

THE RIVER ARUN CATCHMENT MANAGEMENT PLAN ACTION PLAN



NRA

*National Rivers Authority
Southern Region*

MISSION STATEMENT

The NRA's mission is:

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

Our Aims are to:

- Achieve a continuing overall improvement in the quality of rivers, estuaries and coastal waters, through the control of pollution.
- Manage water resources to achieve the right balance between the needs of the environment and those of the abstractors.
- Provide effective defence for people and property against flooding from rivers and the sea.
- Provide adequate arrangements for flood forecasting and warning.
- Maintain, improve and develop fisheries.
- Develop the amenity and recreation potential of inland and coastal waters and associated lands.
- Conserve and enhance wildlife, landscape and archaeological features associated with inland and coastal waters of England and Wales.
- Improve and maintain inland waters and their facilities for use by the public where the NRA is the navigation authority.
- Ensure that dischargers pay the costs of the consequences of their discharges, and, as far as possible, to recover the costs of environment improvements from those who benefit.
- Improve public understanding of the water environment and the NRA's work.
- Improve efficiency in the exercise of the NRA's functions and to provide challenge and opportunity for employees and show concern for their welfare.

The National Rivers Authority will form the major part of a new organisation which will have responsibilities for the environmental protection of water, land and air. The new Environment Agency starts its work of managing the environment in England and Wales on April 1 1996.

River Arun Catchment Management Plan
Action Plan

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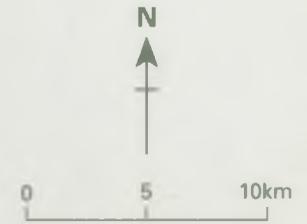
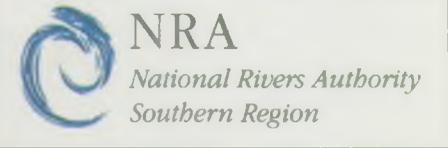
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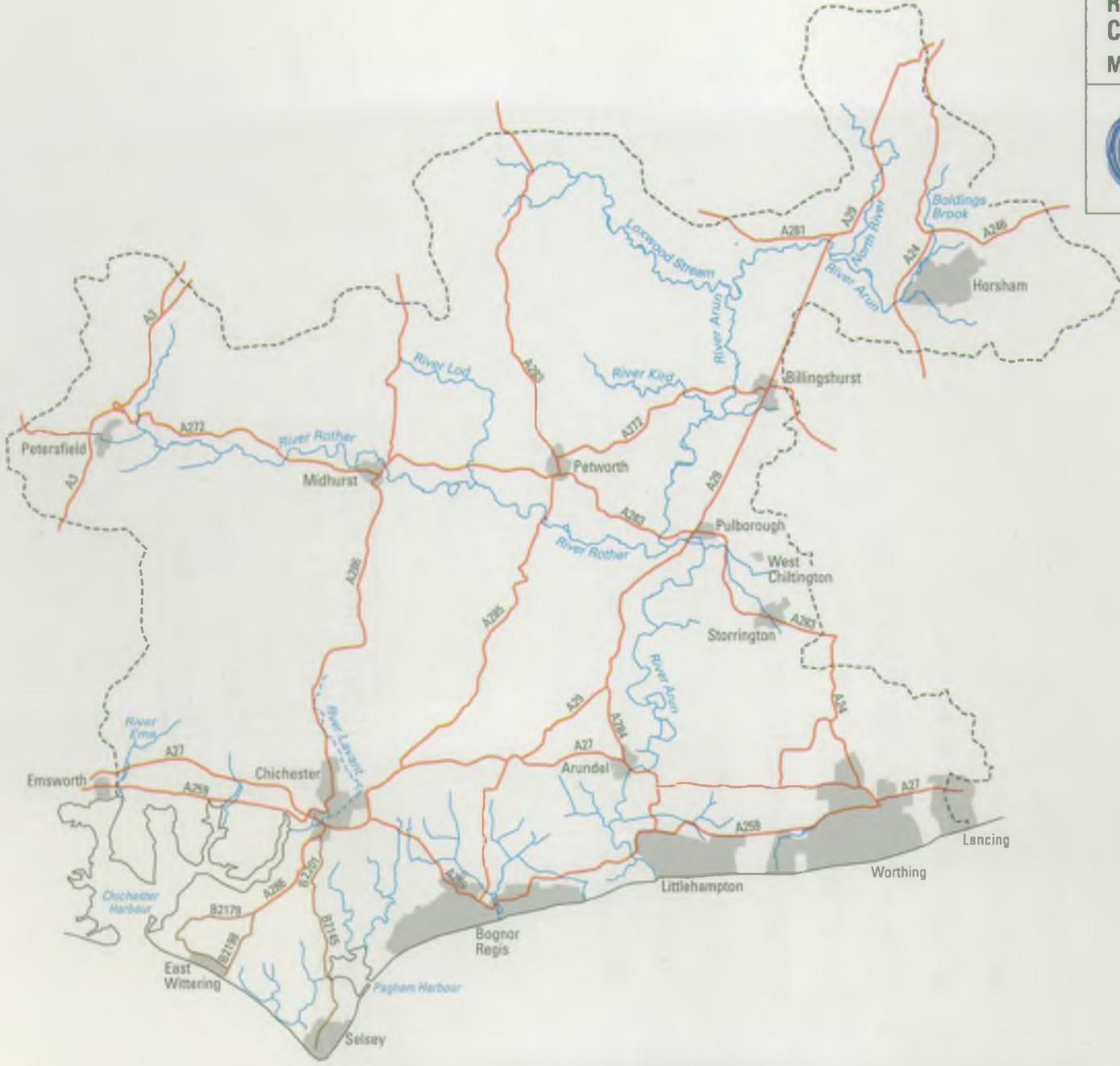
**River Arun
Catchment Management Plan
Map 1**



The Catchment

KEY

- Catchment Boundary
- Perennial Watercourse
- - - - - Ephemeral Watercourse
- A Roads
- B Roads
- Built up Area



A. CATCHMENT VISION

The catchment is home for around 470,000 people who depend on water and its environment to maintain their quality of life.

The chalk aquifer is the primary source of water for domestic and industrial purposes within the catchment. To protect public health and the quality of water the NRA will continue to apply its Groundwater Protection Policy to prevent aquifer pollution. It will also be vigilant in the maintenance of river water quality and will continue to monitor bathing beaches for compliance with EC standards. It will seek improvement to water quality and in conjunction with other statutory bodies will secure the greatest benefit to coastal water quality from the sewage discharge improvement required by the Urban Wastewater Treatment Directive.

