



THE WARWICKSHIRE AVON CATCHMENT  
MANAGEMENT PLAN  
CONSULTATION REPORT SUMMARY



NRA

*National Rivers Authority*

*Severn-Trent Region*

1994





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## YOUR VIEWS

The Warwickshire Avon Catchment Management Consultation Report is our review of the Catchment and the issues facing it. This summary document gives an overview of the Catchment, and lists the issues and suggested options for action.

We would like to hear your views on the Report and in particular:

- Have we identified all the issues?
- What do you think about the options proposed?

*To comment on the report please write to:*

**DR. R. A. BAILEY,  
NRA LOWER SEVERN AREA,  
RIVERSMEET HOUSE,  
NORTHWAY LANE,  
TEWKESBURY.  
GL20 8JU**

**Please send your comments in writing.**

**The closing date for response is Tuesday 28th, June, 1994.**

Requests for further copies of this summary document, the full Consultation Report or further information should be made to: Dr. Roger Wade at the above address or by calling Tewkesbury (0684) 850951.

# WARWICKSHIRE AVON CATCHMENT



## AVON SUB-CATCHMENT

- 10. Upper Avon (above Sowe Confluence)
- 11. Sowe
- 12. Leam
- 13. Mid Avon (Sowe confluence-Bidford)
- 14. Stour (Warwickshire)
- 15. Arrow & Alne
- 16. Badsey Brook
- 17. Lower Avon (Below Bigford)
- 18. Isbourne
- 19. Bow Brook

# KEY DETAILS

## CATCHMENT DETAILS

Area	2893 square km
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 Spa (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 the 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/yr
Total licensed abstraction	208,606 megalitres/yr
Mean flow of Avon at Tewkesbury	2,660 megalitres per day
Number of licensed abstractions	1548
Comprising	
ground water	795
surface water	753

## FLOOD DEFENCE

Length of main river in Catchment	514 km
Number 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	71.4 km
Cyprinid - River	263 km
- Canal	138 km

## CONSERVATION

Number of Sites of Scientific Interest (including 55 water based sites)	89
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## CATCHMENT VISION

- To ensure water quality is appropriate for the current and potential uses of the Catchment and the 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 operations do not adversely affect the ecology of the river
- 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 legitimate water resource demands are met where possible.
- 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 provide flood defences to 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 eel stocks by the provision of eel and elver passes.
- To enhance wildlife and encourage the spread of otters throughout the Avon Catchment.
- To seek the removal of unsatisfactory storm 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 others uses of the river.
- In all areas to work towards a sustainable water environment in the Avon Catchment.

# CATCHMENT OVERVIEW

## Introduction

The source of the River Avon is near the Civil War battlefield of Naseby (190 m AOD) on the Northamptonshire and Leicestershire borders. From here it flows in a south westerly direction towards Stratford and Evesham, finally joining the River Severn at Tewkesbury after a distance of 179 km. The main tributaries are the Rivers Leam and Arrow. Important smaller tributaries are the Rivers Sowe, Stour, Isbourne and Dene, and the Badsey and Bow Brooks.

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, Warwick, Stratford, Evesham, Lutterworth, Kenilworth and Redditch all lie within the Catchment. The population of the Catchment is around 900,000 of whom some 600,000 live upstream of where the M40 crosses the river near Warwick.

THE RIVER AVON  
AT TEWKESBURY



The Avon is a river of great natural beauty representing the very best in English landscape. It provides the perfect habitat for a wide range of birds, such as the kingfisher and marsh warbler. Many riverside plants, mammals and trees thrive in the catchment. The Avon is therefore recognised as a river of very special environmental importance.

The Avon is a major amenity enjoyed by many thousands of people and between Tewkesbury and Stratford the river is extensively used by canal holiday boats. Along the whole river the local economy benefits greatly from the tourism the river generates. The Avon is a major coarse fishery and has been the venue for the World Coarse Fishing Championships.

The river and tributaries have often been used as a source of water supply as well as a source of power. The protection of water resources from the effects of urbanisation and modern agricultural practises is very important in the Catchment. The river banks and floodplain also need protection. The environment has been adversely affected in the past by development, river drainage practices, use of pesticides and herbicides and extensive recreational use.

While there are undoubtedly 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 immediately below Rugby or the Sowe confluence at Coventry. Banks of foam were a common sight. Today there are fish along the whole river and foaming is restricted to small patches below weirs.

## Geology

Impermeable clays and mudstones dominate over 80% of the Catchment. The clays are found south east of a line running from Tewkesbury north eastwards through Stratford to the north of Rugby. To the northwest of this line lie the Mercia Mudstones. Both the clays and the mudstones provide only small quantities of groundwater, usually obtained from the minor sandstone bands in the mudstones and thin limestone beds in the clays. 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 parts of the Catchment more permeable strata occur which, in many places, are important underground water supplies. Sherwood Sandstones are found in small areas to the west of Redditch and outcropping in a long narrow strip running from Warwick north eastward to the immediate east of Coventry city centre. The sandstones are also found at depth in the Stratford area. Rocks of the Permo-Carboniferous age, comprising many thick sandstones beds, are found extensively in the Coventry-Meriden-Kenilworth area. Along the south eastward part of the Catchment limestones of the Inferior Oolite Series form the highground of the Cotswolds Edge.

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

## Hydrology

There is little variation in average rainfall across the catchment. Rainfall is recorded at 11 intensity rain gauge sites (see Fig. 2). The range is from 600 mm/year at Milcote to 752 mm/year at Chipping Campden. The average catchment rainfall is 672 mm/year and the normal loss through evaporation is 464 mm/year.

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

The average July soil moisture deficit of 80 mm means that in most years irrigation is required for crops in the catchment.

With the variation in geology rivers have different low flow characteristics. The dry weather flow in the Arrow, for example, is three times higher on a proportional basis than the Bow Brook. During dry weather, flows rapidly fall away causing concern for water resources, water quality and fishing interests.

## Monitoring Network

Within the Catchment there are 12 flow gauging stations, 8 level gauges, 11 intensity rain gauges and two water quality monitors which record continuously. The data is captured by a control computer system at Regional Headquarters, Solihull.

In addition to these continuous recordings some 8,000 chemical samples and 500 biological samples are taken each year to monitor the state of the Catchment.

