the catchment are protected from the effects of new development by close liaison with Local Authorities and developers.
- To ensure that new development does not increase the risk of flooding by increased run-off or loss of flood plain.
- To conserve and enhance all components of the river corridor landscape.
- To provide flood defences to protect people and property at risk from flooding where this is cost effective and environmentally acceptable.

- To maintain and develop the existing good coarse and trout fisheries and to improve fish stocks by the provision of passes for eels, elvers and coarse fish.

- To conserve and, where possible, enhance the quality of riparian and wider catchment wildlife habitats of all kinds, including species of special conservation interest in the Avon Catchment.

- To seek the removal of unsatisfactory storm sewage overflows in urban areas.

- To identify, and work towards the elimination of, pollution from contaminated land.

- To maintain weirs and other structures which are essential for navigation and conservation interests by assisting the owners in all practicable ways.

- To encourage further recreation and conservation use of the catchment where this is compatible with other uses of the river.

Establishing strong NRA involvement and links with local communities and their representatives is seen to be necessary to ensure local views are respected and future development decisions respect this vision for the catchment. We will therefore:

- Work with all relevant parties to implement the principles of sustainable development.

TEWKESBURY SLUICES

2 INTRODUCTION

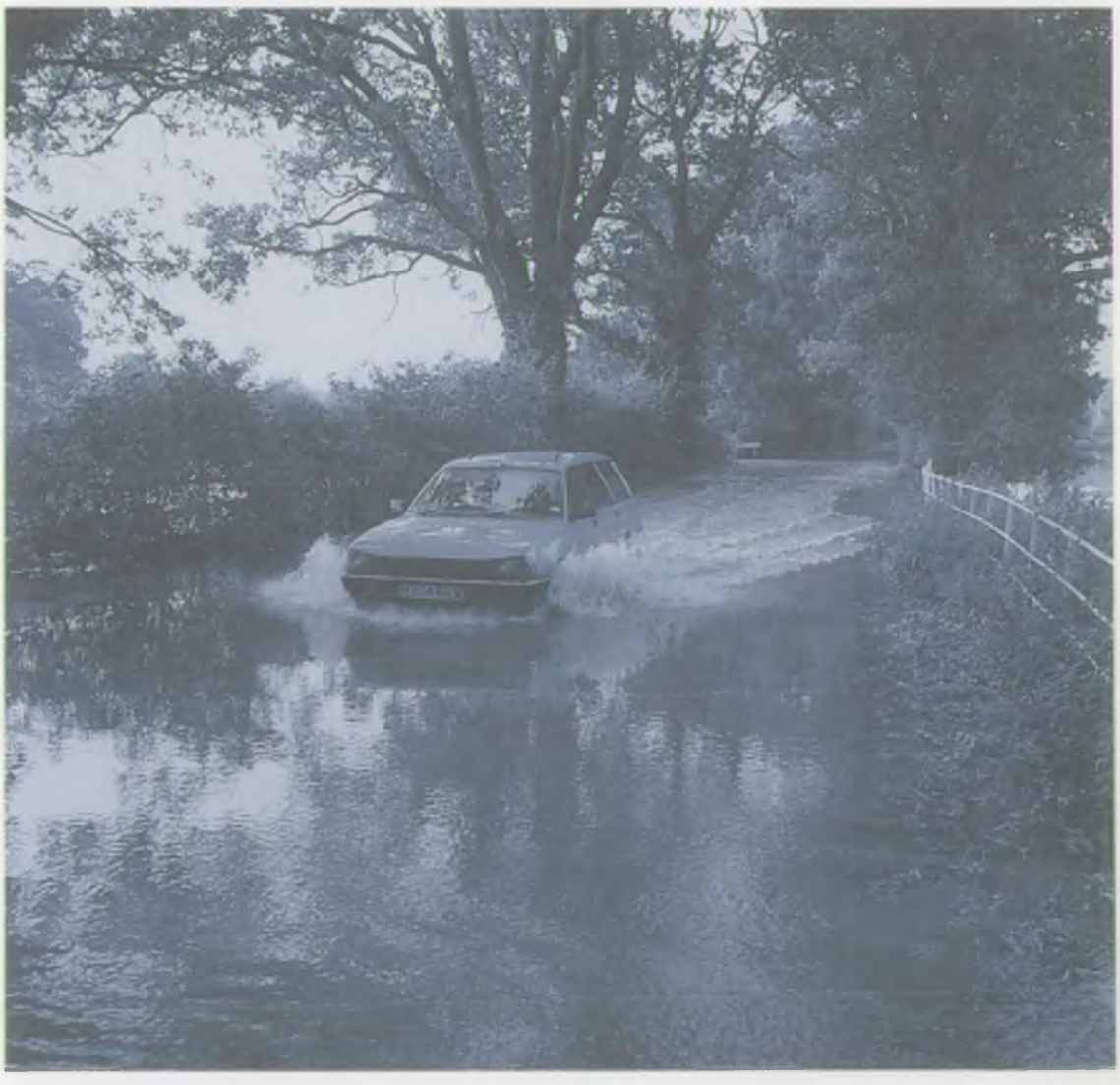
The Concept of Catchment Management Planning

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

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

We have chosen to use Catchment Management Plans to translate these principles into action. The plans describe our vision for each catchment, identify problems and issues and propose

HAMPTON LUCY
RIVER AVON IN FLOOD



actions that may be taken to resolve them. The plans also form a framework to promote consistent and appropriate responses to development proposals and to influence the drafting of local plans.

Relationship between Land Use Planning and Catchment Management Planning

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

The policies in statutory development plans are important in this regard, in that they set out the framework for land use change and provide the key reference in determining development applications; the NRA encourages the inclusion of policies which reflect its concerns and responsibilities.

