

EA - SOUTH WEST LEAPS Box 8



# local environment agency plan

## EXE

### ACTION PLAN

### PLAN from JULY 2000 to JULY 2005



ENVIRONMENT  
AGENCY

Further copies of this Action Plan can be obtained from:

LEAPs (Devon Area)  
The Environment Agency  
Exminster House Miller Way  
Exminster  
Devon EX6 8AS  
Telephone: (01392) 444000

E-mail: [rosalind.keenan@environment-agency.gov.uk](mailto:rosalind.keenan@environment-agency.gov.uk)

#### **Environment Agency Copyright Waiver**

This report is intended to be used widely and the text may be quoted, copied or reproduced in any way, provided that the extracts are not quoted out of context and that due acknowledgement is given to the Environment Agency. However, maps are reproduced from the Ordnance Survey 1:50,000 scale map by the Environment Agency with the permission of the Controller of Her Majesty's Stationery Office, © Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. Licence Number GD 03177G.

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

# 1. Introduction

## 1.1 The Environment Agency

We have a wide range of duties and powers relating to different aspects of environmental management. These duties are described in more detail in Section Six. We are required and guided by Government to use these duties and powers in order to help achieve the objective of sustainable development. The Brundtland Commission defined sustainable development 'as development that meets the needs of the present without compromising the ability of future generations to meet their own needs'.

At the heart of sustainable development is the integration of human needs and the environment within which we live. Indeed the creation of the Agency itself was in part a recognition of the need to take a more integrated and longer-term view of environmental management at a national level. We therefore have to reflect this in the way we work and in the decisions we make.

Taking a long-term perspective will require us to anticipate risks and encourage precaution, particularly where impacts on the environment may have long-term effects, or when the effects are not reversible. We must also develop our role to educate and inform society as a whole, as well as carrying out our prevention and enforcement activities, in order to ensure continuing protection and enhancement of the environment.

One of the key outcomes of the United Nations 'Earth Summit' held in Rio de Janeiro in 1992<sup>2</sup> was agreement by governments that, in order to solve global environmental problems, local action is crucial: we must all therefore think globally but act locally.

### Our vision is:

- a better environment in England and Wales for present and future generations

### Our aims are:

- to achieve major and continuous improvements in the quality of air, land and water
- to encourage the conservation of natural resources, animals and plants
- to make the most of pollution control and river-basin management
- to provide effective defence and warning systems to protect people and property against flooding from rivers and the sea
- to reduce the amount of waste by encouraging people to re-use and recycle their waste
- to improve standards of waste disposal
- to manage water resources to achieve the proper balance between the country's needs and the environment
- to work with other organizations to reclaim contaminated land
- to improve and develop salmon and freshwater fisheries
- to tell people about environmental issues by educating and informing
- to set priorities and work out solutions that society can afford

### We will do this by:

- being open and consulting others about our work
- basing our decisions around sound science and research
- valuing and developing our employees;
- being efficient and businesslike in all we do.

## 1.2 Local Environment Agency Plans

We are committed to a programme of Local Environment Agency Plans<sup>3</sup> (LEAPs). They help us to identify and assess, prioritize and solve local environmental issues related to our functions, taking into account the views of our local customers.

LEAPs replace the Catchment Management Plans, which were produced by the former National Rivers Authority and build on their success by covering all the Agency's functions.

This LEAP Action Plan has been produced following consultation of the Exe LEAP, Consultation Draft (July 1999).

**The Annual Review** - We will monitor implementation of the Action Plan and report on progress in a published Annual Review. The Annual Review will also identify any additional actions needed to maintain progress in the light of any changes in the LEAP area, and also whether any actions need removing or amending where they are no longer appropriate. After five years, or sooner if required, we will carry out a major review of the progress we have made.

**Review of the consultation process** - The issues listed in this Action Plan were either identified in the Consultation Draft or resulted from the consultation process (see Appendix Six). The Consultation Draft was launched in July 1999 and the consultation period concluded on 5 October 1999. Responses were received from 68 individuals and organizations; these were collated and summarised in our "Summary of Responses to Public Consultation" document (available on request).

In general, the response was supportive of the Plan and the opportunity to comment on environmental issues welcomed (see Appendix Five). Many of the organizations identified specific areas where they could work in partnership with the Agency to help resolve some of the issues.

### 1.3 Action Tables

The following tables outline the actions needed to address the issues identified by the consultation process. The tables show the following information:

- organizations which will implement the proposed actions, either in a lead role or as a key supporter (shown in *italics*), are listed under the heading 'Action by Lead *Other*';
- which of the Agency's nine themes from the Environmental Strategy (see Section 4) are covered by the action;
- a timetable for the action;
- an estimate of cost to us over the next five years, where available. The inclusion of a cost does not mean funds have been allocated to the action. All actions will be incorporated into the Agency's annual business plan on a priority basis and bids will be made for appropriate funding. It should be noted that the inclusion of an action in an Action Plan does not guarantee that funding will be available for its programmed completion. The letters 'n/a' indicate that we do not contribute to the funding or the action, 'unknown' indicates that no cost estimate is available at present and 't.b.c.' indicates to be confirmed;
- the financial years covered by this plan are represented by a single year, for example, '00' is the financial year April 2000 to April 2001.

Please refer to the abbreviations and units section at the end of the report for the definition of acronyms and abbreviations.

The following points should also be noted:

- our everyday work commits substantial resources to monitoring and managing the environment.
- 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 actions may not be justified. The Environment Agency and participating organizations have limited resources and powers. Some work may take longer than indicated owing to funding availability, government policy or changing priorities.
- new issues will be added during the Annual Reviews.

