



RIVER SEVERN - UPPER REACHES CATCHMENT MANAGEMENT PLAN

CONSULTATION REPORT SUMMARY 1994

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RIVER SEVERN - UPPER REACHES CATCHMENT MANAGEMENT PLAN CONSULTATION REPORT SUMMARY 1994

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INTRODUCTION

The National Rivers Authority is committed to protecting and improving the water environment, and protecting people and property from flooding. The NRA has a wide range of responsibilities for the control of the water environment, in particular:

- conservation of water resources
- pollution control
- flood defence and flood warning
- maintenance and improvements of fisheries
- nature conservation in water related habitats
- promotion of water based recreation
- control of navigation in some areas

Establishing a sound planning base for the development of river catchments is essential for their future management and a major task for the NRA. River catchments are subject to increasing use by a variety of activities. Many of these interact and some conflicts arise. The conflicting requirements and interests of users and beneficiaries must be balanced.

It is the NRA's view that the most effective way of balancing all interests is through the production of Catchment Management Plans. This involves the NRA using its powers and working with others to ensure that the rivers, lakes, coastal and underground waters are protected and improved for the sake of future generations.

Using this approach the NRA can assess the current state of water environment and the uses made of it. Comparisons can then be made with the relevant standards and targets. Where the objectives are not being met, the shortfalls together with options to resolve them, are presented as issues. Catchment Management Plans provide a link between the NRA and users of water, so the Authority can better reflect their interests while carrying out its duties.

The River Severn - Upper Reaches Catchment Management Plan is currently in the Consultation Phase. This plan is one of 17 Catchment Management Plans that are being produced by Severn-Trent Region. Following the consultation phase, a Final Plan will be produced for the catchment. This will include an action plan which will form the basis for improvements to the water environment. It will outline areas of work and investment proposed by the NRA and others.

YOUR VIEWS

The River Severn - Upper Reaches Catchment Management Consultation Report is the NRA's 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:

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SHELTON
SHREWSBURY
SHROPSHIRE, SY3 8BB

Please send your comments in writing.
The closing date for response is Friday 3 February 1995.

Requests for further copies of this summary document, the full Consultation Report or further information should be made to: Mrs D Murray at the above address or by calling Shrewsbury (0743) 272828.



THE NRA'S VISION FOR THE CATCHMENT

The catchment of the upper reaches of the River Severn is predominantly rural in character, and is an area known for its attractive upland landscape and great natural beauty. The rivers in the catchment support high class fisheries and provide a diversity of habitats for a wide range of flora and fauna.

The catchment is home to around 75,000 people, who depend on the water environment in many ways and value it for the amenities and enjoyment it provides for their local communities. The picturesque and unspoilt countryside within the catchment is also increasingly seen as a tourist attraction.

The catchment has an important role far beyond its physical boundaries, and indirectly affects many people who live outside the catchment. One reason is the plentiful high quality water in its rivers and lakes, which is used as a major source of water supply to surrounding areas. Also of note is the fact that the catchment comprises the upper parts of the longest river in Britain. What occurs in these sensitive upper reaches can have an impact downstream for up to a distance of some 350 kilometres.

The NRA's vision for the catchment is to:

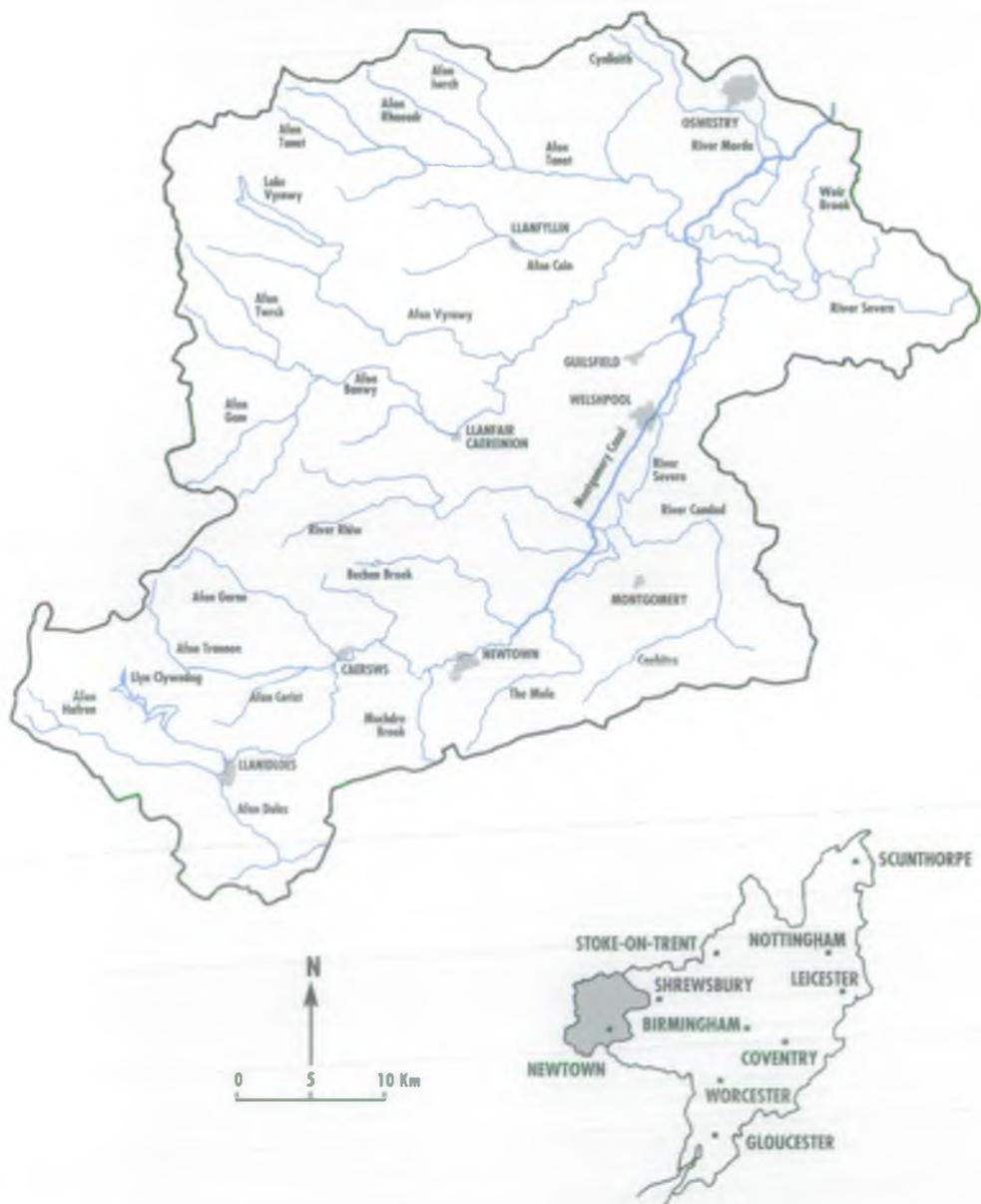
- safeguard existing high quality water and habitats, and where appropriate work towards enhancing the water environment.
- work in an integrated manner towards resolving those issues and problems that have been identified in the plan.
- ensure that future demands on the water environment from both within and outside the catchment are planned and managed in a balanced and sustainable way for the benefit of all users.