The protection of the quality of the natural water environment also demands that abstractions of water from ground and surface sources are in balance with the ecological needs of rivers.

One of the NRA's primary objectives will continue to be the protection of property and land from flooding. This will be undertaken through maintenance and improvements to rivers and sea defences and ensuring new development is not at risk to flooding and does not exacerbate flooding to others.

In undertaking its duties the NRA will promote conservation, amenity and public recreation. It will also work with landowners and angling organisations to maintain, improve and develop fisheries.

New development can pose a serious threat to the water environment. The NRA will continue to promote close liaison with local authorities to ensure development does not increase flood risk or cause environmental damage through pollution or unsustainable demands on water resources.

Establishing strong NRA involvement and links with local views are respected in all our decisions. The NRA will work with all relevant parties to establish the principles of sustainable development.

Sussex Area Manager

B. INTRODUCTION

The Water Act 1989 established the National Rivers Authority (NRA) as the "Guardian of the Water Environment", a non-departmental public body with responsibility for regulating and managing water resources, water quality in coastal and inland waters, flood defence, salmon and freshwater fisheries, water recreation and, in some areas, navigation. A duty laid on the NRA was to further conservation of the natural environment, seeking opportunities for enhancement wherever possible.

On 1st April 1996 The Environment Agency will become operational drawing together the responsibilities of the NRA, Her Majesty's Inspectorate of Pollution (HMIP) and Waste Regulation Authorities (WRA). The Secretary of State for the Environment, John Gummer, said of the Environment Agency:

"It will, first of all need to take an integrated approach to providing effective environmental protection: integrated to take account of impacts of air, water and land and integrated geographically so that integrated systems such as river catchments are considered as a whole".

Catchment Management Plans, to be renamed 'Environment Agency Local Management Plans' to reflect their broader remit, will progressively be developed to include integrated pollution control, nuclear and waste issues. Annual reviews will incorporate relevant issues although the fully integrated plans will result from the 5 yearly reviews of each plan.

The work of the Environment Agency will be critical in achieving the aims of the Government's proposals on sustainable development. This will involve combining economic development with the furtherance of conservation and enhancement of the environment. The new legislation requires consideration to be given to the costs likely to be incurred and the resulting benefits that would be accrued. These concepts will form the basis of future Local Management Plans and reviews.

C. CATCHMENT MANAGEMENT PLANNING

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

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

We have chosen to use Catchment Management Plans to translate those principles into action. The plans describe our vision for each catchment, identify problems and issues and propose actions that may be taken to resolve them. They also provide a means of promoting two key aspects of environmental management - land use planning and water quality objectives.

Catchment Management Plans relate primarily to the Authority's own operations and regulating activities, and have regard to its role as a statutory consultee in the Planning and Development Control process. The Plans concentrate on topics where the Authority has a direct interest and are focused mainly on the river corridor, although some functions such as water resource management and pollution control inevitably extend over the whole catchment area. Whilst they are not statutory documents, it is hoped that Catchment Plans will make a positive input to the Town and Country Planning process.

The River Arun Catchment Management Plan Consultation Report was produced as a vehicle for wide public consultation about the catchment issues and gave an opportunity for input from the public and interested organisation to the development of NRA policies. This Action Plan has been prepared in the light of comments received.

D. REVIEW OF THE CONSULTATION PROCESS

The Arun Catchment Management Plan Consultation Report identified the primary concerns and objectives of the NRA for the protection and enhancement of the water environment. The Report was launched at Arundel Castle on the 23rd October 1995 and at this highly successful event the views of the public and interested parties were invited in order that they could contribute to the future priorities of the NRA.

The consultation period finished on the 23rd January 1996 and 26 written responses were received (see Table 1). It was encouraging to note that these in general were supportive of the issues and concerns raised by the NRA. The main themes of the comments received were as follows:

- There were particular concerns about the conflicts which could arise between the demands for water abstraction and the NRA's duty to further the conservation of the natural water environment.
- It was highlighted that there was a need to ensure conservation issues were addressed when carrying out works to reduce the risks of flooding.
- It was expressed that greater emphasis should have been given to water level management plans, such as that at Amberley Wildbrooks.
- There was a general desire to maintain and improve water quality standards. The issue of the identified unclassified rivers in the catchment raised concern.
- The need to protect aquifers from nitrate pollution and saline intrusion in order to protect public water supplies was emphasised.
- The loss of water from the catchment by discharging sewage effluent out to sea was raised with the effect this has on natural river flows and the quality of bathing waters.
- The need for the recreational uses of the catchment to be in keeping with the protection of the natural environment was stressed. Potential conflicts between angling interests and the desire to promote navigation were identified.
- The effects of mineral extraction on groundwater movement to the west of Chichester was raised as a specific point both at the launch and in the comments received.
- There was concern that the NRA had no statutory powers to ensure sustainable development.

These concerns are addressed by the NRA by ensuring, through effective internal liaison, a multifunctionary assessment of all proposals and also by undertaking the actions identified in the table on issues in the plan.

It is not the NRA's intention to re-issue a detailed plan on the format of all the consultation report at present. However, in the future the plan will be updated to incorporate all the interests of the Environment Agency. As such the comments received with respect to the general text and maps have been noted and will be utilised for the production of updated plans.

This document presents the NRA's action plan for the future management of the catchment. The NRA would thank the public and organisations who responded to the consultation report and hence have contributed to the preparation of this plan.

E. THE CATCHMENT

This Plan considers the catchments of the River Arun and West Sussex coastal streams, including the River Ems, River Lavant, Chichester and Pagham Harbours.

The River Arun rises east of Horsham on the Tunbridge Wells Sandstones of St Leonard's Forest, with tributaries from the Greensand hills to the north and west. At Hardham, downstream of the tidal limit, the Lower Arun is joined by the West Sussex Rother which rises from Chalk springs north-west of Petersfield, draining the scarp slope of the South Downs and the Greensand hills eastwards to Stopham.

Due to the low lying nature of the Sussex coastal plain, the tidal limit of the River Arun at Pallingham is 40km (25 miles) from its outfall to the English Channel at Littlehampton and the estuary is subject to strong tidal currents. To the north of Arundel the estuary flows for 10km (6 miles) through a wide valley cutting through the Chalk South Downs.