## Flood Defence

The Avon and its tributaries are prone to regular flooding which is not confined to winter months. Floods of note occurred in 1900, 1936, 1947, 1960, 1968, 1979, 1981, 1992 and 1993.

The NRA's flood defence powers relate to the control of structures on all watercourses, and the carrying out of maintenance and improvement schemes on main river.

In addition to records at gauging stations there are flood level records at most bridges on the Avon and all its major tributaries. Aerial photographs were taken of the 1968, 79, 81 and 92 floods on the Avon, on the Leam in 1979 and on the Swift in 1992. On watercourses which are not main river (ordinary watercourses), information is not so detailed and the extent of flood plains has not been mapped.

TEWKESBURY SLICES AND  
DREDGING ON THE RIVER  
AVON AT BINTON



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

There are 514 km of main river in the Avon Catchment. While most main river urban flooding has been reduced by flood alleviation schemes the problem of frequent flooding on ordinary watercourses still exists. One significant issue is the consideration by the NRA of including problem watercourses as extensions to the main river network.

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 Avon, Leam, Stour and Arrow.

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 brush work, debris removal and weed cutting. These all help to maintain the flow capacity of the river.

The NRA issues consents for structures in, over, under or near a watercourse and works through the Local Planning Authority to control developments in the flood plain or those likely to cause flooding problems. Of special interest in the Avon Catchment at present is development around the River Swift at Rugby, mixed development draining to minor watercourses at Stratford, continuing expansion of Redditch New Town and substantial development at Tewkesbury where flood plain storage is at risk.

The numerous road schemes with their consequent problems of watercourse crossings and increased run-off are of concern. Examples are the M1-A1 link, M1 widening, M6 widening, Norton Lenchwick Bypass, and the A435 and A46 improvements.

## Water Resources

Surface waters and groundwaters are extensively abstracted across the Avon Catchment. There are a total of 1548 abstraction and impoundment licences of which 753 relates to surface waters and 795 are from groundwater. The volumes licensed for abstraction are 79,532 million litres per annum (Ml/a) for surface water and 50,074 Ml/a from groundwater giving a total potential abstraction of 129,606 Ml/a. The main uses of surface waters are public water supply (68%), cooling water (11%) and spray irrigation (10%). Groundwater uses are public water supply (76%), industrial (13%), mineral washing (6%) and spray irrigation (2%). For surface abstraction licensing purposes the Avon is split into 10 hydrometric sub-catchments. The sub-catchments can be divided into categories of criticality depending on the extent of abstraction, dry weather flow and impact on the environment. The Upper Avon, Leam, Badsey Brook and Bow Brook are very critical and are either closed for new licences or restricted to winter use only. In the Sherbourne, Arrow and Isbourne new licenses can only be used when the flow in the river is greater than that which is considered adequate to protect the river uses (a prescribed flow). There are no restrictions at present on the Middle or Lower Avon as the flows here are greatly enhanced by discharges from sewage works further up the Catchment. The main sewage works discharge at Finham near Coventry adds around 120 Ml/d of water initially abstracted from the River Severn.

The Upper Avon is a critical sub-catchment owing to abstraction for water supply and diversion of water to canals. Water is taken direct from the Avon at Stanford Reservoir and a further abstraction takes place just above Rugby at Brownsover. In the Upper Avon water is also diverted into the British Waterways canal system under old agreements, such as the Bevan James Agreement of 1811. While these are primarily agreements between Severn Trent Water and British Waterways, the NRA tries to ensure the environment is not affected. The NRA has no direct control over British Waterways abstractions.

Two major water supply intakes are found on the River Leam, one feeding Draycote Reservoir and the other at Leamington. Draycote is filled during the winter and can then be used to support the River Leam to allow abstraction at Leamington in the summer.

The Badsey Brook is a critical catchment as there are 158 licences for spray irrigation on what is a comparatively small river. Most of these licences are Licences of Right which means they cannot be easily restricted. The licenced volume is greater than the dry weather flow in the river. The water is primarily used for extensive horticultural activity in the Vale of Evesham.

For management purposes there are nine groundwater units within the Avon Catchment and the resource capacity has been assessed on the units of Sherwood Sandstone and the Coal Measures near Coventry and Warwick. No assessment of capacity has yet been made of the Cotswold Aquifer.

Three of the nine units are currently considered to be over abstracted and no further licences will be issued in the Bromsgrove, Coventry or Avon confined units. This over abstraction has led to low flows in the upper reaches of the Bow Brook at Redditch and the Sherbourne through Coventry.

Coventry is one of the last large cities in the Severn-Trent Region where significant quantities of drinking water are still obtained from local groundwater sources.

## 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 and is still 40-50% of the flow at Tewkesbury. The impact of sewage effluent on the river has led to the Catchment being nominated for sensitive area status under the European Union Urban Waste Water Directive.

Within the Avon Catchment 996 km of rivers and canals are classified for water quality purposes. Most of the rivers are Class 1B or 2 (402 and 534 km respectively) which is a good or fair quality. 33.5 km are very good (Class 1A) and 30.7 km poor (Class 3).

In 1992 85 km of river failed to meet quality objectives. 50.2 km of these failures were new since 1990. Currently there are capital schemes in progress that should remedy some of the failures caused by sewage works in 1990. More recent failures caused by sewage works are unlikely to be remedied unless there is a requirement to meet quality conditions under a European Directive. This is due to the tighter financial framework that is being imposed by the Government on water company expenditure. Any expenditure to improve water quality above that required to meet statutory obligations, will have to be approved by the water industry's financial regulator OFWAT and the Department of the Environment.

Biological water quality (as measured by the distribution and occurrence of pollution sensitive and insensitive macro invertebrates) is generally good (Class 1a or 1b) in the River Avon throughout its length, except at two sites (Little Lawford and Ashow) which are affected by sewage effluent. Twelve of the sixteen biological monitoring sites are of higher biological than chemical class especially in the lower reaches.

The Rivers Isbourne, Itchen, Leam, Dene and the Bow and Finham Brooks are all of good biological water quality (Class 1b) The Rivers Arrow and Swift and the Badsey Brook are of moderate quality (Class 2).

The Rivers Alne, Stowe and Stour are all generally of better biological quality than their chemical classification. However, the Rivers Sherbourne, Sowe and Cam, and the Bretforton, Cow Honeybourne, Gran, Marchfont and Noleham Brooks have poorer biological quality than expected from their chemical classification. There are a number of factors which give rise to this effect on biological quality including urban run-off, sewage effluents, agricultural inputs and run-off.