As guidance for local authorities, the NRA has prepared a set of statements relating to the broad headings of water quality and water resources, flood defence, fisheries, conservation, recreation and navigation in the river corridor, mineral workings and waste disposal. These statements are summarised in the NRA's "Guidance Notes for Local Planning Authorities in the Methods of Protecting the Water Environment through Development Plans".

River Water Quality and River Quality Objectives

The NRA has recently adopted a new system of classification for river water quality - General Quality Assessment (GQA)which will in future replace the scheme originally devised by the National Water Council (NWC) and later adopted by the Department of the Environment. In addition, a new Statutory Water Quality Objective scheme will be introduced under the provisions of the Water Resources Act 1991 to replace the advisory River Quality Objectives that were formulated from the NWC/DoE scheme. However, as this plan utilised the NWC/DoE scheme during the consultation process it has been decided that the Final Plan should be formulated using the NWC/DoE scheme. A translation exercise will be undertaken to adopt these recent changes at the first annual review.

RIVER AVON AT RYTON ON DUNSMORE

3 REVIEW OF THE CONSULTATION PROCESS

The Warwickshire Avon Catchment Management Plan Consultation Report was launched on 29 March 1994 at the Shire Hall Warwick. The Consultation Document concentrated on the issues in the catchment and the management options for their solution. Delegates at the launch represented a wide spectrum of interests from within the catchment, plus national groups and organisations. The launch was attended by approximately 90 representatives who all received a copy of the report. Further copies were distributed to industry, local authorities, environmental groups, sport and recreation groups and the public.

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

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

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

A total of 80 written responses were received as detailed in Appendix 4. Each response was acknowledged. A questionnaire was also sent out, aimed mainly at Parish Councils, to focus attention on the issues and options for action. These comments have all been considered and, where possible, incorporated into the Final Plan. A number of local issues were also raised in the course of the consultation procedure and, where appropriate, these matters have been referred to the appropriate department for action. Consideration has also been given to recently published NRA and external documents.

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

Following the launch, a series of meetings were held with County Councils, Severn Trent Water Ltd, navigation groups, statutory bodies and other interest groups to discuss issues arising from the Report. A forum was held on 12 September 1994 with all the main respondents at which further discussions took place.

The Final Plan is a strategic policy framework for the management of the catchment. It includes an action plan to achieve the vision for the Avon Catchment. The action plan will form the basis for improvements to the water environment by outlining the areas for work and investment proposed by the NRA and others. The Final Plan primarily covers the five-year period from 1994/1995 to 1998/1999. A number of the projects may take longer owing to funding availability and government policy.

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

Please see Section 6 for details of the future review and monitoring process.

4 OVERVIEW OF THE CATCHMENT

4.1 Brief Description of the Catchment

The Avon Catchment drains an area of approximately 2,900 square kilometres and is mostly rural in character, although the City of Coventry and the towns of Rugby, Leamington Spa, Warwick, Stratford upon Avon, Evesham, Lutterworth, Kenilworth, and Redditch all lie within the catchment. The population is around 900,000.

The Avon is a river of great natural beauty representing the very best in English landscape and is recognised as a river of very special environmental importance. The river and it's tributaries have often been used as a source of water supply as well as a source of power.

It is a major amenity and the local economy benefits greatly from the tourism that the river generates.

While there are many problems to overcome the river is in a better condition now than it has been for many decades. Only 20 years ago there were no fish present in large stretches but today there are fish along the whole river.

4.2 Geology

Impermeable clays and mudstones dominate over 80% of the catchment. This predominant impermeable geology leads to fast run-off under heavy rainfall and low flows in summer with implications for flood defence, river quality and water resources.

For the remaining part of the catchment more permeable strata occur which, in many places, are important underground water supplies.

Over abstraction of groundwater has led to low flows in the upper reaches of Bow Brook and also on the River Sherbourne in Coventry. A major groundwater resource lies directly beneath Coventry and this has been contaminated in places by waste disposal from industrial processes.

4.3 Hydrology

There is little variation in rainfall across the catchment. The average is 672 mm/year and the normal loss through evaporation is 464 mm/year.

The effective rainfall together with inputs from major sewage works provide an average flow of 2,660 million litres(Ml) per day at the confluence with the River Severn. This is some 30% of the average flow of the Severn at Gloucester.

The average July soil moisture deficit means that in most years irrigation is required for certain crops in the catchment.

4.4 Flood Defence

The Avon and it's tributaries are prone to regular flooding which may occur at any time of year. Floods of note occurred in 1900, 1939, 1947, 1960, 1968, 1979, 1981, 1992 and 1993.

There are 13 flood alleviation schemes in the Avon Catchment protecting over 250 hectares of land and more than 300 houses and businesses.

There are 514 km of main river in the catchment and while most main river urban flooding has been reduced by flood alleviation schemes, the problem of frequent flooding on ordinary watercourses still exists.

Where flood alleviation schemes are not practicable, and where catchment response times allow, a flood warning scheme operates to lessen the damage from floods. Warnings are issued by the NRA on the Rivers Arrow, Avon, Leam and Stour.

The NRA maintains sluices on the Avon and Arrow to control flood water and, where applicable, maintain water levels within navigable limits for as long as possible. It also undertakes work in main river channels including dredging, tree and bush work, debris removal and weed cutting.

4.5 Water Resources

Surface waters and groundwaters are extensively abstracted across the Avon Catchment. There are a total of 1548 abstraction and impoundment licences giving a total potential abstraction of 129,606 Ml/annum. The main use of the water abstracted is potable water supply.

Four of the sub-catchments are judged to be very critical and we do not wish to see any further licences issued or we will restrict new abstractions to winter use only.