The West Sussex coastal plain lies on London Clay with Quaternary Tertiary deposits. This area is drained by small streams which rise on the Chalk, many of them winterbournes, the most notable being the River Lavant which flows through Chichester. Despite often being dry for much of the year the Lavant has a history of flooding, the most recent being in January 1994. West of Bognor Regis the coastal plain broadens to become the Manhood peninsula with Selsey Bill at its tip; nowhere higher than 10m AOD, much of this area is below high tide level and at risk to flooding from the sea. On its eastern side, Pagham Harbour is a tidal inlet which was formerly reclaimed for agriculture, as were parts of Chichester Harbour which bounds the peninsula to the north.

The whole coastline of the catchment is low lying and in places has been eroded by several kilometres over the last two thousand years. Urban development covers more than 70% of the coastal frontage, the highest proportion in the UK, and is protected against tidal erosion and flooding by sea defence embankments/walls.

Chalk outcrops constitute an important groundwater resource and being hydraulically isolated by river valleys including the Arun, the individual Chalk blocks can be managed as discrete units. At Hardham water is abstracted from the River Rother to provide water for Horsham and Crawley (in the Thames NRA Region). The extensive Lower Greensand aquifer which underlies the Hardham area is recharged naturally by rainfall and percolation from the river, and provides a backup resource which is managed conjunctively with the surface abstraction for public water supply.

Water quality is generally good and the headwater streams support wild populations of brown trout. Sea trout migrate up the Arun estuary to their spawning grounds in the tributaries, especially the Chalk streams feeding the River Rother, and are present in the streams flowing into Chichester Harbour. Elsewhere, ponds and streams support productive coarse fisheries which are extensively used by anglers. Lakes have been developed commercially as "put and take" trout fisheries and a number of spring-fed sites are managed as fish farms, producing trout for restocking.

Wildlife conservation features strongly in the area. Chichester and Pagham Harbours are noted for their wildfowl, the Royal Society for the Protection of Birds (RSPB) has a regional reserve at Pulborough Brooks, and the Wildfowl and Wetlands Trust operates a visitor centre at Arundel. The wetlands of the Arun and Rother valleys are regionally important for their flora, insect and bird life, and the Arun between Billingshurst and Pulborough supports a diverse dragonfly fauna.

F. INTERACTION WITH LAND USE PLANNING

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

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

As a guidance for local planning authorities the NRA has prepared a set of statements relating to the broad headings of water quality, water resources, flood defence, fisheries, conservation, recreation and navigation in the river corridor. These statements are included in the NRA's "Guidance notes for Local Planning Authorities on the methods of protecting the Water Environment through Development Plans". The strategic aims of the NRA through these policies are:

- To protect surface, ground and coastal waters from pollution arising from development.
- To ensure that development is not at an unacceptable risk from flooding (including tidal inundation) and does not put other areas at risk or greater risk from flooding.
- To ensure that development does not result in over-exploitation of water resources.
- To minimise the adverse effects of development on the water environment, particularly with regard to fisheries, wildlife conservation, landscape and historic sites, and to maximise the potential environmental benefits which development may offer.

G. CATCHMENT STATISTICS

G1. GENERAL INFORMATION

Surface Catchment Area	148,402 Ha (1405 km ²)
Groundwater Catchment Area	150,920 Ha (1509 km ²)
Topography	Maximum Level 294m AOD Minimum Level 0m AOD

Geology

From the north-east to south-west the catchment geology at the surface follows the sequence of the Wealden deposits (Tunbridge Wells Sands, Weald Clay, Lower Greensand and Gault Clay), the Chalk and Tertiary deposits (Reading Bed Gravels, London Clay and Bracklesham Beds). The Chalk of the South Downs is an important aquifer.

Estimated Catchment Population

Year	Population	Change Per Decade
1991	480,000	+ 8.3%
2001	520,000	+ 8.3%

Districts and Estimated Population (1991)

District	Persons per Hectare	Ha in Catchment	% Area of Catchment	Population in Catchment
<i>West Sussex CC</i>	3.2	128,900	86.86	407,200
Adur	13.9	1,800	1.21	25,000
Arun	5.9	22,700	15.30	133,900
Chichester	1.3	74,800	50.40	97,200
Horsham	2.0	25,800	17.39	51,600
Mid Sussex	3.6	500	0.34	1,800
Worthing	29.6	3,300	2.22	97,700
<i>Surrey CC</i>	3.6	11,600	7.82	41,500
Mole Valley	3.1	4,900	3.30	15,200
Waverley	3.3	6,600	4.45	21,800
Guildford	4.5	100	0.07	4,500
<i>Hampshire CC</i>	2.0	7,900	5.32	15,800
E Hampshire	2.0	7,900	5.32	15,800
TOTAL CATCHMENT	3.1	148,400	100.00	464,500

Note: The population figures are approximate

G2. WATER RESOURCES

Rainfall

Rainfall (mm)	Average Year	1:10 Yr Drought
Mean Annual Total	862	671
Effective Rainfall	354	204

Groundwater

Resource Area	Resource No.	Area (Ha)	% of Catchment
River Adur (Part)	23	2,800	1.86
Worthing Chalk (Part)	24	16,220	10.75
River Arun	25	48,200	31.94
West Sussex Rother	26	35,520	23.54
Chichester Chalk	27	48,180	31.91
TOTAL (Groundwater Catchment)		150,920	100.00

River Flow (cumecs)

	Q50	Q95
River Arun at Pallingham	1.26	0.32
River Rother at Hardham	2.79	1.06

Authorised Abstraction (Ml/d)

Licensed Abstraction	485.2 (103.7 for water power)
Licensed (excl. water power)	381.5
Actual Abstraction (1989)	218.7 (excl. water power)
% from groundwater	74.4%
% in High/Md Loss category	64.8%

Public Water Supply Companies Serving the Catchment

Water Company	Area (Ha)	% of Catchment
SWS Sussex (West)	65,300	43.98
SWS Sussex (Coast)	16,700	11.25
SE Water (Mid-Southern)	11,100	7.48
SE Water (Mid Sussex)	400	0.27
Portsmouth	43,000	29.00
Thames Water Utilities	9,100	6.13
East Surrey Water	2,800	1.89
TOTAL	148,400	100.00