Key objectives of this plan are to:

- maintain the highest possible level of protection for the water environment, restore damaged habitats and protect rare and threatened species.
- address the problem of stream acidification.
- improve water quality of the 41 km of rivers where the required longer-term River Ecosystem water quality objective is not already achieved.
- improve fisheries by making spawning areas in rivers more accessible to migratory fish.
- ensure proper management of the catchment's valuable water resources.
- influence the planning processes of local authorities to ensure that development does not adversely impact on, and wherever possible proceeds in a way to benefit, the water environment.

The realisation of the NRA's vision will be achieved through a balanced management approach to all activities in collaboration with all users of the catchment. It is our intention to work in partnership with all relevant agencies and representative organisations to promote and achieve an integrated approach to managing the catchment. The plan will ensure required improvements can be carried out, and future demands catered for, in a sustainable manner.

RIVER SEVERN - UPPER REACHES CATCHMENT



KEY DETAILS

AREA	2,065 km ²	
Population (estimates from 1991 Census)	Year 1991 2001 (predicted)	Population 74,800 83,000
TOPOGRAPHY	Source of Severn Highest Point Lowest Point	613m (AOD) 741m (AOD) 55m (AOD)
ADMINISTRATIVE DETAILS		Percentage of Plan Area
County Councils	Powys County Council Shropshire County Council Clwyd County Council Gwynedd County Council Dyfed County Council	79% 14.5% 6%)) < 1%
District Councils	Montgomeryshire District Council Oswestry Borough Council Shrewsbury & Atcham Borough Council South Shropshire District Council	Radnorshire District Council Meirionnydd District Council Glyndwr District Council Ceredigion District Council
National Parks	Snowdonia National Park (< 1%)	
NRA	Severn-Trent Region, Upper Severn Area	
Water Companies	Severn Trent Water North West Water Dwr Cymru/Welsh Water	
Internal Drainage Boards	Melverley IDB	Powysland IDB
British Waterways	Montgomery Canal	

MAIN TOWNS AND LAND USE

Main towns and settlements in the catchment are Oswestry (14,219), Newtown (10,097), Welshpool (5,725), Llanidloes (2,616), Llanfair Caereinion (1,257), Caersws (1,182), Montgomery (1,059), Llanfyllin (1,054) and Guilsfield (1,020).
The main land uses in the catchment are upland pasture/rough grass 33%, arable 17%, grass 12%, woodland 10%.

KEY DETAILS

WATER QUALITY

Length (km) of river and canal in each component of the General Quality Assessment - 1993

General Description	Chemistry Component Grade	Biological Component Grade
GOOD	A 221.3) 343.3 B 122.0)	A 389.7
FAIR	C 21.3) 21.3 D 0)	B 6.1
POOR	E 5.0) 5.0	C 28.2
BAD	F 0)	D 0
Not Graded (Due to insufficient data)	113.9	59.5

No of Consented Discharges 200

Comprising :- 104 water undertaker sewage and storm overflows, 88 private sewage works, 8 industrial.

WATER RESOURCES

Average annual rainfall	1,160mm
Total licensed abstraction	112,397 Megalitres per year
Mean flow of River Severn at Montford	3,660 Megalitres per day
Number of licensed abstractions	351
of which:-	
Groundwater	239
Surface water	112
Llyn Clywedog	49,924 Megalitres
Lake Vyrnwy	59,666 Megalitres

FLOOD DEFENCE

Length of Main River in Catchment	277 km
Length of Main River within IDB area	64 km
Length of floodbanks and flood walls maintained by NRA	79 km
No of urban flood alleviation schemes	4
No of operational sluices/pumping stations	2
Max. flood drawdown runoff at Llyn Clywedog	171 mm over catchment to dam
Max. flood drawdown runoff at Lake Vyrnwy	140 mm over catchment to dam

FISHERIES

Length of watercourse designated under EC Directive for Freshwater Fisheries (78/659 EEC)	
Salmonid	351.1 km
Cyprinid - rivers	0
Cyprinid - canals	40.5 km

CONSERVATION

Sites of Special Scientific Interest	77	(of which 49 have a wetland interest)
Prime Sites	111	(of which 42 have a wetland interest)
Scheduled Ancient Monuments	263	(of which 48 have a close association with the water environment)

CATCHMENT OVERVIEW

Introduction

This Catchment Management Plan considers the upper reaches of the Severn catchment, and includes the River Severn and lakes and tributaries from its source in Powys to where it is joined by the River Perry some 6 km to the north west of Shrewsbury.