The 137 km of canal in the Catchment include the Stratford-upon-Avon, Worcester and Birmingham, Coventry, Grand Union and Oxford canals. Pleasure boating on canals and the Avon between Stratford and Tewkesbury gives rise to some oil and sewage disposal problems. The canals themselves are fairly

GRAND UNION CANAL  
OVERFLOW TO THE RIVER  
LEAM AT LEAMINGTON SPA





static water bodies and are prone to blue-green algal blooms. Overflows from the canals may then affect the Avon. As the Avon exists for much of its length as a series of interconnecting lakes, it has also been classified in recent dry summers as blue-green algae positive. The Upper Avon is also a sensitive sub-catchment in this respect. Blue green algae may be toxic to man, harmful to wild life and give rise to treatment problems for abstracted water.

The possible extension of navigation on the River Avon upstream of Stratford is of concern as the reach from Barford to Tiddington is the 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 (Junction 19 - M1/M6/A1 intersection is immediately over the River Avon). There is also the threat of pesticides and nitrates from agricultural point discharges and diffuse run-off. For example, there is a significant seasonal nitrate problem on the River Leam.

High nitrate levels are also found in some groundwater sources. The major concern for groundwater, however, relates to problems from land contaminated by industrial processes such as metal finishing, historic tipping and petrol storage.

There are 373 consented discharges of sewage, storm overflows, pumping stations and village drains issued to Severn Trent Water.

There are 420 private sewage discharges, 69 consented industrial discharges and around 150 agricultural discharge consents in the Catchment.

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



## Fisheries

The River Avon is recognised as an important coarse fishing venue by angling clubs and individual pleasure anglers alike. Over most of its length the river supports healthy populations of both coarse fish and eels. The eels are caught by both rod and line anglers and commercial fishermen who use licensed fyke nets, putcheons and eel weir traps. For many years the river has been an important match venue and the World Championships were held at Luddington (between Stratford and Evesham) in 1981.

Several tributaries of the Avon, such as the Alne, Stour, Isbourne and Bow Brook contain stable mature wild brown trout populations, especially in their upper reaches. Some rod and line fishing for these trout is carried out but the majority of trout anglers are to be found on stillwaters in the Catchment. Reservoirs and lakes of suitable quality can be stocked with trout, often rainbow trout, and make very popular trout fishing venues. Draycote Reservoir near Rugby is an example of such a water.

Within the Avon Catchment there are 401 km of river designated under the EC Fisheries Directive as cyprinid (coarse) fishery. The majority of classified water is on the Avon itself although the Leam is also a significant fishery.

There are 71 km of designated salmonid fishery within the Alne, Stour, Isbourne and Bow Brook sub-catchments.

During the 1992-93 season, 76 angling clubs were known to lease, rent or own water on the main River Avon between Rugby and Tewkesbury. Most fishing rights are in private ownership though the NRA does own the rights over some sections of the Avon.

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 the Avon and a number of its tributaries, and long term solutions are needed to alleviate these problems.

The quality of waters supporting both salmonid (trout) and cyprinid (coarse) fish should be maintained to comply with standards set in the EC Fisheries Directive. Fish populations will be monitored and managed where necessary to maintain the fishery potential.

Fishery habitat has been degraded in the past by the construction of weirs, use of the river for navigational purposes, and bankside and channel works for flood alleviation purposes. Some resident coarse fish spawn on submerged aquatic plants, others over or in gravel. These spawning and nursery areas need to be protected from disturbance at critical times of year. Trout spawning gravels on some tributaries have been degraded by sedimentation and improvement of these gravels is planned e.g. the River Alne, by fencing to prevent cattle poaching and by scarification of the gravels.

## Land Use and Landscape

The Avon Catchment lies to the south of the Midlands conurbation and it is bounded to the south by the northern scarp of the Cotswolds.

The main Avon valley is broad and meandering, flowing through a large floodplain, but occasionally constrained by steep wooded hills. Intrusions of sand and gravel occur and these have given rise to extensive extractions.

The Catchment has some of the finest stretches of natural lowland river habitat anywhere in the Midlands and has an extremely varied character.

DRAYCOTE WATER AN  
AERIAL VIEW SHOWING  
THE ARABLE NATURE OF  
THE CATCHMENT



While in urban areas the river is straightened and channelled, it also has some of the most scenic reaches on any British river. In some parts there is no public access and this results in very quiet, secluded and undisturbed habitats.

Predominantly rural, the river basin landscape is characterised by an agricultural and park land landscape with a settlement pattern of small villages. Many are of high conservation value, carrying conservation area or archaeological designations.

Early settlements were clustered along rivers as communication links, focusing on the location of bridging points and the use of water for power. The Stour, for example, abounds in mills and control structures, many of which have now fallen into disrepair.

The northern tributaries are protected in part by green belt and landscape designations; to the south of the main Avon, protection is afforded by the Cotswold Area of Outstanding Natural Beauty and further landscape designations.

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

## Conservation

The Catchment is of high conservation value with a rich flora and fauna. It supports a wide variety of habitats, including woodland, scrub, parkland, marshy grassland, water meadows, marsh, reedbed and natural rock exposures.

The quality of habitat improves generally towards the headwaters of the tributaries and away from settlement and the availability of public access.

The most special areas for nature conservation, Sites of Special Scientific Interest (SSSI's) occur mainly in the more remote parts, away from the main Avon, except for those related to the River Avon marsh warbler habitat. Of the 89 SSSI's in the Catchment, 55 are water dependent.

By contrast, the distribution of the county prime sites shows clearly that all watercourses are valuable nature conservation resources.

The rivers are abundant in plant communities, both submerged and emergent. Particularly notable are the widespread growths of yellow water lily, common club rush, arrowhead lily and amphibious bistort.

Birdlife is rich. Kingfishers and herons are seen frequently and the Catchment supports a varied bird population, including mute swan, mallard, moorhen, coot, snipe, curlew and lapwing. In the lower Catchment, the very rare marsh warbler still maintains a small population.

The creation of appropriate habitat and artificial holts has recently encouraged the return of the otter to the Catchment.