**Devon Area Business Plan** - the Agency's Area Business Plans set out the activities that will be carried out in each area, each year. They are based on national, regional and local priorities. Local priorities are defined through the LEAP process.

The Devon Area Business Plan provides a focus to our work and allows managers to ensure the delivery of the required work and to identify and allocate resources. The plan enables the Agency to manage change, as tasks can be re-prioritised and resources re-allocated as needs arise.

## 2. The LEAP Area

### 2.1 Key Statistics for the Exe Catchment

Catchment Area	1,530 km <sup>2</sup>	
Main River Length (km) (upstream of Tidal Limit*)	Exe Culm Barle Clyst Creedy	82.7 km 45.3 km 35.7 km 25.1 km 24.3 km
Population (1991) Density	235,100 persons (approx) 154 persons/km <sup>2</sup>	
Main Towns/Cities	Exeter, Crediton, Tiverton, Cullompton, Exmouth, Dawlish	
Average Annual Rainfall (Source: MAFF)	1,097 mm	
Controlled Water Length (Monitored for Water Quality Purposes)	656 km	
Administrative Areas (see Map 7)	Mid Devon District Council, East Devon District Council, Teignbridge District Council, Exeter City Council, Exmoor National Park, North Devon District Council, West Devon Borough Council, Taunton Deane District Council, West Somerset District Council	

\* Tidal Limit as defined in Section 192 of the Water Resources Act, 1991

### 2.2 Physical Features

This LEAP encompasses the entire catchment of the River Exe, covering an area of 1,530 km<sup>2</sup>. It drains diverse habitats ranging from the moorland of Exmoor National Park at the headwaters of the River Exe, to the Exe Estuary at Exmouth, see Map 1. This area will subsequently be referred to as 'the catchment'.

The River Exe rises on Exmoor at 450m above sea level and descends 87.2 kilometres from its source to the tidal limit, and the length designated as Main River is 82.7 kilometres (see table above). The main tributaries of the River Exe are the River Culm, River Barle, River Clyst and the River Creedy.

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 broad-leaved woodlands. Further east, smaller tributaries run off the Brendon Hills, with the River Haddeo dammed to create Wimbleball Reservoir. Man has modified much of the Exmoor landscape, with extensive enclosure and agricultural improvement taking place in the nineteenth century, giving it a less rugged appearance than other moorland (see Map 5).

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 valley sides are heavily wooded, with rock outcrops and occasional quarries acting as a contrast. The floodplain becomes increasingly broad further south, with rolling farmland replacing the woodland on less steeply sloping ground. South of Tiverton and towards the coast, the rivers are of typical lowland character, meandering across a flatter landscape with valleys separated by low hills in a patchwork of pasture and arable land.

The River Culm rises on the Blackdown Hills where small fields and high hedges create an enclosed appearance.

South of Exeter, backed to the west by the 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.

A number of landscape designations apply to the catchment, notably Exmoor National Park, Blackdown Hills AONB and East Devon AONB all of which are of national importance. There are also areas of county importance, namely Areas of Great Landscape Value in Devon around Tiverton and to the west of Exeter, Special Landscape Areas in Somerset in the east of the catchment and Coastal Preservation Areas around the Exe Estuary (see Maps 5 and 6).

English Nature has developed the concept of Natural Area profiles<sup>39</sup>, through which the country has been divided into areas each with their own unique identity arising from the interaction of wildlife, landform, geology, land use and human impact. The catchment lies within several of these Natural Areas of which the most significant are Exmoor and the Quantock Hills, Lyme Bay, the Devon Redlands and the Blackdowns. The Countryside Commission (now Countryside Agency) has produced an assessment of the countryside character of the South West<sup>3</sup>, however this was unavailable at the time of going to press (see Issue 15).

**Geology** – The geological history of the rocks exposed within the catchment spans approximately 400 million years from the Devonian Period to the present day. The oldest rocks exist in the north of the catchment and in part form the uplands of Exmoor. The most recent include the sands and muds being deposited today within the Exe Estuary (see Map 2).

The majority of the rock formations can be divided by age into those formed during (in decreasing age) the Devonian, Carboniferous, Permian, Triassic, and Cretaceous Periods. However, the rocks of Permian and Triassic age are difficult to separate and are usually referred to as Permo-Triassic.

During the last 400 million years, earth movements and continental drift have resulted in a constantly changing environment, ranging from deep marine to desert conditions. In addition, the area has been subjected to igneous activity resulting in the presence of basalts and other igneous rocks.

The oldest rocks are of Devonian age (408-360 million years old) and include the Pilton Beds, Baggy Sandstone, Morte Slates, Ilfracombe Beds and others that were deposited in a variety of marine and non-marine environments. The fine-grained siltstones and shales were laid down in deep marine conditions. More sandy formations are generally associated with depositional environments closer to the coast, either in shallow marine or estuarine environments.

Carboniferous rocks (360-286 million years old) are represented by thick sequences of mudstones, siltstones and sandy siltstones of the Bude and Crackington formations. These again have been deposited in deep marine conditions. Burial of these sediments has resulted in compression and alteration to low grade shales and slates.

Many of the rocks of the Devonian and Carboniferous Periods that are exposed in the catchment are characterised by heavily fractured and cleaved black or purple shales and mudstones. Locally, such rock types are often referred to as "shillet". These rocks were deformed during the period of earth movement known as the Variscan Orogeny and associated with the emplacement of the Dartmoor granite mass to the west.

