

NRA-wales 55

Lower Wye
Catchment
Management Plan
Consultation
Report Summary



NRA

*National Rivers Authority
Welsh Region*

**Guardians of
the Water Environment**

June 1994



ENVIRONMENT AGENCY

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COVER PHOTO - River Wye at Hereford

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ACKNOWLEDGEMENTS: PHOTOGRAPHS OF WHITEBROOK, REDBROOK BRIDGE; CANOEING AT SYMONDS YAT;
COURTESY OF WALES TOURIST BOARD

OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Consider feasibility of introduction of navigation byelaws and the adoption of navigation authority powers.	NRA	Better management of river use.	Cost of users if registration introduced.
2. Support the Wye Forum representing river users, owners and conservation interests.	NRA/Members of Wye Forum	Increased awareness of needs of different recreational groups and of conservations	
3. Improve the distribution of information about the river.	Members of Wye Management Advisory Group	Better management of recreation and improved environmental protection.	
4. Monitor levels and distribution of recreational use of river.	Wye Management Advisory Group	Better management of river use.	
5. Investigate impact of recreational uses on conservation.	NRA/CCW/EN	Improved environmental protection.	

The Wye at Ross-on-Wye

THE NRA'S VISION FOR THE LOWER WYE CATCHMENT

The lower Wye catchment is one of idyllic beauty and unspoilt scenery. For generations animal husbandry and the farming of fruit, potatoes and hops have lent it's lowland plain a rural charm and colour which vies for attention with the more dramatic uplands and gorges of the catchment periphery. Little wonder that much of the valley is designated as an Area of Outstanding Natural beauty, or that its towns and villages swell with visitors during the spring and summer.

It is the river which provides a focus for it's valley. Each of the historic towns of Hay, Hereford, Monmouth, Chepstow and Ross lie on its banks and it sustains much of the farming, industry and daily water needs of the people of the catchment and beyond.

It is also the river and it's many tributaries which afford such a wide variety of recreational uses. Many people come to enjoy the unique landscape, the world famous salmon are avidly sought by fishermen and the river itself attracts canoeists and rafters from far afield.

It is the NRA's vision to maintain and enhance both the natural and man-made environment of the river, and the tributaries and aquifers which sustain it. As one of the largest rivers in Britain, and one of national importance, this presents a great challenge. This challenge is best met by addressing the existing and foreseen problems identified within this plan, and by continuing to balance the needs of all users of the catchment. In particular, the NRA is seeking to make further improvements in water quality by reducing the impact of sewage and agricultural pollution. The NRA is also to implement a licensing policy which will enable us to manage the water resources of the catchment to allow sustainable development whilst safeguarding the aquatic environment. The flood defences need to be maintained to the appropriate standard of service throughout the catchment and to be improved where appropriate and cost effective. Equally important is the careful conservation and maintaining and improving the wildlife of the lower Wye with it's rare species of plants, animals and birdlife.

The NRA recognises the importance of this river system and the competing activities for which it is used. It is our intention to work with all other agencies and representative organisations in the catchment to promote an integrated approach to river management. In particular, the NRA anticipates that the plan will influence the planning processes of local authorities.

The realisation of the NRA's vision will be achieved through a balanced management approach so that the required improvements in the catchment can be made and sustained in active collaboration with all users of the catchment's resources.

INTRODUCTION

Never before has there been such a pressing need to conserve our rivers, lakes and coastal waters to support the rapidly increasing recreational, domestic, agricultural and industrial demands placed upon them. On the other hand, the need to protect life and property from flooding has never been greater. The NRA has a wide range of responsibilities for the control of the water environment, and seeks to reconcile the conflicts raised by the competing needs for water.

In particular the NRA is responsible for:

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



The Wye Valley

The NRA believes that it can only carry out it's work by adopting the concept of integrated catchment management. This means that a river catchment is considered as a whole and the actions in each of the NRA areas of responsibility must take account of the possible impact on other areas.