The Catchment is known generally to provide excellent invertebrate habitat. Within the last few years, the rare club-tailed dragonfly has extended its range from its previous territory on the Severn to the lower Avon as far upstream as Evesham.

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 in the Vale of Evesham. Agricultural practices have, over the years, encouraged a loss of bank and marginal habitat, and all forms of river-related vegetation, such as wetland, marsh or reedbed.

The use of fertilisers, herbicides and pesticides to boost productivity and diffuse pollution from silage and slurry storage may have affected the ecology of the Avon and its tributaries. Wildlife cover in the form of hedgerows, scrub, copses and banktop vegetation has been lost.

## Recreation

The Catchment provides an easily accessible recreational resource for the West Midlands conurbation.

The Avon itself is navigable by means of locks to Alveston, immediately upstream of Stratford. The Avon ring provides a useful circular route by using the Grand Union or Stratford Canals, the Worcester and Birmingham Canal and the River Severn resulting in a total loop of 109 miles.

Boat traffic is heavy, particularly in summer and speed limits are frequently disregarded, resulting in eroded banks and a loss of marginal vegetation. Active recreation such as sailing and canoeing occurs sporadically as far upstream as Warwick, often highlighting conflicting objectives between recreational uses and the natural environment.

Angling is a major recreational activity presenting its own conflicts in terms of bank erosion and vegetation loss. During the fishing season, watercourses are lined with both match and pleasure anglers.

A number of caravan sites are located in the floodplain of the Avon as well as some of the tributaries. They may be visually unattractive and take up some of the best watermeadows. These sites are at risk from flooding and may increase flooding elsewhere.

Footpath access to the Avon is restricted. Few linear footpaths exist, probably due to the pattern of land ownership and agricultural holdings.

Human intrusion, through navigation, angling and other forms of access puts 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 vital to all users.

PLEASURE BOATING ON  
THE RIVER AVON



## ISSUES AND OPTIONS

The following tables list the 36 issues which the NRA has identified within the Warwickshire Avon Catchment. We would like to hear from you if:

- You think that there are other issues which have been missed.
- You think that we have not considered all the options available.
- You have any views on the options suggested.
- You have any other information about the catchment or any other comments about its future management.

Options / Actions	Responsibility	Benefits	Constraints
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ISSUE 1: EUTROPHICATION AND ALGAL BLOOMS			
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1. Treatment of Sewage effluent for Phosphate.	Severn Trent Water NRA Department of Environment (DOE)	Reduced algal growth. Significant improvements in river by treatment at 5 sites.	High cost, requires designation of Avon as sensitive area by DOE. Implementation by Severn Trent Water.
2. Encourage Code of Good Agricultural Practice and designation of Nitrate Vulnerable zones (possible designation of River Leam).	Ministry of Agriculture Fisheries and Food NRA	Reduction in nitrate run-off from farmers.	Staff resource requirement to enforce. Possible reduction in crop yield for farmers.
3. Research and monitoring on Algal bloom formation.	NRA	Better understanding of causes.	Resource requirement and long time scale.
4. Use chemical or biological methods to control algae. (Possible sites are Bittell Reservoir and canal overflow to Leam).	NRA British Waterways Riparian Owners	Low cost effective short term control.	Only local benefit. Success uncertain. Not long term solution.

ISSUE 2: COMPLIANCE OF REACHES OF RIVER IN CATCHMENT WITH RIVER QUALITY OBJECTIVES			
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1. Extension of existing sewage works. Possible sites include Corley, Manks Kirby, Snitterfield, Wellesbourne, Chipping Campden, Wootton Wawen, Snowhill and Pershore.	Severn Trent Water	Improvement of water quality.	Cost of additional treatment to be approved by the Office of Water Services (OFWAT)
2. Recommended planning embargo in sewage works catchment area until remedial works undertaken. Sites as for Option 1.	Local Authorities NRA	Ensures no further deterioration. Low cost option.	Precludes development in area.
3. Investigate farm pollution. Proposed action: Brefforton Brook	NRA Landowner / Tenant	Improvement in quality. Grants available for remedial measures.	Costs to farmer for additional treatment.
4. Investigate diffuse source problem. Proposed action: Upper Arrow.	NRA	Improve water quality.	Resource demands.
5. Encourage remedial measures on contaminated land Proposed action: River Swilgate, Marle Hill Tip.	NRA Landowners Local Authorities	Improve water quality.	Cost may exceed land value.

Options / Actions	Responsibility	Benefits	Constraints
<b>ISSUE 3: EFFECTS ON RIVER QUALITY FROM DIFFUSE AGRICULTURAL RUN-OFF CONTAINING NITRATES HERBICIDES AND PESTICIDES</b>			
1. Promotion of good Agricultural Practice. Particular areas of concern are the Upper Avon and Leam Catchment.	NRA Ministry of Agriculture Fisheries and Food (MAFF) National Farmers Union (NFU)	Low cost to Farmers, abstracted waters meet quality standards.	Resources for Advisory visits, etc.
2. Full use of and support for National and E.C. legislation to protect environment.	NRA MAFF	Reduction in surface water nitrates and pesticides, abstracted waters meet quality standards.	Restriction on farming practise. Enforcement resources required.
3. Research to establish environmental standards for pesticides.	NRA MAFF	Better targeting of resources. Protection of river life from pesticide toxicity.	Cost/time scale, number of pesticides to investigate.
<b>ISSUE 4: POLLUTION OF RIVERS AND GROUNDWATER ARISING FROM URBAN STORM OVERFLOWS</b>			
1. Improve modelling of storm overflows.	NRA Severn Trent Water and agents	Improved design and control of storm discharges.	Resource implications.
2. Imposition of temporary consents while drainage studies progress.	NRA Severn Trent Water and agents	Short term control of problem.	Not long term solution.
3. Control of 'first flush' storm sewage from sewage works and sewer outlets. Possible sites for action are Coventry and Redditch.	NRA Severn Trent Water and agents	Controls waste quality discharge.	Costs to Severn Trent Water and customers.
4. Objection to development in areas of inadequate sewerage.	Local Planning Authorities NRA	Prevents further quality problems.	Requires co-operation with Local Authorities. Cost of new sewers.
5. Better liaison with Water Companies on Drainage area studies and Capital Programme.	NRA Severn Trent Water	Allows planned infrastructure investment.	Possible commercial confidentiality of information.
<b>ISSUE 5: POLLUTION OF RIVERS AND GROUNDWATER ARISING FROM CONTAMINATED LAND, LANDFILL AND INDUSTRIAL SITES</b>			
1. Impose planning conditions and agree associated Section 106 agreements on redevelopment of affected sites.	NRA Local Authorities	Sets up requirement for monitoring.	Resource implications.
2. Encourage Engineering and Waste Management solutions. Possible Sites include Cathorpe and Hawkesbury Tips.	NRA/HMIP/Landowners Local Authorities Waste Regulation Authorities	Controls existing problems. Good schemes may save energy and money. Sites can be made fit for development.	Requires co-operation of landowners. Initial capital cost.
3. Maintain liaison with Waste Regulation Authorities.	NRA Waste Regulation Authorities	Better inspection and monitoring of sites. Enforcement of remedial action.	None identified.
4. Maintain database of information on existing contaminated land sites.	NRA Local Authorities	Identify possible problems with development proposals. Identifies possible source of pollution problems.	Sensitive issue for landowners. Reduction of value of land if data misused. Contaminated land register rejected by government.
5. Recommended environmental assessment and scope of study on significant planning application concerning contaminated land.	NRA Local Authorities	Full identification of environmental problems.	Costly and time consuming, not relevant for all sites.
6. Close co-operation with Fire Services to ensure that environmental hazards are known and action plans agreed.	NRA Local Fire and Rescue Services Industrial Site Owners	Minimise implications of fire to water environment.	Resource required for site surveys.

