

catchment management plan

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RIVER EXE action plan

August 1996



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map 1

Fold out for Map 1
Key Sites Relating to Issues in the River Exe Catchment

Map 1 - Key Sites Relating to Issues in The River Exe Catchment



Information correct as of June 1996

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Key Statistics for the River Exe Catchment

Catchment Area	1,530 km ²								
Main River Length (km) (upstream of Tidal Limit*)	<table> <tr> <td>Exe</td><td>82.7 km</td></tr> <tr> <td>Culm</td><td>45.3 km</td></tr> <tr> <td>Clyst</td><td>25.1 km</td></tr> <tr> <td>Creedy</td><td>24.3 km</td></tr> </table>	Exe	82.7 km	Culm	45.3 km	Clyst	25.1 km	Creedy	24.3 km
Exe	82.7 km								
Culm	45.3 km								
Clyst	25.1 km								
Creedy	24.3 km								
Population (1991)	235,100 persons (approx.)								
Main Towns/Cities	Exeter, Crediton, Tiverton, Cullompton, Exmouth, Dawlish								
Average Annual Rainfall (<i>Source: MAFF</i>)	1,097 mm								
Controlled Water Length (Monitored for Water Quality Purposes)	656 km								

* Tidal Limit as defined in Section 192 of the Water Resources Act, 1991 (Ref. 1).

This Action Plan for the River Exe Catchment covers a significant part of Devon and Somerset. The River Exe is an important part of our heritage and this Plan provides a blueprint for the future. The Environment Agency, in partnership with local communities, will use this Plan to ensure that improvements in the local environment are achieved and that good progress is made towards the vision.

We are very grateful for the contributions made during the consultation period. I am sure that the local authorities, environmental and interest groups, and the public will continue to help the Agency to take this initiative forward and assist us in refining and developing the Plan as we all implement it.

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Contents

Foreword	
Key Statistics for the River Exe Catchment	(fold out flap)
Acknowledgements	ii
Catchment Vision	1
1. Introduction	2
1.1 The Environment Agency	2
1.2 Catchment Planning	3
1.3 Local Environment Agency Plans and Catchment Management Plans	3
2. Review of the Consultation Process	4
2.1 Public Consultation	4
2.2 Results of Consultation and Further Action	4
3. Catchment Overview	8
3.1 Description	8
3.2 Review of Resources, Uses and Activities	8
4. Activity Tables	11
Table 1 River Quality Objectives	12
Table 2 Compliance with EC Directives	14
Table 3 Grand Western Canal	16
Table 4 Measuring and Managing River Flows	18
Table 5 Public Water Supply	19
Table 6 Reported Falling Groundwater Levels at Dawlish Warren	20
Table 7 Landscape, Geology and Archaeology	21
Table 8 Wildlife Conservation	22
Table 9 Exe Estuary Management Plan	29
Table 10 Green Tourism Initiatives	30
Table 11 Canoeing in the River Exe Catchment	31
Table 12 Management of Environment Agency Owned Land	32
Table 13 Review of Flood Defence Operations	33
Table 14 Waste Management	34
Table 15 Fisheries	35
Table 16 Barriers	38
5. Implementing the Plan: Monitoring and Review	39
Appendix 1 The Role of the Environment Agency	40
Appendix 2 Integrated Pollution Control/Radioactive Substances Functions in the River Exe Catchment	42
Appendix 3 Responses Received Through Consultation	44
Appendix 4 River Quality Objectives	45
Appendix 5 Species and Habitats for Conservation Targets and Actions	47
Appendix 6 Guide to Consultation Report and Action Plan Issues	49
Glossary	53
Units	55
Abbreviations	56
References	57
Maps	
Map 1 Key Sites Relating to Issues in the River Exe Catchment	fold out to front
Map 2 1995 Compliance with Proposed River Quality Objectives (River Ecosystem Classification)	fold out to back

ACKNOWLEDGEMENTS

We would like to thank all those who responded during the consultation period giving valuable contributions to this report. We would like to give particular thanks to the River Exe Catchment Steering Group (see Section 5.0). They are:

Name	Representing
R Bell	Industry (Devon Valley Industries Ltd.)
D Boyce	Exmoor National Park
A Box	Recreation - British Canoe Union
J Carr	Exeter & District Angling Association
P Chamberlain	County Ecologist, Devon County Council
J Clark	Mid Devon District Council
I Cook	River Exe Riparian Owner Association
A Crang	National Farmers Union
T Gameson	South West Water Services Ltd.
H Maund	Exe Valley Fishery and Trout Farmers
E Newton	Industry (John Heathcoat & Company Ltd.) (and on the old Regional Rivers Advisory Committee)
J Nott	Exeter City Council
P Parker	Council for the Protection of Rural England (Devon)
R Retallick	Tiverton & District Angling Club
M Robins	RSPB and South West Regional Flood Defence Committee
H Thresher	Crediton Fly Fishing Club
I Voysey	River Exe Netsmen Association
M Weaver	Devon Fisheries Advisory Committee

Catchment Vision

Our vision of the River Exe Catchment is of a healthy and diverse water environment, managed in an environmentally sustainable way, balancing the needs of all users.

To realise the potential value and optimise the use of the water environment within this catchment, the Environment Agency will work in partnership with local authorities, environmental groups and other interested organisations. The River Exe Catchment Management Plan provides an important focus for this partnership. We look forward to a future for the catchment where there is:

- achievement of environmentally sustainable use of the water resource
- maintenance and, where appropriate, enhancement of biodiversity, particularly of aquatic features, habitats and species
- conservation of features of archaeological and historic interest within the aquatic environment and associated land
- continuing improvement to existing discharges to meet the most appropriate standards
- development of a sustainable agricultural, aquacultural and forestry system which reduces the risk of diffuse pollution and improves the physical habitat of the river system and wetlands for wildlife
- increasing enjoyment and appreciation of the water environment
- minimal risk to people and property from flooding
- maintenance of the natural hydrological cycle, including natural river and wetland functions and processes
- achievement of sustainable salmonid, freshwater, sea and shellfisheries within the catchment.

vision

1.0 Introduction

1.1 The Environment Agency

The Environment Agency was formed on 1 April 1996, bringing together the National Rivers Authority (NRA), Her Majesty's Inspectorate of Pollution (HMIP), the Waste Regulation Authorities (WRAs) and some units of the Department of the Environment (DoE) dealing with the technical aspects of waste and contaminated land.

Our Principal Aim

Our aim, as set out in the Environment Act 1995, is to protect or enhance the environment, taken as a whole, in order to play our part in attaining the objective of sustainable development.

Sustainable development is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (*Brundtland Report, 1987*).

Our Objectives

The Environment Agency works towards sustainable development through seven objectives, set by Ministers:

- An integrated approach to environmental protection and enhancement, considering the impact of all activities on natural resources;
- Delivery of environmental goals without imposing excessive costs on industry or society as a whole;
- Clear and effective procedures for serving its customers, including the development of single points of contact with the Agency;
- High professional standards, using the best possible information and analytical methods;
- Organisation of its own activities to reflect good environmental and management practice, and provision of value for money for those who pay its charges, and for taxpayers as a whole;
- Provision of clear and readily available advice and information on its work;
- Development of a close and responsive relationship with the public, including local authorities, other representatives of local communities and regulated organisations.

Our Role

Our work is divided into seven main functions:

- Flood Defence
- Water Resources
- Pollution Prevention and Control
- Navigation
- Fisheries
- Recreation
- Conservation

These roles are explained in further detail in Appendix 1.

1.2 Catchment Planning

The water environment is subject to a wide variety of uses which invariably interact with and sometimes conflict with each other. The process of catchment planning was developed by the former National Rivers Authority to help manage these interactions and conflicts for the overall benefit of the water environment and its users. This forward planning process will continue under the Environment Agency and will include the production of two documents - a Consultation Report and an Action Plan. The Consultation Report describes our vision for each catchment, identifies problems and acts as a focus for consultation between ourselves and other interested parties in the catchment. Following consultation, the Action Plan identifies actions to resolve the problems and issues.

This Action Plan follows the production of the River Exe Catchment Management Plan Consultation Report (Ref. 2) and the consultation period. The Action Plan forms the basis for improvements to the water environment, and primarily covers the five year period from 1996 to April 2000. Achievement of the Action Plan will be monitored and reported annually.

Appendix 2 gives a brief overview of areas of the Environment Agency's work relevant to the River Exe Catchment which was not covered in the Consultation Report, namely the Integrated Pollution Control and Radioactive Substances functions.

1.3 Local Environment Agency Plans (LEAPS) and Catchment Management Plans

Catchment Management Plans instigated by the NRA will continue to be called Catchment Management Plans, although new plans initiated by the Agency will be known as Local Environment Agency Plans (LEAPs). LEAPs will cover the full range of the Environment Agency's responsibilities and examine the environment as a whole, considering the air, land and water. They will be primarily based on river catchments and will cover all catchments in England and Wales.

2.0 Review of the Consultation Process

2.1 Public Consultation

The issues listed in this Action Plan were identified in the Consultation Report or resulted from the consultation process. The Consultation Report was launched on 11 December 1995 at The Dolphin Hotel, Thorverton.

The consultation period concluded on 29 February 1996. During this time the Consultation Report was promoted by:

- Radio, television and press reports;
- A display about the Catchment Management Plan at Dawlish, Exmouth, Topsham, Cullompton, Uffculme, Tiverton, Exeter, Crediton and Dulverton libraries. Environment Agency personnel were present at three of these locations;
- The distribution of over 1000 copies of the report and a large number of summary leaflets;
- Presentations by Agency staff to local interest groups;
- Meetings with interested parties to discuss the plan.

2.2 Results of Consultation and Further Action

One-hundred and eight written responses were received of which 59 were questionnaire replies. All of these responses have been considered and have provided valuable contributions to the formulation of this Action Plan. The respondents included statutory organisations, industry, interest groups, landowners, sport and recreation groups and the public. See Appendix 3 for a list of responses received through public consultation.

The response was generally positive and constructive, particularly towards issues concerning wildlife. Several organisations indicated their strong support for the concept of catchment management planning. The Agency's vision for the catchment was shared or fully supported by a large number of organisations.

All comments have been considered and, where appropriate, incorporated in the Action Plan.

The Agency welcomes the comments received. Several changes to the issues raised in the Consultation Report have been made; issues have been renumbered, new issues added and existing issues modified (see Appendix 6).

Many of the written responses suggested rewording in the Consultation Report as it stood, treating the report as if it were a draft, which is not the case. Ideas included the provision of more visual information such as graphs or diagrams to clarify the text and an improved glossary and list of abbreviations. We will use these ideas to improve future documents.

We asked consultees to list what they felt were the most important issues highlighted in the consultation report. The responses indicated that the following were the most significant issues:

- The forecasting of deficit in public water supply in Wimbleball Supply Zone;
- The impact on landscape of inappropriate development;
- Various conservation issues such as the 'need for better understanding of significance of the conservation importance of the whole catchment', the 'loss and decline in value of semi-natural habitats', and the 'need for retention/restoration of conservation value of floodplain habitat';
- The need to balance recreation and conservation uses of coastal and river sites;
- The decline in runs of spring fish;
- The effect of fish-eating birds on game and coarse fish populations;
- Issues concerning the Grand Western Canal;
- Removal of gravel from the river-bed.

Some of these issues, together with our responses, are dealt with below, others are included in the Activity Tables (see Section 4):

Impact on landscape of inappropriate development

Several people said that the National Rivers Authority (NRA), now the Environment Agency, needs more say in the planning process.

Our Response:

The Agency's role in the planning process is very similar to that of the former NRA. However, we are also expected to make a contribution towards sustainable development. The Agency recognises the importance of promoting the environment through the statutory development plan system and the Local Authority decision making process relating to planning applications.

County and district planning authorities plan and control development; although they must consult us, they do not have to follow our advice. Local authorities prepare statutory development plans that set out the framework for land use changes within the area under their jurisdiction. These plans act as key instruments for determining planning applications, and are, therefore, an important way of protecting the environment. The Environment Agency works closely with the local authorities in the production of development plans, to encourage the inclusion of policies which reflect its concerns and responsibilities.

We will continue to give advice to planning authorities, screening all planning applications in the River Exe Catchment to ensure that the environment is protected and flood risk is not increased. We will also encourage planning authorities to include environment protection policies in relevant local plans.

Conflict between canoeing and angling

Some riparian owners pointed out that no public right of navigation exists on the River Exe. Recreation activities, such as canoeing can only occur where access agreements have been set up by the riparian owners outside of the salmon fishing season in areas where no damage can be done to redds or spawning gravels.

Anglers highlighted that they pay a licence fee and rents, whereas canoeists pay nothing. It was mentioned that angling is a 'net' contributor to the environment, whereas canoeing causes damage and disturbance to the river and riverside environment.

One canoeing organisation wrote asking for access agreements to be reviewed between February and October through Tiverton.

Our Response:

The British Canoe Union (BCU) works on behalf of all canoeists and attempts to control access by members and non-members alike. An access agreement is in force for much of the Rivers Exe and Barle, as indicated in the Catchment Management Plan. Riparian and fishery owners were involved in these negotiations.

Proposals in the plan are aimed at enabling improvements to facilities for canoeists, as the Agency is required to do under existing legislation. Little conflict currently occurs between anglers and canoeists since the access agreements only allow canoeing outside the fishing season. However, there may be areas, for example in Tiverton town centre, where canoeing could take place at other times without adversely impacting the fishery. This agreement will be discussed further with Tiverton Town Council. Payment for access is presently an issue under extensive discussion by the BCU and others. Damage and disturbance to redds has been shown to be minor as when rivers are low enough for this to be a problem river levels are unsuitable for canoeing. Providing information on flow and water levels may help prevent wasted journeys by canoeists at times of low flow. See also Section 4.11 for issues concerning canoeing in the River Exe Catchment.

The effect of fish-eating birds on game and coarse fish populations

Several anglers and riparian owners complained about the effect of fish-eating birds, particularly cormorants, on fish populations. It was pointed out that fish which are injured but not killed may suffer from infections.