The NRA has decided to formally present its catchment management policies to the public via Catchment Management Plans which will be produced for all the rivers in Wales by 1998. The Plans are intended to provide a link between the NRA and the users of water in each catchment so that the Authority can better reflect their interests whilst carrying out its duties. For this reason each Plan includes a Consultation Phase during which the general public are invited to comment on the NRA's proposals for the future management of the catchment.

ISSUE No: 29 MANAGEMENT OF EEL AND ELVER STOCKS			
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Consider results and conclusions of NRA R&D Report including the need for regulation of the elver catch byelaw.	NRA	Increased stocks due to greater escapement of elvers.	Reduced fishing opportunity.

ISSUE No: 30 AVIAN PREDATORS OF FISH			
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Initiate an annual survey of goosander and cormorant to build on results of previous surveys.	NRA/Fishery Owners/MAFF/WOAD	Information on numbers of birds essential for impact assessment.	Approx. cost £10K p.a.
2. Undertake R&D to assess impact of goosander and cormorant on fish stocks and consider possible control measures.	NRA/CCW/EN/WOAD/MAFF	Protection of birds and fish stocks.	Practicality of controls

ISSUE No: 31 DECLINE IN COARSE FISH STOCKS ON THE RIVER LUGG			
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Monitor coarse fish stocks and carry out habitat improvement works to increase fish fry survival.	NRA/Fishery Owners.	Increased fish stocks.	Approx. cost £10K.

ISSUE No: 27		DECLINE IN BROWN TROUT STOCKS	
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Review fishery byelaws to control exploitation and to allow greater escapement to spawn.	NRA/Fishery Owner	Increased stocks due to greater escapement.	Loss of angling opportunity.
2. Act on recommendations in the Brown Trout Strategy including establishment of a database, identification of possible habitat degradation, research into restocking policies and the effects of predators on stocks.	NRA	Increased stocks of natural brown trout.	Restrictions on restocking.

ISSUE No: 28		MONITORING OF FISH STOCKS	
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Install acoustic fish counter to count ascending adult salmon and descending kelts, smolts and migrating shad.	NRA	To enable more accurate management of fish stocks.	Approx. cost of project £350K.
2. Assess juvenile salmon and trout stocks at 120 sites throughout the Wye catchment annually.	NRA	To enable more accurate management of fish stocks.	Restrictions on restocking.
3. Collect and analyse information on catches of coarse fish submitted by angling clubs.	NRA/Angling Clubs	To enable more accurate management of fish stocks.	

YOUR VIEWS

The lower Wye Catchment Management Consultation Report is our assessment of the state of the catchment and identifies the key issues which need to be resolved. The most important are outlined in the tables at the end of this summary report.

We need your views:

- what do you think about the Plan in general?
- have we identified all the uses?
- have we identified all the issues?
- what do you think about the options proposed?
- have you any other information about the catchment or any comments about its future management?

If you would like to comment on the Consultation Report or receive a copy of the full document please write to:

**THE AREA CATCHMENT PLANNER
NATIONAL RIVERS AUTHORITY SOUTH-EAST AREA
PLAS-YR-AFON
ST MELLONS BUSINESS PARK
ST MELLONS
CARDIFF
CF3 0LT**



Canoeing at Symonds Yat

THE CATCHMENT

This 'lower Wye' Plan considers the lower River Wye catchment from Hay-on-Wye to Chepstow. The remainder of the catchment is covered in the 'upper Wye' Plan, with which this plan is linked and to which the reader may wish to refer.

At Hay-on-Wye the river already contains around half it's total flow and flows eastwards to Hereford where it is joined by it's foremost tributary, the River Lugg, and subsequently heads abruptly south. During the last 60km stretch, the river is joined by the second of it's major tributaries, the River Monnow, and cuts through the deep limestone gorge to meet the Bristol channel at Chepstow.

Though predominantly lowland in character, the lower Wye catchment encompasses a variety of topography ranging from the extensive Herefordshire plain at it's centre to tracts of upland, such as Radnor Forest and the Black Mountains, at it's periphery. The catchment is rural in nature and largely unspoilt, possessing a rich array of natural habitats. Market towns and other urban developments are found at intervals along the river.