During the Permian and Triassic Periods (286-213 million years ago) the land mass now forming the south west of England was located near the equator. Hot arid conditions and rapid weathering of the mountainous area to the west of the catchment (the remains of which now form the uplands of Dartmoor) resulted in the deposition of vast quantities of sands and gravels in fan-shaped accumulations and valleys on the margins of the mountains. These sediments now form the red sandstones, breccias and conglomerates that are observed between Dawlish and Tiverton. Much of the sediments have accumulated in a faulted structure known as the Crediton Trough, which forms an east – west exposure of breccias and conglomerates approximately 3-7 km wide extending from the west of the catchment via Crediton to the River Exe.

During the last Carboniferous and early Permian Periods, igneous activity resulted in the intrusion of basalts and lavas into and onto some of the newly laid red breccias and sandstones. Such rocks can be seen in the Crediton Trough and around Silverton and Killerton.

The late Triassic Period saw a return to marine conditions in the area and the deposition of the Mercia Mudstone, which is exposed in the east of the catchment. This was succeeded by the sandy deposits of the Cretaceous Upper Greensand.

The youngest deposits within the catchment are the Quaternary alluvium deposits found along most of the river valleys with well-developed gravel deposits underlying much of the River Exe and River Culm valleys.

**Hydrogeology** – Groundwater is water contained below the water table within underground strata. It is abstracted from boreholes, wells and springs for many uses including public supply and river augmentation by South West Water Limited and by private users for a variety of agricultural, domestic and commercial uses.

Groundwater is also essential in the maintenance of flow of rivers and streams (surface watercourses) and wetland features, providing a component of flow (base flow), to many watercourses throughout the year. There are 34 groundwater monitoring sites in the catchment. The majority of them are sited north of Dawlish and west of Crediton within the major aquifers.

There are both Major and Minor Aquifers in the catchment. The older formations, generally cropping out in the north of the catchment are hard rocks of Devonian and Carboniferous slates, siltstones and mudstones and these are classified as Minor Aquifer. In such aquifers water is stored and transmitted within fissures and fractures, and provides sufficient water for private domestic and limited agricultural use. Higher amounts (yields) are associated with areas of more intense fracturing.

Minor Aquifers also exist in the south of the catchment and include the Carboniferous Crackington and Bude Formations, (which consist of interbedded sandstones, mudstones and shales) and the Triassic Aylesbeare Mudstone Group. This latter Group (comprising the Exmouth and Littleham Mudstones) is largely composed of low permeability mudstones, marls and silty clays. In all of these formations, there is enough water to meet small-scale domestic and agricultural requirement when boreholes intercept the more sandy, water-bearing strata.

In the east of the catchment small amounts can be obtained from the Triassic Mercia Mudstone in the Culm Valley and from the overlying Cretaceous Upper Greensand.

Major Aquifers in the catchment are associated with the Permian and Triassic strata found overlying the Devonian and Carboniferous Formations in the south of the region. Higher amounts of groundwater are found in the Permian Dawlish Sandstone and associated breccias within an area to the south-west of the Exe Estuary and the breccias and conglomerates including the Crediton Breccia found in the eastern section of the Crediton Trough. In these aquifers the majority of water is stored in pores between the sediment grains and groundwater movement occurs both as flow between interconnected pores and, if present, via fissures. The breccias are generally found to have lower amounts than the more uniform sandstone formations.

In the east of the catchment a small section of the Triassic Otter Sandstone and underlying Budleigh Salterton Pebble Beds are exposed. These formations are classified as a Major Aquifer and, as well as supporting the headwaters of the Rivers Kenn and Weaver, provide groundwater to large spray irrigation abstractions. Further east, with the Culm Catchment they become overlain by the Mercia Mudstone (Minor Aquifer). Large quantities of water can be obtained from boreholes that penetrate through the Mercia Mudstone into the Otter Sandstone.

**Soils** – The published soil information for the district (Soil Survey of England and Wales<sup>4</sup>) shows broad distribution of soil associations. The majority of the soils in the catchment are well drained<sup>5</sup>.

On the high ground of Exmoor, at the headwaters of the catchment, are found peat soils, peaty topped gley soils of low permeability and podzolic soils. On the fringes of Exmoor, permeable loamy soils occur often with bedrock at shallow depth. To the south, over Carboniferous rocks, loamy soils with slight seasonal waterlogging are interspersed with banks of heavy soils of low permeability which are seasonally waterlogged, with some patches of reddish stony loamy soils south east of Wimbleball Reservoir. Between Tiverton and Crediton soils developed over Carboniferous rocks are generally better drained, of medium loamy or clayey texture, with wet clayey soils confined to footslopes and minor valley bottoms.

To the east up the Culm valley and east of Exeter and the Exe Estuary are the reddish fine loamy or silty over clayey soils with slowly permeable subsoil. To the east and south-west of Exeter are found sandy and coarse loamy soils over soft sandstone. Around Tiverton and Crediton, and to the south of Exeter, reddish, permeable and very stony soils are developed over Permian Breccias.

**River Flows** – River flow is monitored at 15 river gauging stations. Most of the sites are linked to the Environment Agency's regional telemetry network and can also be used for flood warning purposes.

An analysis of the 42-year flow record (1957-1999) for Thorverton gauging station on the River Exe indicates a mean (average) daily flow of 16.006 cubic metres per second and a measured Q95 flow of 1.940 cubic metres per second. The Q95 value is used as an indication of a low flow and is the flow which is equalled or exceeded 95 per cent of the time.

At Thorverton the maximum recorded daily mean flow of 285.859 cubic metres per second and the maximum instantaneous flow of 492.56 cubic metres per second were both recorded on 4 December 1960.