The Upper Avon is a critical sub-catchment owing to abstraction for water supply and diversion of water to canals. There are also two major water supply intakes on the River Leam, one of which feeds Draycote Reservoir which in turn can be used to support the other abstraction at Leamington under low flow conditions. The Badsey Brook is critical as there are 158 spray irrigation licences on a comparatively small river. Most of these are Licences of Right which means that they cannot easily be restricted under low flow conditions. The total licensed volume exceeds the total flow of the river. Over abstraction has led to low flows in the upper reaches of the Bow Brook at Redditch.

An abstraction from the River Severn at Upton provides water for the City of Coventry. This in turn provides a nett addition of approximately 120 Ml/day flow to the Avon Catchment.

DRAYCOTE WATER RESERVOIR

No.	ISSUE	ACTIONS	RESPONSIBILITY		TOTAL COST (£K)	1994/95	1995/96	1996/97	1997/98	1998/99	FUTURE
			LEAD	ACHIEVE							
29	Creation of a management Strategy to resolve conflicts between recreation, navigation and conservation uses and to ensure sustainability of the resource.	a) Survey recreation, conservation and navigation uses and facilities and maintain database of records.	N	H	8	═══					
		b) Evaluate conflicts and devise a strategy to deal with them assisted by the setting up of user groups with clear objectives and terms of reference to produce output such as codes of practice/conduct, user leaflets, calendars of events.	J	M	U		═══				
		c) Promotion of footpaths for walkers where it does not conflict with conservation. Establish options and opportunities for riverside regional routes and local footpaths in the Lower Avon catchment in collaboration with owners, occupiers and LA's eg. H&WCC, WDC and WCC	J	M	U		═══	═══	═══	═══	
30	Navigation and boating on inland waters	a) Support for Avon Weirs Trust. Weir refurbishment between Stratford & Tewkesbury.	J	H	U	═══					
		b) Avon navigation Warning Scheme. Provision of notices & 24 Hour flood warning.	J	H	U	═══	═══	═══	═══	═══	═══
		c) Provision of sanitary stations on Lower Avon.	J	H	2-5pa	═══	═══	═══	═══	═══	
		d) Overnight moorings at Navigation Trusts sites.	J	H	20		═══				
		e) Assess impact on river of existing and proposed weirs (including effects of storm overflows).	N	M	45	═══	═══				

No.	ISSUE	ACTIONS	RESPONSIBILITY		TOTAL COST (£K)	1994/95	1995/96	1996/97	1997/98	1998/99	FUTURE
			LEAD	ACHIEVE							
31	Conservation and rehabilitation of river corridors and wetlands.	a) Assess impact of NRA's operational work on the environment including secondary impacts.	N	H	300	═	═	═	═	═	
		b) Extend programme of river & pool rehabilitation at Arrow Valley, R Alne and Swift/Avon valley, Hewell Grange, Leek Wootton, Tocil and Brailes.	N	H	68	═	═				
		c) Collaborate with other organisations in production of Water Level Management Plans and with English Nature, Co Co and LA's to produce action plan for improving nature conservation status of riparian land.	J	M	U			═	═		
		d) Re-survey river corridor habitats periodically.	N	H	5-10	═	═	═	═	═	
		e) Promotion of rare or threatened species.	J	H							
		i) Otter Project	NRA		12	═	═	═	═	═	
		ii) Vale Wildlife	NRA		3						
		f) Production of Species Action Plan for agreed priority species with English Nature & others (eg RSPB, Wildlife Trusts)	J	M	U		═	═			
32	Requirement for a review of EC designated areas for salmonid and cyprinid fisheries.	a) Investigate possible designation of river lengths currently fished but not designated dependent on DoE approval.	J	L	U						

4.6 Water Quality

The Avon is essentially a lowland river characterised by a large population in the upper catchment. It is the sewage effluent derived from these settlements that provides the bulk of the flow under dry weather conditions. This can be as much as 80% of the flow for the Upper Avon near Warwick, and still represents 40-50% at Tewkesbury. The impact of sewage effluent on the river has led to the catchment being designated as a sensitive area under the EC Urban Waste Water Treatment Directive.

Within the Avon Catchment, 996km of Rivers and Canals are classified for water quality purposes. Most of the rivers are either Class 1B or 2 which is good or fair quality, 33.5km are very good (Class 1A) while 30.7 km. are poor (Class 3). There are no Class 4 rivers in the catchment.

In 1992, 85 km of rivers failed to meet quality objectives - 50.2km of these were new failures since 1990. Currently there are capital schemes in progress that should remedy some of the 1990 failures caused by sewage works, but more recent failures are unlikely to be remedied unless there is a requirement to meet quality conditions under an EC Directive. This is due to the tighter price limits that were imposed by OFWAT in the recent review of water company expenditure for the next ten years. Any expenditure to improve water quality above that required to meet statutory obligations will have to be approved by the Department of Environment. Water industry investment is governed by Asset Management Plans - See Glossary for details.

Biological water quality (as measured by the distribution and occurrence of pollution sensitive and insensitive macro invertebrates) is generally good and 12 of 16 biological monitoring sites are of higher biological than chemical class especially in the lower reaches.

There are 137 km of canals in the catchment and as these are fairly static bodies of water they are prone to blue-green algal blooms. Indeed, the same is true for River Avon which exists for much of its length as a series of inter-connecting lakes. Blue-green algae may be toxic to man, harmful to wildlife and give rise to treatment problems for abstracted water.

The reach from Barford to Alveston is one remaining stretch where the river enjoys its original course and this provides much-needed self purification.

Protecting the surface water abstractions on the Avon and Leam is of major importance in the catchment. There is an increasing risk of spillages resulting from motorway accidents. The M1, M6, M40, M42 and M45 motorways cross the catchment. Pesticides and nitrates pose a further risk of pollution.

Between 1991 and 1993 there were approximately 2,500 reported pollution incidents in the catchment of which around 90 were considered to be major incidents.