The catchment drains an area of 2,065 km², and almost 86% of the catchment lies within Wales. The population is just under 75,000, with the most populated parts of the catchment being in the eastern and southern areas.



The catchment is predominantly rural in character, and is an area known for its attractive upland landscape and natural beauty. The River Severn corridor is one of the most important environmental features of the Welsh Border area. Tourism is becoming an important activity within the catchment, and the River Severn, together with its tributaries, is an amenity being increasingly enjoyed by many people. The rivers and canals in the catchment support high class fisheries and provide habitats for a wide range of flora and fauna such as floating water plantain, otters and crayfish.

The high standard of water quality, together with the reliable and large quantities of winter water, make this catchment one of the most important in the country for water resources. The River Severn is an important source of domestic water supply for surrounding areas, and extensive abstraction takes place further downstream. Llyn Clywedog and Lake Vyrnwy reservoirs are situated near the western edge of the catchment. Llyn Clywedog, which was built between 1964 and 1967, supports the provision of water supplies to 6 million people, and Lake Vyrnwy has supplied water to north west England since the scheme was commissioned in 1892.

The Severn-Vyrnwy confluence area is one of the major flood plain environments in the catchment, and is of national importance for wading birds and overwintering wildfowl. As the catchment is predominantly hilly, there is often pressure for development in lower lying flood plain areas. These areas and river banks need protection from the impacts of development.

The protection of the existing high quality water resources from the effects of land use changes and pressures for development is of vital importance in the catchment.

Topography

The catchment is dominated on its western edge by the northern end of the Cambrian mountain range. Drainage from these mountains flows generally eastwards in deeply incised valleys through rounded hill country that extends over almost 90% of the catchment. Moving eastwards, the hills give way to the Shropshire Plain, which includes areas of extensive flood plain at the confluence of the two principal rivers, the Severn and Vyrnwy, at the foot of the Breidden Hills.

The River Severn rises on the north eastern slopes of Bryn-Cras, one of the peaks of Plynlimon on the western border of Powys, just 25 km from Aberystwyth. It is only 3 km from the source of the River Wye, and 613 metres above sea level. By the time the Severn reaches Llanidloes, only 19 km to the east, it has dropped 457 metres. The Severn then flows north-eastwards from its source until it meets the River Vyrnwy, where it turns to follow the Vyrnwy's generally easterly direction.

The total length of the River Severn to the point where it is joined by the River Perry on the downstream boundary is 112.4 km. Overall, the catchment falls from 741 metres above sea level at Plynlimon to 55 metres above sea level at the downstream boundary near Montford Bridge west of Shrewsbury.

The catchment has a wide variety of attractive landscape types, ranging from the flat low-lying Severn-Vyrnwy flood plain in the east, through undulating hills to the moorland plateaux of the Berwyn Mountains in the west. The river valleys are an important feature of the landscape.



Land Use

The catchment is predominantly rural, with agriculture being the main land use.

Satellite photography shows that upland pasture accounts for about a third of the catchment area. Sheep farming is widespread in the western uplands, and dairy farming predominates in the river valleys. Arable farming (17% of the catchment area) is mainly concentrated to the north and east of the River Severn and also on lower lying land along the main west-east river valleys.

Forestry constitutes a major land use in the catchment. Satellite data shows that approximately 10% of the catchment area is woodland, with the majority of this being coniferous and in the west of the catchment.

Urban development within the catchment is characterised mainly by market towns and local administrative centres, many with business parks and light industrial estates. These towns and most of the population are located mainly in the eastern and southern parts of the catchment. There is very little major industry in the catchment, but there are a number of quarries used mainly for extraction of stone for road construction.

Geology and Hydrogeology

The geology of the catchment is dominated by impermeable mudstones and shales from the Ordovician and Silurian periods. Both the mudstones and shales provide only small quantities of groundwater, usually obtained from thin interbedded sandstones and limestones.

There is a limited area in the north east of the catchment where more permeable strata occur which provide important underground water supplies. These rocks include the Permo-Triassic Sandstones, which are found to the east and south east of Oswestry. The sandstones are highly permeable, and are an important source of water for public supply, agricultural purposes and for flow augmentation of the River Severn via the Shropshire Groundwater Scheme. Groundwater from the sandstones also provides natural baseflow to support rivers and streams during dry periods.

Separating the Permo-Triassic Sandstones from the Silurian mudstones to the south west of Oswestry is a relatively small area of strata of Carboniferous age, including Carboniferous Limestone, Millstone Grit and Coal Measures. Groundwater occurs in the more permeable, highly weathered and fractured rocks, and yields are variable but may be locally important for domestic and small agricultural supplies.

Overlying much of the Carboniferous and Permo-Triassic strata is a cover of glacial and post-glacial sands, gravel and boulder clays. Such superficial deposits are generally thin and variable in composition. Water can flow through them easily so they can be important in supplying local needs, as well as providing baseflows to rivers and streams and sustaining wetlands and marsh areas along the valley margins.

Hydrology

There is considerable variation in average rainfall across the catchment from west to east. Annual rainfall varies from over 2,500mm per annum along parts of the main divide from Plynlimon to the Berwyns, to 660mm per annum at the lowest point of the catchment just to the west of Shrewsbury. The rainfall is not evenly distributed, however, with most of the Vale of Powys receiving less than 1,000mm per annum. The average catchment rainfall is 1,160mm per annum.

The available *effective* rainfall, after allowing for evaporation losses and transpiration, varies from around 1,500mm along the western ridge to less than 200mm in the lowlands.



River flows in winter months reflect the rainfall distribution, with frequent flooding occurring from numerous upland streams and rivers as water accumulates in the flatter vales and around the Severn-Vymwy confluence area. During dry summer months flows in upland streams are unreliable, but flows progressively increase in reliability downstream of valley gravels and, particularly, downstream of groundwater storage in the Sandstones.