G3. WATER QUALITY

River Designated under EC Freshwater Fish Directive (Km)

Salmonid designation	57.55
Cyprinid designation	73.87

Length of River in each GQA Quality Class (Km)

Class	Description	Achieved
A	Good	3.0
B	Good	76.2
C	Fair	81.9
D	Fair	37.5
E	Poor	24.9
F	Bad	6.0
	Unclassified	6.9
	TOTAL	236.4

EC Designated Bathing Waters 10 (marine)

- West Wittering
- Bracklesham Bay
- Selsey
- Pagham
- Bognor Regis
- Felpham
- Middleton on Sea
- Littlehampton
- Worthing
- South Lancing

Effluent Discharges

	Number	Vol (M ³ /d)
To River	128	51,287
To Estuary	8	670
To Sea	5	78,987

Routine Pollution Prevention Monitoring Site Categories

Farm making silage	244
Arable Farms	169
Beef Farms	349
Dairy Farms	224
Sheep Farms	70
Piggeries	40
Goat Farms	6
Poultry Farms	52
Miscellaneous Farms	318
TOTAL	1472
Fish Farms	>10 tonnes/yr 4
	<10 tonnes/yr 2

Sewage Treatment Works (by vol. m3/d)

	< 15	697
	15-49	91
	50-499	23
	500-4999	13
	>5000	8
Combined sewer overflows		50
Private Potable abstractions		101
Public Potable supply abstractions		30
Active Domestic Waste Landfills		3
Oil Exploration Sites		4

G4. FLOOD DEFENCE

Length of Coastline (Km)

Coastline to Schedule	142.50
Sea Defences (NRA)	18.81
Sea Defences (LA)	13.74
Tidal Banks (NRA)	65.10

Length of Main River (km) 408.27 (Includes tidal lengths)

Internal Drainage Districts (Ha)

River Arun IDD	3304
South West Sussex IDD	5005

Total Length of IDB Watercourse (Km) 122

G5. CONSERVATION

Number of Statutory Designated Sites in the Catchment

Type	Number	Water Dependent
Ramsar Site or SPA	3	-
National Nature Reserves	1	-
SSSIs	55	28
Env. Sensitive Areas	1 (South Downs)	

G6. NAVIGATION

	Length (Km)
Length of inland navigation	27
Length of towpath	6
Chichester Canal (LA maintained)	6
Wey & Arun Canal (LA maintained)	
Length restored to date	7
Proposed for restoration	14

H. CATCHMENT ISSUES

- 1 In assessing proposals for new development it must be ensured that adequate provisions are made for the proper use and conservation of water resources.
- 2 The Chichester and Worthing Chalk Blocks are known to be at a point where abstraction has an impact on the water dependent environment which the NRA considers unacceptable. The NRA currently operates a policy of presumption against licensing new consumptive abstractions from the Worthing and Chichester Chalk Blocks. For the Lower Greensands of the Rother, applications are judged on their merits.
- 3 Abstraction from the Hythe beds by Mid Southern Water is thought to have impact on the Ashford Stream. Fed by spring flow from the Hythe beds any upward variation in licence quantities would be expected to affect the stream's hydrology. The Company is currently undertaking a study in support of a licence variation. This has caused considerable correspondence between local residents, the Authority, the company and its agents, Dynamco.
- 4 Southern Water Services intend to develop the existing source at Hardham to its full potential by re-examining the groundwater option. The first stage would be to obtain the quantity available under the current groundwater licence by drilling new boreholes. The second stage would be to expand that development beyond the agreed yield of 65 Ml/d until the current licenced quantity of 75 Ml/d is reached. Questions concerning the potential environmental impact must, however, be addressed as a number of conservation projects have commenced since the initial trials in the seventies.
- 5 Present computer modelling of the Chalk Block indicates that current public water supply abstractions impact upon groundwater dependent features, such as Swanbourne Lake at Arundel. Water Companies are currently attempting to address summer demand peaks by the use of additional groundwater sources. Under the Water Resources Act 1991 it is the duty of the NRA to determine whether further abstraction can be permitted.
- 6 The Portsmouth Water Company public water supply source at Mid Lavant utilises water which would otherwise remain in the Lavant. Even during the floods of 1993/94 the impact of the pumping regime could clearly be discerned. Investigations should be carried out to determine the scale of the impact that pumping makes and produce proposals to lessen these.
- 7 A minimum residual flow (MRF) has been stipulated for the River Rother at Hardham. The condition was stipulated when the licence was determined, and new environmental analysis techniques could be used to examine the impact of the MRF upon the ecology of the river.
- 8 Investigations into the legacy of gravel extraction in the Chichester area indicate a trend of rising groundwater. It is thought that the backfilling of old pits and the siltation of pits left as open water present a barrier to groundwater moving through the gravels from the foot of the Downs to the sea. The winter of 1993/94 indicated how important the gravels are. Any proposed gravel extractions in the area may be opposed by the NRA on the grounds of enhanced flood risk from groundwater.
- 9 Significant agricultural abstractions are made in the coastal strip for market gardening under glass, much of the water being administered via trickle irrigation which is not licensable under the Water Resources Act 1991. The NRA therefore currently has no control over quantities of water used in this way with implications for derogation of other users.

River Arun Catchment Management Plan

- 10 Water related issues for the Wey and Arun Canal Trust include obtaining a reliable water supply for the length of the waterway, reducing leakage and losses from locks to a minimum, and reinstating river crossings without compromising floodplain waterway area/storage.
- 11 In assessing proposals for new development it must be ensured that adequate precautions are taken to protect both surface and groundwaters from pollution.
- 12 To minimise implications of storm sewage overflows, it must be ensured that their operation complies with discharge consents and they are adequately maintained.
- 13 There is a need to control intermittent and diffuse pollution to ensure the quality of watercourses is not compromised.
- 14 Leaked or tipped oil from storage tanks serving residential properties, industrial estates and farms leads to pollution of surface and groundwaters.
- 15 Surface and groundwaters are susceptible to pollution from farming practices.
- 16 Groundwater abstracted from chalk and sandstone aquifers for drinking water in the catchment is particularly susceptible to pollution.
- 17 There is concern that pesticides utilised without due consideration to approved guidelines could contaminate abstraction points at Hardham.
- 18 Poor maintenance of cesspits and small treatment plants in areas which are not served by main drainage leads to cumulatively significant water quality problems.
- 19 The coastal plains of the catchment are below sea level. The integrity of the sea and tidal defences is paramount in ensuring continued protection to property and land from tidal flooding.
- 20 Low lying land behind sea defences must be considered at risk from tidal flooding in the event of a breach or overwhelming of the defence. New development on such areas along the existing undeveloped coast should be resisted and restrictions placed on types of development in built up areas so as to minimise the risk to life and property in the event of a severe breach or overwhelming of defences.
- 21 The NRA through its aerial survey of the coastline will monitor the volume of beach material forming the sea defences.
- 22 With further development in the catchment there is an increasing threat to existing access routes to and along sea defences.
- 23 With the loss of rain forests there is increasing concern regarding the use of timber particularly in sea defence works. The NRA seeks to ensure that all timber is from a sustainable source.
- 24 The combination of sea level rise and sinking of land in south-east England, produces an effective annual sea level rise of 6mm per annum. There is also an increased impact due to wave action on defences as levels rise, increasing damage to defences and causing a gradual reduction in the standard of protection.