Options / Actions	Responsibility	Benefits	Constraints
<b>ISSUE 6: SETTING AND ENFORCEMENT OF SEWAGE WORKS CONSENT CONDITIONS TO MEET STATUTORY WATER QUALITY</b>			
1. Use high quality data in consent review. Prime sites are Coventry, Rugby, Stratford, Warwick and Redditch.	NRA	Better protection for environment, confidence in requirements.	Cost of increased data collection.
2. Maintain monitoring capability with possible new continuous monitors on Arrow and Lower Avon.	NRA	Aid to enforcement provides long term quality data.	Expensive to maintain. Only a few possible pollutants measured.
3. Develop strategy for appraising	NRA Severn Trent Water	Reduction of NRA resource. Maintains effective monitoring.	Public perception of self-monitoring.
<b>ISSUE 7: POLLUTION FROM INADEQUATE RURAL SEWERAGE</b>			
1. Identify impact of inadequate rural sewerage in Catchment. Over 50 sites in Catchment including Hawke Mill (near Coventry) and Peapleian.	NRA Severn Trent Water Private Sewage Work Operators.	Knowledge of extent of problem.	Requires co-operation from many organisations.
2. Identify methods of funding provision for rural sewerage.	NRA Department of Environment Severn Trent Water Local Authorities	More schemes to prevent pollution.	Time consuming to organise - cost to householders.
3. Lobby for new legislation if necessary.	NRA Department of Environment Local Authorities	To cover areas presently not addressed.	Legislation liable to take a long time.
4. Include policies in Local Plans to prevent further problems in critical areas.	Local Authorities NRA	Existing problem areas do not become worse.	Not a long term solution.
<b>ISSUE 8: THE AVON AND CONTACT SPORTS</b>			
1. Education on problems of contact sports in relation to water quality. Target users on lengths of river used for canoeing - Fladbury and Bredon.	NRA Environmental Health Department Local Authority	Prevention of disease.	Still a very uncertain area - not statutory NRA responsibility.
2. Identify Water Quality Standards for contact sports.	Local Authority Environmental Health Department NRA	Identification of suitable reaches of river for sports.	Not statutory responsibility - some liability may be implied.
<b>ISSUE 9: FOAMING AT WEIRS IN LOWER AVON</b>			
1. Continue analysis of detergents in sewage works and rivers. Sewage works samples from Coventry, Warwick, Rugby and Redditch. River samples from below Evesham.	NRA	Help to establish causes and main sources.	Cost of analysis and sampling.
<b>ISSUE 10: OIL POLLUTION FROM BOATS</b>			
1. Control quality of canal overflow discharges. Possible action: Overflow from Grand Union to Leam near Warwick.	NRA British Waterways (BW) Department of Environment	Controls spread of algal blooms or pollution.	Requirement for operating.
2. Diversion of overflows to less sensitive watercourse. Possible action as Option 1.	BW NRA	Removes impact on water supply abstractions.	Costs of new overflow.
3. Press for polluting discharges from vessels to become an offence.	Department of Environment	Quality improvement in rivers and canals.	Requires legislation.
4. Compliance of boats with British Waterways standards.	BW Upper and Lower Avon Navigation Trusts	Prevents oil contamination of bilge water and river.	Costs to builders and owners of boats.