The River Haddeo has been dammed to create Wimbleball Reservoir. To ensure a flow of water is maintained a continuous compensation flow of at least 0.105 cubic metres per second is released from Wimbleball Reservoir into the River Haddeo. In low flow conditions releases are also made from the reservoir to support public water supply abstraction further downstream. These releases are made when the flow at Thorverton reaches a certain level (prescribed flow). In addition, until 1 November 2000, South West Water Ltd have a licence to transfer water from the River Exe at Exebridge to the River Taw headwaters.

In winter, water can be pumped, if required, from the River Exe at Exebridge back up to Wimbleball via a pipeline, to assist the winter refill of the reservoir.

### 2.3 Wildlife - Habitats and Species

The catchment is of great importance for nature conservation, containing some of the finest sites in the South West. The Exe Estuary and adjacent land is of international importance being designated as a Special Protection Area (SPA) under the EC Birds Directive and as a wetland of international importance (for wildfowl and waders) under the Ramsar Convention. The East Devon Pebblebed Heaths are also of international importance being designated as a SPA supporting nationally important breeding populations of the nightjar and the Dartford warbler. The heaths are also a candidate Special Area of Conservation (cSAC) under the EC Habitats Directive on account of their dry and wet heath habitats. Only the western fringes of these heaths lie within the catchment however. In the north of the catchment, there are areas of heathland which make up the Exmoor Heaths cSAC, considered to be one of the best areas in the UK for dry heath.

Nationally the catchment contains a diverse range of important habitats including part of one National Nature Reserve (Dunkery and Horner Wood), 27 Sites of Special Scientific Interest (SSSIs) and 22 local or non-statutory Nature Reserves. Other important sites within the catchment are designated as County or Local Wildlife Sites, depending upon their importance. Habitats of particular importance in the catchment include the valley woodland of Exmoor; alder/willow carr and springline mire (Rhōs pasture) within the Blackdown Hills; the freshwater habitat of the River Barle, Exeter Ship Canal and Grand Western Canal; bogs and associated habitats on Exmoor; and the Exe Estuary for its eelgrass beds, intertidal mudflats, sandbanks, saltmarsh and the diverse freshwater habitats associated with Exminster Marshes and other sites adjacent to the Estuary.

The whole coastline of the catchment lies within the proposed Dorset and East Devon Coast World Heritage Site. As a World Heritage Site, the coast would receive international recognition as an area with globally important geological interest. The area has great scientific and educational importance, with some of the finest coastal scenery in Britain. In particular, the site includes best examples of landslips, sandspits, coves and barrier beaches. The complex marine topography includes submerged cave systems and offshore reefs. An outstanding range of wildlife is associated with these marine and coastal features.

### 2.4 Archaeology and Heritage

There are many important archaeological features within the catchment and more than 100 structures and sites have been designated as Scheduled Ancient Monuments by English Heritage. The sites are mostly clustered within the Exmoor National Park (including a fine spread of prehistoric burial mounds), an area west of Brampford Speke and Exeter City where there are Roman remains from the legionary fortress Isca (AD 50/55 – 75), early Roman town Isca Dumnoniorum (AD 80 – 180/200) and later Roman town (AD 180/200 – 420+). There are many Iron Age hill forts and settlements, including those at Stoke Hill, Cadbury and Huntsham. A number of interesting sites have recently been unearthed during the recent road improvements to the A30 between Exeter and Honiton including an iron-age enclosure at Blackhorse near the River Clyst. We have been supporting work undertaken by the University of Exeter, which is investigating the archaeological potential of old river channels, using aerial photographic interpretation, existing archaeological information and sediment analysis. This work is ongoing (see Issue 15f Rivers, Streams, Floodplains & Fluvial Processes).

The Devon County Sites and Monuments Register is the principal source for assessing archaeological significance and includes data on more than 50,000 sites and structures including the Exeter Ship Canal. The original canal was built between 1563 and 1566 and is the oldest ship canal in the country. The final extension to the area called Turf was undertaken between 1825 and 1827, when the banks were also raised to give a depth of fourteen feet.

Many of the archaeological features in the catchment are associated with rivers, such as the timber trackway on river gravels in Marsh Barton, Exeter, an ancient quay in a creek in Kenton, a possible wood-lined leat at Tiverton and evidence of erosion control at Upexe. Over ninety water mills are mentioned in the Domesday record for Devon and the great majority were either on the Exe or to the east of it. Artefacts connected to Brunel's atmospheric railway are present in the sands of the estuary. The regular service between Exeter and Teignmouth opened in 1847, however significant mechanical problems were experienced and the line moved over to locomotive power nine months after opening<sup>6</sup>. The prehistoric clapper bridge at Tarr Steps is found on the River Barle in Exmoor and has an interesting folklore association with the Devil. Topsham has played an important role as a port for Exeter since Roman times and has yielded interesting artefacts from the period. Coldharbour Mill at Uffculme has a long association with the River Culm. A late eighteenth century construction, it was originally powered by a breastshot wheel and later by a steam engine. The site is now a working museum.

A large number of buildings within the catchment are "listed" (Listed Buildings and Conservation Areas Act 1990) with up to 10 per cent in rural districts. Ten Historic Parks and Gardens are designated within the catchment and represent nationally important sites which are noted by reason of their historic layout, features and architectural ornaments. In addition, the central cores of many towns and villages are designated as district-built Conservation Areas.

## 2.5 Land Resources, Uses and Activities

**Farming** - A large proportion of the catchment area is farmed (approximately 80 per cent). Most of the agricultural area is grassland<sup>2</sup>, supporting dairy and other livestock; a smaller area is under crops or fallow. Other agricultural uses include rough grazing, particularly on Exmoor, farm woodland and set-aside (see Table 1).