- 25 Private sluices need to be operated to minimise flood risk and detriment to fisheries and conservation interests.
- 26 Flood information in an effective format is essential if relevant advice is to be given on flood risk to new and existing property and land.
- 27 Careful consideration must be given to the implications of increased surface water run-off to watercourses, generated by additional impermeable areas from new development, so as to ensure flooding is not exacerbated or created. Development and infilling within fluvial floodplains must be resisted.
- 28 Attenuation ponds, required to restrict the rate of surface water run-off to watercourses from new development so as not to exacerbate flooding downstream, can only work effectively if adequately maintained.
- 29 There is a need to investigate how flood warnings can be more effectively disseminated to the public.
- 30 To ensure the effective drainage of a catchment, maintenance of rivers and streams is required. The prime responsibility for maintenance rests with the riparian owner.
- 31 To ensure maintenance and improvement works can be undertaken to rivers so as to maintain effective drainage of a catchment, adequate access is required along the river bank tops. The NRA will on 'main rivers' under its jurisdiction require the retention of unobstructed access routes along the river bank top where new development is proposed.
- 32 Prior to the undertaking of any maintenance or improvement works on rivers the NRA will evaluate implications of such works on the river ecology so as to minimise environmental implications.
- 33 In assessing proposals for new development, due regard must be given to the impact on nature conservation, recreation and fisheries interests. The retention of natural river corridors will be promoted and initiatives encouraged which seek to restore or enhance the natural elements of the water environment.
- 34 Opportunities exist to minimise saltmarsh damage and in some locations recreate them.
- 35 Areas of floodplain grassland in the Arun Valley are of significant conservation importance and require sympathetic water level management to protect and enhance such an environment.
- 36 The loss of wild habitats and species diversity within the Arun catchment reflects more widespread losses of habitat in Sussex and nationally.
- 37 An apparent decline in the nature conservation value of the Amberley Brooks has been identified.
- 38 The long-term conservation of wildlife, archaeology and landscape within the catchment can be improved by raising awareness amongst the general public and interest groups of the importance of water in the environment and of the Arun catchment in particular.

- 39 Reduced in-stream cover and invertebrate diversity arising from the extensive deposition of sand, leads to a reduction in the productivity of the coarse and game fish populations.
- 40 Restricted spawning habitat for both coarse and game fish species leads to low recruitment within these populations. Limited refuge areas for juvenile and adult fish during periods of high flow leads to the downstream displacement of stock and depletes upstream populations. The problem is compounded by the presence of obstructions preventing recolonisation of previously inhabited sections of the river.
- 41 The NRA will promote access to the water environment for the disabled where compatible with other duties and interests.
- 42 The use of tidal defences as bridleways and public footpaths can result in erosion and localised settlement which can lead to a reduction in the overall integrity of the defence. There is also a potential risk to life if a person fell into the fast flowing river.
- 43 The increased leisure time available to the public may impose increased pressure on the water environment as recreational needs conflict with conservation.
- 44 Speeding and large water craft along the navigable lengths of the River Arun result in erosion of banks, disturbance of wildlife and danger to other users.
- 45 The numerous demands on the use of rivers can lead to conflict between users, particularly where fishing and navigation rights are available.
- 46 There is public concern that possible mineral extractions in the Funtington and Westbourne areas could result in impedance of groundwater flows thus exacerbating drainage problems associated with springs.

I. ACTION PROGRAMME

Management Task	95 96 97 98 99 Future	In Liaison With	Comments
ISSUE 1: Ensure adequate provisions are made for the proper use and conservation of water resources			
<ul style="list-style-type: none"> Promote the principles of the NRA Regional Strategy "Sustaining our Resources, The Way Forward" Provide effective response to development proposals 	<p>Ongoing activity</p> <p>Ongoing activity</p>	Water Companies, Local Authorities	
ISSUE 2: Need to protect Chichester and Worthing Chalk Blocks from over abstraction of groundwater			
<ul style="list-style-type: none"> Presumption against further abstraction for consumptive purposes Promote the Management of water resources as set out in the NRA Regional Strategy "Sustaining Our Resources, The Way Forward" 	<p>Ongoing activity</p> <p>Ongoing activity</p>	Water Companies and potential abstractors Water Companies	
ISSUE 3: Need to determine implications of increased water abstraction from the Hythe beds upon flows in the Ashford Stream			
<ul style="list-style-type: none"> Variation in licence granted. Monitor and ensure conditions are adhered to 	██████████		Time limited increase granted (expires 1999)
ISSUE 4 : Assess implications of developing groundwater abstraction at Hardham			
<ul style="list-style-type: none"> Collect baseline data and audit Southern Water Services (SWS) investigations Determine licence application taking into full account the environmental implications 	<p>██████</p> <p>██████</p>	SWS	