Water Resources

The plentiful surface water resources within the catchment confer a responsibility of stewardship far beyond that required for local needs. The catchment is strategically important as both an existing and potential provider of water resources for other parts of the country. Conservation of resources needs to take into account requirements for releases of water from storages such as Llyn Clywedog and Lake Vymwy, which serve users in other areas such as north west England, the West Midlands and the Bristol area.

The flow of the River Severn is regulated to ensure minimum flow needs are met. In summer, river flows may need to be topped up by releasing water so that there is enough available for vital water supplies. Llyn Clywedog, Lake Vymwy and the westernmost part of the Shropshire Groundwater Scheme are all used to regulate the flow of the River Severn.



The prolific surface water resources are reflected in the volume of surface water licensed abstractions, which are ten times by volume those issued for groundwater. Much of the catchment is underlain by Non-Aquifer, consisting mainly of mudstones and shales, and groundwater resources throughout the area are therefore generally very limited. A large proportion of the catchment is exempt from the need for licensing for groundwater abstraction.

The Major Aquifers, including the Permo-Triassic Sandstones, are confined to a small area in the north east of the catchment. The three sandstone Groundwater Units (Knockin, Ensdon and Alberbury) support public water supplies and are managed according to their intensity of use. Five boreholes of the Shropshire Groundwater Scheme are in the Ensdon Groundwater Unit and within the catchment boundary.

Water Quality

The catchment contains the highest proportion of top grade rivers within the Severn-Trent Region. The 1993 General Quality Assessment (GQA) of water quality covered approximately 400 km of river and canal, with 93% achieving the category of Good (Grades A & B for the chemistry component and Grade A for the biological component). With their high dissolved oxygen and high velocity, the rivers support a diverse fauna with stoneflies, mayflies and caddisflies being found in large numbers.

This high quality water provides a perfect basis for a wide range of aquatic habitats for birds and animals and extensive salmonid and cyprinid fisheries, many of which are EC designated. The high quality of the water enables large scale abstraction for drinking water to take place within the catchment and downstream in neighbouring catchments.

Headwaters of many streams and rivers along the western uplands are affected either by acid run-off due to the combined effect of increased acidic atmospheric pollution and land use change, or by drainage from abandoned metalliferous mines. In some cases, both may be contributing.

There are a total of 200 consented discharges within the catchment, of which 104 are sewage effluent or sewerage system overflows owned and controlled by Severn Trent Water Ltd., 88 are sewage works in private or local council control, and the remaining 8 discharges are trade effluent.

During 1993, 137 pollution reports were received and investigated in the catchment; 3 were identified as being major incidents, 26 as significant and 108 as minor. The largest single cause and source of pollutant was agriculture, followed equally by oil and sewage.

Although little data are available on the quality of groundwater in the catchment, the NRA is not aware of any specific quality problems.



Flood Defence

The Severn and its tributaries are prone to regular flooding, with floods of major note in 1946, 1947, 1948, 1960, 1964, 1965 and 1968.

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 statutory Main River.

In addition to continuous records at gauging stations, there are flood level records at significant points throughout the catchment, usually adjacent to structures such as bridges. Aerial photographs were taken of the 1948, 1960, 1990 and 1993 floods, but were confined to the lower reaches of the catchment. On watercourses which are not Main River ('ordinary watercourses'), information is not so detailed and the extent of flood plains has not been mapped. There are 277 km of Main River in the catchment.

Flood defence works were built following the floods in the 1960s to alleviate the risk to property and land within the catchment, specifically at Caersws, Meifod and Newtown. A comprehensive system of over 50 km of embankments (known locally as argaes) provide limited protection to over 5,000 hectares of land upstream of the confluence of the Rivers Severn and Vyrnwy.

Where catchment response times allow, a flood warning scheme operates to lessen the damage from floods. Warnings are issued by the NRA on the River Severn downstream from Llandinam, and on the River Vyrnwy downstream from Newbridge, Meifod.

As part of its capital works programme the NRA is undertaking a detailed survey of all flood defences and assets. The assets currently identified for renewal or improvement and other capital projects include structural improvements to the Rivers Severn and Vyrnwy Argaes at Haimwood, Rhandregynwyn, Shores to the Ark, and Melverley to the Shores; Guilsfield Brook embankments; and Rivers Severn and Vyrnwy flood plain mapping.

The NRA undertakes maintenance works 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.



Fisheries

The catchment is characterised by having many high quality and unspoilt fishery habitats, most of which are designated salmonid fisheries under EC Directive (78/659/EEC). Preservation of these high quality and relatively pristine resources is one of the most important fisheries issues for the NRA to address in the Upper Severn area.

Salmon, trout and grayling dominate in most watercourses, but cyprinids also occur especially in the River Severn. The Montgomery Branch of the Shropshire Union Canal is an EC designated cyprinid fishery throughout its length.

Most of the salmon spawning grounds for the River Severn salmon stocks occur in the catchment, together with salmon rod fisheries primarily in the Rivers Severn and Vyrnwy. Good stocks of wild brown trout also exist, particularly in tributaries such as the Afon Dulas, River Mule, Afon Carno and River Camlad. A number of stillwater trout fisheries are also located in the catchment, most notably Llyn Clywedog and Lake Vyrnwy.



Over 100 km of potentially high quality salmon spawning and nursery areas are inaccessible as a result of obstructions to salmon migration. Fish life is adversely affected by acidification problems which occur in some upland watercourses, most notably the top 10 km of the River Severn, and also the Afon Twrch. The NRA recognises that in some locations there is concern that predatory birds may be adversely affecting fish stocks.

Conservation and Recreation

The wide range of landscape types within the catchment, ranging from plateaux to narrow valleys and flood plain, supports an equally wide range of habitats. Consequently the conservation value of the catchment is reflected in the number of designated sites.