4.7 Fisheries

The River Avon is recognised as an important coarse fishing venue by angling clubs and individual pleasure fishermen alike. Over most of its length the river supports healthy populations of both coarse fish and eels. Eels are caught by both rod and line anglers and commercial fishermen. For many years the river has been an important match venue and the World Championships were held at Luddington in 1981.

Several tributaries of the River Avon such as the Alne, Stour, Isbourne and Bow Brook contain stable mature wild brown trout populations, especially in their upper reaches.

Within the Avon Catchment there are 401 km of river and canal designated under the EC Fisheries Directive as cyprinid (coarse) fishery, the majority of which is on the Avon. There are 71 km of designated salmonid fishery within the Alne, Stour, Isbourne and Bow Brook sub-catchments.

Fish populations are very much dependent on the variety and quality of the habitat and the quality and quantity of water present. The control of demand for water and the maintenance of water quality standards are therefore of paramount importance to fisheries. Low flows have been identified as a problem in a number of tributaries of River Avon and long term solutions are needed to alleviate these problems.

Fishery habitat has been significantly affected in the past by the construction of weirs, use of the river for navigational purposes and bankside and channel works for flood alleviation purposes. This has resulted in restricted access to gravel spawning grounds, greater limitations on population movements and degraded habitats. Spawning and nursery areas need to be protected and movement facilitated throughout the river.

4.8 Land Use and Landscape

Predominantly rural, the main Avon is a wide lowland river, flowing through a broad flood-plain, but occasionally constrained by steep wooded hills. While in urban areas the river is straightened and channelled, it also has some of the most scenic and secluded reaches on any British river. The need to preserve historic settlements, ancient parkland and valuable lowland habitat have to be reconciled with the uses of pastoral and arable agriculture and the very specialised horticultural production in the Vale of Evesham. The visual and cultural value of the landscape and settlement pattern is already recognised in designations and policy documents such as the Warwickshire Landscapes Guidelines.

DREDGING RIVER AVON AT BINTON

4.9 Conservation

The catchment is of high conservation value with a rich flora and fauna supporting a wide variety of habitats which improve towards the headwaters of the tributaries and away from settlements. The majority of Sites of Special Scientific Interest (SSSI's) are water dependent (55 out of 89 in the catchment). By contrast the distribution of locally designated conservation sites shows clearly that all watercourses are valuable nature conservation resources.

Rare species such as the marsh warbler, otter, club-tailed dragonfly and the black poplar are being protected and, where appropriate, promoted.

The Upper Avon and tributaries are small to medium sized rivers, naturally well-vegetated but too often showing the impact of man's presence in loss of habitat and degraded channel profiles.

The lowland agricultural landscape of the floodplain and river basin is predominantly pastoral, but intensifies in the horticultural holdings of the Vale of Evesham. Agricultural practices have, over the years, encouraged a loss of bank and margin habitat, and all forms of river-related vegetation such as wetland, marsh or reedbed.

The use of fertilisers and pesticides to boost productivity may have affected the ecology of River Avon and its tributaries. Wildlife cover in the form of hedgerows, scrub, copses and banktop vegetation has been lost.

Satellite photography shows 7% of the catchment to be urban, 49% arable and 31% grassland.

4.10 Navigation

The Avon is navigable by means of locks up to Alveston, immediately upstream of Stratford-upon-Avon, while the Avon ring provides a circular route by using the Grand Union or Stratford Canals, Worcester and Birmingham Canal and the River Severn (109 miles).

The possible extension of navigation on the River Avon upstream of Stratford-upon-Avon is of concern.

CANAL OVERFLOW UPSTREAM OF LEAMINGTON

4.11 Recreation

The catchment provides an easily accessible resource for the West Midlands Conurbation. Sailing, recreational boating and canoeing occur sporadically, while angling is a major recreational activity.

Footpath access to the Avon is restricted and few linear paths exist, although access is available at key points.

Human activities such as navigation, angling and other forms of access put pressure on habitat and wildlife. One activity is often in conflict with another, for example, angling and navigation or recreational access with nature conservation.

The management of the catchment to provide a sustainable resource is essential to all users.

4.12 Summary of Catchment Uses and Activities

Seventeen catchment uses were identified in the Consultation Report:

Development
Flood Water Conveyance and Storage
Conservation - Ecology
Conservation - Landscape and Archaeology
Amenity/Recreation
Navigation
Fisheries Ecosystem
Angling and Commercial Fishing
Abstraction for Potable Water - Surface Water Sources
Abstraction for Potable Water - Groundwater Sources
Agricultural Abstraction
Livestock Watering
Industrial Abstractions
Water Power
Sewage and Industrial Effluent Disposal
Mineral Working
Waste Disposal to Land

These catchment uses have been taken into account in the Action Plan which is on an issue-by-issue basis.

Catchment Key Details

Catchment Details	Area	2,893 km²
	Population (Estimate)	912,000
Topography	Source of Avon	190m (AOD)
	Confluence with Severn	11m (AOD)
	Highest point in Catchment	330m (AOD)

Main Towns and Land Use

Main towns and cities are Coventry (300,000), Warwick and Leamington (73,000), Redditch (62,000), Rugby (60,000) and Stratford (21,000).
The urban area accounts for 7% of the catchment while 49% is arable and 31% is grassland.

Water Quality

Length of river in National Water Council Class*, comparing present quality with River Quality Objective (RQO).

		Present Quality (km)	RQO (km)
Class 1A	(Very Good)	33.5	27.5
Class 1B	(Good)	402.8	468.8
Class 2	(Fair)	534.4	499.4
Class 3	(Poor)	30.7	8.5
Class 4	(Bad)	None	None

Number of Discharge Consents	1012
comprising:	
sewage and storm overflows	373
private sewage works	420
industrial	69
agricultural	150

Water Resources

Average annual rainfall	672 mm/year
Total licenced abstraction	129,606 megalitres per year
Mean flow of Avon at Tewkesbury	2,660 megalitres per day
Number of licensed abstractions	1,548
of which:-	
Groundwater	795
Surface Water	753

Flood Defence

Length of main river in catchment	514km
No. of Flood Alleviation Schemes	13
Operational sluices/pumping stations	10

Fisheries

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

Salmonid	71.4km
Cyprinid-River	263.0km
-Canal	138.0km

Conservation

Sites of Special Scientific Interest 89 (Water based 55)

*NWC/DoE scheme has been used for continuity. The NRA's new scheme of classification (General Quality Assessment) will be introduced when the plan is reviewed in 1995.