Management Task	95 96 97 98 99 Future	In Liaison With	Comments
ISSUE 5: Need to ensure the protection of the water environment at Swanbourne Lake, which is an SSSI, and surrounding area in assessing applications for further groundwater abstractions from the Chichester Chalk Block			
<ul style="list-style-type: none"> Determine licence applications taking into full account the need to protect existing licence holders from derogation Investigate impacts of abstraction with view to nominating catchment as alleviation of low flow candidate 	<p>█████</p> <p>██████████</p>		Licence application received from Portsmouth Water company
ISSUE 6: The implications of water abstraction on flows in the River Lavant			
<ul style="list-style-type: none"> Investigate impact of pumping by Portsmouth Water Company on river flows 	██████████	Portsmouth Water Company	
ISSUE 7: There is a need to support the minimum residual flow at Hardham by environmental study			
<ul style="list-style-type: none"> Determine and collate relevant environmental information Undertake relevant environmental impact analysis 	<p>██████████</p> <p>██████████</p>	Southern Water Services Southern Water Services	
ISSUE 8: Impact of gravel workings and after use in the Chichester area upon groundwater movement levels			
<ul style="list-style-type: none"> Investigate and record groundwater levels Resist further extraction in the area through representations on the West Sussex County Council Minerals Plan pending the final report on the River Lavant alleviation scheme 	Ongoing Activity ██████████	Local Authorities, Mineral Companies West Sussex County Council	Minerals Plan to be published in 1996

Management Task	95 96 97 98 99 Future	In Liaison With	Comments
ISSUE 9: NRA has no effective control over use of water resource for trickle irrigation			
<ul style="list-style-type: none"> Promote legislative changes 	██████████	Department of the Environment	
ISSUE 10: Implications of river crossings and restrictions on surface and groundwater abstraction on the restoration of the Wey and Arun Canal			
<ul style="list-style-type: none"> Exploration of potential water sources for the canal Identification of specific water resource requirements, location and timing Quantify resultant increase in flood levels due to crossing of floodplains 	██████████ ██████████ ██████████	Local Authority Liaison Group Canal Trust Canal Trust	Dependent on lottery bid
ISSUE 11: Ensure new development is not detrimental to the quality of surface and groundwater			
<ul style="list-style-type: none"> Promote the principles of the NRA's Groundwater Protection Policy to Local Authorities, developers and public Provide effective response to development proposals and develop further pollution prevention guidelines Provide Local Authorities with maps indicating revised source protection areas as soon as feasible 	Ongoing activity Ongoing activity Ongoing activity	Local Authorities Local Authorities Local Authorities	

Management Task	95 96 97 98 99 Future	In Liaison With	Comments
ISSUE 12: Storm Sewage overflows and discharges of sewers during periods of heavy rainfall			
<ul style="list-style-type: none"> Enforcement to ensure overflows are within the terms of the discharge consent Check emergency overflows from sewerage systems to protect properties. Formulate a policy of action/enforcement 	<p>Ongoing activity</p> <p>██████████</p>	<p>Southern Water Services</p> <p>Southern Water Services</p>	NRA to assess priority and to target areas subject to frequent problems
ISSUE 13: Control intermittent and diffuse pollution			
<ul style="list-style-type: none"> Undertake pollution prevention inspections of industrial units and farms Promote public awareness and education 	<p>Ongoing activity</p> <p>Ongoing activity</p>		Computer database to be compiled
ISSUE 14: Many pollution incidents in the catchment are attributable to oil			
<ul style="list-style-type: none"> Conduct pollution prevention campaigns to promote awareness of the potential problems associated with oil storage Implement the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991 and encourage the bunding of all liquid storage tanks Support the introduction of oil regulations for industry to ensure the satisfactory storage of liquids 	<p>Ongoing activity</p> <p>Ongoing activity</p> <p>Ongoing activity</p>	<p>Farmers</p> <p>Department of the Environment, Industry</p>	

Management Task	95 96 97 98 99 Future	In Liaison With	Comments
ISSUE 15: Accidental discharges from farming activities cause localised water pollution incidents			
<ul style="list-style-type: none"> • Continue the NRA farm inspection programme to advise farmers on best practice for waste management • Implement the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991 • Encourage the public to report pollution incidents • Maintain the capacity to make an appropriate response to pollution incidents 	<p>Ongoing activity</p> <p>Ongoing activity</p> <p>Ongoing activity</p> <p>Ongoing activity</p>	Farmers	<p>First Legal Action taken</p> <p>Training and Equipment to be part of National Project</p>
ISSUE 16: The unconfined chalk aquifer is vulnerable to pollution			
<ul style="list-style-type: none"> • Enforce the NRA Groundwater Protection Policy • Raise public awareness of the risks posed by pollution and groundwater contamination 	<p>Ongoing activity</p> <p>Ongoing activity</p>	Local Authorities	Initial data collected for NVZ. Extend pollution prevention guidelines
ISSUE 17: The drinking water abstraction point at Hardham is vulnerable to pesticide contamination			
<ul style="list-style-type: none"> • Encourage reduced pesticide use, and adherence to approved guidelines when using pesticides 	Ongoing activity	MAFF, Farmers, Railtrack, Local Authorities	Pollution prevention work required

Management Task	95 96 97 98 99 Future	In Liaison With	Comments
ISSUE 18: Poor maintenance of cesspits, septic tanks and small treatment plants			
<ul style="list-style-type: none"> • Ensure effluent compliance with discharge consents • Review discharge consents where appropriate • Liaise with Local Authorities and dischargers to prevent illegal overflows from cesspits 	<p>Ongoing activity</p> <p>Ongoing activity</p> <p>Ongoing activity</p>	<p>Dischargers</p> <p>Local Authority Environmental Health Departments, Public</p>	<p>Legal Actions Pending</p> <p>Explore connections to mains drainage</p>
ISSUE 19: Ensure continued standard of defence provided by sea defences under jurisdiction of the NRA			
<ul style="list-style-type: none"> • Assess standard of defences provided by existing structures • Object to proposals which would adversely affect the integrity and continuity of sea and tidal defences • Assess implications of rising sea levels on future effectiveness of sea defences • Ensure NRA access to and along sea and tidal defences is retained for maintenance/improvement works • Collate information relative to any breach or overwhelming of sea defences and tidal flooding • Promote liaison with Local Authorities on Coastal and shoreline Management Plans • Identify and assess effectiveness of secondary sea defences 	<p>Ongoing activity</p> <p>Ongoing activity</p> <p>██████████</p> <p>Ongoing activity</p> <p>Ongoing activity</p> <p>Ongoing activity</p> <p>██████████</p>	<p>Local Authorities</p> <p>Local Authorities</p> <p>MAFF</p> <p>Local Authorities</p> <p>Local Authorities, Public</p> <p>Local Authorities</p>	