Our Response:

We accept that both game and coarse fish are taken by fish-eating birds, particularly cormorants. Many such birds, including cormorants, are protected species. We will not support licensed killing of such birds unless there is sufficient evidence that there is a decline in fish stocks attributable to fish-eating birds and that removal or control is proven to be the most effective means for preventing this loss. Removal would normally be limited to individual birds and would only be carried out after all other lawful attempts at dissuasion have been tried. Licences for culling are only issued by the Ministry of Agriculture, Fisheries and Food (MAFF) once it has been demonstrated that all other methods have failed. However, we are committed to working positively with owners and anglers to establish the full facts in each individual situation (see Section 4.15).

Issues concerning the Grand Western Canal

Several consultees commented that weed cutting and dredging would be counter-productive in solving the problem of eutrophication in the canals. A suggested course of action from one consultee was to encourage the growth of submerged plant species along the margins on the opposite side to the towpath. It was pointed out by a consultee that dredging should only be done where absolutely necessary for navigation purposes and then only in short sections at any one time. Similar comments were received from other consultees who included the need for a buffer zone of natural vegetation between arable land and the canal to reduce effect of runoff from fertilized farm land.

Our Response:

A meeting was held with Devon County Council in May 1996. The actions which resulted from this meeting are shown in Section 4.3.

Inappropriate Bank Erosion Control

Concerns have been raised by some consultees over inappropriate works carried out by previous authorities and riparian owners to control bank erosion on river banks and sea defences. Furthermore, some riparian owners have looked to the Environment Agency to carry out such works.

Our Response:

Erosion is a natural process. Rivers and coastline change as the forces of water shape the land. We now operate to the presumption that natural river or coastal processes should not be disrupted, except where people or important natural or manmade assets are at risk. Riparian owners have the right at common law to repair their banks and protect land from the effects of erosion as long as this is accomplished without injury to the property of others and does not cause obstruction to flow. However, they may require consent from the Agency who will seek to ensure that appropriate methods and material are used as previous works have sometimes had significant detrimental effects on the river morphology, wildlife and landscape. We can provide guidance, such as that contained in the 'New Rivers and Wildlife Handbook' (Ref. 3).

We will encourage early control of erosion by landowners, using traditional methods and materials where possible, to avoid the need for extensive works later. We will also encourage areas to be reinstated and replaced with less damaging options.

We will only use public funds to control erosion if the watercourse is 'main river' (see Glossary for definition of 'main river') and if certain criteria are satisfied.

3.0 Catchment Overview

3.1 Description

The River Exe Catchment covers a large area (1,530 km²) and drains diverse habitats ranging from the moorland of Exmoor National Park at the River Exe's headwaters, to the City of Exeter where it flows into the Exe Estuary.

The Catchment extends across several different landscape types. The Rivers Exe and Barle rise in the wet open moorland of Exmoor, before running south-eastward through steep sided valleys with extensive broadleaved woodlands. Further east, smaller tributaries run off the Brendon Hills, with the River Haddeo dammed to create Wimbleball Reservoir. Much of the Exmoor landscape has been modified by man, with extensive enclosure and agricultural improvement taking place in the 19th century, giving it a less rugged appearance than Dartmoor.

Below Dulverton there is a transition where the River Exe and its tributaries cut through the Culm Measures creating valleys with rounded ridges between. The sides are heavily wooded, with rock outcrops and occasional quarries standing out in contrast. The floodplain becomes increasingly broad further south and rolling farmland replaces woodland on the higher ground to the sides.

The River Culm rises on the Blackdown Hills where small fields and high hedges create an enclosed, intimate feel. South of Tiverton, towards the coast, the rivers are more typical lowland rivers, meandering across a flatter landscape with valleys separated by low hills in a patchwork of pasture and arable. Major transport routes follow several of the rivers.

South of Exeter and backed to the west by Haldon Ridge, the Exe Estuary exerts its own particular influence on the landscape. Wide open spaces with extensive grazing marshes are set against the constantly changing aspect of the estuary itself.

The catchment is home to approximately 235,100 people. Many more visit to enjoy the natural beauty, particularly of Exmoor and the coastal resorts of Dawlish and Exmouth.

Apart from tourism, the catchment supports a mixed agricultural and industrial economy. Several large industries have historically used one of the major tributaries, the River Culm.

3.2 Review of Resources, Uses and Activities

These were described in detail in the Consultation Report. The following are key extracts:

Landscape, Wildlife and Archaeology

The River Exe Catchment is of great importance for nature conservation, containing some of the finest sites in the South West, including 27 Sites of Special Scientific Interests (SSSIs) and 22 Nature Reserves. In particular the River Barle is considered to be the best English example of a river which has an acidic upland character grading into a rich sandstone. The Exe Estuary and surrounding land is designated as a Special Protection Area (SPA) under the EC Birds Directive (Ref. 4), and as a Wetland of International Importance, especially as a waterfowl habitat, under the terms of the Ramsar Convention. Other key habitat areas include: valley oak woods on Exmoor; alder and willow carr and springline mires in the Blackdowns; the freshwater habitats of the Exeter and Grand Western Canals; bogs on Exmoor; and the Exe Estuary for its sea grass beds and sand dune system.

There are many important archaeological features within the catchment. About 111 Scheduled Ancient Monuments have been designated within the catchment, including Tarr Steps which crosses the River Barle on Exmoor and is listed as an excellent example of a prehistoric clapper bridge.

Fisheries

The catchment supports high quality game and coarse fisheries. The middle and upper reaches of the River Exe, and most of the main tributaries support stocks of brown trout and salmon. The lower reaches of the River Exe, the Exeter Canal and the Grand Western Canal contain prolific and varied coarse fisheries.

The Exe Estuary sustains a wide range of fishing activities from commercial operations to sport fishing. There is a designated bass nursery in the estuary which protects juveniles of this species from 1 May - 31 October.

Recreation and Amenity

Recreation use of the estuary is considered in detail in 'The Future of the Exe Estuary - Draft Management Plan' (see Section 4.9). Canoeing occurs at a number of locations throughout the catchment; limited access agreements have been negotiated by the British Canoe Union (BCU) for parts of the River Barle and the River Exe. Rowing takes place mainly on the Exeter Canal and at Wimbleball, under the control of local clubs and the University of Exeter. There are also several long distance footpaths that cross the catchment.

Flood Defence and Land Drainage

We maintain a number of flood defence schemes in the catchment. Other work, such as tree clearance, is undertaken as the need arises. In the Exminster Marshes a ditch maintenance programme is carried out and a Water Level Management Plan is in place and is currently being further developed. In certain parts of the catchment, flooding is a problem. Flood warnings are issued for the following rivers in the River Exe Catchment: Barle for Withypool, Newbridge; Bathern for Bampton; Clyst for Broadclyst, Clyst Honiton, Clyst St Mary; Creedy for Crediton; Yeo for Fordton; Upper Culm for Hemyock, Culmstock, Uffculme, Coldharbour, Cullompton; Lower Culm, for Hele, Silverton Mill, Stoke Canon; Upper Exe for Exford, Winsford, Bridgetown, Exeter Inn, Exebridge; Middle Exe for Oakfordbridge; Lower Exe for Bickleigh, Upexe, Netherexe; Lowman for Craze Lowman, Tiverton.

The Built Environment and Development Plans

The rivers in the catchment flow through eight district council areas and the Exmoor and Dartmoor National Parks. Only four of these councils (Mid Devon, East Devon, Teignbridge and Exeter City) and the Exmoor National Park cover a significant area of the catchment.

Waste Disposal

Seventy-five landfill sites (16 of which are currently operational) and 14 waste transfer stations and civic amenity sites have been identified in the catchment.

The incinerator on the outskirts of Exeter currently burns the majority of Exeter's domestic waste but is due to close by the end of 1996 (see Section 4.14).

Sewage sludge from Countess Wear Sewage Treatment Works (STW) is currently dumped out at sea. Sewage sludge from some other South West Water Services Limited (SWWSL) STWs, private septic tanks and cess pools is spread to land in parts of the catchment. This practice is likely to increase after 1998 when the North Sea Agreement (Ref. 5) and the EC Urban Wastewater Treatment Directive (Ref. 6) abolish dumping sludge at sea.

Farming

Agricultural land accounts for approximately 80% of the catchment area, 76% of this is grassland (MAFF statistics). Livestock farms in the catchment are a major cause of pollution incidents mainly as a result of poor management of farm waste when applied to land. Two Environmentally Sensitive Areas (ESAs) have been designated in the catchment; these are Exmoor and the Blackdown Hills. ESA is a MAFF scheme designed to encourage farmers to adopt agricultural practices which will help to protect and enhance the environment.

Forestry

Forests and woodland are widely scattered across the catchment, but concentrated in the northern part. Here many of the steep river valleys of the River Exe and its tributaries are lined with oak and other deciduous woodland, much of which is ancient woodland. There are a few coniferous plantations in the catchment. The largest of which is Great Haldon owned by the Forestry Authority and managed by Forest Enterprise.

Water Abstraction and Supply

In the River Exe Catchment both rivers and groundwater are used for water supply. 98% of abstraction is from rivers and is mainly for public and private water supplies, fish farms and water power. Public water supplies are the main reasons for groundwater abstraction. The major aquifers include the Otter Sandstone and the Breccia and Conglomerate deposits. Both Wessex Water Services Limited (WWSL) and SWWSL provide mains supplies within the catchment. Wimbleball Reservoir is the source of much of the catchment's public water supply.

Effluent Disposal

Recent improvements by SWWSL, including a new improved STW at Crediton, have resulted in improved water quality in the River Creedy. The River Exe and the River Culm have been used for industrial water supply and effluent disposal since the last century. Effluent treatment facilities have been improved at a number of sites in the catchment over the last few years, including, on the River Culm, Higher Kingsmill (St Regis Paper Co. Ltd) at Cullompton and St Ivel Ltd at Hemyock. A major improvement scheme in progress at Cullompton STW will provide the treatment capability for major development occurring in the town. Substantial enhancements are also being installed this year at Lloyd Maunder Ltd and Devon Valley Mill. Significant improvements have been achieved in the water quality of the River Culm as a result of these changes.

Mining and Quarrying

There are no active metalliferous ore mines within the River Exe Catchment, although 42 abandoned metalliferous ore mines, concentrated in the upper River Exe and River Barle subcatchments, have been identified. There are seven active quarries within the catchment working mainly sandstone, limestone, sand and gravel. All of these quarries are located where there is either a major or a minor aquifer and, therefore, groundwater protection is an important issue.

4.0 Activity Tables

The following 16 tables outline the actions needed to address the issues we identified in the Consultation Report together with additional issues raised during the consultation process. The issues and activities are not presented in any order of priority.

The tables show the following information:

- i) Organisations which will implement the proposed activities, either in a lead role or as a key supporter, are listed under the heading 'Action by Lead Other'.
- ii) A timetable for the activity.
- iii) An estimate of indicative cost to the Agency over the next five years, where available. The initials n/a means that the Agency does not contribute to the funding of the action, 'unknown' means that no cost estimate is available at present.

The financial years covered by this plan are represented by a single year, for example, '96' is the financial year April 1996 to April 1997.

- iv) Please refer to the glossary and list of abbreviations for the definition of acronyms.

The following points should also be noted:

- Our everyday work commits substantial resources to monitoring and managing the environment. Some of this work was explained in the Consultation Report.
- It should be appreciated that some actions will require feasibility studies and cost-benefit appraisal of options prior to work commencing. In some cases, depending on the outcome of these studies, further action may not be justified. The Environment Agency and the participating organisations have limited resources and powers, and some work may take longer than indicated owing to funding availability, government policy and more urgent priorities.
- Should more issues become apparent during the life of this Plan, further actions will be added at succeeding Annual Reviews.

Table 1 River Quality Objectives

We aim to maintain and, where appropriate, improve the quality of water for all those who use it. This is achieved by setting water quality targets for the catchment based on:

- Standards laid down in EC Directives;
- River Quality Objectives (RQOs) to protect recognised uses (see Appendix 4).

In the Consultation Report we proposed RQOs for the whole catchment. These targets have now been finalised as a result of the consultation process and are shown on Map 2.

We have also finalised our long term objectives for the catchment. These are objectives we would like to achieve but for which there are currently no resources to make improvements. Many of these stretches require further investigation before specific actions can be identified which will achieve the required improvements. Where appropriate actions have been identified for the stretches they have been added to the following table, others will be put into future Annual Reviews. See Appendix 4 for a list of stretches for which we have set long term objectives.

Specific water quality issues are detailed in this section where current water quality does not meet its RQO. Map 2 shows where current water quality fails to meet its RQO. This assessment is based on three years of data from 1993 to 1995.

The water quality status of some river stretches has changed since we published the Consultation Report in December 1995. The upper reaches of Alphin Brook (Source to Dymond's Bridge) and Spratford Stream (Source to Leonard Moor Bridge) which marginally failed to meet their proposed RQOs based on the 1994 assessment, were compliant with their RQOs using 1995 assessment. As water quality in the Spratford Stream improves, macroinvertebrate quality is also expected to improve. We will continue to ensure that the recent improvements on these watercourses are sustained as part of our routine work. Dunkeswell Stream, Aylesbeare Stream and the Grand Western Canal complied with their proposed RQOs in 1994, but marginal failures occurred in 1995. All watercourses which failed their RQOs in the 1995 assessment are shown in the following table.

The biological quality of the River Clyst is classed as being of a moderate/good standard. Many stretches have shown slight improvements since the River Exe Consultation Report (Ref. 2) was published, although some influence from organic enrichment is still apparent. However, Farm Waste Management Plans have been drawn up for a number of farms in this subcatchment as part of a pilot scheme, and further improvements to water quality, and hence ecological quality are expected.