5 ACTION PLANS

Implementation of the plan is based around the 34 key issues set out below. These have been modified where appropriate in the light of the consultation responses and their resolution is considered necessary in order that the plan can be successful in achieving real improvements within the Catchment.

The issues are presented with a number of actions, a target timetable and the identification of responsible parties. Where possible, costs have been outlined for the period covered by the plan. This does not necessarily reflect the total cost of the schemes. This document is produced in good faith, recognising current priorities both in the NRA and other organisations.

The plan will span a five year period and will be reviewed annually.

Key

LEAD	N	NRA.
	J	Joint NRA and others.
	O	Mostly others.
ACHIEVE	H	High, generally few parties involved, clear cut responsibilities.
	M	Medium, may be several parties involved, more complex problems.
	L	Low, many parties involved, may be high cost.
	>	Greater than
	<	Less than
	U	Unknown at this time

A number of actions will require feasibility studies and appraisal of options prior to work commencing. In some cases, depending on the outcome of these studies and investigations, further action may not be required. Any action identified will be subject to funding availability. A number of the projects may take longer than indicated, owing to funding availability and government policy.

Where possible an entry has been made in the year column(s) to indicate times for identified actions, but many activities are either under development or ongoing and it is considered inappropriate to specify.

During the consultation process three issues that were originally identified have been eliminated. These were:

Issue 8
The Avon and Contact Sports. This was eliminated as this Authority does not hold any statutory responsibility in this area.

Issue 33
Close Season Evasion. The introduction of a national close season for coarse fishing should eliminate these problems.

Issue 36
Changes in Local Government Structure.

In addition a new issue has been identified:
Issue 30
Navigation and boating on inland waters

No.	ISSUE	ACTIONS	RESPONSIBILITY		TOTAL COST (£K)	1994/95	1995/96	1996/97	1997/98	1998/99	FUTURE
			LEAD	ACHIEVE							
1	Changes in the ecology of the river by increasing nutrient levels derived from sewage effluents and agriculture.	a) Research and monitoring of eutrophication in Lower Severn Area. Subject to evaluation of year 1 and funding availability.	N	H	412						
		b) Treatment of sewage effluent for phosphorus and/or nitrogen. EC Directive including AMP II spending by STW LTD.	O STW Ltd	M	>50,000						
2	Compliance of river reaches with River Quality Objectives.	a) Extension of existing sewage works. Work not fully covered by AMP II extend to AMP III.	O	L	U						TO 2010 Ongoing
		b) Recommend planning restraint to LA's where existing sewage works are unable to take further development.	J	M	U						
		c) Encourage remedial measures on contaminated land.	J allocated by LA's	H	1000 to 2000						
3	Effect of agricultural activity on compliance with EC Directive on quality of water abstracted for drinking water and general river ecology.	a) Full use of and support for National and EC legislation to protect environment.	J	M	30pa (NRA)						
		b) Promotion of Good Agricultural Practice.	O	L	60pa (NRA)						
4	Pollution of rivers and groundwater arising from urban storm overflows.	a) Improve modelling of storm overflows.	N	H	See 30(e) 10						
		b) Better liaison with Water Companies on sewerage matters.	J	H							
		c) Control of "first flush" storm sewage.	J	M	U						Post 2005.
		d) Objection to development in areas of inadequate sewerage.	J	M	U						

No.	ISSUE	ACTIONS	RESPONSIBILITY		TOTAL COST (£K)	1994/95	1995/96	1996/97	1997/98	1998/99	FUTURE
			LEAD	ACHIEVE							
5	Pollution of rivers and groundwater arising from contaminated land sites and industrial sites.	a) Environmental assessment and study on planning applications concerning contaminated land sites, maintain liaison with Waste Regulation Authority and impose planning conditions & Section 106 agreements.	J	H	90pa	═══	═══	═══	═══	═══	
		b) Encourage Engineering & Waste Management solutions.	O	M	U						
6	Determination and enforcement of consent conditions for major sewage treatment works.	a) Maintain monitoring capability with possible new continuous monitors on Arrow and Lower Avon.	N	H	80	═══	═══	═══	═══	═══	
		b) Use high quality data in consent review dependent on need and AMP II restrictions.	N	M	U				═══	═══	
7	Pollution from inadequate rural sewerage.	a) Identify impact of inadequate rural sewerage in Catchment.	N	H	20	═══					
		b) Identify methods of funding provision for rural sewerage and lobby for new legislation.	J	L	U	═══	═══	═══	═══	═══	
8	Foaming at weirs in the Lower Avon.	Continue analysis of detergents in sewage works and rivers. Sewage works samples from Coventry, Warwick, Rugby and Redditch and river samples from below Evesham.	N	H	20	═══	═══	═══	═══	═══	
9	Water quality issues associated with canals and river navigation.	a) Control quality of canal overflow discharges, diversion of overflows to less sensitive watercourse, press for polluting discharges from vessels to become an offence and compliance of boats with British Waterways standards.	N	M	10	═══	═══	═══	═══	═══	