The catchment includes part of the Exmoor and Blackdown Hills Environmentally Sensitive Areas (ESAs). ESAs are designated by the Ministry of Agriculture Fisheries and Food (MAFF) and aim to encourage farming methods to conserve and enhance the ecology, landscape and historic features of the area.

**Table 1 Agricultural Land Use**

1997	Area (ha)	%
Grassland	81,300	67
Crops & Fallow	25,845	21
Rough Grazing	6,909	6
Farm Woodland	4,225	3
Set-aside	1,300	1
Other Land	2,063	2

**Forestry and Woodland** - Forests and woodland are widely scattered across the catchment, but have a higher concentration in the north. Here many of the steep valley sides of the River Exe and its tributaries are lined with oak and other deciduous trees, much of which is ancient woodland which was often formerly coppiced. There are a few coniferous plantations, the largest of which is Great Haldon owned by the Forestry Commission and managed by the Forest Enterprise. All forestry management practices should observe the guidelines for forests and water contained in The UK Forestry Standard<sup>7</sup> to ensure that they do not impact adversely upon the environment.

**Mining and Quarrying** - There are no active metalliferous ore mines within the catchment, although 42 abandoned sites have been identified, concentrated in the upper River Exe and River Barle. There are 7 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.

Geological investigations for economic gold deposits are continuing in the Crediton Trough. Any future proposal for actual mining will be given full consideration under the planning process by the Mineral Planning Authority (Devon County Council) and for whom the Agency is a statutory consultee.

**Water Abstraction and Supply** - In the catchment both rivers and groundwater are used for water supply. By authorised volume, 98 per cent of abstraction is from rivers and is mainly for public and private water supplies, fish farms and hydropower. Public water supply, private domestic and agriculture supply are the main uses for groundwater abstractions. The major aquifers include the Lower Sandstone and the Breccia and Conglomerate deposits. Both Wessex Water Services Limited (WWSL) and South West Water Limited (SWW Ltd) provide mains supplies within the catchment. Wimbleball Reservoir is the indirect source of much of the catchment's public water supply in the summer.

**Waste Disposal** - There are 75 landfill sites (10 of which are currently operational) and 14 waste transfer stations and civic amenity sites have been identified in the catchment. The operational sites are used for domestic, inert and industrial materials.

The domestic waste incinerator at Exeter ceased operating on 30 November 1996, because it could not meet the requirements of the relevant EC Directive (89/429/EEC).

Sewage sludge from Exeter (Countess Wear) Sewage Treatment Works (STW) was dumped at sea up until 31 December 1998. This practice has now ceased as a result of the North Sea Agreement and the EC Urban Waste Water Treatment Directive. Sludge from this works and that imported from other sewage works, private septic tanks and cess pools is "digested" (heat-treated) at Countess Wear STW and spread as a fertilizer/conditioner onto agricultural land in neighbouring parts of the catchment.

**Recreation and Amenity** - Tourism is a major source of income and concentrated mainly around the city of Exeter, the beaches of Dawlish and Exmouth, and on Exmoor. There are several long-distance footpaths that cross the catchment. Other popular activities include both freshwater and sea angling, bird-watching, boating, sailing, swimming and canoeing. 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 varied coarse fisheries.

The Exe Estuary sustains a wide range of fishing activities from commercial operations to sport fishing. The Exe Estuary Management Plan<sup>21</sup> contains details about commercial fishing and shellfish beds. There is a designated bass nursery in the estuary which protects juveniles of this species from 1 May - 31 October. Further information on recreational activities is given under Issue 6.

Detailed recreational use of the estuary is considered in 'The Exe Estuary Management Plan 1998'<sup>21</sup>.

**Flood Defence and Land Drainage** – We maintain a number of flood defence schemes in the catchment including the one that protects Exeter. 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. In certain parts of the catchment, flooding is a problem. A Flood Warning Service is currently provided for rivers and associated settlements within the catchment area, for more details see Issue 5.

### 3. Our Targets for River Water Quality

**The LEAP Area** – We monitor 599.4 km of rivers in the Exe Catchment. Chemical quality is assessed annually and biological quality is assessed every five years. In 1998, 73 per cent of monitored river lengths in the catchment were of good or very good chemical quality, 27 per cent were either fairly good, fair or poor. In 1995, 54 per cent of monitored river lengths were of very good biology, 37 per cent were of good biology and 9 per cent were of fairly good biology.

#### 3.1 Managing Water Quality

We manage water quality by setting targets called River Quality Objectives (RQOs). They are intended to protect current water quality and future use, and we use them as a basis for setting consents for new discharges and planning future water quality improvements.

We have set RQOs using a classification scheme known as the River Ecosystem (RE) Classification which was introduced by the National Rivers Authority, following public consultation, in 1994. It replaced a former scheme introduced by the water authorities in the late 1970s and used by the NRA until 1994. The RE Classification comprises five hierarchical classes as summarised below.

RQO (RE Class)	Class Description
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 populations

(For details of the actual standards used see Appendix One).

The RQOs we have set must be achievable and sustainable; we must be able to identify what needs to be done to meet the RQO and to ensure as far as practicable that water quality can be maintained at this level in the future.

Where we are unable to identify solutions or resources to resolve current water quality problems, we have set a Long Term RQO (LT RQO). We will measure compliance against RQOs but use Long Term RQOs as a basis for setting consents for new discharges. This will ensure that future developments will not prevent us from achieving our long-term objectives.

The rivers of the Exe Catchment have been divided into 88 classified stretches and the RQOs that we have set are outlined in Appendix Two.

We also manage water quality by applying standards set in EC Directives and other international commitments. Failures to comply with these standards are outlined in the issues section of this document.