There is a total of 77 Sites of Special Scientific Interest (SSSIs), of which 49 are water related. These include blanket bog, mires, fen, wet meadow, carr woodland, lakes and the Montgomery Canal. There are also a number of woodlands which have streams or rivers running through them, and four geological sites occur along the sides of streams. A section of the River Severn itself is a proposed SSSI on geomorphological grounds.



The catchment remains a stronghold for otter populations. However, wading bird populations, most notably lapwing and curlew, have suffered severe declines in recent years through loss of wetland habitats. Dippers may also have declined in some upland acidified streams as a result of poor invertebrate populations. Both flora and fauna diversity are poor in the Afon Cerist, due to heavy metal contamination from old mine workings at Fan. Reclamation works currently underway at the site should improve the situation, and will expose and enhance some of the archaeological features of the site.

Settlement within the catchment has been focused on the major rivers and in particular the River Severn, illustrating their importance for communication and trade and later as a power source for a variety of industries. The Border area itself and these river valleys have also been important in terms of defence, and the area's long history is reflected in a wealth of archaeological sites.



Recreational activities in the catchment include angling, canoeing, ornithology, sailing and walking. At present there is relatively limited use of the catchment for these activities other than for angling. However, increasing pressures from tourism are likely to lead to a greater demand for recreational facilities in the future.



ISSUES AND OPTIONS

The following tables list the 28 issues which the NRA has identified within the River Severn-Upper Reaches 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.

ISSUE No. 1 SAFEGUARDING HIGH QUALITY WATER, WATER RESOURCES AND HABITATS			
OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Maintain water quality to meet EC Directive Standards.	NRA	Maintenance of existing fish populations. Protect water resource uses in other areas.	
2. Seek EC fisheries designations on Rivers Trannon, Cain, Clywedog, Rhiw, Dulais, Eirth and Rhaeadr.	NRA	Improved level of protection for existing fish stocks.	
3. Apply Policy and Practice for the Protection of Groundwater 1992.	NRA Local Planning Authorities (LPAs)	Safe disposal and use of potential pollutants in sensitive areas.	Implementation requires careful investigations.
4. Restore contaminated land.	NRA LPAs Waste Regulation Authorities	Reduction of leaching of heavy metals to watercourses.	Lack of a universal, published database of contaminated land.
5. Seek recognition of extent of ground-water sources both inside and outside the surface water catchment affected by agricultural and industrial practices, and domestic waste disposal.	NRA LPAs Environmental interests	Increased perception of need to safeguard the mostly high quality water resources in the catchment.	Limited published data on quality of groundwater sources.
6. Protect water resources, water quality and aquatic habitats through the planning liaison process and by application of NRA's regulatory powers.	NRA LPAs	Improved awareness of LPAs in taking account of water resources and quality in approving development. Prevention of further degradation of flora and fauna.	Time constraints encourage adoption of "broad brush" policies at Regional or Planning Policy Guidance level. Limitation on development in catchment.

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Seek long term solution by controlling/ reducing sulphur emissions.	Government/ Power Generators	Improved water & biological quality & fishery.	Political.
2. Develop National NRA forestry strategy.	NRA	Reduced impacts of forestry on water environment.	
3. Control and manage future and existing coniferous forests by application of above strategy.	NRA Forestry Authority Local Authorities Countryside Council for Wales (CCW) Forest Enterprise Private Forest Companies Landowners	Maintenance of present water quality	Limitation to Forestry Development.
4. Monitor impacts of acidification on water quality, fish populations and aquatic fauna.	NRA CCW Royal Society for the Protection of Birds (RSPB)	Quantification of changes in water quality, fish stocks, aquatic fauna.	Resources/ Funding.
5. Investigate buffer/ riparian zones to mitigate acidifying impacts of afforestation.	NRA	Maintenance of and/or improvement of existing water quality.	Adverse effects on terrestrial ecosystems.
6. Investigate in-stream liming techniques for pH & total hardness adjustment and control.	NRA	Short term expedient to improve water, biological and fishery quality.	Resources/ Funding.

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Complete Land Reclamation Scheme at Fan Lead Mine.	Powys CC Welsh Development Agency.	Reduce toxic metal levels in Afon Cerist.	
2. Reopen Lower Frankton - Plas Cerrig section of Montgomery Canal.	British Waterways (BW) Canal Restoration Trust (CRT)	Improve Dissolved Oxygen levels by increased flow.	
3. Ensure investment at Newtown and Oswestry - Mile Oak Sewage Treatment Works under AMP 2 Programme.	Severn Trent Water Ltd NRA	Maintain mid-term objective class. Compliance with EC Directives.	Competing priorities for finite funding under AMP2.
4. Investigate cases of class deterioration of Afon Vymwy - Lower reaches.	NRA	Identify cause(s) to prepare Action Plan for next CMP period.	
5. Assess potential for pollution prevention measures at Abandoned Metalliferous Mining Sites.	NRA	Reduce toxic metal levels.	Large number of sites.
6. Support actions of Issue No 2 Acidification.	NRA	Prevent further breaches of EC Directive (pH compliance).	Requires widespread co-operation.

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Further identify impact of inadequate rural sewerage and sewage treatment facilities in catchment.	NRA Severn Trent Water Private STW Operators Local Authorities (Environmental Health Dept)	Knowledge of extent of problem.	Requires co-operation of many organisations.
2. Include policies in structure and Local Plans to prevent further problems in critical locations.	Local Authorities NRA	Existing problem locations do not become worse.	Not a long term solution.
3. Identify methods of funding provision for new public sewerage and sewage treatment facilities.	NRA DoE Severn Trent Water Local Authorities	More schemes to prevent pollution and environmental nuisance.	Time consuming to organise. Cost to householders.
4. Lobby for new legislation if necessary.	NRA DoE Local Authorities	To cover areas not currently addressed.	Legislation liable to take a long time.
5. Control routine maintenance requirements of private facilities by registration scheme & maintenance contract.	Local Authorities	Reduction in number of problem locations.	Time consuming and expensive to establish. Cost to householder.
6. Review of BS6297:1983, in particular advice on assessment of ground conditions.	British Standards NRA DoE Local Authorities	Improved assessment of site suitability.	Liable to take a long time.
7. Promote accreditation scheme for small (package) sewage treatment works.	DoE NRA Small plant manufacturers	Improved performance specification.	Takes time to develop.