ISSUE No: 25			
DECLINE IN SALMON STOCKS, ESPECIALLY LARGE SPRING FISH			
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Review fishery byelaws to control exploitation and to allow greater escapement to spawn.	NRA/Fishery Owners	Increased stocks.	Loss of angling opportunity. Reduced rod catches.
2. Operate Glasbury Hatchery. Collect broodstock and restock fry into catchment to increase productivity.	NRA	Enhancement of stocks by utilising extra nursery areas.	
3. Investigate barriers to salmon migration and recommend a programme of fish pass construction.	NRA	Enhancement of stocks by utilising extra nursery areas.	Possible undesirable impact on indigenous fish fauna. Approx.cost £50K.
4. Conduct feasibility study of a breeding programme to enhance large spring salmon stocks.	NRA	Increased stocks.	
5. Carry out habitat improvements as recommended by 1993 Fisheries Survey.	NRA	Improved spawning and nursery areas to increase productivity.	Cost not yet determined.

ISSUE No: 26			
ILLEGAL FISHING FOR SALMON			
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Maintain surveillance and anti-poaching patrols by Water Bailiffs.	NRA	Protection of stocks and detection of illegal activity.	
2. Control market in illegally caught salmon.	NRA	Reduce market in illegally caught salmon to discourage illegal fishing.	
3. Raise public awareness of illegal fishing and illegal trade in salmon by distributing information e.g. 'Buyer Beware' Leaflets.	NRA	Increased flow of information about illegal activity. Reduces illegal activity.	

OPTIONS / ACTIONS	Responsibility	Advantages	Disadvantages
1. Restrict development on floodplain and riverside via planning consultation procedure.	NRA/LPAs	1. Management of flood risk to people and property. 2. Reduction in need for future flood protection. 3. Protects conservation interests.	
2. Production of Section 105 flood risk maps.	NRA/LPAs	1. Fulfils statutory duty. 2. Allows LPAs to make better informed decisions.	Cost £100K
3. Use of statutory powers.	NRA	1. Better control of flood risk.	

CATCHMENT STATISTICS

GENERAL

Catchment Area:	2513km ²	
Highest Point:	713m AOD	
Population:	Year	Population
	1991	197550
	2021	232400 (predicted)

WATER RESOURCES

Average annual rainfall:	850 mm/yr
Average Daily Flow from Catchment	6400 MI/d
Gross Licensed Abstraction	545 MI/d
Volume of Water Abstracted but not returned to the river:	89 MI/d

(MI/d = Megalitre per day = 1000 cubic metres per day)

FLOOD DEFENCE

Length of Main River:	487km
Total length of flood embankment:	33km
Length of River Resectioned and Regularly Maintained:	25km

ADMINISTRATIVE DETAILS

		(% of Plan area)
County Councils:	Hereford & Worcester	64%
	Gwent	22%
	Powys	10%
	Gloucestershire	4%

National Rivers Authority:

Welsh Region, South East Area	Welsh Region, SE Area-East District
Plas-yr-Afon	Hadnock Road
St Mellons Business Park	Monmouth
St Mellons, Cardiff CF3 OLT	NP5 3NQ

Water Companies:

Dŵr Cymru/Welsh Water plc., Severn Trent Water plc.

GEOLOGY

Much of the catchment is underlain by Old Red Sandstone, with soft marls making up the Herefordshire lowlands and coarser, more resistant sandstones forming the Black Mountains. Older Silurian rocks also outcrop in the upper Lugg catchment and there is a block of younger Carboniferous Limestone and Coal Measures at the southeastern edge of the catchment. Overlying these rocks are extensive deposits of glacial till, with alluvial deposits along the river floodplain.



Slurry Storage

DEVELOPMENT AND LAND USE

Agriculture is the major land use in this predominantly rural area of the country. It ranges from sheep farming in the north and west to arable and dairy farming in the central and southern areas. The lowland plain also has significant areas of fruit, potatoes and hop growing and there are some areas of managed forest.