#### 3.2 Compliance with RQOs

Map 3 shows where current water quality fails to meet its RQO. This assessment is based on three years of routine monitoring data collected between 1996 and 1998 and held on public register. We have shown failures to meet the RQOs as *significant* and *marginal*. Significant failures are those where we are 95 per cent certain that the river stretch has failed to meet its RQO. Marginal failures are those where we are less certain (between 50 per cent and 95 per cent) that the stretch has failed to meet its RQO (please note that Long Term RQO compliance is not shown on this map).

Of the 88 monitored river stretches (599.4 km) in the catchment there are 4 stretches (25.6 km) which significantly fail to meet their RQO, and 13 stretches (93.2 km or river) which marginally fail to meet their current RQO.

We have also assessed whether river stretches meet their Long Term RQO. There are 9 stretches (49.0 km) which significantly fail to meet their Long Term RQO and 8 stretches (39.4 km of river) which marginally fail to meet their Long Term RQO.

The causes of these failures are identified in the following chapter. Some failures are caused by farming practice, others are caused by sewage treatment works.

### 3.3 EC Directives

The EC Shellfish Waters Directive *on the quality required of shellfish waters* (79/923/EEC) sets standards to protect shellfish from the discharge of polluting substances and has a secondary role in protecting public health, including a guideline standard for bacteria in shellfish flesh. Following a consultation exercise by the Department of the Environment, Transport and the Regions (DETR), the Government announced a revision of designated EC Shellfish Waters on 8 July 1999. This resulted in an area on the western side of the Exe Estuary being designated as a Shellfish Water.

This action by the Government ensures that the Shellfish Hygiene Directive and the Shellfish Water Directive are now running in parallel, and their key aims of consumer protection and environmental protection will now complement and reinforce each other. The Agency is responsible for controlling discharges to the estuary to ensure that the requirements of the Shellfish Waters Directive are achieved. In order to achieve the standards for water quality as specified in the Directive improvement will be required to three intermittent sewage discharges in the Exe Estuary. We expect improvements to be provided at all of these intermittent discharges in AMP3. In addition ultraviolet disinfection will be included as part of the treatment process at Countess Wear STW in AMP3 (see Issue 2).

This Directive is not to be confused with the EC Shellfish Hygiene Directive (see Appendix Four). Information on other relevant EC Directives is also shown in Appendix Four.

### 3.4 Biological Quality

Biological monitoring forms part of the General Quality Assessment (GQA) scheme undertaken by the Environment Agency to assess the state of our rivers and is complementary to chemical monitoring.

The biological scheme is based on macro invertebrates: the small animals such as mayfly nymphs, snails, shrimps and worms, which inhabit the riverbed. Macro invertebrates are used because they:

- do not move far;
- have reasonably long life-cycles;
- respond to the physical and chemical characteristics of the river;
- are affected by pollutants which occur infrequently and which may be missed by chemical sampling;
- reflect the recent water quality 'history' of the river.

Biotic indices are used to relate the biology of a river to the quality of the water. The indices used by the Environment Agency are the Biological Monitoring Working Party Score (BMWP) and the Average Score Per Taxon (ASPT). These are used, together with the total number of invertebrate families (or taxa) collected in a sample, in assigning a particular stretch of river to a biological quality class. A more detailed account of the process involved is given in Appendix Three. The six classes of biological quality are shown below:

Biological Class	Class Description
a	Very Good
b	Good
c	Fairly Good
d	Fair
e	Poor
f	Bad

## 4. Issues and Proposed Actions

**Environment Strategy** – Our principal and immediate environmental concerns are stated in our national strategy 'An Environmental Strategy for the Millennium and Beyond' and relate to nine themes. They are:

	Theme 1	Addressing climate change
	Theme 2	Improving air quality
	Theme 3	Managing our water resources
	Theme 4	Enhancing biodiversity
	Theme 5	Managing our freshwater fisheries
	Theme 6	Delivering integrated river-basin management
	Theme 7	Conserving the land
	Theme 8	Managing waste
	Theme 9	Regulating major industry

We will deliver this strategy at a local level by dialogue between ourselves and the various organisations involved in the protection and management of the environment. In order to achieve our aims and objectives and deliver our strategy in this catchment, issues and actions are presented on the following pages.

### Issue 1: Impact of Farming

*Associated Plans: The Exe Estuary Management Plan<sup>21</sup>*

There are 121,642 hectares of agricultural land in the catchment (MAFF 1997). In recent years there has been little change in the total agricultural area and it is not expected to change significantly in the near future. Dairy farms account for approximately 20 per cent of the total number of farms in the catchment. In the north, particularly on Exmoor, low-grade agricultural land supports mainly cattle and sheep. The area south of the rivers Clyst and Kenn and the area on the western side of the Exe Estuary are more varied, with a greater proportion of arable farms and horticulture.

Land management can have severe effects on watercourses. Soil erosion can result in spawning gravels silting up, which in turn is known to severely limit the survival of salmonid eggs, thus impacting upon the salmonid fishery. Land management practices can also affect the ability of soils to absorb water. Poor management can result in degraded soils (e.g. where soils become capped at the soil surface) which accelerate the rate at which water runs off the land and this can lead to mud on roads, blocking of roadside drains and flooding.

Practices which can result in soil degradation and soil erosion include late harvesting of silage maize, outdoor pig rearing, out-wintering and supplementary livestock feeding, and fine use of flat seedbeds in arable crops (which easily cap and seal the soil surface). Soil textures which are vulnerable to degradation and erosion include sands, loamy sands, sandy loams, sandy silt loams, silt loams and silty clay loams. Clay soils are at less risk to soil erosion but can become compacted by stock or if worked when soils are wet. Compaction can increase surface water runoff.