Options / Actions	Responsibility	Benefits	Constraints
<b>ISSUE 11: OPERATION OF AVON SLUICES FOR MAXIMUM BENEFIT OF RIVER USERS</b>			
1. Interested parties to review operating guidelines for Avon sluices.	NRA / Navigation Trusts National Farmers Union (NFU)	Weirs operated to best advantage for water users.	May require greater control or more instrumentation.
2. Farmers to be made aware of risks in growing high value cash crops in flood	NRA NFU	Agricultural losses minimised. Conflicts with navigation reduced.	Loss of income for high value crops.
<b>ISSUE 12: INADEQUATE DEFINITION OF FLOOD PLAIN</b>			
1. Install more level and flow gauging stations. Possible sites: Rivers Alne and Swift, Piddle Brook, Sluices on Avon.	NRA	Better data for flood plain definition and advice to customers.	Capital cost of more stations and revenue cost to run them.
2. Ground level surveys and computer modelling. Priority sites: Avon (Evesham-Stareton), Rivers Arrow, Alne, Leam, Swift.	NRA	Flood plains can be identified without actual flood information. Improves data for development control.	Costly, time consuming, need to prioritise.
3. Update Flooding Survey for S105 Water Resources Act 1991. Priority sites - Wychavon District Council area.	NRA	Data available for use by Planning Authorities and in pre-planning applications by developers.	Maintenance of up to date maps requires constant technical input.
<b>ISSUE 13: CONTROL OF DEVELOPMENT, INCLUDING CARAVANS, IN FLOOD PLAINS</b>			
1. Press for policies to be included in local plans to protect flood plain from development.	Local Authorities NRA	New properties do not flood, existing flooding is not made worse, less call on emergency services.	Requires action by Local Authorities.
2. Press for policies in local plans to remove redundant structures from flood plain.	Local Authorities NRA	Existing flooding alleviated. Improvement to flood flow capacity. River returned to natural state.	As above - may have adverse financial implications to users of redundant structures.
3. Define flood plain better.	NRA	See Issue 12.	See Issue 12.
<b>ISSUE 14: FLOODING PROBLEMS ON ORDINARY WATERCOURSES</b>			
1. Encourage riparian landowners to maintain watercourses.	Local Authorities NRA	Improvement of local flood problems.	Does not alleviate all flooding problems.
2. Local Authority to serve notice on landowners for the removal of illegal structures.	Local Authorities	Risk of flooding decreases.	Only tackles a proportion of flooding problems.
3. District Councils to carry out flood alleviation schemes/improvement to watercourses. Remove grilles where possible or if needed for public safety reasons. Sites for action include Redditch, Evesham and Stratford.	Local Authorities NRA	Improvement of local flood problems.	Involves public expenditure. Some Authorities not willing to use powers or spend money.
4. Improve control of new structures through planning liaison.	Local Authorities NRA	Risk of flooding not increased.	Local Authority decision NRA only control culverts, etc. through Flood Defence Consents.
<b>ISSUE 15: EXTENSIONS TO MAIN RIVER FOR FLOOD DEFENCE PURPOSES</b>			
1. Variation to the 'main river' map to include watercourses currently designated 'ordinary'. Possible sites include Battleton Brook, Racecourse Brook and Sow Brook (Rugby).	NRA (after consultation with Local Authorities) submit to MAFF for variation.	NRA has greater powers of control. Ability to carry out maintenance and improvement works.	Riparian owners tend to believe that the NRA is 'responsible' for maintenance. Increased cost to NRA requiring adjustments to income from Council Tax.

Options / Actions	Responsibility	Benefits	Constraints
<b>ISSUE 16: REQUIREMENT FOR FLOOD ALLEVIATION SCHEMES (e.g. STRATFORD, EVESHAM, WARWICK, HIMBLETON)</b>			
1. Protection schemes to be implemented involving any or a combination of channel improvements, raised embankments and walls, balancing and flood storage areas or pumping schemes.	NRA	Protects life and property (housing and commercial) from flooding for events up to the design standard of the Flood Alleviation Scheme.	In order to qualify for MAFF grant aid the scheme must be economically justified – scheme will not be undertaken otherwise. Can give rise to a false sense of security as all FAS have a finite protection level i.e. it is likely that flooding will occur when the design standard is exceeded.
<b>ISSUE 17: OWNERSHIP AND RESPONSIBILITY OF RIVER STRUCTURES, CONSEQUENCES OF FAILURE</b>			
1. Assess structure for cost/benefit ratio to repair. Allow gradual collapse or removal if no detriment.	Riparian Owner.	Increased capacity for drainage.	Decreases bank stability upstream and downstream of the structure due to rapid drawdown.
2. Rebuild structure to standard.	Owner in consultation with NRA/Local Authority (consent required)	Retains previous uses and river environment.	Cost of repairs. May be re-instating a problem such as an obstruction to flow.
3. Rebuild structure to different standard.	Owner in consultation with NRA.	Retains uses. May remove problems associated with structure.	Increased costs over option 2.
4. Support Avon Weirs Trust	NRA	Maintains uses and safety of structures. Meeting environmental obligations. Guidance on issues available to	Possible resources implications to NRA.
<b>ISSUE 18: DEVELOPMENT OF HYDROPOWER</b>			
1. NRA policy to be produced in consultation with river users and Local Authorities on private and NRA owned weirs.	NRA	developers.	Pressure is immediate and formal consultation may not be possible in time.
2. Investigate viability of incorporating hydropower installations in any refurbishment.	NRA Riparian Owners	Introduction of hydropower.	Extra costs of feasibility studies.
<b>ISSUE 19: FLOOD DEFENCE DUTIES, POWERS AND RESPONSIBILITIES</b>			
1. Provide information on duties, powers and responsibilities for flood defence to all responsible parties.	NRA	Better understanding of responsibilities. Increased management of river system.	No guarantee that better information leads to action. Difficulties in reaching all responsible parties.
2. Encourage all responsible bodies to exercise their powers and responsibilities.	NRA	Increases management and maintenance of river system.	NRA has few powers of control over other responsible bodies.
<b>ISSUE 20: MINERAL EXTRACTION LEADING TO INCREASED FLOOD RISK AND LOSS OF WATER RESOURCES</b>			
1. Increase input to Minerals Local Plans.	NRA County Councils	Prevent immediate or long term impact on environment.	Resource requirement.
2. Investigate use of Conservation Notices where appropriate.	NRA	Under NRA jurisdiction.	Little experience of use to date.
3. Press for adequate protection measures for prevention of pollution by oil and solids.	NRA DOE	Prevention rather than amelioration of pollution.	Requires legislation to implement fuel oil regulations.
4. Where dewatering occurs flow to be directed to critical watercourses.	Local Authority NRA Site Owners	Safeguards critical fisheries and abstractions.	Extra costs may be incurred.