ISSUE No. 5

STEWARDSHIP ROLE FOR ABUNDANT SURFACE WATERS

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Include new river flow control point, probably at Dolwen between Llanidloes and Newtown (review of River Severn Statutory Control Rules).	NRA in consultation with river users.	Ability to control reservoir releases from Llyn Clywedog at times of local low flow but when flows at existing Bewdley Control Point are adequate. Maintenance of and/or improved existing fish stocks, conservation value and amenity use.	Improvements needed to hydrometric flow measurement facilities at Dolwen. Ensure river releases are not disproportionate to benefits.

ISSUE No. 6

RIVER REGULATION AND RESERVOIR CONTROL

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Review reservoir control rules. (See actions under Issue No 5.)	NRA in consultation with <u>local</u> river users in respect of river releases. North West Water and Severn Trent Water in consultation with NRA in respect of drawoff control from Lake Vymwy.	Correct quality of water enters river according to intake level. Correct quality of water is drawn off from Lake Vymwy for supply. Sudden changes of river conditions downstream of reservoir are avoided. Hydropower generation from river releases is optimised. Some measure of flood amelioration.	Must ensure that river releases do not exacerbate natural river flooding. Must ensure poor quality water is not released or drawn off from reservoirs at critical times. Must ensure that reservoir levels are not excessively lowered by hydropower generation.

ISSUE No. 7

EXPORT OF WATER FROM THE CATCHMENT

OPTIONS / ACTIONS

RESPONSIBILITY

BENEFITS

CONSTRAINTS

1. Assess scope for reduced exports from Lake Vymwy.

NRA
North West Water

Extra water could support demands from the River Severn which arise beyond the provision already made through full development of the Shropshire Groundwater Scheme.

Need for water supplies in NW England to be met.

ISSUE No. 8

FUTURE TRANSFERS OF WATER USING THE RIVER SEVERN

OPTIONS / ACTIONS

RESPONSIBILITY

BENEFITS

CONSTRAINTS

1. Investigate River Severn as a carrier of water for subsequent abstraction and use in neighbouring NRA regions.

NRA in consultation with river users. Developers to demonstrate environmental acceptability of proposal.

Better distribution of water resources between areas of plenty and of shortage.

Environmental impacts of 'imported' and 'exported' water on receiving watercourses.

2. Investigate possible extended use of existing reservoirs or of enlarged reservoirs or via 'imported' transfers to augment River Severn flows.

As above.

As above.

Safeguarding of functional role of existing reservoirs where these are to be redeployed and/or enlarged.

ISSUE No. 9

RELIABILITY OF WATER SUPPLIES IN MEETING PEAK DEMANDS

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Appraise water supply reliance on scattered gravel sources to include existing source at Llandinam and that under development near Fron.	NRA Severn Trent Water	Avoidance of environmental problems in numerous locations. Improved quality control of water supplied and possible improved reliability of supplies.	Complex water supply system infrastructure is uneconomic in an area of low population density.
2. Reconsider River Severn abstraction either in Vale of Powys or via a piped extension from Shelton, Shrewsbury.	NRA Severn Trent Water	Conjunctive use of sources, which should minimise adverse environmental impacts and increase reliability of supplies. Avoids development of further scattered sources.	Need to avoid obstruction of flood plain.
3. Consider bulk supplies of treated Vymwy water from North West Water.	NRA North West Water	Improved reliability of supplies.	

ISSUE No. 10

SHROPSHIRE GROUNDWATER SCHEME (SGS) USE AND IMPACTS

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Monitor impact of pumping Phase II Scheme boreholes.	NRA	Safeguarding of water supplies during dry weather, amenity use and wetland habitats.	SGS use controlled by NRA "R Severn Operating Rules" Agreement.
2. Provide alternative water supplies to compensate for local derogation of wells and boreholes.	NRA	Reliability of local water supplies.	Severn Trent Water Authority (SGS Order) 1981.

ISSUE No. 11

USE OF RIVER SEVERN WATER FOR MONTGOMERY CANAL

OPTIONS / ACTIONS

RESPONSIBILITY

BENEFITS

CONSTRAINTS

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|--|----------------------------------|---|---|
| <p>1. Monitor 1988 Agreement between STWA and British Waterways re limits on canal inflows from Rivers Severn and Tanat.</p> | <p>NRA
British Waterways</p> | <p>Reduction of losses from River Severn regulation system means reduced likelihood of use of Shropshire Groundwater Scheme in any one season, with consequent cost savings to NRA.</p> | <p>Requirement to pipe water back to the River Severn at Wern unless canal operator can demonstrate to NRA that significant losses are not occurring.</p> |
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ISSUE No. 12

ABSTRACTIONS FROM RIVER GRAVELS USE AND IMPACTS

OPTIONS / ACTIONS

RESPONSIBILITY

BENEFITS

CONSTRAINTS

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|---|--|---|---|
| <p>1. Determine licences for abstraction from river gravels according to depth, areal extent and degree of hydraulic continuity of the deposits with adjacent rivers.</p> | <p>NRA</p> | <p>Locally available high quality water for all uses.</p> | <p>Limited ability to extend abstractions from gravels. Need to be cognisant of any environmental impacts on local interests.</p> |
| <p>2. Identify gravel sources which are important for water resources, and are therefore not recommended for mineral extraction.</p> | <p>Local Authorities
Mineral Plans
NRA</p> | <p>Protection of water resources.</p> | <p>Many non-alluvial superficial deposits are exempt from licensing (see issue No 14).</p> |

ISSUE No. 13

LAKE VYRNWY POSSIBLE FUTURE CHANGE OF USE

OPTIONS / ACTIONS

RESPONSIBILITY

BENEFITS

CONSTRAINTS

1. Investigate the scope for extending use of Lake Vymwy for significant extra regulation of River Severn flows.

NRA and river users
North West Water

Considerable increases in water availability for transfer to Thames, South Western and Anglian Regions during periods of low flow in these Regions.