Areas at risk of soil erosion in the Exe Catchment include the River Ken a tributary of the River Culm, the mid-reaches of the River Clyst and the River Kenn south of Exeter. **Action 1a.**

We are currently supporting research on soil erosion by the University of Exeter, who are examining the sources of sediment in spawning gravels and the process of sediment intrusion into these gravels in the River Torridge catchment. Initial results here show that bank erosion is an important source of sediment in gravels. Livestock often exacerbate bank erosion at crossing and watering points due to trampling and by limiting the growth of bankside vegetation. **Action 1c.**

Soil degradation and soil erosion can be resolved by using a number of techniques to improve soil structure (by appropriate cultivation and improving organic matter) or by protecting soils using a crop cover.

There is a need to raise awareness of both problems and the solutions associated with soil degradation and erosion. There are many agencies involved in land management and co-ordination is required between them to deliver improvements. We have been supporting the work of the West Country Rivers Trust in North Devon in a project which aims to advise farmers on sustainable land management practices. There may be opportunities to extend this or other similar work to parts of the Exe Catchment in the future. **Action 1b.**

We are also in the process of developing a series of 'Best Practice' leaflets for farmers based on the MAFF Codes of Good Agricultural Practice. These leaflets have been produced with the help of the farming community, highlighting the economic benefits of adopting sustainable land management practices. **Action 1d.**

As part of our routine work we promote riparian fencing, planting, coppicing and formal watering points to reduce bank erosion and through liaison ensure that our interests are reflected in the Countryside Stewardship scheme.

Farm pollution can be either diffuse e.g. land runoff, or from point discharges e.g. field drains, poorly maintained silage clamps and slurry tanks. This pollution can change the quality of the water in rivers, which can have a significant effect on plant and animal life, the physical nature of the river system and human health.

Within the catchment, we have identified the following stretches of river that are impacted by farming activity:

**RQO non-compliance: The River Kenn from source to the A38 Bridge at Kennford** – marginally failed to meet its LT RQO of RE2 as a result of elevated BOD. The cause is catchment-wide erosion and associated runoff. In the past, campaigns of farm visits have been carried out; however due to the nature of the catchment, runoff from exposed bare soil surfaces may continue to cause failure of LT RQO when heavy rainfall occurs. Promotion of the Agency's 'Diffuse Pollution From Agriculture' leaflet among farmers in this catchment is proposed. **Action 1e.**

**RQO non-compliance: The Clyst from Clyst Hydon to Clyst St Lawrence** – significantly failed to meet its LT RQO of RE2 in 1998 as a result of low dissolved oxygen (DO). It is thought the main cause of RQO non-compliance is farm drainage, although there are also two significant sewage effluent discharges into this watercourse. **Action 1f.**

The East Devon District Council (EDDC) sewage treatment works (STW) at Park Close was replaced with a new package treatment plant in the summer of 1999. The septic tank discharge from Clyst Hydon Primary School may also have had an impact in the past, however improvements here are also currently in hand.

Farm visits were carried out during the winter of 1996/97. Fifteen farms had very poor, if any, dirty water containment systems. The farms were revisited in the winter of 1997/98, of which approximately 70 per cent had carried out improvements or ceased farming. Ashclyst Farm had a direct discharge to the river at Ashclyst Bridge until October 1997. The farm has now closed. The combination of the farm and sewage effluent discharge improvements should result in improved water quality in future.

**RQO non-compliance: The Clyst from Clyst St Lawrence to Ashclyst Farm** – marginally failed to meet its LT RQO of RE2 in 1998 as a result of elevated BOD, the cause of which may be due to silage problems from a nearby farm. Improvements to the farmyard dirty water system were carried out in spring 2000. **Action 1i.**

**RQO non-compliance: The Clyst from Ashclyst Farm to the B1381 Bridge at Broadclyst** – marginally failed to meet its LT RQO of RE2 in 1998 as a result of elevated BOD. There have been soil erosion problems at Burrow Farm and leaflets on soil erosion were given to the National Trust farmers at this farm. There have also been farm drainage problems in the vicinity of the monitoring point, improvements to the farm drainage were subsequently made. Farms in the whole of the Clyst catchment were visited in the winter of 1997/1998. We will review the results of monitoring to see if RQO failure recurs in 1999. **Action 1g.**

**RQO non-compliance: The River Culm from source to Bridgehouse Bridge Clayhidon, and from Bridgehouse Bridge Clayhidon to Culmstock** – both significantly failed their LT RQO of RE1 due to elevated BOD. Several free-range pig units in the catchment upstream of the sampling points could possibly be the cause. A farm campaign commenced in the winter of 1999/2000 from Hemyock to the source of the Culm. This area has not had the benefit of any farm campaigns in the past so we expect to see improvements in the water quality as a result. We will monitor the effects of the campaign to determine whether further action is required to achieve LT RQO. **Action 1h.**

**RQO non-compliance: The Alphin Brook from Dymonds Bridge to the Footbridge at Alphington** – significantly failed to meet its RQO of RE2 due to elevated BOD. This is caused by catchment-wide erosion and associated runoff. Failures are typically associated with heavy rainfall. Steep sloping valleys make parts of the catchment particularly vulnerable to soil erosion. This is a rainfall dependent occurrence, there are few point source inputs. Promotion of the Agency's 'Diffuse Pollution From Agriculture' leaflet among farmers in this catchment is proposed. **Action 1e.**