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
1a. Marginal failure of RQO targets at:								
Holly Water and River Creedy (Ashridge Bridge to Creedy Bridge);	i. Conduct catchment inspection taking action where problems identified. <i>Notes: Water quality problems in Holly Water are also affecting the River Creedy.</i>	EA Landowners and Dischargers	3 k	●	●			
Upper River Kenn (also moderate macro-invertebrate quality);	ii. Follow up previous investigation with further inspections, enforcing pollution control legislation where appropriate. <i>Notes: Complied with RQO in 1993. Marginal failure in 1994 and 1995.</i>	EA Landowners and Dischargers	2 k	●	●			
Grand Western Canal (see Issue 3).								
1b. Significant failure of RQO target at:								
Dunkeswell Stream.	i. Improve effluent treatment at Dunkeswell STW (see Map 1) and relocate discharge to the Madford River, by end of 1997.	SWWSL	n/a					
1c. Failure to meet long term RQO at:								
North Brook (and moderate macro-invertebrate quality);	i. Seek further improvements to water quality. <i>Notes: North Brook receives discharges from a number of CSOs and leachate from a waste site. We will continue monitoring to ensure leachate does not enter North Brook from the closed Mincinglake tip.</i>	EA Landowners and Dischargers	< 1 k p.a.	●	●	●		
Aylesbeare Stream;	ii. Follow up previous investigation with further inspections, enforcing pollution control legislation where appropriate.	EA Landowners and Dischargers	2 k	●	●			
River Culm.	iii. Carry out water quality modelling on the River Culm to help identify further actions.	EA	3 k	●	●			

Table 2 Compliance with EC Directives

EC Bathing Waters Directive

This Directive 'concerning the quality of bathing waters' (Ref. 7) protects the environment and health of bathers by reducing pollution entering identified bathing areas. There are five identified Bathing Waters in the River Exe Catchment which are monitored under the Directive. These are at Sandy Bay, Exmouth, Dawlish Warren, Dawlish (Town) and Dawlish (Coryton Cove). These waters are affected by discharges of sewage from coastal outfalls off Exmouth and Dawlish, and occasional high concentrations of bacteria from the Exe Estuary.

Tertiary treatment has been in place at Exmouth since September 1995 as a result of having to comply with the EC Bathing Waters Directive. However, bacteriological pollution from Dawlish Water is presenting a problem in the catchment (see Issue 2a). We are currently negotiating with SWWSL for improvements to be made to discharges of storm sewage to Dawlish Water. We will also be conducting an investigation into other bacterial source of pollution to Dawlish Water and will identify areas for improvements as part of this study. These improvements will also help to reduce the risk of EC Bathing Water Directive failures at Dawlish.

EC Dangerous Substances Directive

This Directive 'on pollution caused by certain substances discharged in the aquatic environment of the community' (Ref. 8) protects the water environment by controlling discharges that contain harmful substances to rivers, estuaries and coastal waters. The Directive describes two lists of compounds; List I and List II. List I contains substances regarded as particularly dangerous because they are toxic, persist in the environment and bioaccumulate. Discharges containing List I substances must be controlled by Environmental Quality Standards (EQSs) issued through Daughter Directives. List II contains substances which are considered to be less dangerous but which still can have a harmful effect on the water environment. Discharges of List II substances are controlled by EQSs set by the individual Member States.

The receiving water site for Dulverton STW, on the River Barle (see Map 1), is one of six EC designated List II sites in the catchment monitored for copper, zinc, lead, chromium, nickel and iron. The EQS at this site was exceeded for copper in 1994, the cause of which is unknown (see Issue 2b).

EC Urban Wastewater Treatment Directive

This Directive 'concerning urban wastewater treatment' (Ref. 6) specifies minimum standards for levels of sewage treatment and sewerage collection systems.

The Directive allows higher standards of treatment for discharges to 'Sensitive Areas', and lower standards of treatment to 'Less Sensitive Areas'. Sensitive Areas are those waters which receive discharges serving population equivalents of greater than 10,000, and are, or may become, eutrophic in the near future.

Less Sensitive Areas or 'High Natural Dispersion Areas' (HNDAs) are those estuarine or coastal waters which are naturally very dispersive. In these areas a lower level of sewage treatment may be acceptable. However, dischargers must demonstrate that no additional harm will be caused to the environment by the lower level of treatment by carrying out detailed studies called 'Comprehensive Studies'. We are responsible for ensuring that these studies are carried out correctly.

The River Creedy has been identified as a Sensitive Area from Crediton STW (SS 8484 0063) (see Map 1) to the Exe Estuary (SX 9310 9090). The qualifying STW is Crediton which has a population equivalent of 12,500. Phosphorous

removal is to be installed at this STW by the end of 1998. Routine monitoring will continue to confirm the Sensitive Area status (see Issue 2c).

The sea off Dawlish has been identified as a HNDA. SWWSL will be carrying out comprehensive studies in order to demonstrate that primary treatment of the discharge at Dawlish will not adversely affect the environment (see Issue 2d). The Agency will be auditing these studies. The proposal to conduct similar studies of the HNDA off Exmouth, as mentioned in the Consultation Report (Ref. 2), will no longer go ahead due to the installation of tertiary treatment at Exmouth STW, as mentioned previously.

EC Surface Water Abstraction Directive

This Directive 'concerning the quality required of surface water intended for the abstraction of drinking water in the Member States' (Ref. 9) protects the quality of surface water used for public supply. It ensures that water abstracted for public supply meets certain quality standards and is given adequate treatment before entering public water supplies. Pynes intake on the River Exe (see Map 1) is a designated Surface Water Abstraction point. This site did not meet with the Directive's standards in 1994 and 1995 due to high polyaromatic hydrocarbon concentrations. There is also a further risk of industrial pollution (see Issue 2e).

EC Nitrates Directive

High nitrate concentrations detected in the Duckaller and Vennbridge public water supply boreholes (see Map 1) have led to the previous designation of a Nitrate Sensitive Area (NSA) between the River Kenn and Dawlish Water, around the Duckaller borehole, as mentioned in the Consultation Report (Ref. 2). The NSA is a voluntary scheme whereby MAFF compensates farmers for changing agricultural land use under the EC Nitrates Directive (Ref. 10) in order to protect public water supplies from nitrate contamination.

This area is now designated as a Nitrate Vulnerable Zone (NVZ). This covers a similar area to the NSA but also includes the Vennbridge borehole. The details of measures to be taken within the NVZs are still being drawn up but unlike the NSAs these measures will be compulsory (see Issue 2f).

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
2a. Bacteriological pollution from discharges of storm sewage to Dawlish Water.	i. Negotiate for improvements to discharges of storm sewage to Dawlish Water to be carried out.	EA SWWSL	<1 k	●				
	ii. Investigate bacteriological source inputs to Dawlish Water.	EA	unknown		●			
	<i>Notes: The investigation is required to ensure that once storm discharge work is complete inputs do not continue from other sources.</i>							
2b. High copper concentrations in River Barle downstream of Dulverton STW.	i. Continue to monitor as required under the EC Dangerous Substances Directive and investigate any further failures.	EA	<1 k p.a.	●	●	●	●	
	<i>Notes: High copper concentrations may be due to natural geology, not necessarily from Dulverton STW.</i>							

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
2c. Eutrophication in the River Creedy.	i. Install phosphorus removal at Crediton STW by the end of 1998.	SWWSL	n/a					
	ii. Continue monitoring.	EA	< 1 k p.a.	●	●	●	●	●
	<i>Notes: The first action may also reduce algal blooms in the Exeter Canal.</i>							
2d. Comprehensive studies required to demonstrate no impact from discharges to the HNDA at Dawlish.	i. Carry out comprehensive study by Spring 1998.	SWWSL	n/a					
	ii. Audit study and determine status.	EA	< 1 k		●	●		
2e. Risk of industrial pollution and high polyaromatic hydrocarbon (PAH) concentrations in the River Exe at Pyne's Intake.	i. Work with site owners to ensure industrial sites upstream of Pynes Intake identified during risk assessments take necessary remedial action. Enforcing pollution control legislation where necessary.	EA, SWWSL Industrialists	3 k	●	●			
	<i>Notes: Risk assessment found 150 potential problems at 50 sites.</i>							
	ii. Continue monitoring for PAHs and investigate any failures.	EA	< 1 k p.a.	●	●	●	●	●
	iii. Review results of national research on road runoff.	EA	< 1 k		●			
	<i>Notes: Road runoff could be contributing to PAH levels.</i>							
2f. High nitrate concentrations in groundwater.	i. Review Duckall NVZ designations every 4 years in accordance with criteria specified by DoE.	DoE/MAFF EA	5 k	●				●

Table 3 Grand Western Canal

The Grand Western Canal at Tiverton, is one of two major canals in the River Exe Catchment and is an historic, education, wildlife and recreation resource, popular with tourists and residents. The canal is approximately 18 km in length and supports a good mixed coarse fishery. We aim to work in close partnership with Devon County Council, the canal manager, to ensure the canal is administered in a sustainable way for the benefit of the environment and the canal users.

The River Exe Consultation Report (Ref. 2) highlighted two areas of concern relating to the canal; algal blooms giving rise to poor water quality and the risk of fish mortalities. During the consultation period a number of responses were received concerning the canal (see Section 2.2) and a meeting was held with Devon County Council to discuss the management of the canal. A number of new issues and actions were raised which are detailed in the following table.

Water quality in the canal is currently classified using two monitoring sites; one is at the canal basin and one at Fenacre. River Quality Objectives for the canal (see Map 2) are RE5 and RE4 respectively. The whole canal has a long term objective of RE3. The current monitoring site at the canal basin is unrepresentative of water quality in this part of the canal and this is likely to be giving an incorrect classification. We will therefore be identifying an alternative monitoring site. Other actions detailed in the table are also likely to have a beneficial effect on water quality.

Dense plant growth and algal blooms give rise to low dissolved oxygen levels at certain times, particularly in the early morning when there is a risk of fish mortalities. Excess water from Westleigh quarry (see Map 1) is currently released at Burlescombe with little benefit to the canal. CAMAS aggregates are proposing to increase the quantity of water pumped from the quarry into the canal. Reinstatement of the old sluice at the canal basin, in conjunction with the increased pumping would allow a flow of water through the canal at certain times. This is likely to reduce plant and algal growth, improve water quality and decrease the likelihood of fish mortality.

The very slow moving waters, profusion of plant life and runoff from adjacent fields all contribute to increasing sedimentation in the canal. The development of a weed control and dredging programme (outlined in Devon County Council's Grand Western Canal Management Plan (Ref. 11)) could be used in conjunction with buffer zones/silt traps to maintain the canal for its users.

Boating activity has decreased in recent years. However, an increase in boating traffic would reduce plant biomass, and it is proposed that this activity should be developed to an appropriate level. In order to prevent pollution from fuel spillage, electric and non-powered craft would initially be promoted, with controls regarding fuel use put in place.

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
3a. Poor water quality and fish mortality risk in the Grand Western Canal.	i. Reinstatement sluice at the canal basin in conjunction with increased pumping from Westleigh quarry and develop a plan for its operation.	DCC EA	< 1 k p.a.	●	●	●		
	ii. Identify an alternative water quality monitoring site for the Tiverton basin site.	EA	< 1 k	●				
	iii. Develop a weed control and dredging programme.	DCC, EA	< 1 k p.a.	●	●			
	<i>Notes: Weed control must take into account the conservation value of the canal and its users.</i>							
	iv. Take steps to reduce siltation and nutrient enrichment from runoff, e.g. using buffer zones/silt traps.	DCC EA	< 1 k p.a.	●	●	●	●	●
	v. Support the development of boating activity in a way which considers other interests.	DCC	n/a					

Table 4 Measuring and Managing River Flows

Low flow Identification Techniques

In 1990 consultants were commissioned by the NRA to study the extent and nature of low flows due to abstraction in Devon and Cornwall. Sites were identified where low flows were believed to adversely affect the river corridor environment.

The NRA undertook a further review in 1993 in order to reappraise the scale of potential low flow problems, and to include all Licences of Entitlement.

Following research a standard method for assessing low flows was developed. We will use the revised methodology to produce a new regional list. Sites towards the top of this list and not already under investigation will be considered for priority treatment once current investigations are complete, solutions implemented or additional resources become available (see Issue 4a).

Perceived Low Flow Sites - River Barle

Perry Weir (see Map 1) diverts a proportion of the River Barle's flow into Exe Valley Fishery leaving a deprived reach from the weir to the confluence of the Rivers' Barle and Exe some 500 m further downstream.

Hydrological investigations indicate that abstraction at the authorised licensed maximum would have a significant impact on the flow in the River Barle downstream of Perry Weir. Simulations also suggest that abstraction at the authorised maximum licensed rates could significantly reduce the habitat available to salmon and trout in the deprived reach. As the previous fisheries studies were carried out during a wet summer further investigation will be undertaken during periods of low flows.

Fisheries studies undertaken since 1992, including radio tracking, have demonstrated that the abstraction regime at Perry Weir has had no significant impact on either juvenile production or fish movement. Furthermore, ecological studies, including river corridor surveys and invertebrate sampling, do not suggest that the abstraction is having a significant impact on the ecology in the deprived stretch. Some water enters the deprived reach through leaks in the weir. Current work to repair the weir being undertaken by the weir owner may further reduce flows (see Issue 4b).

Gauging Station at Trews Weir

It is essential that hydrometric data are available to provide accurate information on flows in the River Exe. Since the gauging station at Trews Weir (see Map 1) closed in 1981, a requirement has been highlighted for the site to be replaced. Accurate data are required to enable informed decisions to be made on many important issues, particularly relating to abstraction licences and prescribed flows (see Issue 4c).