Need to deploy alternative resources in North West Region.

Fisheries, Conservation and amenity uses of higher summer river flows.

Possible need to modify valve release arrangements. Need to check impacts on Afon Vymwy of sustained large releases in summer.

Reduced winter overspill from Vymwy Dam so some flood mitigation downstream.

ISSUE No. 14

GROUNDWATER ABSTRACTION LICENSING EXEMPTIONS

OPTIONS / ACTIONS

RESPONSIBILITY

BENEFITS

CONSTRAINTS

1. Review licensing exemptions policy.

NRA in consultation with abstractors and environmental interests.

Clarification of extent to which the absence of licensing of groundwater in the exempt area has resulted in unacceptable derogations or environmental impacts.

Statutory baseline is challenged, which can be a protracted process.

National policy guidelines.

Consistency of regulatory role.
Improved protection for existing abstractors from derogation of supplies.

ISSUE No. 15
PROTECTION OF RARE AND THREATENED SPECIES

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Maintain and improve bankside cover as habitat for otters	NRA Landowners	Increased otter population.	Some possible loss of agricultural land.
2. Develop policy on mink.	English Nature(EN)/CCW Wildlife Trusts Landowners	Reduction of disturbance to otters.	
3. Identify current distribution of alien crayfish species.	NRA/Ministry of Agriculture, Fisheries & Food(MAFF)	Assessment of scale of crayfish problem.	
4. Develop Regional NRA Policy on alien crayfish & restrict introductions to the catchment where appropriate.	NRA/MAFF	Protection of native crayfish populations.	Limitations on crayfish farming opportunities.
5. Survey and identify conservation requirements for floating water-plantain.	EN/CCW	Conservation of protected species.	

ISSUE No. 16
OPPORTUNITIES FOR AMENITY AND RECREATION

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Long term resourcing of nature reserve management on Montgomery Canal.	British Waterways(BW) Canal Restoration Trust(CRT)	Partial preservation of botanical status of canal.	
2. Develop new fishing facilities on Montgomery Canal.	BW CRT	Increase in angling resource.	
3. Provide canoe launches on River Severn free navigation.	NRA British Canoe Union Landowners Local Authorities	Access to river for canoeists.	Possible conflicts with other river users.
4. Promote and develop waterside footpaths at Hafren Forest, Llanidloes, Newtown and at wetland nature reserves.	NRA Forest Enterprise Local Authorities County Wildlife Trusts	Increase of informal recreational opportunities.	

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Develop and implement Severn Valley wetlands strategy.	NRA/CCW RSPB Wildlife Trusts	Restoration of lost wetland habitats and improved management of existing.	Financial.
2. Improve riparian and instream habitat Afon Trannon/Cerist.	NRA	Restoration of former biological status and fishery.	Level of flood risk afforded by flood defences.
3. Improve compacted salmon spawning gravels where appropriate.	NRA	Improved salmon rearing capacity of affected rivers.	
4. Improve riparian and instream habitat on River Morda.	NRA	Restoration of former biological status and fishery.	Freeboard and flood risk.
5. Promote Tir Cymen, Countryside Stewardship and other appropriate schemes in riparian locations.	CCW/MAFF/ NRA	Incentives for farmers to carry out conservation improvements.	Limitations on farming practices.
6. Investigate riparian tree planting and fencing opportunities and implement where appropriate.	NRA Riparian Owners	Restoration of riparian and river corridor habitats for wildlife.	Restrictions on stock access to river banks, limitations on farming practices.
7. Restore old and create new wetland habitats.	NRA EN/CCW Wildlife Trusts	Restoration of lost wetland habitats, habitat diversity.	Loss of some agricultural land.
8. Develop Regional NRA Policy on invasive weed control and implement on NRA landholdings.	NRA	Restoration of natural riparian vegetation.	

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Improve access for spawning salmon to upper reaches of the Afon Gamo.	NRA	Enhancement of stocks by utilising extra nursery areas.	
2. Investigate means of providing access for spawning salmon to the upper reaches of the River Mule.	NRA	Enhancement of stocks by utilising extra nursery areas.	Possible loss of weirs.
3. Stock rivers above other obstacles with local hatchery reared salmon fry and/or transport adult salmon upstream.	NRA	Enhancement of stocks by utilising extra nursery areas.	
4. If acidification problems improve, provide access for salmon to the River Severn upstream of Felindre Weir.	NRA	Enhancement of stocks by utilising extra nursery areas.	
5. Implement legislative powers to prevent third parties creating new obstacles to salmon migration.	NRA	Protection of existing salmon spawning areas.	Limitations on development.
6. Investigate opportunities for alternative funding of improvements in light of diminishing Grant in Aid (GIA).	NRA	Enhancement of Salmon stocks.	Possible lack of funding sources.

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Safeguard habitats.	See issue no.1, options 1, 2, 6	See issue no.1, options 1, 2, 6.	See issue no.1, options 1, 2, 6.
2. Resolve acidification problems.	See issue no.2, all options.	See issue no.2, all options.	See issue no 2, all options.
3. Determine and implement policy on Section 30 Stocking Consents for brown and rainbow trout in rivers.	NRA	Protection of native brown trout populations.	Limitation of stocking practices.
4. Protect isolated population of native brown trout in upper reaches of Afon Dulas.	NRA	Protection of pristine native trout stock.	Limitation of potential salmon nursery area.
5. Assess present status and identify any declines of brown trout populations in the catchment.	NRA	Determination of current status of trout stocks.	
6. Determine measures to mitigate any declines in river brown trout populations.	NRA	Improvements in trout stocks and in angling potential.	