Management Task	95 96 97 98 99 Future	In Liaison With	Comments
ISSUE 20: Development in tidal risk areas			
<ul style="list-style-type: none"> • Assess standard of defence provided • Identify extent and degree of risk from tidal flooding • Resist development within areas at risk from tidal flooding along the undeveloped coast • Recommend a minimum 2 storey construction for residential dwellings within areas at risk from deep tidal flooding along the developed coast • Advise that caravan and holiday accommodation in areas at risk from tidal flooding are only occupied over the months of May to August inclusive 	<p>Ongoing activity</p> <p>█</p> <p>Ongoing activity</p> <p>Ongoing activity</p> <p>Ongoing activity</p>	<p>Local Authorities</p> <p>Local Authorities</p> <p>Local Authorities</p> <p>Local Authorities</p>	
ISSUE 21: Monitor volume of beach material forming sea defences			
<ul style="list-style-type: none"> • Continue annual aerial survey of the coastline • Progress shoreline management plans (relevant coastal forums) 	<p>Ongoing activity</p> <p>Ongoing activity</p>	<p>Local Authorities</p> <p>Harbour Authorities</p>	
ISSUE 22: Access to and along sea defences			
<ul style="list-style-type: none"> • Identify access routes for NRA plant to and along sea defences • Assess full implications of new development upon access requirements and ensure these are protected through effective liaison and advice 	<p>Ongoing activity</p> <p>Ongoing activity</p>	<p>Local Authorities</p> <p>Local Authorities</p>	

Management Task	95 96 97 98 99 Future	In Liaison With	Comments
ISSUE 23: Use of timber, particularly hard woods, in sea defence constructions			
<ul style="list-style-type: none"> • Ensure timber is obtained from a sustainable source • Investigate the use of alternative materials including soft woods and rock groynes 	Ongoing activity	MAFF	
ISSUE 24: Concern over the effects of sea level rise on sea and tidal defence			
<ul style="list-style-type: none"> • Investigate standard of defence presently available and implications of sea rise • Evaluate cost benefit of undertaking improvement works on NRA defences • Monitor information relative to sea level rise due to greenhouse effect • Investigate condition and level of tidal embankments on the River Arun • Consider implications of do nothing and managed retreat options 	<p>Ongoing activity</p> <p>Ongoing activity</p> <p>Ongoing activity</p> <p>█</p> <p>Ongoing activity</p>	<p>Local Authorities MAFF</p> <p>MAFF</p> <p>MAFF, Landowners</p>	
ISSUE 25: Operation of private sluices			
<ul style="list-style-type: none"> • Identify all Mill Structures and other controls on watercourses • Identify operational procedures undertaken and assess implications to NRA and public interests • Determine responsibilities and powers with respect to structures and their operation 	<p>█</p> <p>█</p> <p>█</p>	Riparian Owners	

Management Task	95 96 97 98 99 Future	In Liaison With	Comments
ISSUE 26: Obtain and collate flood information for future reference and flood assessment			
<ul style="list-style-type: none"> • Undertake S105 survey • Promote public awareness of flooding • Promote liaison with Local Authorities • Review flood recording systems available 	Ongoing activity ■■■■■ Ongoing activity ■■■■■	Local Authorities	National Awareness campaign June 1996
ISSUE 27: Ensure proposed development does not exacerbate fluvial flooding			
<ul style="list-style-type: none"> • Ensure no detriment to NRA access requirements • Oppose development in fluvial floodplains • Require surface water attenuation facilities to be provided where necessary to ensure peak flows in receiving watercourses are not increased • Update flood risk maps and flood information, to include the undertaking of the Section 105 survey • Ensure updated flood maps are sent to Local Authorities 	Ongoing activity Ongoing activity Ongoing activity Ongoing activity Ongoing activity	Local Authority Local Authorities Local Authorities	
ISSUE 28: Long term maintenance of surface water attenuation ponds			
<ul style="list-style-type: none"> • Ensure a responsible body maintains ponds • Location of ponds to be within open recreational land • Minimise future maintenance requirements within design • Ensure safety is considered in all designs 	Ongoing activity Ongoing activity Ongoing activity Ongoing activity	} }Local Authorities }Developers }	

Management Task	95 96 97 98 99 Future	In Liaison With	Comments
ISSUE 29: Dissemination of NRA flood warnings to the public			
<ul style="list-style-type: none"> Investigate methods of communication available Promote awareness of flood risk areas 	<p>██████</p> Ongoing activity	Local Authorities	
ISSUE 30: Promote the need to effectively maintain watercourses			
<ul style="list-style-type: none"> Promote awareness of riparian responsibilities for maintenance Encourage use of Local Authority powers 	<p>██████</p> Ongoing activity	Local Authorities Local Authorities	Produce PR Document
ISSUE 31: Ensure NRA access requirements to maintain/improve watercourses under its jurisdiction are retained			
<ul style="list-style-type: none"> Identify access routes for NRA plant to and along rivers Assess full implications of new development upon NRA's access requirements and ensure these are fully protected 	<p>██████</p> Ongoing activity	Local Authorities	
ISSUE 32: Consider the impact of maintenance work on river ecology			
<ul style="list-style-type: none"> Adopt sensitive maintenance techniques which have minimum environmental impact Where good river management practice exists, ensure that it continues and is developed for other areas 	Ongoing activity Ongoing activity	Riparian Owners	

Management Task	95 96 97 98 99 Future	In Liaison With	Comments
ISSUE 33: Promote the conservation and enhancement of the water environment in assessing development proposals			
<ul style="list-style-type: none"> • Promote the concept of river corridors and their retention and enhancement • Retain and enhance natural water features in development proposals • Support water-based and water-side recreation where this is not detrimental to flood defence and conservation duties • Presumption against culverting except for access requirements • Support use of wet-ponds for surface water attenuation facilities provided on site 	<p>Ongoing activity</p> <p>Ongoing activity</p> <p>Ongoing activity</p> <p>Ongoing activity</p> <p>Ongoing activity</p>	<p>Local Authorities</p> <p>Local Authorities</p> <p>Countryside Commission Sports Council Local Authorities</p> <p>Local Authorities</p>	
ISSUE 34: Concern about the loss of saltmarsh			
<ul style="list-style-type: none"> • Consider managed retreat options • Await outcome of research into causes of saltmarsh depletion • Seek protection of existing saltmarsh from development pressures • Take physical interim measures 	<p>Ongoing activity</p> <p>Ongoing activity</p> <p>Ongoing activity</p> <p>Ongoing activity</p>	<p>MAFF, Landowners MAFF, Landowners</p> <p>Local Authorities</p>	