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
4a. Need to reassess sites based on improved low flow identification techniques.	i. Produce a revised list of low flow sites. <i>Notes: We now have an improved methodology for low flow sites which is currently being tested.</i>	EA	< 1 k	●				
4b. Low flows in the River Barle.	i. Carry out juvenile salmonid fish surveys under low flow conditions to assess impact. <i>Notes: Sites completed as part of routine 1995 survey. Next survey will be in 1998.</i> <i>Situation will be reviewed after improvements carried out to weir (see Issue 16a).</i>	EA	1 k			●		
4c. Need for a gauging station to monitor flows of the River Exe at Trews Weir.	i. Continue with programme to construct a gauging station at Trews Weir. <i>Notes: Feasibility study completed.</i>	EA	30 k	●				

Table 5 Public Water Supply

We need to ensure that there is enough water available for public water supply now and in the foreseeable future. Deficits in water supply have been forecast for the SWWSL Wimbleball Supply Zone. Water deficits will be reached by 2006 under the high scenario and by 2011 under the low scenario¹. These dates have been set using current resources, however it is anticipated that the Wimbleball Pumped Storage Scheme could put these deficit dates back.

The options to meet this deficit, and to ensure that the low demand scenario is the one that actually occurs, are outlined below in order of preference (also see Issue 5a):

- Encourage metering in all new developments;
- Encourage selective metering as an alternative to new resources;
- Promote the efficient use of water for agricultural purposes;
- Encourage and publicise efficient water use and recycling;
- Encourage leakage reduction to a target of 200 l/property/day and set local leakage targets;
- Encourage water companies to make more efficient use of water resources.

¹ The high scenario assumes high growth in consumption, no improvements to reduce losses and no increase in domestic metering to reduce water loss. The low scenario assumes low growth in domestic consumption, no growth in industrial/commercial consumption, broad company leakage targets for SWWSL and WWSL and little or no increase in the proportion of domestic properties subject to metering above 1991 levels (also see Ref. 20).

The Wimbleball Pumped Storage Scheme will have a significant role in meeting public water supply in the Wimbleball Supply Zone. This scheme involves pumping water from the River Haddeo in the winter into Wimbeball Reservoir for storage, and use during the summer months.

Concerns were raised by consultees about the level of exploitation of the Vennbridge/Duckaller aquifer mentioned in the Consultation Report (see Issue 5b).

The Coleford and Knowle (see Map 1) groundwater abstraction licences were mentioned in the consultation report; these have review conditions on them. We propose to review the impact of these abstractions once work on the Source Protection Zones mapping study for these sources has been completed in 1996/97; a Source Protection Zone is an area that contributes flow to a groundwater source, such as a well, borehole or spring.

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
5a. Forecast deficit in supply in Wimbleball Supply Zone.	i. Complete operational management strategy to allocate resources created by Wimbleball Pumped Storage Scheme. <i>Notes: Infrastructure for the scheme is now in place.</i>	EA	2 k					
5b. Perceived over-exploitation of the Duckaller/Vennbridge aquifer.	i. Review existing data.	EA	2 k					

Table 6 Reported Falling Groundwater Levels at Dawlish Warren

In recent years concern has been expressed about falling groundwater levels of three sand dune systems in Devon. Substantial drying out of the dune habitats at Braunton Burrows, Northam Burrows and, in the River Exe Catchment, Dawlish Warren is endangering survival of their outstanding wildlife interest.

Research is necessary to determine the movement of water within the dune habitats. The objective of this research (Sand Dunes Project) is to write a management plan that:

- describes the known and surmised hydrological history of each sand dune system;
- explains how the groundwater systems are operating and, if appropriate, assess the main causes of the falling water tables;
- recommends appropriate remedial/restorative measures.

Studies at Northam Burrows in the River Taw Catchment have already shown that the management of the water levels of drainage ditches around the dunes are closely related to the falling groundwater levels.

In addition the Exe Estuary Water Level Management Plan will include a section on Dawlish Warren.

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
6a. Reported falling groundwater levels at Dawlish Warren.	i. Continue to contribute to 'The Sand Dunes Project' being carried out by Plymouth University.	EN EA, DCC, TDC, Plymouth University	< 1 k	●				
	ii. EA will assist in the implementation of the management plan where appropriate.	EA DCC, TDC, EN, Plymouth University	unknown	●	●	●	●	●
	iii. Consider implications of Dawlish Warren groundwater levels study on sand crocus and encourage implementation of protective measures. Support further studies into decline of sand crocus.	EN Plymouth University, EA, DWT, DCC, TDC	unknown	●	●	●	●	
<i>Notes: The first stage of this project has now been completed. The main study site for this project has been Northam Burrows. Dawlish Warren will be investigated in light of this work and a management plan drawn up if appropriate.</i>								

Table 7 Landscape, Geology and Archaeology

The River Exe Catchment is important for both its diverse landscape and as an area of considerable geological, archaeological and historic interest.

The prime responsibility for the protection of landscape and archaeology rests with other agencies; however, where relevant, we will support initiatives by others. For example, we will support the identification and documentation of County Geological Sites carried out by the Devon and Somerset Regionally Important Geographical Site Group (RIGS) (see Issue 7a). When planning our own operations we will carry out assessments to ensure our own activities do not harm, but rather where possible, enhance the landscape.

Archaeological features of interest will require continued protection if they are to survive. Unidentified features are at risk from new development or changes in practice, both of which may result from increased use of the area. Such losses might include palaeo-environmental information as well as artifacts. During Agency activities we shall ensure that historic sites are protected and when we regulate the work of others we will encourage them to do the same.

There is an absence of easily accessible, general information on the historic environment. A need has been identified for a simple assessment of the overall value of the catchment, rather than specific sites, to provide a framework for considering actions in relation to the historic environment. This may best be achieved by collaboration between all interested parties (see Issue 7b).

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
7a. Adequate consideration is needed to be given to the conservation and enhancement of earth science features associated with the wetland environment (e.g. river and floodplain forming processes).	i. Support the identification and documentation of County Geological Sites.	EA <i>Devon and Somerset RIGS Group, LAs, EN</i>	< 1 k p.a.	●	●	●	●	●
	ii. Promote measures to conserve, enhance or interpret earth science features linked to the water environment.	EA <i>Devon and Somerset RIGS Group, LAs, EN</i>	< 1 k p.a.	●	●	●	●	●
7b. Absence of general assessment of archaeological/historic value of whole catchment.	i. Support production of document(s) covering entire area; investigate potential for collaboration.	<i>EH, DCC, DAS, Civic Society, EA, University of Exeter, RCHME</i>	< 1 k	●				

Notes: Workshop needed to attempt to identify lead body.

Table 8 Wildlife Conservation

For many years conservationists have been criticised for not prioritising their demands. Increasingly, the process of defining what is most needed is now being driven by a process called biodiversity action planning.

In June 1992 the governments of over 150 countries signed the Convention on Biological Diversity at the Rio Summit. The aim was to halt the worldwide loss of plant and animal species through national plans and programmes. The next step in the process saw both the UK Government and a number of voluntary sector conservation bodies produced documents (Refs. 12 and 13) containing priorities, targets and actions, mainly on a national scale. In January 1995 the non-government organisations produced a second edition of Biodiversity Challenge (Ref. 14), which included targets for some 600 species and 30 habitats, with action plans for those with the highest priority.

The process was further developed by the creation of a Biodiversity Action Plan (BAP) Steering Group, with membership from a wide range of organisations, to oversee the production of targets and action plans. Their report (Refs. 15 and 16) outlines the biodiversity planning process in detail and includes action plans for habitats and species. Criteria for prioritisation are defined and a framework for getting the work done is suggested. Particularly important is the recognition of a need for planning not only nationally but also at a local level. In May 1996 the UK Government responded to the report (Ref. 17), generally endorsing its recommendations.

In addition to these national initiatives, work has begun at a regional and local level. The RSPB, Wildlife Trusts and Regional Planning Conference have produced a regional audit which identifies the current state of the nature conservation resource. A group has been set up, of which we are part, to produce action plans for species and habitats in the South West.

There are two main initiatives in Devon; Devon County Council is producing a Nature Conservation Strategy, while Exmoor National Park Authority and English

Nature are working on a BAP for the National Park. Devon Wildlife Trust have recently introduced the 'Biodiversity Action Plan for Devon's Rivers and Wetlands' in partnership with a number of environmental organisations (Ref. 18). This document is intended to steer aquatic conservation in Devon in the future. Detailed, often catchment specific, action plans are included for river and floodplain features, wetland habitats such as Culm grassland and reedbeds, and species including water vole and freshwater crayfish.

A meeting was held with various conservation bodies to identify priority species and habitats for inclusion in this plan. Several criteria were used; these and the full list which we devised are shown in Appendix 5, together with references to specific issues and actions.

The species-rich wet grasslands found on the poorly drained Culm Measures of North Devon and the spring-lines of the Blackdown Hills are of extremely high conservation value. Around 90% of the area present in 1900 has been lost and steps must be taken to prevent further loss and to try to restore degraded areas. A number of species are closely linked to Culm grassland; these include marsh fritillary, for which specific actions are proposed. The narrow-bordered bee hawk moth is believed to have similar habitat requirements and should also be assisted by these actions.

Floodplains once supported a range of wetland habitats, but have declined in value over hundreds of years. Much of the River Exe floodplain still floods regularly, although it is now mostly agriculturally improved grassland, however we wish to see the extent of land managed for wildlife increased, possibly leading to increased use of floodplain habitats by birds; figures for current usage can be obtained and progress measured. The Agency owns land in the floodplain, some of which is already managed in this way, although there may be opportunities to extend this area. Water Level Management Plans should also help to target suitable sites. The valley upstream of Exeter is of particular interest.

The Exe Estuary is one of Devon's most outstanding wildlife resources; it includes a variety of important habitats supporting a large number of species. The Estuary Management Plan (see Table 9) will help to protect these habitats. Particular actions have also been identified to provide missing information and increase the extent and value of these habitats. In addition, actions to protect the general ecology of the estuary are likely to be beneficial for waders and wildfowl which use the area, especially in winter. Numbers are regularly monitored through the Wetland Birds Survey (WEBs), these figures will provide a baseline for measuring success in relation to these targets.

While the flocks of birds are fairly obvious, the estuary is also home to many invertebrate species, including the rare polychaete worm, *Ophelia bicornis*. It has very specific habitat requirements, only utilising sand which is exposed at certain states of the tide. Although numbers are presently stable, it is threatened by the major changes to the pattern of currents or estuary morphology that might occur following large changes to Dawlish Warren or the loss of significant areas of mussel beds.

Reedbeds have been identified as a priority for developing a Habitat Action Plan and this is now well under way. This habitat has a restricted distribution in the South West and it is important to both protect what remains and to look for opportunities to create new areas. In addition to pure stands of reed, the mosaic of reedbed, willow scrub and other semi-natural habitats around the estuary margins is also of high value. Actions to enhance these areas should also benefit Cetti's warbler, a relative newcomer to the breeding bird population.

Otters have partially recovered from the major decline of the 1960s and 1970s, however their distribution in the River Exe Catchment is still patchy. This

catchment is particularly important for the species, as it is the boundary between the relatively well populated north and west Devon rivers and the sparsely populated catchments to the east. It is therefore vital to encourage the increase of the River Exe population to feed an eastward expansion. General and catchment specific actions are identified in the Rivers and Wetlands (R&W) BAP.

Water voles are the subject of much current interest, with the recent realisation that this species has undergone a massive reduction in abundance and distribution. Some of the remaining Devon sites are in this catchment and these locations are therefore a priority for action. Again, plans are included in the R&W BAP.

Some typical riparian birds attract a high level of interest; sand martins and kingfishers are both included on our list of priority species. Sand martins, in particular, are vulnerable to changes in river morphology and typically exploit new sites as rivers change course. Erosion control works can mean the loss of sites, therefore we need up-to-date information on where colonies are present to enable us to develop targets and actions for their conservation.

Native or white-clawed crayfish (*Austropotamobius pallipes*) is uncommon in Devon and suffering from a number of threats nationally, including that of crayfish plague which is transmitted by alien crayfish species. There is an apparently healthy population in the Creedy Yeo which we must take specific steps to protect, as well as carrying out actions from the R&W BAP.

The Exeter Canal supports a number of plant species which are rare in Devon. Management of the canal is difficult without a clear understanding of the distribution of these species. There is also a clear need for a comprehensive management plan for the canal to enable the many uses and interests to be properly balanced.

Dawlish Warren provides the only UK mainland location for the sand crocus (*Romulea columnae*); it is subject to a number of threats here but research may show how it can be protected (see Table 6).

There is widespread concern about several alien plant species which are becoming extensively established. These include Japanese knotweed, Himalayan balsam and giant hogweed. We will continue to monitor the spread of these plants, particularly on land we own or manage, and control them where appropriate. In addition there are several invasive aquatic species such as parrot's feather (*Myriophyllum aquaticum*) and swamp stonecrop (*Crassula helmsii*) which we are interested in. Any records of these would be welcome.

We have recently become aware of a fungal disease which affects alder, a typical bankside tree. The disease, Phytophthora root disease, can kill the tree and in some parts of the country has infected a large percentage of trees. Some trees on the River Culm are known to be infected. We will be working with the Forestry Authority to monitor the situation carefully, although there are no clear solutions to the problem at present.