ISSUE No. 20

POACHING AND ILLEGAL FISHING

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
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|---|-----|---|--|
| 1. Maintain surveillance and anti-poaching patrols by Water Bailiffs. | NRA | Protection of stocks.
Control of illegal activity. | |
| 2. Water bailiffs visit major potential outlets for salmon. | NRA | Control of market in illegally caught fish. | |
| 3. Review fishery byelaws to combat illegal salmon fishing in close season. | NRA | Protection of stocks.
Control of illegal activity. | |

ISSUE No. 21

PISCIVOROUS BIRDS

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
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| 1. Liaise and promote awareness on control and impacts of piscivorous birds. | MAFF
NRA
EN/CCW
RSPB | Protection of birds and fish stocks. | |
| 2. Publicise and implement NRA policy on piscivorous birds. | NRA | Protection of birds and fish stocks. | |
| 3. Monitor impacts of piscivorous birds on local fish stocks. | NRA | Possible protection of fish stocks. | |

ISSUE No. 22
EROSION AND ILLEGAL RIVER WORKS

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Promote awareness in agricultural community of damaging impacts of unauthorised river works.	NRA	Maintenance of biological status and fishery.	Potential loss of agricultural land through erosion.
2. Enforce Water Resources Act 1991 to prevent unauthorised river works.	NRA	Maintenance of biological status and fishery. Protection of adjacent landowners from increased erosion impacts.	Limitations to farming practices.
3. Notification of Dolwen/Penstrowed geomorphological SSSI on River Severn.	CCW	Maintenance of existing geomorphological status of river.	Limitation to farming practices, plus cost of management agreement payments.
4. Enforce fisheries legislation to protect salmon spawning gravels from unauthorised river works.	NRA	Maintenance of the salmon rearing potential of rivers.	Limitations to farming and mineral extraction practices.

ISSUE No. 23
WATER LEVEL MANAGEMENT IN THE SEVERN/VYRNWY CONFLUENCE AREA

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Develop long term environmental strategy for water level and landuse management in the confluence area.	NRA,EN/CCW, Landowners, Internal Drainage Boards, Country Landowners Association, MAFF	Restoration of wading bird and wildfowl populations.	Limitations to agricultural practices, prolonged water cover on land.
2. Develop and implement strategy for flood defence capital and maintenance works in the confluence area.	NRA	Continued protection of land and property from flooding. Prioritisation of works.	No enhancement of water environment beyond narrow corridor.
3. Merge environmental and flood defence strategies to form overall strategy.	NRA	Unified approach to confluence strategy.	
4. Identify sites of archaeological importance in the confluence area.	NRA	Protection of cultural heritage.	
5. Promote Set-Aside, Tir Cymen, Countryside Stewardship and other appropriate schemes in riparian locations.	CCW/MAFF/NRA	Incentives for farmers to carry out conservation improvements.	Limitations on farming practices.

ISSUE No. 24

PRESERVATION AND DEFINITION OF FLOOD PLAIN

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Press for policies to be included in Local Plans to protect flood plain from development.	LPAs NRA	New properties do not flood, existing flooding is not made worse, less call on emergency services.	Limitation of developable land.
2. Press for policies in Local Plans to remove redundant structures from flood plain.	LPAs NRA	Alleviation of existing flooding.	As above. May have adverse financial implications to users of redundant structures.
3. Install more level and flow gauging stations.	NRA	Better data for flood plain definition and advice to customers.	Capital costs of more stations and revenue to run them.
4. Carry out ground level surveys and computer modelling.	NRA	Flood plains can be identified without actual flood information. Improved data for development control.	Costly, time consuming, need to prioritise.
5. Update Flooding Survey for S105 Water Resources Act 1991.	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.

ISSUE No. 25

CARAVAN SITES IN FLOOD PLAIN

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Press for inclusion of Policies in Statutory Plans to prevent development of caravan sites in flood risk areas.	LPAs NRA	Minimises risk to people and property. Less call on emergency services.	Limitation on land use. Impact on tourism.

ISSUE No. 26

IMPACT OF LAND USE CHANGES, INCLUDING HILL LAND IMPROVEMENT AND AFFORESTATION, ON RATES OF RUN-OFF

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Investigate scale of impact.	NRA	Improved input to planning process. Production of NRA policy to assist strategic planning.	Limitations on land use.

ISSUE No. 27

CONTROLLING THE IMPACT OF DEVELOPMENT ON THE WATER ENVIRONMENT

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
1. Advise developers on pre-planning enquiries.	NRA	Issues identified before work commenced.	Possibility of increased number of speculative enquiries leading to wasted staff time.
2. Liaise with Local Authorities and include appropriate policies in Local Plans.	NRA Local Planning Authorities (LPAs)	Developments have less effect on water environment.	Variable response from Local Authorities. Long term solution.
3. Include environmental enhancement as part of development, including integration of existing watercourse and wetland habitats where appropriate.	NRA Developers LPAs Dept. of Transport/Welsh Office	Preservation of watercourse/wetland habitats, prevention of flytipping.	If poorly maintained may become an eyesore.
4. Press for aftercare programmes.	LPAs NRA Developers Riparian Owners	Continued maintenance of river corridor.	Maintenance costs to Local Authority or Riparian Owners.
5. Increase NRA involvement in development briefs and planning agreements.	NRA LPAs Developers	Proper specification of mitigation measures, during development.	Requirement for staff time and additional skills.

ISSUE No. 28

CHANGES IN LOCAL GOVERNMENT STRUCTURE

OPTIONS / ACTIONS	RESPONSIBILITY	BENEFITS	CONSTRAINTS
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	Local policies applicable to new areas.	Difficulty in assigning 'old' Local Plan policies to new Council areas.

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NRA

*National Rivers Authority
Severn - Trent Region*