Industrial development is centred around the City of Hereford and the major towns of Chepstow, Monmouth, Ross-on-Wye, Bromyard, Leominster, Presteigne, Kington and Hay-on-Wye.

Substantial housing development of over 13000 houses is envisaged for Hereford, Bromyard, Leominster, Monmouth and Ross areas by 2001. It is also probable that there will be development pressure in the Caldicot and Chepstow areas of the catchment due to the second Severn crossing .

WATER QUALITY

Most of the waters of the River Wye and it's tributaries are of very high quality and owing to the value of the natural ecosystem of the river, high standards of water quality must be maintained. There are relatively few water quality problems for a catchment of this size but those that are apparent are mainly as a result of the land uses in the catchment.

There are 41 major sewage treatment works plus other minor ones that discharge a total of 47.6 Ml/d to the freshwater part of the catchment. There

ISSUE No: 21 PROTECTION OF THE HERITAGE RESOURCE			
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Initiate procedures to identify unscheduled features when considering consent applications.	NRA/Conservation Agencies	Avoids damage to heritage features.	
2. Consider all NRA capital and maintenance activities to ensure no damage to heritage features.	NRA/Conservation Agencies	Avoids damage to heritage features.	
3. Seek opportunities to enhance sites of heritage interest in river corridors.	NRA/Conservation Agencies	Protects resource.	

ISSUE No: 22 CONSERVATION OF RARE SPECIES			
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Prepare conservation strategies for each rare species.	NRA/CCW/EN Voluntary Conservation Bodies	Monitor status of species. Specific needs determined.	
2. Restrict movement of non-native crayfish into the catchment.	NRA/MAFF/CCW/EN	Protection of native crayfish.	Restricts crayfish farming.

ISSUE No: 23 TIDAL/FLUVIAL FLOODING IN SOME AREAS			
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Monitor flooding.	NRA/LA	Maintains accurate database.	
2. Review options for flood defence improvements to standards of services.	NRA/LA	May lead to development of new schemes.	
3. Promote schemes as appropriate.	NRA/LA	Standards of service improved.	

ISSUE No: 18

IMPROVED LAND DRAINAGE AND LAND USE CHANGES IS ALLEGED TO HAVE REDUCED BASEFLOWS AND INCREASED RATES OF RUNOFF

OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Investigate flow records to establish to what extent higher runoff rates and lower base flows occur.	NRA	Will understand causal mechanisms. Scope for ameliorative measures can be assessed.	

ISSUE No: 19

DEGRADATION OF RIVERBANK HABITAT

OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Seek to enhance the riverbank habitat when undertaking NRA flood defence works.	NRA	Improve the conservation resource	
2. Seek riverbank habitat improvements when considering applications for abstraction licences and land drainage consents and also when consulted on planning applications.	NRA	Improve the conservation resource.	
3. Encourage the creation of riparian buffer zones.	NRA/Landowners	Protection of riparian and aquatic resource.	Cost to NRA and Landowners.
4. Encourage sensitive bank management by angling interests.	NRA/Angling Interests	Improve the conservation resource.	Maintaining adequate access for angling.

ISSUE NO: 20

NO STANDARDS OF SERVICE AGREED WITH CCW/EN FOR NRA OPERATIONS AFFECTING SITES OF SPECIAL SCIENTIFIC INTEREST

OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Agree standards of service	EN/CCW/NRA	Protect SSSI. Ensures consistent approach.	

are also sewage inputs to the Wye estuary. The River Wye from Hereford to its tidal limit has been designated as a eutrophic sensitive area under the Urban Waste Water Treatment Directive. This means that the STWs at Hereford and Leominster have been targeted for nutrient reduction. There are very few industrial discharges to the river.

LOWER WYE WATER QUALITY DATA

Length of river in fisheries ecosystem class:



The Wye estuary is class A (good) water quality and allows the passage of migratory fish.

Groundwater is important in the catchment particularly around Chepstow and

in the Yazor and Lugg subcatchments. The quality of these waters must be high in order to support the dependent industrial, public, domestic and agricultural supplies. Several Sites of Special Scientific Interest are dependent on these aquifers.