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
8a. Need for conservation of key habitats.	i. Continue development and implementation of the Rivers and Wetlands BAP (Ref. 18).	DWT EA, EN, DCC, WERG	unknown	●	●	●	●	●
	ii. Continue development of Devon Nature Conservation Strategy.	DCC EA, DWT, EN, RSPB, DNP, ENP	< 1 k	●				
	iii. Clarify status of rivers within County Wildlife Site selection guidelines.	Wildlife Trusts EA	unknown	●	●			
	iv. Continue production and updating of wildlife inventories.	Wildlife Trusts EA, Planning Authorities	unknown		●			
	v. Attempt to identify main uses and activities affecting priority sites.	DWT EA, EN, RSPB	unknown	●	●	●	●	●
	vi. Continue process of designating the River Barle SSSI and devising a conservation strategy.	EN EA, ENP	3 k	●	●			
8b. Rapid loss of Culm grassland and springline mires.	i. Total catchment resource to be entered into protective management schemes by 2005.	MAFF DWT, EA, EN, RSPB, DCC, Blackdown Hills Officer	< 1 k p.a.	●	●	●	●	●
	ii. Produce list of priority sites for restoration by 1997. <i>Target: Restore 60 ha of Culm grassland and springline mires by 2005.</i>	DWT EA, EN, RSPB, DCC, Blackdown Hills Officer, MAFF, NFU	< 1 k p.a.	●	●			
8c. Decline of marsh fritillary.	i. Contribute to appropriate management and work through the existing groups, e.g. CGWG, Butterfly Conservation, EDDC, landowners etc. to maintain and restore existing populations. <i>Target: Maintain or restore two or three large populations on Exmoor and the Blackdown Hills within the catchment by 2010.</i>	EA EDDC, landowners, public, DWT	< 1 k	●	●	●	●	●
8d. Need to retain/restore conservation value of floodplain wetlands.	i. Develop formal Water Level Management Plan for Exe Estuary by April 1997.	EA, EN RSPB	10 k	●				
	ii. Implement recommendations and monitor results of the Water Level Management Plan for Exminster Marshes.	EA, EN RSPB	20 k	●	●	●	●	●
	iii. Investigate extent of current and potential floodplain wetlands using S105 surveys (see Table 13).	EA	11 k	●				

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
	iv. Produce list of priority sites for conservation management by 1998.	EA, DWT, RSPB	1 k		●			
	v. Produce management plans by 1998 for EA's land holdings (particularly the Lower Wear Reedbed and the nearby field to the south east of Countess Wear Bridge) to maximise conservation value, while fulfilling other requirements.	EA EN	2 k		●	●		
	Target: Increase numbers of birds on Exe/Culm floodplain u/s of Exeter.							
	Target: Extend area of seasonally inundated grassland upstream of Exeter managed for conservation purposes by 10% by 2005 using voluntary management agreements.							
8e. Need to maintain and enhance conservation value of estuary margin wetlands.	Target: Increase area of grazing marshes managed for conservation purposes by 50%, by 2005.							
	i. Contribute to production and implementation of management strategy for wetland habitats, e.g. willow scrub.	EA DWT, EN, RSPB, DBWPS	unknown		●	●	●	●
	Target: To maintain range and numbers of Cetti's Warbler.							
	Target: To increase population of Cetti's Warbler by 50% by 2005 by increasing habitat availability.							
8f. Need to maintain/enhance or protect/expand reedbed habitat.	Target: To increase the area of wetland margin habitat under sympathetic management by 25% by 2005.							
	i. Promote and implement, as appropriate, actions identified in Rivers and Wetlands BAP (Ref. 18).	DWT EA, EN, RSPB, DCC, WERG, Blackdown Hills Officer, MAFF	unknown		●	●	●	●
	Target: Ensure no loss of existing reedbeds > 0.5 ha.							
	Target: Ensure Exe Estuary reedbeds are managed primarily for their nature conservation interest by 2000.							
	Target: To create 10 ha of new reedbed on land of low nature conservation importance by 2010, giving priority to sites >5 ha.							
	Target: Sustain populations of water rail and roosting birds, e.g. swallow.							

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
8g. Need to retain/restore conservation value of estuarine habitats.	i. Support the development of a management statement for the Exe Estuary SPA.	EA EN, DWT, RSPB	< 1 k	●	●			
	ii. Obtain data from WEBS counts.	EA	< 1 k	●				
	<i>Target: Maintain populations of waders and wildfowl, particularly Avocet, Black-tailed godwit, Curlew and wintering waterfowl.</i>							
	iii. Map Zostera beds in the estuary.	EN EA, DWT	unknown	●				
	iv. Review existing statutory protection.	EN	n/a					
	v. Establish as part of the proposed JNCC network of seagrass monitoring stations.	EN	n/a					
8h. Otter population below optimum level.	<i>Target: To maintain the seagrass (Zostera) beds in the Exe Estuary and assess the need for and feasibility of restoring damaged or degraded beds.</i>							
	vi. Control exploitation of shellfishery.	Devon Sea Fisheries EA, EN	< 1 k	●	●	●	●	●
8i. Decline of water vole population.	<i>Target: Ensure retention of mussel beds and associated communities.</i>							
	i. Promote and implement, as appropriate, actions identified in Rivers and Wetlands BAP (Ref. 18).	DWT EA, EN, DCC, WERG	unknown	●	●	●	●	●
8i. Decline of water vole population.	<i>Target: Maintain existing population of otter and expand use to all suitable areas of catchment.</i>							
	i. Promote and implement, as appropriate, actions identified in Rivers and Wetlands BAP (Ref. 18).	DWT EA, EN, DCC, WERG	unknown	●	●	●	●	●
	(Site specific actions will be added at the annual review stage).							
	<i>Target: Identify current and historic water vole sites by 1997 (all taken from JNCC report).</i>							
8i. Decline of water vole population.	<i>Target: Ensure water voles return to their 1970s range by 2010.</i>							
	<i>Target: Restore at least 10 km of suitable habitat by 2010.</i>							

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
8j. Lack of current information on sand martin and kingfisher distribution.	i. Develop targets based on survey results.	EA River Users	< 1 k	●	●	●	●	●
	ii. Support Devon Bird Watching and Preservation Society's (DBWPS) proposed county-wide survey of sand martin nest sites during 1997.	DBWPS EA	unknown		●			
	iii. Raise awareness of field staff and encourage reports of presence. Work with interested parties, such as anglers, to encourage reports of sand martins.	DWT EA, DBWPS, RSPB	unknown			●		
8k. Need for protection of native crayfish.	i. Determine distribution and abundance of the River Creedy crayfish population.	EA	2 k	●				
	ii. Survey sites previously known to support crayfish on River Culm.	EA	< 1 k	●				
	iii. Maintain records arising from biological or fisheries surveys.	EA EN	< 1 k	●	●	●	●	●
	Target: Maintain existing populations.				●			
	iv. Implement no-go area recommendations through consenting process.	MAFF EA	< 1 k	●	●			
	v. Seek to agree containment measures with owners/operators of sites containing non-native species outside no-go areas.	EA	< 1 k	●	●	●	●	●
	vi. Attempt to identify water quality requirements for native crayfish, and set longer term RQOs on particular stretches should the need arise.	EA	unknown	●	●			
8l. Need for a Management Plan for the Exeter Canal, including rare plant species.	vii. Support actions from the Rivers and Wetlands BAP.	EA	unknown	●	●	●	●	●
	Target: Prevent further losses.							
8m. Spread of invasive plant species.	i. Encourage production of survey and mapping of canal flora.	EA ECC, EN	< 1 k		●			
	ii. Develop Management and Business Plans for Exeter Canal.	ECC	n/a					
	i. Continue programme of surveys and consider need for control programmes.	EA	< 2 k	●	●	●	●	●

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
8n. Presence of root disease of alder.	i. Check alders for signs of disease.	EA, FA	< 1 k p.a.	●	●	●	●	●
	ii. Raise awareness of riparian owners and others.	EA	< 1 k p.a.	●	●	●	●	●
	iii. Produce regular updates on National Position.	EA	< 1 k p.a.	●	●	●	●	●

Table 9 Exe Estuary Management Plan

The draft Exe Estuary Management Plan was launched by Devon County Council for public consultation in May 1996. The consultation period ended on 26th July. This Estuary Management Plan has now been adopted taking the comments of local users and interested organisations into consideration. It identifies the main issues in the Estuary and proposes actions for the short, medium and long term to address these.

The Estuary Plan seeks to promote the sustainable use of the Exe Estuary, balancing the demands made on its natural resources and resolving conflicts of interest where they arise. It also provides a framework for the co-ordinated management of the Estuary and to improve communication between users and organisations with authority over the River Exe Estuary.

The proposals put forward in the Exe Estuary Management Plan include:

- Maintain and improve the nature conservation value of the Estuary.
- Encourage safety on the water.
- Encourage land based and intertidal recreational activities to take place without damaging the Estuary's resources.
- Support the management of the fisheries resource at a sustainable level.
- Encourage the adoption of policies promoting sustainable development of the area.
- Encourage Green Tourism initiatives (see Table 10).
- Develop an effective, integrated information and interpretation strategy.
- Support monitoring and study work.

We will continue to work with other agencies and organisations to develop and implement the Estuary Management Plan.

There has been a particular concern over the impact of sewage from boats on water quality and water sports in the coastal waters and estuary of the catchment. The Agency's monitoring of EC and non-identified bathing waters provides information on water quality close to beaches.

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
9a. Need for implementation of Exe Estuary Management Plan.	i. Continue to work with other agencies and organisations to develop and implement an agreed Exe Estuary Management Plan.	Estuary Manager Exe Estuary Officer's Working Group	<1 k p.a.	●	●	●	●	●
9b. Concern over the impact of sewage from boats and of water quality adequate to protect water sports.	i. Support actions in the Exe Estuary Management Plan.	EA, Estuary Manager, Exe Estuary Officers Working Group	<1 k p.a.	●	●	●	●	●

Table 10 Green Tourism Initiatives

The use of many coastal and river sites is intense during the summer, leading to some conflicts, both amongst recreation users and between recreation and conservation interests (see Issue 10a). Coastal sites at both Dawlish Warren and Exmouth are of high conservation value and there is potential for this to be affected by visitor pressure. River sites may also be affected, for example, at Tarr Steps on the River Barle, an important archaeological site, large numbers of visitors cause erosion of bankside vegetation.

We will support green tourism initiatives which balance recreational use of rivers and the coast with the conservation of wildlife and the needs of other users. An example of this could be the development of the Exe Valley Way (see Issue 10b), where public access needs to be improved; the actions listed in the table seek to improve recreation opportunities without significant impact on conservation.

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
10a. Need to accommodate a variety of recreation uses of river and coastal sites in a way which does not conflict with environmental interests.	i. Develop and implement agreed recommendations of the Exe Estuary Management Plan.	Estuary Manager, Exe Estuary Officers' Working Group EA, DCC, TDC, CPRE, Users	unknown	●	●	●	●	●
	ii. Need for improved visitor management at Tarr Steps.	Exmoor National Park	n/a					
10b. Need for access improvements in the Exe Valley.	i. Improve public access by foot along the Exe Valley Way.	DCC EA	< 1 k	●	●			
	ii. Establish cycle route within the Exe Valley, with off-road sections.	DCC EA	< 1 k	●	●			

Table 11 Canoeing in the River Exe Catchment

The existing access agreements for canoeing in the River Exe Catchment are presently restricted to the winter months. This is largely to prevent disturbance of the important game fishery during the summer. However, there may be opportunities for canoeing, particularly by 'touring' canoes, at locations where conflicts would not arise. Restricting access to particular times or prearranged dates at these locations might be an option (see Issue 11a).

Where canoeing already occurs, access points are generally not easy to use, involving some risk for able-bodied canoeists and ruling out access by less able people. Simple structures, for example, steps or limited surfacing could be put in place at a few major sites at relatively low cost (see Issue 11b).

Some Agency regions operate a telephone message service for canoeists, giving advice on access, river levels and other aspects of river canoeing (see Issue 11c). In Devon a similar service is operated on the River Lyn. These services can prevent canoeists making long journeys only to find conditions are unsuitable. The message service could also be used to provide information for anglers.

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
11a. Limited access agreements for summer canoeing.	i. Encourage discussions between interested parties to investigate possibilities for extending access agreements, including limited summer access at appropriate locations.	EA BCU, REROA, LAs, Landowners	< 1 k p.a.	●	●	●	●	●
11b. Poor access to river for canoeing, particularly for less able canoeists.	i. Encourage discussions between interested parties to investigate the possibilities for improving access to the river.	EA, BCU DCC, LAs, Landowners	< 1 k p.a.	●	●	●	●	●
11c. Lack of readily available information on canoeing conditions.	i. Review success of existing telephone or E-mail information lines and extend to River Exe if appropriate.	EA, BCU	< 1 k	●				

Table 12 Management of Environment Agency Owned Land

The Environment Agency owns two sites of considerable recreation and conservation importance in the River Exe Catchment, at Exeter and Tiverton.

In Exeter, much of the riverside land between Cowley Bridge and Countess Wear is under our ownership, although almost all is leased out. The major areas with public access are the Exwick Flood Relief Channel and the part of the Riverside Valley Park from Trews Weir to Countess Wear Bridge, which is leased to and managed by Exeter City Council under a Countryside Stewardship agreement. Both areas function as part of a major flood defence scheme.

The Exwick Flood Relief Channel offers great potential for water-based recreation such as model boating, windsurfing, raft races and water skiing. We are reviewing the use of this site and are exploring ways of managing it to maximise its recreational value, without disturbance to wildlife and other users of the area (see Issue 12a).

Public access from Exeter's Riverside Park is difficult, involving a dangerous road crossing. We own land on both sides of the road, and there may be a possibility of developing a safe crossing point here (see Issue 12b). However, a new canal crossing would still be required.

At Tiverton, the land owned by us is again part of a major flood defence scheme; it includes walkways alongside the river through the centre of town. Although mostly hard surfaces, it is a well-used site, especially by dog walkers. We are working with Mid Devon District Council on schemes to enhance the amenity value of this site. However, there is also a significant problem with dog fouling here (see Issue 12c).

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
12a. Need for revision of recreation management of Exwick Flood Relief Channel.	i. Draw up management plan for recreation (and conservation).	EA Users	5 k	●	●			
12b. Need for improved access to and from EA owned land at Countess Wear.	i. Appraise options for new road crossing points.	EA Users, Civic Society, ECC	< 1 k	●				
	<i>Notes: Crossing points must take account of the effect of increased recreational use on nature conservation interests in the Exe Estuary.</i>							
12c. Need for amenity improvements to Tiverton Flood Alleviation Scheme.	i. Review possibilities with other agencies, Mid Devon District Council (MDDC), for carrying out enhancements to scheme.	MDDC EA, Landowners	< 1 k	●				
	<i>Notes: Enhancements will include developing and implementing solutions to dog fouling problems with the co-operation of other interested parties.</i>							

Table 13 Review of Flood Defence Operations

All rivers are classified as either main river or ordinary watercourse (sometimes referred to as non-main river). We supervise all flood defence matters but have special powers to carry out or control work on main rivers and sea defences. Local authorities also have powers to carry out sea-defence work and flood defence on non-main rivers.