No.	ISSUE	ACTIONS	RESPONSIBILITY		TOTAL COST (£K)	1994/95	1995/96	1996/97	1997/98	1998/99	FUTURE
			LEAD	ACHIEVE							
10	Operation of the Avon sluices for maximum benefit to river users.	a) Interested parties to review operating guidelines for Avon sluices.	N	H	U	—					
		b) Farmers to be made aware of risks in growing high value cash crops in flood plain.	N	M	U		—				
11	Inadequate definition of the flood plain.	a) Install more level and flow gauging stations.	N	H	U		—	—			
		b) Ground level surveys and computer modelling.	N	M	264	—	—	—			
		c) Update flooding Survey for S105 Water Resources Act 1991.	J	M	U						
12	Control of development, including caravan sites, in flood plain.	a) Press for policies to be included in local plans to protect flood plain from development.	J	M	U	—	—	—	—	—	
		b) Press for policies in local plans to remove redundant structures from flood plain.	J	L	U	—	—	—	—	—	
		c) Define flood plain better.	N	M	U	—	—	—	—	—	
13	Flooding problems on Ordinary Watercourses.	a) Encourage riparian landowners to maintain watercourses.	O	L	U	—	—	—	—	—	
		b) Local Authority to serve notice on landowners for the removal of illegal structures.	J	M	U	—	—	—	—	—	
		c) District councils to carry out flood alleviation.	J	L	U	—	—	—	—	—	
		d) Improve control of new structures through planning liaison.	J	M	U	—	—	—	—	—	

No.	ISSUE	ACTIONS	RESPONSIBILITY		TOTAL COST (£K)	1994/95	1995/96	1996/97	1997/98	1998/99	FUTURE
			LEAD	ACHIEVE							
14	Extensions to Main River.	a) Variation to the 'main river' map to include watercourses currently designated 'ordinary'. Battleton Brook, Glebe Farm Brook, Guilders Brook.	N	M	U		—				
15	Provision of Flood Alleviation Schemes on Main River.	Protection schemes i) Beoley-floodbank constructed.	N	M	21	—					
		ii) Stratford & Bridgend FAS.	N	M	453		═══	═══	═══	═══	═══
		iii) Ongoing programme of maintenance on all main River.	N	H	500pa	═══					
16	Maintenance of weirs and other structures.	i) Abbey Mill Sluice reconstruction.	N	H	912	—					
		ii) Lucy's Mill Sluice, Pershore, Nafford & Stanchard Pit sluices reconstruction	N	H	712	═══	═══	═══			
		iii) Fladbury weir reconstruction	N	H	98	═══	═══				
		iv) Evesham & Chadbury reconstruction	N	H	344	═══					
		v) Berwick Brook & Harvington weirs	N	H	30		═══				
		vi) Alscot Park feasibility	J	H	U	═══					
		vii) Avon Weirs Trust Ongoing	J	H	1000						
17	Increased pressure for the development of hydropower.	a) Development of National Policy and Guidance document	J	M	U	═══	═══				
		b) Viability and impact assessments on other users at 4 sites on Avon in connection with proposed Capital refurbishment.	N	H	13	═══					
18	Responsibility for Flood Defence duties & powers.	a) Provide information on duties, powers and responsibilities for flood defence to all responsible parties.	J	L	U	═══	═══	═══			
		b) Encourage all responsible bodies to exercise their powers & responsibilities.	N	M	U	═══	═══	═══	═══		

No.	ISSUE	ACTIONS	RESPONSIBILITY		TOTAL COST (£K)	1994/95	1995/96	1996/97	1997/98	1998/99	FUTURE
			LEAD	ACHIEVE							
19	Mineral Extraction leading to increased flood risk and possible loss of local water supplies.	i) Increase input to Mineral Local Plans.	N	H	U	—	—	—	—		
		ii) Investigate use of Conservation Notices where appropriate.	N	H	U	—					
20	Assessment of the water resources capacity of the Cotswold Limestones and Offenham River Gravels.	a) Hydro-geological investigation of Cotswold Aquifer with identification of suitable springs and boreholes for monitoring.	N	H	5	—					
		b) Hydro-geological investigation of Offenham gravels with identification of monitoring wells and boreholes.	N	H	5		—				
21	Abstraction licence policy in the Coventry Groundwater Unit.	a) Review aquifer recharge to assess water balance for each sandstone horizon.	N	H	10		—				
22	Groundwater abstractions for potable supply affecting surface water flows in the River Sherbourne and Bow Brook.	a) Identify possible compensation boreholes to provide flow in rivers under dry weather conditions.									
		i) Bow Brook support	N	H	25		—				
		ii) Sherbourne support	J NRA	M	50			—			
		b) Consider other options such as large balancing ponds associated with developments. Feasibility study	N	H	7	—					
23	Lack of water for spray irrigation in summer months particularly in the Vale of Evesham	a) Provision of flow support for Badsey Brook.	J NRA	M	50			—			
		Feasibility study for Badsey Brook flow support	N	H	7	—					
		b) Feasibility study into local abstraction rotas.	J	M	U			—			

No.	ISSUE	ACTIONS	RESPONSIBILITY		TOTAL COST (£K)	1994/95	1995/96	1996/97	1997/98	1998/99	FUTURE
			LEAD	ACHIEVE							
24	Improved data required for better management of flood warnings, low flows and the setting of consents to discharge to watercourses.	a) Improvement to existing gauges	J	M							
		i) Besford Bridge	N	H	85	═══					
		ii) Offenham (Badsey Brook)	N	H	100		═══				
		b) Review number of interrogable river level, flow and rain gauges	N	H	U			═══			
25	Specification of environmental requirements of the river and its plant, animal and fish life for setting prescribed conditions.	Fundamental research into in-stream flow requirements.									
		i) Feasibility on Bow Brook.	N	H	5	═══					
26	Low flows on the Upper Avon.	a) Subject to satisfactory cost/ benefit analysis negotiate operating agreements with British Waterways or Severn Trent Water to provide more in-river flow.	J	M	U			═══			
		b) Ensure compliance with original agreements. British Waterways Scheme for Naseby Feeder.	O BW	H	170	═══	═══	═══	═══	═══	═══
27	Diversion of sewage treatment works effluents to lower reaches of the catchment.	a) Be sure that consent review considers low river flow implications.	N	H	U	═══	═══	═══	═══		
28	Optimising the use of Draycote Water support to the River Leam for the benefit of the river and the quality of abstracted water at Leamington.	a) Encourage use of shared quality data on the Leam and investigate possibility of further continuous monitors.	J	H	U		═══				