There is a perceived problem of elevated nitrate levels in groundwaters at three locations within the lower Wye. Currently these public potable groundwater sources are being considered by the Government as potential Nitrate Vulnerable Zones within the terms of the EC Nitrate Directive. The NRA has provided technical advice to the Government on this matter.



River Wye at Redbrook



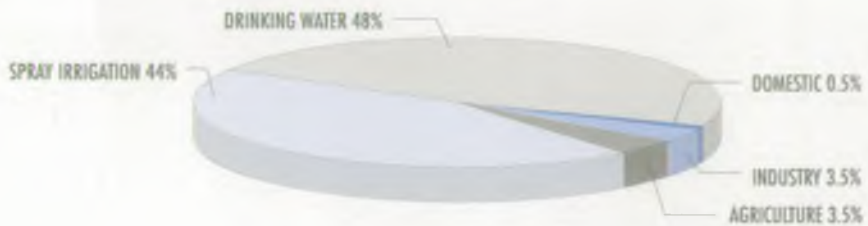
Spray irrigation

WATER RESOURCES

The surface and groundwaters of the lower Wye supply the agricultural, industrial and recreational needs of the catchment. More importantly still, the Wye is a major source of drinking water, sustaining the people both inside and outside of the catchment. Large transfers of water from the River Wye catchment help to supply Cardiff, Newport, Llanwern and Gloucester. These water transfers are supported with water from the Elan Reservoirs (in the upper Wye) to minimise the impact on the river environment.

The use of large quantities of water inevitably result in some being 'lost' and not returned to the river. The estimated water loss during the summer (the most vulnerable time for river flow) is given in the figure below:

Percentage water loss, Lower Wye Catchment



OPTION No.16 RESTRICTIONS ON ABSTRACTIONS CANNOT BE BASED ON THE ENVIRONMENTAL REQUIREMENTS OF RIVER PLAN AND ANIMAL LIFE			
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Undertake research into flow requirements for river flora and fauna.	NRA	Already underway in NRA R&D Programme.	Unlikely to produce practically applicable results quickly.
2. Develop and implement licensing policy based on research to provide a Nationally consistent policy.	NRA and others as consultees	Can provide policy within 2 years.	Not as scientifically rigorous as 1. May not alter trigger level for Section 57 restrictions.
3. Undertake review of trigger levels.	NRA	Trigger level defensible.	Environmental benefits too difficult to quantify. Does not assist in setting of "Hands-off" flow conditions.
4. Do nothing.		No cost or effort	Trigger levels and "Hands-off" flow conditions may not protect the river or unduly penalise abstractors.

ISSUE No: 17 GROUNDWATER ABSTRACTIONS FOR SPRAY IRRIGATION AFFECTING SURFACE WATER FLOWS			
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Determine which spray irrigation abstractions from groundwater affect river flows directly and include in any restrictions.	NRA	Comply with legal requirements. Reduced demand on river during very low flows. Abstractors treated consistently.	Abstractors not previously affected, now restricted. May require some pumping tests.
2. Do nothing.		There are only a small number of abstractors who would not be covered.	Fail to comply with legal requirement. Demand on river in drought higher than necessary.

OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Full upgrade of relevant Wye Gauging Stations. More sites on tributaries with many abstractions (e.g. the Garren Brook or Pinsley Brook).	NRA	More accurate flow measurements. Increased protection of environment. Better water management.	Cost: £300,000 -£500,000.
2. New stations to measure highly used streams - Garren Brook. Re-open gauging stations on lower Lugg and Pinsley Brook.	NRA	Better protection of local environment and water resource management.	Cost £100,000. Less accurate measurement than 1. for main Wye installations.
3. Programme of installing simple measuring posts where abstractions take from small watercourses.	NRA	Protects small watercourses. Can be done in conjunction with 1. and 2.	Cost £3,000. Less accurate and very localised information if not used with 1. and 2.
4. Increase monitoring of groundwater levels within the minor aquifers of the catchments (similar works programmed for upper Wye).	NRA	Protect local aquifers and associated surface waters from over abstraction. Gain better understanding of catchment water resources.	Cost £50,000 for lower Wye. Further £50,000 for the upper Wye.