Options / Actions	Responsibility	Benefits	Constraints
<b>ISSUE 21: ASSESSMENT OF WATER RESOURCES CAPACITY OF COTSWOLD LIMESTONES AND OFFENHAM RIVER GRAVELS</b>			
1. Hydro-geological investigation of Cotswold Aquifer with identification of suitable springs and boreholes for monitoring.	NRA	Assessment of water resource capacity and environmental need.	May require inter-regional studies.
2. Hydro-geological investigation of Offenham gravels with identification of monitoring wells and boreholes.	NRA	Proper assessment of resource capacity.	Present over-abstraction may mean little positive results from investigation.
3. Vary licences in Offenham area to include requirement for meters.	NRA	Allows proper assessment of resource capacity and proper enforcement.	Compensation may need to be paid to licence holders.
<b>ISSUE 22: ABSTRACTION LICENCE POLICY IN THE COVENTRY GROUNDWATER UNIT</b>			
1. Review aquifer recharge to assess water balance for each sandstone horizon.	NRA	Maximises the water resource without affecting environmental requirements.	A complex aquifer which could result in a resource intensive investigation.
2. Encourage revocation of unused and review of under-used licences.	NRA	Ensures that the situation does not deteriorate by further uptake of resources.	Compensation required for licence holders unwilling to give up an asset.
<b>ISSUE 23: GROUNDWATER ABSTRACTIONS FOR POTABLE SUPPLY AFFECTING SURFACE WATER FLOW IN RIVER SHERBOURNE AND BOW BROOK</b>			
1. Review licences to ensure base flow in rivers maintained.	NRA Water Companies	Only real long term solution.	Costly to NRA in compensation, problems for licence holders in obtaining alternative water.
2. Identify possible compensation boreholes to provide flow in rivers under dry weather conditions.	NRA River Users	Possible 'quick fix' solution.	Does not provide long-term solution, possible further groundwater table lowering.  Long-term maintenance is a problem.
3. Consider other options such as large balancing ponds associated with developments.	NRA Local Authority's Developers.	Could be a design feature of a development.	
4. Encourage return of abstracted water upstream of groundwater abstraction Sites.	NRA	Maintain flow in rivers.	Most sewage works are downstream of groundwater abstraction areas.
<b>ISSUE 24: LACK OF WATER FOR SPRAY IRRIGATION IN SUMMER MONTHS IN BADSEY BROOK, UPPER AVON AND BOW BROOK</b>			
1. Encourage winter storage reservoirs.	NRA Abstractors MAFF	Security of supply and lower abstraction charges. Reservoirs may have amenity use.	High initial capital cost.
2. Provision of Catchment or local reservoirs.	Water Companies/Water Users / NRA	Provision of water in summer to all spray irrigators on supported rivers.	NRA not normally able to provide finance. Large storage reservoirs require high costs.
3. Encourage local abstraction rates.	NRA/NFU Local Abstractors.	Best use of available resources.	Requires high degree of local co-operation.
4. Encourage better irrigation techniques and crop growing which is less dependant on spray irrigation.	MAFF NRA NFU	Less requirement for abstracted water.	Disruption to present practise; finding new markets.
5. Continued enforcement activity to ensure abstractors are keeping to licensed quantity. Installation of meters where possible.	NRA	Fairer allocation of resources.	NRA may need to pay compensation for installation of meters.

Options / Actions	Responsibility	Benefits	Constraints
<b>ISSUE 25: IMPROVED DATA REQUIRED FOR BETTER MANAGEMENT OF FLOOD WARNING, LOW FLOWS AND SETTING OF CONSENTS ON RIVERS STOUR, ALNE, SWIFT AND UPPER AVON</b>			
1. Increase number of interrogable river level, flow and rain gauges.	NRA	Improve flood forecasting, increased confidence in low flow restrictions and setting consents to discharge.	Cost of new stations and maintaining data.
<b>ISSUE 26: SPECIFICATION OF ENVIRONMENTAL REQUIREMENTS OF THE RIVER AND ITS PLANT, ANIMAL AND FISH LIFE. SETTING PRESCRIBED FLOWS.</b>			
1. Fundamental research into in-stream flow requirements.	NRA	Protection of river flora and fauna and best use of water resources.	The suggested method is very resource intensive and will be some years before generally applicable.
<b>ISSUE 27: LOW FLOWS IN THE UPPER AVON</b>			
1. Ensure adequate dilution for major sewage works so that River Quality Objectives can be met.	NRA	River water quality is improved with increased flow.	Pollution cannot be solved by increased dilution but a balance has to be found.
2. Ensure compliance with original agreements.	NRA Severn Trent Water British Waterways	Maintain water for potable supply and in-river use.	Enforcement of legal agreements unclear.
3. Negotiate operating agreements with British Waterways or Severn Trent Water to provide more in-river flow.	NRA British Waterways Severn Trent Water	Provide environmentally acceptable flow.	Costs of alternative sources or back-pumping in canals.
4. Enforcement of compensation flow from Stanford reservoir.	NRA Severn Trent Water	Increases flow in river downstream of Stanford.	Difficult to enforce until problems further upstream rectified.
<b>ISSUE 28: DIVERSION OF SEWAGE WORKS TO LOWER IN CATCHMENT LEADING TO LOSS OF WATER RESOURCE</b>			
1. Ensure that implication of consent reviews on possible sewage works diversion are considered early.	NRA	Remedial options can be considered early.	Maintenance of water resources should not prejudice water quality improvement.
2. Diversions should be subject to Environmental Assessment (EA).	Local Authorities NRA Water Companies	Best option for environment should be found.	Costs of EA. Some diversions may not be subject to planning. Local Authority may not consider EA appropriate.
3. Maintain some flow from works by negotiating operating agreements.	NRA Water Company	Maintenance of adequate flow in river.	Costs to NRA for agreement. Maintenance costs for Water Company.
<b>ISSUE 29: LOSS OF SUPPLY WATER AND RIVER SUPPORT IN LOWER RIVER LEAM</b>			
1. Target Lower Leam for abstraction enforcement activity under low flow conditions.	NRA	Ensures Severn Trent Water can abstract majority of water released from Draycote.	May be seen as 'special case' by other abstractors.
2. Encourage use of shared quality data on the Leam and investigate possibility of further continuous monitors.	NRA Severn Trent Water	Discharges can be made from Draycote when quality is most favourable.	Costly to run and maintain.
3. Encourage Severn Trent Water to maintain support to the Leam whenever practicable.	NRA Severn Trent Water	Maintains good flow in Leam under dry weather conditions.	Severn Trent Water may prefer to use direct pipeline.

Options / Actions	Responsibility	Benefits	Constraints
<b>ISSUE 30: CREATION OF A STRATEGY TO RESOLVE CONFLICTS BETWEEN RECREATION, NAVIGATION AND CONSERVATION USES</b>			
1. Survey recreation, conservation and navigation uses and facilities and maintain database of records.	NRA	Allows strategy to be based on best current data. General public interest.	Some other organisations may consider this their responsibility.
2. Evaluate conflicts and devise a strategy to deal with them.	NRA Local Authorities User Groups Navigation Trusts	Protection of recreational resource and water quality.	Co-operation from many organisations required.
3. Promote exchange of information and understanding between users.	NRA User Groups	Better tolerance of other river users.	Primarily dependent on user groups.
4. Educate users on impact of recreation on environment.	NRA	Better use of resource by users.	Many user groups to target in Avon Catchment.
5. Promotion of footpaths for walkers where it does not conflict with conservation.	Local Authorities Landowners Countryside Commission NRA	Beneficial to recreational use.	Possible conflict with conservation and forestry interests.