The Environment Agency is a member of the Lyme Bay and South Devon Coastline Group, which includes other coastal defence bodies. The Group will oversee the production of the Shoreline Management Plan for the South Devon Coastline ensuring that coastal defences take full account of coastal processes (see Issue 13a). We have decided after consultation with Devon Wildlife Trust, English Nature and Teignbridge District Council that we will allow the existing hard defences on the estuary side of Dawlish Warren to decay. However, we will monitor this process to ensure that the Warren is not at risk from erosion. Decay of the hard defences should result in the re-generation of salt marsh.

Local planning authorities and the Agency are required by the Department of the Environment Circular 30/92 'Development and Flood Risk', to liaise closely on flooding and surface water runoff matters. This ensures that the flood defence risks of development are an integral part of the decision making process. In this respect the Agency has responsibility to prepare surveys under Section 105 of the Water Resources Act 1991 to define the nature and extent of flood risks (see Issue 13b).

We maintain rivers and flood defence structures to minimise the risk of flooding. To continue to improve the efficiency and effectiveness of this work we try to target the areas of greatest need using a method called 'Standards of Service' (SoS) to operate a flood defence management system (see Issue 13c). This method has only recently been put to use and we are collecting the information we need to put it into practice, we will then compare actual SoS against standard SoS and address the difference.

In the River Exe Catchment Management Plan Consultation Report (Ref. 2) a risk of flooding was identified at Topsham, Bampton and Woodbury Salterton. Investigations are also to be carried out on the need for works at Exebridge, Bickleigh and Powderham (see Issue 13d). A pre-feasibility study is currently in progress at Powderham, a site of major interest in terms of conservation and recreation. See Map 1 for location of flood risk sites.

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
13a. Coastal management.	i. Preparation of a Shoreline Management Plan for the Lyme Bay and South Devon coastline.	EA TDC, WDDC, EDDC, SHDC, WPDC, TBC, PCC, DCC, DoCC	40 k	●	●			
	ii. Monitor managed retreat at Dawlish Warren. <i>Notes: Monitoring will be biannual by topographical survey.</i>	EA DWT, EN, TDC	< 1 k p.a.	●	●	●	●	●
13b. Planning and flood risk.	i. Provide information (S105 Surveys) to planning authorities to prevent inappropriate development in the floodplain.	EA Planning Authorities	30 k	●				

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
13c. The efficiency and effectiveness of our flood defence work.	i. Implement the flood defence management system.	EA	70 k	●	●	●	●	●
13d. Risk of Flooding at Topsham, Bampton, Woodbury, Salterton, Bickleigh, Exebridge and Powderham.	i. Carry out feasibility study at: Topsham, Bampton and Woodbury Salterton.	EA	835 k				●	
		MAFF	855 k				●	
			28 k					●
	ii. Examine flood protection at Bickleigh, Exebridge and Powderham.	EA	6 k	●				
13e. Need to improve flood warning at some locations.	i. Complete the 'review of flood warning'.	EA	12 k		●	●		

Table 14 Waste Management

The Agency authorises waste disposal activities and is a statutory consultee over developments relating to waste disposal. Through this process the management and disposal of waste is carefully controlled to ensure that waste management sites do not endanger public health, cause pollution or spoil local areas. We will be developing a strategy for sustainable waste management for the South West which will encourage minimisation, recycling and recovery of waste. Devon County Council have already started a waste sorting facility which has reduced the quantity of waste going to incineration/landfill.

The Exeter incinerator operated by Devon Waste Management Ltd, currently burns the majority of Exeter's (and the adjacent area of East Devon's) domestic waste; some 60,000 tonnes per annum. This incinerator is due to close by December 1996.

Wherever waste disposal sites are suspected of causing pollution to surface and groundwaters, they require monitoring and the development of a restoration plan in conjunction with the site operators/owners to minimise environmental impact. An example of such a site in the catchment is Higher Kiln (see Map 1) which accepted solid and liquid industrial waste for disposal since the 1940s until its closure in 1992 (see Issue 14a).

Two separate planning applications were made to the County Planning Authority for the development of landfill sites within the catchment for the disposal of household waste. Haul Waste proposed to infill Broadpath quarry at Uffculme and Devon Waste Management proposed to deposit waste within a natural amphitheatre feature near Cullompton.

Finding a suitable location for a landfill site is difficult and generates a great deal of local objection. County Councillors refused planning permission for both of the sites on 8 May 1996. Should either of the planning applications be accepted at an appeal, an application for a waste management licence will be made to us. We have already examined the likely environmental impacts of each of these sites. A licence would include detailed conditions and procedures to ensure that the protection of the environment is the foremost consideration. The waste management licensing process also now ensures that operators are technically competent to operate a site and that they make financial provisions for aftercare of the site and for pollution control.

Litter in and alongside rivers and the estuary is unsightly but it can also encourage vermin, increase flood risk, cause pollution and be a public health hazard. In some areas litter causes a significant problem for agriculture, particularly as a health hazard for livestock or damaging machinery. It is also an offence to litter any public open space.

We remove litter from our own land on a routine basis, and during routine flood defence maintenance operations, litter is removed from the river channel. On other stretches of riverbank the onus for the removal of the litter lies with the landowner. However, more needs to be done to tackle the problem at source (see Issue 14b).

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
14a. Pollution of groundwater around the disused Higher Kiln Waste Disposal Site.	i. Develop a Restoration Plan with the owners for Higher Kiln Waste Disposal Site.	EA CAMAS Restored Properties	unknown	●				
	ii. Continue detailed groundwater monitoring and regularly review the data.	EA	< 1 k p.a.	●	●	●	●	●
14b. Litter in River Exe corridor.	i. Investigate source of litter (e.g. dumping from boats and riparian owners).	River Exe Steering Group, EA, LAS Volunteer Groups, REROA, BMIF	< 1 k	●				
	ii. Provide information on sources of litter to responsible bodies to encourage clean up and preventive measures.	EA	< 1 k	●	●			

Notes: County and District Councils are designated as 'principal litter authorities' under the Environmental Protection Act 1990 (Ref. 19).

Table 15 Fisheries

The numbers of salmon returning to the River Exe during the spring months has declined dramatically in recent years. This run of 'spring fish' is made up of large salmon which have spent more than one winter at sea. The overall production of salmonid species in the catchment is below the optimum level and the protection of spring fish is important to maximise the numbers of fish returning to spawn. Although many factors which influence the numbers of fish returning to the river are beyond the control of the Environment Agency, such as high seas fisheries, action taken locally to protect fish and improve conditions for successful spawning are of great importance. The major issues which need to be addressed to bring about an increase in salmon productivity are; improvement to water quality, allowing fish a free passage to spawning areas and protecting stocks from illegal exploitation.

In February 1996, the former NRA launched its Strategy for the Management of Salmon, this has now been taken on by the Environment Agency. Over the next five years, Salmon Action Plans will be produced for all salmon rivers in England and Wales with the following aims; safeguarding salmon stocks, maximising economic/social benefits, and ensuring sustainable long term improvements. Each Plan will describe the fishery and how it is performing, identify the key issues in each river system, set fishery targets and fishing effort controls and

outline a programme of improvement. We intend to develop a Salmon Action Plan for the River Exe in 1999.

The presence of non-native fish species (particularly chub) in the catchment suggests that illegal releases of fish have taken place. If these stocks become established the river's natural fish population may be adversely affected due to the risk of disease transfer and competition for food and habitat with the non-native species. We will continue to enforce Section 30 of the Salmon and Freshwater Fisheries Act (1975) in order to prevent releases of illegal fish species.

Concern has been expressed over brown trout populations in the catchment and the coarse fishery in the Exeter Canal (see Issue 15d). Monitoring programmes for these fisheries are planned and any actions resulting from these surveys will be included in future annual reviews of this Action Plan.

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
15a. Decline in spring runs of salmon.	i. Consider introduction of mandatory fishing effort controls.	EA	unknown	●	●	●	●	●
	ii. Promote conservation measures, e.g. bag limits for anglers and agreed restrictions on netting.	EA Anglers	unknown	●	●	●	●	●
	iii. Investigate distribution, spawning activity and behaviour of spring salmon in the river to give us better information about their protection and enhancement.	EA	2 k	●	●			
	iv. Work with MAFF to investigate the effect of reported fish diseases on fish stocks in the catchment.	EA, MAFF	unknown	●	●	●	●	●
15b. Perceived decline of brown trout populations.	i. Monitor stocks through routine survey.	EA	5 k	●		●		●
	ii. Review existing data and advise on appropriateness of restocking.	EA	< 1 k	●	●	●	●	●
15c. Capture of migratory fish in drift nets at sea.	i. Monitor drift net fishery closely.	EA, DSFAC	1.5 k p.a.	●	●	●	●	●
15d. Perceived decline in the quality of fishing on the Exeter Canal.	i. Survey to identify the problem.	EA	2 k	●		●		●
	ii. Assist in the management of the fishery where appropriate.	ECC EA	1 k p.a.	●	●	●	●	●
15e. The effect of fish-eating birds on game and coarse fish populations.	i. Co-operate with the licensing authority to progress further research into this issue.	EA MAFF, Landowners, Anglers	< 1 k	●	●			
	ii. Continue to work positively with owners and anglers to establish the full facts in each situation.	EA MAFF, Landowners, Anglers	< 1 k	●	●	●	●	●

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year				
				96	97	98	99	2000
15f. Extensive gravel removal from the river-bed on the River Creedy at Yeaton Bridge.	i. Attempt to identify persons responsible and ensure that appropriate legislation is being complied with.	EA	< 1 k	•	•			
	<i>Notes: Legislation includes Salmon and Freshwater Fisheries Act 1975 and Waste Regulations.</i>							
15g. Smolt entrapment and escape of rainbow trout.	i. Remove escaped fish on a routine basis using electric fishing methods.	EA EN	3 k p.a.	•	•	•	•	•
	ii. Ensure installation and operation of effective screening of fish farms and abstraction intakes.	EA Fish farmers, Abstractors	< 1 k p.a.	•	•	•		
15h. Need for a comprehensive plan for salmon management in the catchment.	<i>Notes: Screening will reduce both escape by fish from fish farms and loss/damage of fish at intakes. The Environment Act 1995 requires that screening is in place by 1/1/99.</i>							
	i. Develop Salmon Action Plan.	EA	5 k					•
	<i>Notes: Salmon fishery targets will be developed as part of this plan.</i>							

Table 16 Barriers

There are over fifty major weirs and obstacles in the catchment. Most of these are easily negotiated by migrating fish, but a small minority reduce or even prevent fish passage.

Perry Weir on the River Barle, Oakford Bridge Weir and Salmon Pool Weir on the River Exe, and Exwick Weir on the River Creedy all present problems for the upstream migration of salmon under certain flow conditions. An agreement has been made for improvements to be made to fish passage at Oakford Bridge Weir, and work will be carried out in Summer 1996. Fordton Weir on the River Yeo is only passable during high flows. As this is the only obstacle to upstream migration above Exwick Weir, some priority will be given to improving conditions at this site.

Measures include easement of fish passage and the incorporation of the structural facility for a fish counter at St James/Salmon Pool Weir, best use of the Wimbleball fisheries and conservation water bank and stocking of salmon smolts into the catchment.

The continuing improvement in water quality of the River Culm may soon allow migrating salmon and trout to return to the river. Surveying the river now to identify obstructions (Issue 16b) will allow us to plan this.

Issue	Actions	Action By Lead Other	Cost to EA (£)	Financial Year 96 97 98 99 2000
16a. Impeded fish migration on the Rivers Exe and Creedy.	i. Improve conditions for upstream migration of salmonids at: Perry Weir on the River Barle (see also Issue 4b); Oakford Bridge Weir on the River Exe, by 1997; Fordton Weir on the River Yeo; Exwick Weir on the River Creedy	EA EN, Fishing Interests, weir owners	< 1 k ¹	
			< 1 k ¹	
			5k	
			5k	
	Notes: Water quality improvements could also ease fish passage - see Issues 1 and 2.			
	ii. Easement of fish passage and incorporation of the structural facility for a fish counter at St James Weir.	SWWSL EA	< 1 k ¹	
Notes: Easement of fish passage as part of Wimbleball Pumped Storage Scheme mitigation measures.				
16b. Obstructions to fish passage on the River Culm.	i. Conduct obstruction survey for the River Culm and identify priority sites for improvements.	EA Fishing Interests	< 1 k	
16c. Need to modify current Wimbleball bank release strategy in light of Pumped Storage Scheme.	i. Revise current strategy.	EA SWWSL, Fishing Interests	< 1 k	
Notes: Bank is 900 MI per calendar year and is for fisheries and conservation purposes.				
1 Main cost of these improvements to be borne by others				

¹ Main cost of these improvements to be borne by others.

5.0 Implementing the Plan: Monitoring and Review

The Environment Agency is jointly responsible, with other identified organisations and individuals, for implementing this Action Plan.

Progress will be monitored on a regular basis and reported annually by the Environment Agency in a review document to all the key partners and the Catchment Steering Group for the River Exe. This group has been formed by the Environment Agency (previously the NRA) from those individuals and groups with an interest in the catchment. The Catchment Steering Group represents a range of commercial, local authority and environmental interests who support the Consultation Report and Action Plan prior to public release (see Acknowledgements for list of members). They will monitor the implementation of the Action Plan and provide the Agency with specific advice on the importance of issues within the catchment. They act as a communication link between the local community, the Agency and its committees and will help to promote and develop initiatives of benefit to the environment within the catchment. Copies of the Annual Reviews will also be available to the public.

Annual Reviews will:

- detail the progress of the work shown in the activity tables;
- identify additional actions required in the light of changes in the catchment.

Note: This is not a legally or scientifically binding document.

APPENDIX 1

THE ROLE OF THE ENVIRONMENT AGENCY

Flood Defence has the role of protecting people and the developed environment from flooding by providing effective defences and protection of floodplains. Safeguarding life is our highest priority and to meet this aim we provide a flood forecasting and warning service. Flood Defence also aims to protect and enhance the natural environment by promoting works that are sustainable and work with nature.