No.	ISSUE	ACTIONS	RESPONSIBILITY		TOTAL COST (£K)	1994/95	1995/96	1996/97	1997/98	1998/99	FUTURE
			LEAD	ACHIEVE							
33	The protection, maintenance and development of trout, coarse fish and eel stocks.	a) Maintain and improve brown trout populations.	J	M							
		i) Pennyford Mill project R. Alne includes gravel scarification, restocking of young brown trout in many tributaries eg Bow Brook, Stour Finham Brook, Isbourne			20						
		b) Enhance coarse fishery by improvements.	N	H							
		1 i) Predator removal ii) Monitoring iii) Restocking			5pa 10pa 6-10pa						
		2 Installation of multi-species fish passes in weirs to facilitate movement of gravel spawners-chub, dace, barbel as part of Avon Weirs Refurbishment	N	H	90						
		3 Produce policy on mink control in consultation with MAFF EN & Wildlife Trusts	J	H	U						
34	Effect on the water environment of urban and infrastructure development.	a) Source control of run-off by balancing ponds or soakaways.	J	M	U						
		b) Ensure relevant comments are made on appropriate planning consultations	J	M	U						

6 FUTURE REVIEW AND MONITORING PROGRAMME

The NRA will be jointly responsible, with other identified organisations and individuals, for implementing this Final Plan. Progress will be monitored and normally reported annually. These reviews will examine the need to update the CMP in the light of changes in the Catchment. The period between major revisions will normally be five years.

The annual review will take the form of a short progress report prepared by NRA to include work achieved compared with that planned and to highlight any changes to the Plan. It will be sent to all those who responded to our consultation and considered at a forum to be held in October 1995.

APPENDICES

APPENDIX 1 –River Quality Objectives

River Class	Quality Criteria	Remarks	Current Potential Uses
1A	Class limiting criteria (95 percentile) i) Dissolved Oxygen saturation greater than 80% ii) Biochemical Oxygen Demand not greater than 3mg/l iii) Ammonia not greater than 0.4mg/l iv) Where the water is abstracted for drinking water, it complies with requirements for A2** water v) Non toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available).	i) Average BOD probably not greater than 1.5mg/l ii) Visible evidence of pollution should be absent	i) Water of high quality suitable for potable supply abstractions and for all other abstactions. ii) Game or other high class fisheries. iii) High amenity value.
1B	i) DO greater than 60% saturation ii) BOD not greater than 5mg/l iii) Ammonia not greater than 0.9mg/l iv) Where the water is abstracted for drinking water, it complies with requirements for A2** water v) Non toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available).	i) Average BOD probably not greater than 2mg/l ii) Average ammonia probably not greater than 0.5mg/l iii) Visible evidence of pollution should be absent iv) Waters of high quality which cannot be placed in Class 1A because of high proportion of high quality effluent present or because of the effect of physical factors such as canalisation, low gradient or eutrophication v) Class 1A and Class 1B together are essentially the Class 1 of the River Pollution Survey (RPS).	Water of less high quality than Class 1A but usable for substantially the same purpose.
2	i) DO greater than 40% saturation ii) BOD not greater than 9mg/l iii) Where water is abstracted for drinking water, it complies with requirements for A3** water iv) Non toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available).	i) Average BOD probably not greater than 5mg/l ii) Similar to Class 2 of RPS iii) Water not showing physical signs of pollution other than humic colouration and a little foaming below weirs	i) Water suitable for potable supply after advanced treatment ii) Supporting reasonably good coarse fisheries iii) Moderate amenity value
3	i) DO greater than 10% saturation ii) Not likely to be anaerobic iii) BOD not greater than 17mg/l*	Similar to Class 3 of RPS	Waters which are polluted to an extent that fish are absent or only sporadically present. May be used for low grade industrial abstraction purposes. Considerable potential for further use if cleaned up
4	Waters which are inferior to Class 3 in terms of dissolved oxygen and likely to be anaerobic at times	Similar to Class 4 of RPS	Waters which are grossly polluted and are likely to cause nuisance
X	DO greater than 10% saturation		Insignificant watercourses and ditches not usable, where objective is simply to prevent nuisance developing.

Notes

a) Under extreme weather conditions (eg flood, drought, freeze up), or when dominated by plant growth, or by aquatic plant decay, rivers usually in Classes 1, 2 and 3 may have BOD and dissolved oxygen levels, or ammonia content outside the standard levels, for those Classes. When this occurs the cause should be stated along with analytical results.

b) The BOD determinations refer to 5 day carbonaceous BOD (ATU). Ammonia figures are expressed as NH_4.

* This may not apply if there is a high degree of reaeration.

** EEC category A2 and A3 requirements are those specified in the EEC Council Directive of 16 June 1975 concerning the Quality of Surface Water intended for Abstraction of Drinking Water in the Member States.

c) In most instances the chemical classification given above will be suitable. However the basis of the classification is restricted to a finite number of chemical determinands and there may be a few cases where the presence of chemical substance other than those used in the classification markedly reduces the quality of the water. In such cases, the quality classification of the water should be downgraded on the basis of the biota actually present, and the reasons stated.

d) EIFAC (European Inland Fisheries Advisory Commission) limits should be expressed as 95% percentile limits.

APPENDIX 2 – Water Quality Targets

Water quality is assessed against a number of control measures:

i) Compliance with River Quality Objectives (RQO) based on the National Water Council (NWC) target classes.
ii) Biological target classes.
iii) Compliance with relevant EC Directives.
iv) Compliance with Proposed Statutory Water Quality Objectives (SWQO).