Management Task	95 96 97 98 99 Future	In Liaison With	Comments
ISSUE 35: Protection and enhancement of floodplain grassland			
<ul style="list-style-type: none"> Identify target areas where management of water levels is required and where changes to existing management are likely to be successful Assess ecological and environmental effects of existing water management of identified sites Determine other requirements for these sites including flood defence and farming Promote the production and implementation of water level management plans for sites where flooding of property would not be exacerbated 	<p>██████████</p> <p>██████████</p> <p>██████████</p> <p>██████████</p>	<p>MAFF, Conservation Bodies</p> <p>Farmers</p> <p>MAFF</p>	
ISSUE 36: The loss of wild habitats and species diversity			
<ul style="list-style-type: none"> Determine target species which require positive management to prevent further decline Identify current distribution and formulate action programme to protect existing populations and encourage recolonisation to areas where these species have been lost 	<p>██████████</p> <p>██████████</p>	<p>Arun Valley Countryside Project</p> <p>Arun Valley Countryside Project</p>	
ISSUE 37: There is widespread concern about the decline in the nature conservation value of Amberley Wildbrooks			
<ul style="list-style-type: none"> Prepare water level management plan for the SSSI Work in close consultation with all interested parties and seek to obtain agreement where possible Work with MAFF and English Nature to achieve satisfactory implementation of the water level management plan 	<p>■</p> <p>Ongoing activity</p> <p>Ongoing activity</p>	<p>MAFF</p> <p>Farmers, Conservation Bodies</p> <p>MAFF, English Nature</p>	Completed

Management Task	95 96 97 98 99 Future	In Liaison With	Comments
ISSUE 38: The long term conservation of the water environment in the catchment can be improved by raising public awareness			
<ul style="list-style-type: none"> Promote and support the development of new educational materials Investigate new outlets for publicity literature Support work of visitor centres, schools etc to increase awareness of the importance of water in the environment 	<p>■■■■</p> <p>■■■■</p> <p>■■■■</p>	Arun Valley Countryside Project	Project Officer now appointed
ISSUE 39: Deposition of sand, leading to a reduction in the productivity of the coarse and game fish populations			
<ul style="list-style-type: none"> Evaluate channel management practices to minimise sand deposition at vulnerable locations Identify areas with degraded habitat due to sand deposition 	<p>■■■■</p> <p>■■■■</p>	Consultant from Southampton University Consultant from Southampton University, Angling Clubs	Project has commenced
ISSUE 40: Restricted spawning habitat and refuge areas for both coarse and game fish species may lead to reduced natural populations			
<ul style="list-style-type: none"> Identify areas where the enhancement of spawning and refuge areas would be appropriate Support fishery owners and angling clubs in their involvement with fish enhancement schemes 	<p>Ongoing activity</p> <p>Ongoing activity</p>	Angling Clubs Angling Clubs Fisheries Owners	

Management Task	95 96 97 98 99 Future	In Liaison With	Comments
ISSUE 41: Promote access for the disabled to the water environment			
<ul style="list-style-type: none"> Identify areas where access for the disabled could be improved Liaise fully with interested parties Provide and support appropriate initiatives where necessary 	<p>Ongoing activity</p> <p>Ongoing activity</p> <p>Ongoing activity</p>	<p>Local Authorities</p> <p>Local Authorities</p> <p>Local Authorities</p>	
ISSUE 42: Use of tidal defence embankments along the River Arun as bridleways and public footpaths			
<ul style="list-style-type: none"> Assess safety implications to the public Assess implications of such use upon the integrity of the embankments Determine implications upon maintenance and future improvements of the defences 	<p>■</p> <p>■</p> <p>Ongoing activity</p>		Proposed Operational Investigation
ISSUE 43: Increased leisure time for the public may place increased demands on the catchment			
<ul style="list-style-type: none"> Ascertain trends in available leisure time and in favoured recreational pursuits Assess level of existing provision of recreational facilities within the catchment Work in consultation with other organisations to ensure any increases in access do not adversely affect the nature conservation value of the catchment Plan for requirements in future 	<p>■</p> <p>■</p> <p>■</p> <p>Ongoing activity</p>	<p>Sports Council</p> <p>Countryside Commission</p> <p>Local Authorities</p> <p>Local Authorities</p> <p>Conservation Bodies</p> <p>Local Authorities</p>	Project at Regional Level

Management Task	95 96 97 98 99 Future	In Liaison With	Comments
ISSUE 44: Wash from larger boats navigating the Arun is leading to erosion of banks and disturbance of wildlife			
<ul style="list-style-type: none"> Assess areas of significant erosion Increase speed patrols in identified areas 	<p style="text-align: center;">■■■■■ ■■■■■</p>	Littlehampton Harbour Authority	
ISSUE 45: Conflict between the use of the river for navigation and fishing			
<ul style="list-style-type: none"> Identify existing rights of navigation Encourage sensitive use of rivers by boaters and canoeists Promote education of anglers to respect other users' rights 	<p>■ Ongoing activity</p> <p style="text-align: center;">■</p>	Harbour Authorities Harbour Authorities Angling Clubs	Completed 1995 Young anglers day
ISSUE 46: Extraction of minerals in the Westbourne and Emsworth area			
<ul style="list-style-type: none"> NRA to carry out investigation 	<p style="text-align: center;">■■■■■</p>		

TABLE 1: LIST OF ORGANISATIONS WHICH RESPONDED

Company/Organisation
Arun District Council
Arun Friends Of The Earth
ADAS
Bersted Parish Council
Campaign For The Protection Of Rural England
Countryside Commission
English Nature
Fishbourne Parish Council
Forest & Riverside Neighbourhood Council
Funtington Parish Council
Horsham District Council
Inland Waterways Association
Littlehampton Harbour Board
Ministry Of Agriculture, Fisheries & Food
National Farmers Union
OFWAT
Frank Penfold
Portsmouth Water
Royal Society For The Protection Of Birds
Southern Water Services
Sussex Downsmen
Sussex Wildlife Trust
Westbourne Parish Council
West Sussex County Council
Wey & Arun Canal Trust
Worthing Borough Council

River Arun Catchment Management Plan

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Telephone this number anywhere in England or Wales to report pollution, poaching, flooding or any sign of damage or danger to the natural water environment.



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