The **Water Resource** function comprises the conservation, redistribution and augmentation of surface and groundwater supplies. It includes the powers to encourage water conservation and to promote transfer schemes and to balance the needs of water users and the environment by issuing licences for users to abstract water from rivers and boreholes.

The **Pollution Prevention and Control** function includes:

- Integrated Pollution Control (IPC) regulating the most polluting, or technologically complex, industrial and other processes that release materials to air, land or water;
- Water quality and pollution control which prevents and controls pollution and monitors the quality of rivers, estuaries and coastal waters;
- Radioactive Substances regulating the disposal of radioactive material, including that from licensed nuclear sites, and regulating the accumulation, keeping and use of radioactive materials, except from licensed nuclear sites;
- Waste Regulation setting consistent standards for waste management practice to regulate the treatment, storage, movement and disposal of controlled waste. The Agency also has a requirement to register and monitor those who produce waste imposing obligations to re-use, recover or recycle products and materials;
- Reporting on the extent of contaminated land and contributing to its management (primarily undertaken by local authorities);
- Abandoned mine operators are also required to work with the Agency so that steps can be taken to prevent minewater pollution in the future.

The Environment Agency is responsible for maintaining, improving and developing **Fisheries**. This is carried out by licensing, regulation and enforcement schemes which cover salmon, sea trout, non-migratory trout, coarse and eel fisheries. The Agency also carries out improvements to fisheries by improving the habitat, fish stocks and providing advice to fishery owners. The Agency is also the sea fisheries authority for some tidal waters, though not for the River Exe Catchment. We control commercial fishing for sea fish and shellfish in these waters.

The **Navigation** function is responsible for managing and improving over 800 km of inland waterways, the Harbour of Rye and Dee Estuary. Its aim is to make these resources widely available to the public for water or land based recreational use. The Agency has no navigation responsibilities in Devon.

The Agency must also take account of **Recreation** and access. Over 1000 sites in our control are managed for recreational use. We also have a general duty to promote the recreational use of inland and coastal waters and associated land throughout England and Wales.

In fulfilling all its functions the Environment Agency is required to contribute to the **Conservation** of nature, landscape and archaeological heritage. We have a *regard* to conserving and enhancing flora, fauna, geological or physiographical features when carrying out our pollution control functions, and a *duty to further* conservation when carrying out our other functions. We also have a duty generally to promote the conservation of flora and fauna dependent on the aquatic environment.

What we do not do

The Environment Agency does not cover all aspects of environmental legislation and service to the general public. Local authorities deal with all noise problems, litter and air pollution arising from vehicles, household areas, small businesses and small industries.

Planning permission is the responsibility of the local authorities who will contact us when necessary. The local authorities also deal with contaminated land issues in liaison with us.

Environmental Health issues should also be directed to your Local Authority - details can be found in your local telephone directory.

APPENDIX 2

INTEGRATED POLLUTION CONTROL/RADIOACTIVE SUBSTANCES FUNCTIONS IN THE RIVER EXE CATCHMENT

The Environment Agency's responsibilities include Heavy Industrial Processes and Radioactive Substances. These are covered here, although they were not detailed in the Consultation Report.

Heavy Industrial Processes

The Environment Agency is the statutory authority in England and Wales for regulating the largest and most complex industrial processes. To do this we use a system known as Integrated Pollution Control (IPC). This system requires the use of best available techniques not entailing excessive cost (BATNEEC) to prevent the release of particular substances into the environment or, where this is not practicable, to minimise their release and render them harmless.

Two lists of processes have been prescribed by regulations for control: Part A processes are controlled under IPC by the Agency; releases to the air from Part B processes are controlled at a local level under a system of Local Authority Air Pollution Control. Part A processes found in the River Exe Catchment are: Devon Waste Management - Exeter incinerator, South West Metals Finishing and Howmet Ltd.

Radioactive Materials

The Environment Agency is the principal regulator in England and Wales under the Radioactive Substances Act 1993. This statute is concerned with the storing, use and disposal of radioactive substances and in particular, the regulation of radioactive waste.

Radioactive substances are present in the environment as a result both of natural processes and human technological developments. The uncontrolled and incautious use of these substances can pose both immediate and long-term hazards.

The Environment Agency is the Competent Authority for a number of EC Directives on the shipment of radioactive substances and sealed sources between EU Member States. We also regulate shipments of radioactive waste into, out of, or through England and Wales.

The major nuclear establishments are licensed to operate by the Nuclear Installations Inspectorate (NII), but discharges from them are authorised by the Agency. These discharges arise from the day-to-day operations at the sites. Site operators are required to ensure that discharge conditions are met and also ensure that radiation dose limits to the public are not exceeded as a result of the discharges.

There are nine sites in this area which are licensed under the Radioactive Substances Act. These sites are listed in the following table. Each of these sites has been assessed by the Agency and permission granted on the basis that the use of radioactive materials is justified and that operators are prepared to abide by conditions to safeguard human health and protect the environment. The permissions take the form of:

- certificates of registration for keeping and using radioactive materials; and,
- certificates of authorisation for the accumulation and disposal of radioactive waste.

Table A2: Operators in the River Exe Catchment licensed under the Radioactive Substances Act

Operator	Use/Notes
Exeter University	RAS 3 and 4
Royal Devon and Exeter NHS Trust, Wonford Hospital	RAS 3 and 4
Howmet Ltd.	RAS 4
CAMAS Associated Asphalt Ltd.	RAS 4
Devon County Council	RAS 4
Bibby Paper - Hele	RAS 4
Securicor Ltd.	RAS 4
St. Regis Paper Co. Ltd. - Cullompton	RAS 4
St. Regis Paper Co. Ltd. - Hele	RAS 4

Note: RAS 3 authorisation or RAS 4 registration denote a non-nuclear site (for example a hospital). The Environment Agency publication 'Charging Scheme for Radioactive Substances Act Regulations 1996-97' gives further details (Ref. 21).

APPENDIX 3

RESPONSES RECEIVED THROUGH CONSULTATION

National Organisations

The Forestry Authority
 Friends of the Earth
 Countryside Commission
 The National Association of Water Power Users
 English Nature
 Ministry of Agriculture, Fisheries and Food
 Royal Society for the Protection of Birds
 National Farmers Union
 Clean Rivers Trust
 CAMAS Aggregates Ltd.
 British Trust for Ornithology
 Country Landowners Association

Regional and Local Organisations

Devon Archaeological Society
 Devon Bird Watching and Preservation Society
 University of Exeter:
 -Department of Continuing and Adult Education
 -Department of History and Archaeology
 The Exe Valley Fishery Ltd.
 Council for the Protection of Rural England
 (East Devon Group & Mid Devon Group)
 Hele Conservation Society
 Devon Wildlife Trust
 Devon Conservation Forum
 South Avon Canoe Club
 South Western Federation of Sea Anglers
 Lloyd Maunder Ltd.
 Blackdown Hills Joint Advisory Committee
 River Exe Riparian Owners Association

Local Authorities

Devon County Council
 Teignbridge District Council
 West Somerset District Council
 East Devon District Council
 Mid Devon District Council
 Uffculme Parish Council
 Kentisbeare Parish Council
 Lympstone Parish Council
 Ashford Parish Council
 Woodbury Parish Council
 Dunkeswell Parish Council
 Oakford Parish Council
 Exmoor Parish Council
 Exton Parish Council
 Kenn Parish Council

A further 73 written responses, including questionnaires, were also received from members of the public. Other comments were received at the display.

APPENDIX 4

RIVER QUALITY OBJECTIVES

The Environment Agency has set water quality targets for all rivers. These targets are known as **River Quality Objectives (RQOs)**, introduced in May 1994, and are used for planning the maintenance and improvement of river quality. RQOs establish a defined level of protection for aquatic life. Achieving these will help to sustain the use of rivers for recreation, fisheries and wildlife, and protect the interests of abstractors. RQOs provide a basis for setting Consents to discharge effluent into rivers, and guide decisions on the Agency's other actions to control and prevent pollution. The water quality classification scheme used to set RQO planning targets is known as the **River Ecosystem** scheme.

The River Ecosystem scheme replaces the **National Water Council (NWC)** scheme, which was first introduced in the late 1970s.

The River Ecosystem Scheme

The River Ecosystem scheme provides a nationally consistent basis for setting RQOs. The scheme comprises five classes which reflect the chemical quality requirements for communities of plants and animals in our rivers. The standards defining these classes reflect differing degree of pollution by organic matter and other common pollutants.

River Ecosystem classes can be summarised as follows:

- RE1** Water of very good quality suitable for all fish species
- RE2** Water of good quality suitable for all fish species
- RE3** Water of fair quality suitable for high class coarse fish populations
- RE4** Water of fair quality suitable for coarse fish populations
- RE5** Water of poor quality which is likely to limit coarse fish population.

The River Ecosystem scheme takes forward the core standards from the old NWC scheme, but also incorporates new standards and firm rules on how the scheme should be applied. These are described in detail in the document *Water Quality Objectives: Procedures used by the National Rivers Authority for the purpose of the Surface Waters (River Ecosystem) (Classification) Regulations 1994*, available from the Water Quality Planning departments at our Regional Office in Exeter.

Current and long term River Quality Objectives for stretches of the River Exe where long term RQOs have been set are shown in Table A4.

Table A4: Current and Long Term RQOs for the River Exe and its tributaries.

River Name	Stretch	Current RQO	Long term RQO
Culm:	Source - Bridgehouse Bridge Clayhidon	2	1
	Bridgehouse Bridge, Clayhidon - Culmstock	2	1
	Skinner's Farm Willand - Higher Upton Farm	3	2
	Higher Upton Farm - Below Cullompton STW	3	2
	Below Cullompton STW - d/s weir, u/s Silverton Mill	3	2
	Above Silverton Mill - d/s Silverton Mill	3	2
	d/s Silverton Mill - Exe confluence	3	2
Spratford Stream:	u/s Strong Rawle & Willand - d/s Strong Rawle & Willand	3	2
	d/s Strong Rawle & Willand - Five Bridges	3	2
	Five Bridges - Culm confluence	3	2
Madford River:	Dunkeswell Abbey - Culm confluence	2	1
Bolham River:	Source - Madford confluence	2	1
Dunkeswell Stream:	Source - Madford confluence	2	1
Grand Western Canal:	Source - Fenacre Bridge	4	3
	Fenacre Bridge - The Basin Tiverton	5	3
Bathorn:	Ranscombe - confluence with Exe	2	1
Exe:	Below Tiverton STW - Bickleigh Castle	2	1
	Bickleigh Castle - Thorverton Gauging Station	2	1
Clyst:	Source - Clyst Hydon	4	2
	Clyst Hydon - Clyst St Lawrence	4	2
	Clyst St Lawrence - Ashclyst Farm	3	2
	Ashclyst Farm - A38 Bridge Broadclyst	3	2
Cranny Brook:	Barnshayes - Crannaford Crossing	3	2
	Crannaford Crossing - Clyst confluence	3	2
Ford Stream (Exe)	Source - Cranny Brook confluence	3	2
North Brook	Source - Normal Tidal Limit	3	2
Creedy	Creedy Bridge - Westacott Cottages	3	2
Hollacombe Lake	Source - Pitt Stream confluence	5	2
Haddeo.	Source - Wimbleball Reservoir inflow	2	1

APPENDIX 5

SPECIES AND HABITATS FOR CONSERVATION TARGETS AND ACTIONS

Species ¹	Globally threatened	Exe Catchment has> trivial pop	Threat exists in Exe Catchment	Population of Exe Catchment significant for UK/Devon	Type of Action Plan for Exe Catchment	Reference to issues
Water vole		●	●	Devon	Species	8i
Bats		●	●	Devon	Habitat	8b, 8d, 8e
Otter		●		UK	Species	8h
Kingfisher		●				8j
Cetti's Warbler		●	●	UK	Species	8e
Sandmartin		●	●	UK(roost) Devon (breed)	Species	8j
Avocet		●	●	UK	Habitat	8g
Curlew		●	●	UK (wintering)	Habitat	8b, 8g
Black Tailed Godwit		●	●	UK	Habitat	8g
Nightjar		●	●	UK	Habitat	8b
Aquatic Warbler	●		●			
Reed Bunting		●	●			8d, 8e, 8f
Slavonian Grebe		●		UK (wintering)		
Wintering Waterfowl		●	●	UK	Habitat	8d, 8g
Water Rail		●	●	unknown	Habitat	8e, 8f
Golden Plover		●	●			
Lapwing		●	●	Devon	Habitat	8d
Snipe		●	●	Devon	Habitat	8d
Woodcock		●	●	Devon, unknown UK	Habitat	8d, 8e
Redshank		●	●	UK (wintering)	Habitat	8d, 8g
Barn Owl		●	●			
Green Woodpecker		●	●			
Swallow		●	●	UK	Habitat	8f
Grasshopper Warbler		●	●	Devon	Habitat	8d, 8e
Willow Tit		●	●	Devon	Habitat	8e
Starling		●	●	UK	Habitat	8f
Great Crested Newt		●				
White Clawed Crayfish	●	●	●	UK	Species	8k
Salmon		●	●	unknown	Species	1a, 15h
Bullhead		●				
Lamprey		●				
Marsh Fritillary		●	●	UK	Species	8c
Narrow Bordered		●	●	unknown	Species	8c
Bee Hawkmoth						
<i>Ophelia bicornis</i>		●	●	UK	Habitat	8g
Sand Crocus		●	●	UK	Species	6a
Zostera		●	●	UK	Habitat	8g

¹Species requiring actions now are shown in green.