Spray irrigation is perhaps the most serious cause of water loss because all the water used is taken up by the plants and is not returned to the river. Moreover, this practice occurs in the summer months when water loss is most damaging.

Locally important sources of groundwater are available within the lower Wye catchment, notably in the Chepstow limestone, in the gravel deposits in the Yazor and Lugg catchments and to a lesser extent in the Old Red Sandstone. Groundwater throughout the catchment is important in sustaining the low flows in surface streams and rivers. It is abstracted for use in industry, agriculture and for public and private water supplies.

FLOOD DEFENCE

Flooding on the lower Wye is usually the result of prolonged rainfall over most of the catchment. Snowmelt can be a factor on occasions and short, intense storms may cause localised problems in headwater streams. Floods can take up to 2 days to travel down the river from Hay to Chepstow.

Flood defences have been constructed at Presteigne, Leominster, Wellington, Withington Marsh, Mordiford, Hampton Bishop, Kingstone, Peterchurch, Pontrilas and Monmouth. The NRA also maintains sea defences from Thornwell to Black Rock at the mouth of the River Wye near Chepstow. Flood warnings are provided for the River Wye between Hay-on-Wye and Monmouth and for the River Monnow and the River Lugg.



Monmouth Flood Defences

FISHERIES

There are twenty-nine species of fish in the catchment ranging from minnow to salmon. The lower Wye is the principal area for salmon fishing in the catchment and the Lugg is important for their spawning.

Most of the other tributaries are either inaccessible to salmon or unsuitable as spawning areas. In particular the River Monnow is inaccessible to salmon due to the weir

at Osbaston. Brown trout stocks are variable and have been subject to decline for many years. Coarse fish species are found throughout the catchment.

Fishing rights on the Wye and its tributaries are all in private ownership. Angling for salmon occurs only on the main River Wye but trout fishing occurs throughout the catchment. Coarse fishing is centred on the main river and the lower reaches of the Lugg and Monnow. The lower Wye unfortunately suffers from illegal salmon fishing, with organised gangs of individuals using gill nets to catch salmon on their migration upstream to spawn.



Angling on the River Wye

CONSERVATION/ECOLOGY

The lower Wye catchment is largely rural in character and is of considerable natural beauty. The River Wye and its banks are designated a Site of Special Scientific Interest (SSSI) as an example of a major river which has a largely natural regime and which is relatively free from pollution. It supports a variety of aquatic animals and plants including a nationally rare species of mayfly and the freshwater pearl mussel. The River Lugg is proposed as a SSSI from the

headwaters to the confluence with the Wye and its headwaters support insects of national conservation status.

The otter population in the catchment is showing evidence of expansion and mink and several rare bat species are present.



OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Implementation of Regional Licensing Policy throughout the catchment.	NRA	Improved understanding of the balance of water resources. Widely accepted.	Takes time to implement. Not scientifically rigorous at all sites.
2. Undertake fundamental research into the flow requirements of river flora and fauna.	NRA	Partly in hand through NRA research programme. Will give a thorough assessment of the state of the catchment.	Unlikely to produce practically applicable results in the near future.
3. Apply the present method used for subcatchments to selected river stretches or to every river stretch.	NRA	Accepted method. More easily and rapidly applied than 1 or 2.	Not scientifically rigorous. The method gives an arbitrary measure of the state of the catchment.

OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Detailed study of the Yazor Gravels and Chepstow Limestone Block.	NRA	Enables better protection of the aquifers and of local streams. Allows better determination of new licences for abstraction from the aquifers and associated surface waters.	Cost: £100,000-£150,000
2. Draw up a policy regarding local abstraction regime in the Chepstow Limestone Block.	NRA	Allows better determination of new licences for abstraction from the Chepstow Limestone and associated surface waters. Prevents potential over-abstraction from the aquifer.	Cost: £20,000
3. Implement the NRA's Groundwater Protection Policy throughout the catchment.	NRA	Minimises the risk of derogation of groundwater sources and resources. Can be implemented along with 1 and 2.	Cost: £20,000-£30,000



Rowing on the Wye at Hereford

RECREATION

Many people live adjacent to watercourses in the catchment and many more come to visit for recreation of some sort. These activities range from walking along the famous Offa's Dyke Path, angling for salmon, trout and coarse fish, canoeing, rafting and even water skiing in some areas. The River Wye has been used for navigation for many centuries but the only vessels seen on the water these days are linked to tourism. The majority of craft seen on the river are individuals, families or organised groups canoeing, rowing and rafting the natural river, free from artificial obstructions for almost 160 km.

ISSUE AND OPTIONS

The following tables list the 32 issues which the NRA has identified within the Lower Wye catchment. We would like to hear from you if:

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

ISSUE No: 1 WATER QUALITY FAILURES IN THE WORM BROOK, FROME AND LUGG CATCHMENTS DUE TO AGRICULTURAL ACTIVITIES			
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Targetted catchment control work in sub-catchments. Identify farms for remedial waste management works to comply with COPRA 1991.	NRA/Farm owners Products	Will achieve improvements in long term..	Cost to farmers unknown. Costs to NRA of pollution prevention work.
2. Propose interim water quality (WQ) targets of Fisheries Ecosystem (FE) Class 3 and FE5 affected stretches.	NRA	Maintain existing water quality. Zero cost.	Will not achieve FE2 and FE4 target in short term.
3. Investigate impact of low flow on achievement of quality targets.	NRA	Quantification of problem. Prevents unnecessary expenditure by farmers.	May not be able to achieve long term Water Quality target.

ISSUE No: 2 POOR BIOLOGICAL QUALITY IN THE UPPER AND MIDDLE REACHES OF THE RIVER FROME			
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Investigate the continued use of pesticides in the catchment, develop a comprehensive monitoring programme and develop an action plan for WQ improvements.	NRA	Quantification and identification of sources and uses of pesticides in the catchment.	Cost unknown. Resource implications.
2. Improved methods of pesticide handling/ storage and application	Farm Owners Local Authorities	Improvement of water quality.	Cost unknown.
3. Investigate catchment for point source and diffuse farm pollution and develop an action plan for WQ improvements.	NRA/Farm owners	Improvement of water quality.	Cost and resource implications

OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Identify if existing conditions create environmental problems and identify possible solutions.	NRA	Increased knowledge of the catchment. Will identify what further action needs to be taken.	Time delay whilst study is completed. Cost-effective solutions may not be apparent. Cost: £2,000.
2. Provide winter storage reservoirs for spray irrigators instead of summer abstraction.	MAFF/NRA Spray Irrigators	Less water loss during summer. Protection of the environment.	Cost: Unknown. Depends upon demand. Not certain if conditions cause a problem.
3. Co-operatives between farmers to ensure existing winter storage is fully utilised.	NRA/FUW/NRA	Less demand on summer water level. Environmental protection improved.	May give only limited improvements. Not certain if present conditions cause a problem.
4. Augment Flow in watercourses.	NRA/Spray Irrigators	Allows abstraction when water required. Reduced summer demand on river. Increased flow in dry periods.	Several storage facilities required. Dependant upon availability of water resources. Cannot realistically supply to all sites.

OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Development of action plan during 1994/95 together with programme of catchment inspection	NRA	Quantification of problem and identification of problem sites.	Cost of implementation action plan. Resource implications.
2. Improvement in farm effluent storage/disposal systems.	Farm owners	Improvement in water quality, reduction in nutrient inputs. Grant aid for farm pollution control work available from MAFF.	Cost to farmers unknown.

OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Designation of lower Wye as 'Sensitive Area' under the Urban Wastewater Treatment Directive - phosphorus removal at Hereford STWs and Leominster (Worcester Road) STW.	NRA/Dŵr Cymru	Possible reduction of weed and algal growth.	Cost to Dŵr Cymru.
2. Physical removal of surface plant growth..	NRA/Fishery Owners/Other river users	Reduced plant cover and improved passage for craft.	Recurring cost. Impact on river ecology. Increase in rate of plant regrowth
3. Monitor water quality over the diurnal cycle during plant growth and decay periods.	NRA	Quantify extent of water quality impact. Minimise unnecessary cost.	Cost unknown. NRA resource implications.

OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Improvements to Weobley STW to meet environmentally protective consent. Due for completion by May 1994.	Dŵr Cymru	Achievement of FE target.	Costs £420K

OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Continued operational improvements to Burghill STW.	Dŵr Cymru	Improvement in Yazor Brook water quality.	Costs unknown.
2. Abandon Burghill STW and pump sewage to Hereford City STWs.	Dŵr Cymru	Remove pollution load from Yazor and hence improve quality.	Costs unknown. Extra load on Hereford STWs and sewerage
	3. Propose interim target of FE4.	NRA	Maintain water quality. Allow Dŵr Cymru time to assess alternative schemes.

ISSUE No: 5

WATER QUALITY FAILURE IN THE COLDSTONE BROOK BELOW KINGSTONE AND MADLEY
SEWAGE TREATMENT WORKS

OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Continued operational improvements at Kingstone and Madley STW.	Dŵr Cymru	Improvement in brook quality.	Costs to DCC. Brook may not achieve long term quality.
2. Retain in Dŵr Cymru's Capital Programme (AMP2).	Dŵr Cymru/NRA	Improvement in water quality.	Capital costs Dŵr Cymru.
3. Consider alternative point of discharge into higher dilution stream.	NRA/Dŵr Cymru	Improvement in Coldstone Brook quality	Costs unknown. Practicality of effluent pipeline length.
4. Re-assess long term FE2 target of Coldstone Brook to FE3 or FE4.	NRA	Maintain existing water quality. Minimise unnecessary expense by Dŵr Cymru.	Not achieving FE2 target. Possible impact on downstream uses.

ISSUE No: 6

POOR BIOLOGICAL QUALITY OF VALLEY BROOK BELOW COLEFORD TOWN

OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Remove foul connections to Valley Brook from Market Square, Coleford and connect to foul sewer.	Forest of Dean District Council	Improved WQ in brook.	
2. Improve performance of Newland Street Combined Sewer Overflow (CSO) and remove non-foul flow from Smithkline Beecham.	Forest of Dean District Council	Improved overflow operation and minimise discharges to brook.	
3. Improve foul sewer at Mill End to prevent surcharging.	Forest of Dean District Council/ Dŵr Cymru	Improved WQ in brook.	Cost unknown.

ISSUE No: 7 SEWAGE LITTER IN RUDHALL BROOK FROM HOMMS ROAD PUMPING STATION, ROSS			
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Improvements to storm sewage overflow.	Dŵr Cymru/ District Council	Removal of nuisance caused by sewage debris in stream.	Cost unknown.

ISSUE No: 8 LOCALISED POLLUTION OF RIVER FROME FROM BROMYARD PUMPING STATION			
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Upgrade pumping station to provide additional capacity and storage and provide for storm sewage treatment capacity at Bromyard STW if necessary.	Dŵr Cymru	Remove threat of pollution in River Frome.	Cost unknown. Impact on performance of Bromyard STW unknown.
2. Consider priority of other CSOs in Dŵr Cymru capital programme.	Dŵr Cymru/NRA	Remove threat of pollution in River Frome.	Cost unknown.

ISSUE No: 9 SEWAGE LITTER IN WYE ESTUARY DUE TO CRUDE SEWAGE DISCHARGES FROM CHEPSTOW TOWN			
OPTIONS/ACTIONS	Responsibility	Advantages	Disadvantages
1. Interception of foul discharges and take to single point for treatment to Urban Wastewater Treatment Directive requirements.	Dŵr Cymru	Improvement in Estuary water and aesthetic quality.	Costs unknown. Will not be achieved until post 2000.