River Quality Objectives are based upon water quality requirements for different river uses. The standards relating to the most sensitive use in a given stretch apply.

Biological assessment of the presence and abundance of aquatic invertebrates, in conjunction with sampling and analysis for some chemical parameters, provides a comprehensive indication of water quality.

As well as the RQO classification, European Commission (EC) Directives are also used to set quality targets for both ground and surface water.

a) the 78/659/EEC Fisheries Directive defines standards necessary to ensure that water quality is suitable for supporting fish populations.

b) the 76/464/EEC Dangerous Substances Directive deals with the discharge of substances considered harmful to the aquatic environment.

N.B. The Fisheries Directive applies only to designated stretches, whereas the Dangerous Substances Directive applies to all waters.

c) the Surface Water Abstraction Directive (75/440/EEC) must also be considered when setting consent conditions in the catchment.

d) the Nitrate Directive deals with the problem of nitrate pollution in surface and groundwaters for any designated areas.

e) the Urban Waste Water Directive does apply to the catchment.

(When a stretch is classified under an EC Directive additional Environmental Quality Standards apply).

APPENDIX 3 Glossary

Ammonia	A chemical compound found in water often as a result of pollution by sewage effluents. It is widely used to determine water quality. Ammonia detrimentally affects fish.
AMP II	Asset Management Plan II sets out the water industry's investment programme for the ten year period 1995-2005. AMP III will be the next phase of this programme.
Anaerobic	Living without free oxygen.
Blue-Green-Algae	Blue-green algae are organisms with some properties characteristic of both bacteria and algae. They are natural inhabitants of many inland waters, estuaries and the sea.
BOD	Biochemical Oxygen Demand. A measure of the amount of oxygen consumed in water (over 5 days), usually by organic pollution. Oxygen is vital for life so the measurement of the BOD tests whether pollution could affect aquatic animals.
Cyprinid Fish	Coarse fish belonging to the carp family, like roach, dace and bream.
DO	Dissolved Oxygen. The amount of oxygen dissolved in water. Oxygen is vital for life so this measurement is a test of the health of a river.
Eutrophication	The process of nutrient enrichment of waters. This enrichment can cause unsightly growths of algae and other biological changes in the water environment
Main River	The watercourses shown on the statutory 'Main River maps' held by NRA and MAFF. The NRA has permissive powers to carry out works of maintenance and improvement on these rivers.
95 Percentile	A level of water quality, usually a concentration which is not exceeded for 5 percent of the time.
Salmonid Fish	Game fish of the Salmon Family, eg trout and salmon.
SSSI	Sites of Special Scientific Interest. Designated by English Nature or the Countryside Council for Wales for their nature conservation & physiographic interest of at least regional importance or their earth science interest of at least national importance. Statutory set up under National Parks and National Heritage or advice from English Heritage or by the Access to the Countryside Act 1949 and Wildlife and Countryside Act 1981.

Notes on Abbreviations

AMP	=	Asset Management Plan
BW	=	British Waterways
Co Co	=	Countryside Commission
DoE	=	Department of the Environment.
EC	=	European Community.
EN	=	English Nature.
FAS	=	Flood Alleviation Scheme
H & W CC	=	Hereford & Worcester County Council
LA's	=	Local Authorities
MAFF	=	Ministry of Agriculture Fisheries & Food
OFWAT	=	Office of Water Services
pa	=	per annum
RSPB	=	Royal Society for the Protection of Birds
STW Ltd	=	Severn Trent Water Ltd
W CC	=	Warwickshire County Council
W DC	=	Wychavon District Council

APPENDIX 4 Responses to Consultation Document

Alcester Town Council
Allesley PC
Ashurch PC
Badsey & Aldington PC
Barnt Green Waters Ltd
Bearley PC
Bidford on Avon PC
Birmingham Anglers Association
Brailes PC
British Waterways
Charlecote Parish Meeting.
Cherwell District Council
T R E Chidley
Claycoton PC
Cookhill PC
Coventry CC (attended Forum)
CPRE Worcestershire Branch
Countryside Commission
H Crowther
Cubbington PC
English Heritage
English Nature
Feckenham Parish Council
Frankton Parish Council
Gloucester Fire & Rescue
Gloucester CC
Gould Rural Environment Ltd
Halford PC
Harborough DC
Harvington PC
HM Inspectorate of Pollution
Hereford & Worcester CC
P Holliday
Hook Norton P C
Inland Waterways Association
Kenilworth Town Council
Keresley PC
Lower Avon Navigation Trust
MAFF
Marton PC
Naseby PC
National Association of Boat Owners
NFU East Midlands Region
F A Newbould
Northamptonshire CC
Oxfordshire CC
Pershore Town Council
Priors Hardwick PM
The Ramblers
Redditch Borough Council
RSPB
Rugby BC (attended Forum)
Ryton on Dunsmore PC
Severn Trent Water
Soil Survey & Land Research Centre
Southam Town Council
Sports Council West Midlands Region
Stratford on Avon DC (attended Forum)
Stratford upon Avon TC
Studley
Tewkesbury Town Council
Tredington PC
UK Irrigation Association
Upper Avon Navigation Trust Ltd
Warwick Society
Warwickshire CC
Warwickshire & West Midlands Metropolitan Association of Parish & Town Councils
Warwickshire Health Authority
Warwickshire Wildlife Trust
Warwick TC
Welford PC
Welford-on-Avon PC
Wellesbourne PC
Welsh Office
J & P Whitehead
Wick PC
Wildfowl & Wetlands Trust
Withybrook PC
Wixford
Wolfhampcote PC
Wychavon DC
Wyre Piddle PC

NRA

National Rivers Authority
Severn-Trent Region

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