### ISSUE 31: CONSERVATION AND REHABILITATION OF RIVER CORRIDORS

1. Assess impact of NRA's operational work on the environment including secondary impacts.	NRA	Ensures compliance with statutory obligations under EEC Directive 85/337.	Resources and staff training to achieve best practice.
2. Ensure relevant comments are made on appropriate planning applications.	NRA Local Authorities	Ensures development is compatible with sustainable wildlife resource and protection of river corridors.	Comments not always taken up by Planning Authorities.
3. Monitor effectiveness of environmental input to Licence and Consent applications.	NRA	Protection of river corridor and wildlife.	May extend time taken to process consents and licences.
4. Establish conservation strategy to ensure wise use of scarce resources.	NRA	Determination of priorities and assessment of impacts. Further baseline knowledge.	Long time scale required.
5. Encourage improvement to agricultural practice and creation of river corridor buffer zones.	NRA MAFF Landowners	Reinstatement of river corridor vegetation and improvement in quality of habitat. Restriction in use of herbicides close to river corridor.	NRA advice may not be taken.
6. Extend programme of river rehabilitation with particular reference to the Arrow at Redditch, the Swift and Avon at Rugby.	NRA Landowners Local Authorities	Restoration of natural river habitat and creation of urban recreational resource.	Needs to be closely integrated with requirements of all NRA functions.
7. Collaborate with other organisations and agencies to promote and enhance the water environment, using grant schemes where appropriate.	NRA, Local Authorities, Landowners, Groundwork Trust, Countryside Commission, Ministry of Agriculture Fisheries and Food.	Improvement of habitat associated with the water, environment and quality of landscape.	Resources to provide advice. Cost of operation works.
8. Re-survey river corridor habitats periodically.	NRA	Ensures validity of data. Identifies opportunity for improvements.	Resource requirement.
9. Promotion of rare or threatened species such as the otter and native black poplar.	NRA in collaboration with wildlife agencies.	Increases rare species.	Protection of threatened species.
10. Collect archaeological data related to the water environment and survey river structures of historic and cultural interest. Assess impact of structures to ecosystem. Special reference will be made to the River Stour.	NRA	Ability to evaluate sensitivity of Catchment to development or operational works.	Costs and resources.

Options / Actions	Responsibility	Benefits	Constraints
<b>ISSUE 32: REVIEW OF EC DESIGNATED AREAS FOR SALMONID AND CYPRINID FISHERIES</b>			
1. Investigate possible designation of river lengths currently fished but not designated. Possible sites include reaches of the Stour, Isbourne, Alne, Arrow and Avon itself.	NRA Department of the Environment.	Improved protection by application of tighter water quality standards.	Requirement for increased monitoring and possible further treatment of discharges. Expenditure implications may need Government approval.
<b>ISSUE 33: LICENCE EVASION AND UNLAWFUL FISHING DURING THE CLOSE SEASON - PARTICULARLY IN COVENTRY AREA</b>			
1. Maintain enforcement activity.	NRA	Protection of fishery resource.	Enforcement of close season is not consistent between regions.
2. Review close season byelaws.	NRA in consultation with fishery interests.	Greater respect for byelaws.	Not likely to please all interests.
<b>ISSUE 34: PROTECTION AND IMPROVEMENT OF TROUT AND COARSE FISH AND EEL STOCKS</b>			
1. Maintain and enhance brown trout populations by fencing and improvement of gravel quality. (A site for action is the River Alne).	NRA	Increased trout stocks and angling potential.	Enhancements such as fencing may have local effect on access for angling.
2. Enhance coarse fishery by improvements to (i) habitat (ii) water quality (iii) flow (iv) survey techniques and by management of predators, restocking and introduction of new species. Predator control is envisaged in the Evesham-Strensham reach followed by restocking with chubb and dace.	NRA	Increased coarse fish stocks and angling potential.	Cost is the main concern for improvements to quality and flow. Management of predators (e.g. zander) can deprive some anglers of their preferred sport.
3. Enhance eel populations in Lower Avon by construction of eel passes on weirs and sluices. Passes are being considered at Chadbury, Fladbury, Evesham and Stratford.	NRA	Improve eel fishery.	Some continuing maintenance requirement.
<b>ISSUE 35: EFFECT ON URBAN ENVIRONMENT OF URBAN AND INFRASTRUCTURE DEVELOPMENT</b>			
1. Pre-planning consultation with developers.	NRA	Issues identified before work commenced.	Possibility of increased number of speculative enquiries leading to wasted staff time.
2. Liaison with Local Authorities and inclusion of appropriate policies in Local Plans.	NRA Local Authorities	Developments have less effect on aquatic environment.	Variable response from Local Authorities. Long term solution.
3. Source control of run-off by balancing ponds or soakaways.	NRA Local Authorities Developers	Prevention of flooding and contaminated drainage. Continued recharge of groundwater. Cost savings.	Possible pollution of aquifers. General acceptance of new approach may take time.
4. Integration of watercourses in development design.	NRA/Local Authority/Developers	Prevention of fly tipping, improved safety.	If poorly maintained may become an eyesore.
5. Requirement for aftercare programmes.	Local Authority/NRA/ Developers/Riparian Owners	Continued maintenance of river corridor.	Maintenance costs to Local Authority or Riparian owners.
6. Increased involvement in development briefs and planning agreements.	NRA/Local Authorities/ Developers.	Proper specification of mitigation measures, during development.	Requirement for staff time and additional skills.
<b>ISSUE 36: CHANGES IN LOCAL GOVERNMENT STRUCTURE</b>			
1. Establish liaison with any new authorities as rapidly as possible.	NRA Local Authorities	Maintain contacts on development control and Local Plan issues.	Disruption caused by establishment of new organisations and loss of contacts.
2. Use of database with planning policies to cover individual council areas.	NRA	Locate policies applicable to new	Difficulty in assigning 'old' Local Plan policies to new Council areas.



NRA

*National Rivers Authority  
Severn-Trent Region*