Habitat	Globally threatened	Exe Catchment has > trivial area	Threat exists in Exe Catchment	UK/Devon proportion of area in Exe Catchment	Specific Action Plan for Exe Catchment	Reference to issues
Improved permanent pasture		●		Devon	Habitat	8a, 8d
Culm	●	●	●	Devon	Habitat	8b
Rhos (spring line mires)	●	●	●	Devon	Habitat	8b
Seasonally inundated grassland (includes grazing marsh)		●	unknown	Devon	Habitat	8d
Wet heath	unknown		●			
Canal		●		Devon		8l, 3
Fast flowing acidic river		●	●	Devon		
Estuary		●	●	Devon	Habitat	8e, 8f, 8g
Reedbed				Devon		8d, 8f

APPENDIX 6

GUIDE TO CONSULTATION REPORT AND ACTION PLAN ISSUES

Former Consultation Report Issue	Table Number in this Action Plan
1. Failure to meet proposed RQO target RE2 in upper Alphin Brook.	This issue has since been resolved. See Table 1 for further details.
2. Failure to meet proposed RQO target RE2 (1995) in upper River Weaver.	This issue has since been resolved. See Table 1 for further details.
3. Marginal failure of proposed RQO target RE2 (1999) in Grindle Brook.	This issue has since been resolved. See Table 1 for further details.
4. Marginal failure of proposed RQO target RE2 (1995) in Holly Water.	1a
5. Marginal failure of proposed RQO target RE2 (1999) in the upper Spratford Stream.	This issue has since been resolved. See Table 1 for further details.
6. Bacteriological pollution from combined sewer overflows discharging into the Dawlish Water.	2a
7. High copper concentrations in River Barle downstream of Dulverton STW.	2b
8. Algal blooms result in poor water quality in both the Exeter and Grand Western Canal.	3a
9. Eutrophication in the River Creedy.	2c
10. Comprehensive studies required to demonstrate the High Natural Dispersion Area off Exmouth and Dawlish.	2d
11. High polyaromatic hydrocarbon concentrations in the River Exe at Pyne's Intake.	2e
12. Moderate or poor aquatic macroinvertebrate quality in North Brook, Upper River Kenn, River Clyst and Spratford Stream.	1a , 1c and Table 1
13. Concern over water quality adequate to protect water contact sports in the mouth of the Exe Estuary.	9b
14. Pollution of groundwater around Higher Kiln Waste Disposal Site.	14a
15. High nitrate concentrations in groundwater.	2f
16. Need to reassess sites based on improved low flow identification techniques.	4a
17. Low flows in the River Barle.	4b
18. Reported falling groundwater levels at Dawlish Warren.	6a
19. Need for a gauging station to monitor flows of the River Exe in Exeter at Trews Weir.	4c
20. Forecast deficit in supply in Wimbleball Supply Zone.	5a
21. Perceived over-exploitation of the Duckall/Vennbridge aquifer.	5b

22.	Review of Coleford and Knowle abstraction licence conditions.	This is no longer an issue. See Table 5 for further details.
23.	Need to balance recreation and conservation uses of coastal and river sites.	10a
24.	Need to accommodate recreation uses of the estuary.	10a
25.	Need for revision of recreation management of Exwick Flood Relief Channel.	12a
26.	Need for improved access to and from NRA owned land at Countess Wear.	12b
27.	Need for amenity improvements to Tiverton Flood Alleviation Scheme.	12c
28.	Limited access agreements for summer canoeing.	11a
29.	Poor physical access to river for canoeing, particularly for less able canoeists.	11b
30.	Lack of readily available information on canoeing conditions.	11c
31.	Impact on landscape of inappropriate development.	See Section 2.2 for further details.
32.	Litter in River Exe Corridor.	14b
33.	Absence of general assessment of archaeological/historic value of whole catchment.	7b
34.	Need for improved archaeological input to NRA routine conservation screening activities.	7b
35.	Need for clear biodiversity targets for conservation of the water environment.	See Table 8 for further details.
36.	Need for implementation of estuary management plan.	9a
37.	Need for better understanding of significance of the conservation importance of the whole catchment.	8a
38.	Loss and decline in value of semi-natural habitats.	8b
39.	Need for retention/restoration of conservation value of floodplain wetlands.	8d
40.	Otter population below optimum level.	8h
41.	Decline of water vole population.	8i
42.	Lack of current information on sand martin distribution.	8j
43.	Need for improved information on species of lampreys & shads.	We will continue to monitor lampreys under our routine fisheries monitoring programme. Shads are present only in a very small non-breeding population.
44.	Need for protection of native crayfish.	8k
45.	Lack of full understanding of distribution of rare plant species in Exeter Canal.	8l
46.	Spread of invasive plant species.	8m
47.	Impeded fish migration on the Rivers Exe and Creedy.	16a

Former Consultation Report Issue	Table Number in this Action Plan
48. Obstructions to fish passage on the River Culm.	16b
49. Smolt entrapment.	15g
50. Decline in runs of spring fish.	15a
51. Poor migratory fish runs in Culm, Creedy and Clyst.	16a, 16b and Table 1
52. Escapement of rainbow trout.	15g
53. Perceived decline of brown trout populations.	15b
54. Fish mortality risk in the Grand Western Canal (Tiverton).	3a
55. Capture of migratory fish in drift nets.	15c
56. Perceived decline in the quality of fishing on the Exeter Canal.	15d
57. The effect of fish-eating birds on salmonid and coarse fish populations.	15e
58. Illegal releases of non-native fish species.	See Table 15 for further details.
59. Proposals for coastal defence works need to be considered within an overall and integrated strategy.	13a
60. Need to identify flood risk for planning authorities.	13b
61. Continue to improve the efficiency and effectiveness of our flood defence work.	13c
62. Risk of Flooding at Topsham, Bampton, Woodbury Salterton, Exebridge, Bickleigh and Powderham.	13d
63. Need to improve flood warning at some locations.	13e

New Issues

Table Number in this Action Plan

Marginal failure of RQO targets at: Upper River Kenn & Grand Western Canal.	1a
Significant failure of RQO target at Dunkeswell Stream.	1b
Failure to meet Long Term RQO at North Brook, Aylesbeare Stream and River Culm.	1c
Ensure adequate consideration is given to the conservation and enhancement of earth science features associated with the wetland environment (e.g. river and floodplain forming processes).	7a
Decline of marsh fritillary.	8c
Need to retain/restore conservation value of estuarine habitats.	8g
Need to maintain and enhance conservation value of estuary margin wetlands.	8e
Need to maintain and enhance, or protect and expand, reedbed habitat.	8f
Need for access improvements in the Exe Valley.	10b
Extensive gravel removal from the river bed on the River Creedy at Newton Bridge.	15f
Need for a comprehensive plan for salmon management in the catchment.	15h
Need to modify current Wimbleball bank release strategy in light of Pumped Storage Scheme.	16c

GLOSSARY

ABSTRACTION

Removal of water from surface or groundwater.

AQUIFER

A sub-surface zone or formation of rock which contains exploitable resources of groundwater. Aquifers are classed as either major, minor or non-aquifers depending upon the availability of the groundwater sources. Major aquifers provide large yields and are usually used for public water supply, minor aquifers have smaller yields and are usually used only for local water supply, non-aquifers yield little water and have very few, if any, abstractions.

BIOACCUMULATE

The accumulation by living organisms of materials from their surroundings such that the concentrations of these materials in the biomass are higher than in the surrounding medium.

BIODIVERSITY

The variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. (Article II of the Biodiversity Convention)

BUFFER ZONE

A strip of land, typically 10-100 m wide alongside rivers which is removed from intensive agricultural use. Can reduce inputs of pollutants and improve habitat diversity and landscape.

CARR

Wet woodland composed of trees such as willow and alder, which is a successional stage between open water and dry woodland.

COUNTRYSIDE STEWARDSHIP SCHEME

An initiative run by MAFF to enhance and conserve farming landscapes, wildlife habitats and cultural heritage.

COUNTY WILDLIFE SITES

Sites which are of county significance for wildlife, in line with formal guidelines prepared by the Devon Wildlife Trust.

CULM GRASSLAND

A habitat which comprises a characteristic mixture of marshy grassland, bog, wet heath and scrubby woodland which collectively supports a wide range of flora and fauna. The habitat is underlain by a geological formation of sandstones and shales.

ECOSYSTEM

A functioning, interacting system composed of one or more living organisms and their effective environment, in a biological, chemical and physical sense.

ENVIRONMENTAL QUALITY STANDARD (EQS)

The concentration of a substance found in a body of water which should not be exceeded in order to protect a given use of the water body. An EQS is set by the European Community through EC Directives and the government.

ENVIRONMENTALLY SENSITIVE AREA (ESA)

Area where landscape, wildlife and historic interest are of national importance. Payments are made by the Ministry of Agriculture, Fisheries and Food Departments for appropriate sensitive land management.

EUTROPHIC

Water enriched with nutrients which result in high plant (including algal) growth. Usually used when referring to enrichment from man-made sources such as fertilizers leaching from the soil.

FARM WASTE MANAGEMENT PLANS

Voluntary plans drawn up between farmers and ADAS advisers describing the planned disposal of waste on the farm e.g. when and where.

FLOODPLAIN

This includes all land adjacent to a watercourse over which water flows or would flow but for flood defences in times of flood.

GROUNDWATER

All the water contained in the void spaces in pervious rocks and that held within the soil, mainly derived from surface sources.

HABITAT

A certain type of location in which an organism prefers to live, and characteristic of it.

HYDROGEOLOGY

Branch of geology concerned with water within the Earth's crust.

MAIN RIVER

Some, but not all watercourses are designated as 'Main River'. 'Main River' status of a watercourse must be first approved by MAFF. Statutory (legally binding) maps showing the exact length of 'Main River' are held by MAFF in London and the EA in Regional Offices.

MORPHOLOGY

Science of form and structure of, for example, a river channel.

RAMSAR CONVENTION SITES

Sites identified by UK Government under the Convention on Wetlands of International Importance which was ratified by the UK Government in 1976.

REDD

Hollow created in river bed gravels by spawning salmonid fish into which the female deposits ova.

RIPARIAN OWNER

Owner of river bank and/or land adjacent to a river. Normally owns river bed and rights to midline of channel.

RIVER CORRIDOR

Land which has visual, physical or ecological links to a watercourse and which is dependent on the quality or level of the water within the channel.

RUNOFF

Water which does not soak into the ground but which is intercepted by impermeable surfaces and is passed into gulleys and drains.

SALMONID

Game fish of the salmon family e.g. salmon, trout and sea trout.

SECTION 105 SURVEYS

Section 105 of the Water Resources Act 1991 allows for Standards of Service Assets and Flood Risk Surveys.

SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI)

The best examples of our national heritage of wildlife habitats, geological features and landforms. They are administered by the Statutory Nature Conservation Agencies, namely English Nature, Countryside Council for Wales and Scottish National Heritage.

SPECIAL AREA OF CONSERVATION (SAC) AND SPECIAL PROTECTION AREA (SPA)

Areas designated under EC Directives.

SPRING FISH

Adult salmon which return to freshwater, mostly in late winter/early spring, after two or more winters.

WETLANDS

Areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt including areas of marine water, the depth of which at low tides does not exceed 6 m.

UNITS

mm	Millimetre
m	Metre
km	Kilometre
km ²	Kilometre squared
ha	Hectare
l	litre
MI	Megalitre
%	Percentage
>	Greater than
<	Less than
k	Thousand
p.a.	Per annum

ABBREVIATIONS

AMP2	Asset Management Plan 2
BAP	Biodiversity Action Plan
BCU	British Canoe Union
BMIF	British Marine Industries Federation
CGWG	Culm Grassland and Wetland Group
CMP	Catchment Management Plan
CPRE	Council for the Protection of Rural England
CSO	Combined Sewer Overflow
DAS	Devon Archaeological Society
DBWPS	Devon Bird Watching & Preservation Society
DCC	Devon County Council
DoCC	Dorset County Council
DoE	Department of the Environment
DSFAC	Devon Sea Fisheries Advisory Committee
DNP	Dartmoor National Park
DWT	Devon Wildlife Trust
EA	Environment Agency
EC	European Commission
ECC	Exeter City Council
EDDC	East Devon District Council
EH	English Heritage
EN	English Nature
ENP	Exmoor National Park
EQS	Environmental Quality Standard
ESA	Environmentally Sensitive Area
HNDA	High Natural Dispersion Area
JNCC	Joint Nature Conservation Committee
LA	Local Authority
LEAP	Local Environment Agency Plan
MAFF	Ministry of Agriculture, Fisheries and Food
MDDC	Mid Devon District Council
NSA	Nitrate Sensitive Area
NRA	National Rivers Authority
NWC	National Water Council
NVZ	Nitrate Vulnerable Zone
PCC	Plymouth City Council
RCHME	Royal Commission on the Historical Monuments of England
RE	River Ecosystem, RE1, RE2 etc
R&W	Rivers and Wetlands
REROA	River Exe Riparian Owners Association
RIGS	Regionally Important Geological Site
RQO	River Quality Objective
RSPB	Royal Society for the Protection of Birds
SHDC	South Hams District Council
SSSI	Sites of Special Scientific Interest
STW	Sewage Treatment Works
SWWSL	South West Water Services Limited
TBC	Torbay Borough Council
TDC	Teignbridge District Council
UK	United Kingdom
WDDC	West Dorset District Council
WEBS	Wetland Bird Survey
WERG	Wetland Ecosystem Research Group
WPDC	Weymouth and Portland District Council
WWSL	Wessex Water Services Limited

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Map 2 - 1995 Compliance with Proposed River Quality Objectives (River Ecosystem Classification)



map 2

Fold out for Map 2
1995 Compliance with Proposed River Quality Objectives

MANAGEMENT AND CONTACTS:

The Environment Agency delivers a service to its customers, with the emphasis on authority and accountability at the most local level possible. It aims to be cost-effective and efficient and to offer the best service and value for money.

Head Office is responsible for overall policy and relationships with national bodies including Government.

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For general enquiries please call your local Environment Agency office. If you are unsure who to contact, or which is your local office, please call our general enquiry line.

ENVIRONMENT AGENCY GENERAL ENQUIRY LINE

0645 333 111

The 24-hour emergency hotline number for reporting all environmental incidents relating to air, land and water.

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