**RQO non-compliance: The River Dart from B3137 Bridge Bradley to the Exe Confluence** – marginally failed its RQO of RE2 due to BOD. The cause was thought to be agricultural runoff. Farm visits were carried out in this location in 1998. We will review the 1999 monitoring data and decide if further action is required. **Action 1j.**

**RQO non-compliance: The River Creedy from Creedy Bridge to Westacott Cottages, and from Westacott Cottages to the Exe Confluence, and the River Yeo (Creedy) from Gunstone Mills to the Creedy Confluence** – Creedy Bridge to Westacott Cottages marginally failed its LT RQO of RE2 as a result of elevated BOD. From Westacott Cottages to the Exe Confluence, and the River Yeo (Creedy) from Gunstone Mills to the Creedy Confluence marginally failed to meet their RQOs of RE2 as a result of elevated BOD. Diffuse farm drainage is suspected together with discharges from Lords Meadow Industrial Estate. A risk assessment has been completed for the industrial estate and pollution prevention visits were carried out to farms in the catchment in 1999. We will review the 1999 monitoring data for these stretches to see if failures recur following the farm visits. **Action 1i.**

**RQO non-compliance: The Holly Water from source to the Creedy Confluence** – marginally failed its RQO of RE2 as a result of elevated BOD. Farm visits were made in 1998 to address the problems. No new failures occurred in 1998. If the review of the 1999 monitoring data reveals no failures of the RE2 standards no further action will be undertaken. **Action 1k.**

**RQO non-compliance: The Binneford Water from source to the Creedy Confluence** – marginally failed its RQO of RE2 as a result of elevated BOD. Farm drainage is implicated; one farm was targeted for specific problems in 1997/98. Subsequently there were no failures of the RE2 standards in 1998. A campaign of farm visits on this catchment was carried out in the winter of 1999/2000. We will review the 1999 monitoring data and decide if further action is required. **Action 1k.**

**RQO non-compliance: The Polly Brook from source to the Normal Tidal Limit** – marginally failed to meet its RQO of RE2 owing to elevated BOD. It is suspected that the origins of failure may be rainfall related diffuse pollution from the upper part of the catchment, however further work is needed in order to confirm this. The SWW Ltd STW at Exton North and South are included in AMP3 for improvement works. We will investigate the cause of the failure and review the 1999 monitoring data. **Action 1l.**

**RQO non-compliance: Shobrooke Lake from source to Creedy Confluence** – marginally failed to meet its RQO of RE2 in 1998 as a result of elevated BOD, the cause of which may be due to rainfall related runoff from fields. However we will undertake further investigation in this catchment over the coming year in order to confirm this. **Action 1l.**

**RQO non-compliance: The Spratford Stream from Leonard Moor Bridge to Above Strong Rawle** – marginally failed to meet its RQO of RE2, in 1998 as a result of elevated BOD, the cause of which may be due to diffuse pollution from agriculture and storm overflows at Willand STW. Farm campaign visits were undertaken in the area to advise on best management practices during the winter of 1999/2000. **Action 1m.**

**RQO non-compliance: The Sheldon Stream from source to the Culm Confluence** – marginally fails to meet its RQO of RE2 in 1998 as a result of elevated BOD, the cause of which may be due to diffuse pollution from agriculture. Farm visits were undertaken in the area to advise on best management practices in the winter of 1999/2000. **Action 1m.**

**Failure of EC Surface Water Abstraction Directive: Thornes Intake at Kenton.** This site failed due to colour in 1996 and 1997 and dissolved iron in 1997 and 1998. None of the exceedences at this site were connected to any reported pollution incidents. Exceedences were associated with periods of high rainfall when the river was in spate and the conclusion is that the heavy rain caused runoff which contributed to the failures. As such, no action can be taken. (For a full explanation of the Surface Water Abstraction Directive see Appendix Four).

**Management of farm wastes** – Farm-related practices 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. In these areas MAFF schemes have been designed to maintain and enhance the landscape, wildlife and historic value of each area by encouraging beneficial farming practices. Both schemes focus on unimproved grasslands, hedgerows and archaeological and historic features, with moorland being emphasised in Exmoor and species-rich haymeadows and heathland in the Blackdown Hills. In line with many current conservation initiatives, the emphasis is upon maintaining and enhancing biodiversity and the Agency is fully supportive of these objectives.

**Sheep-dips** – There is growing concern about the increased use of sheep-dip insecticides based on synthetic pyrethroids. Many farmers have switched to these products because of the health concerns associated with organophosphate insecticides. However, synthetic pyrethroids are highly toxic to aquatic life particularly the invertebrates that inhabit the river bed, (up to 100 times more toxic than organophosphates) and they have caused some serious pollution incidents in other parts of the country. The Agency is currently undertaking an R&D project, in consultation with representatives from those involved with sheep farming (including dip manufacturers), and R & D project to develop best management practices for sheep flock management. This is due to be published in the late summer of 2000. The R&D project resulted from the Agency Sheep Dip Strategy<sup>8</sup> which has 29 recommendations to minimise the environmental impacts of the range of sheep dipping procedures.

In 1998 the Agency undertook a pilot study, located on Exmoor in the upper tributaries of the River Exe, to investigate the potential impact from the use of synthetic pyrethroid sheep-dips. Initial assessment of the data has found no evidence of an impact on the invertebrate life in these watercourses. The findings of this study are complete and are available on request. Routine biological sites on this catchment will be surveyed again in 2000 as part of the National General Quality Assessment (GQA) survey. The situation should improve further now that the Agency is controlling the disposal of used sheep-dip under the Ground Water Regulations.

**Groundwater Regulations** – These regulations complete the implementation of the 1980 EC Groundwater Directive in England and Wales. This Directive aims to protect the quality of groundwater by:

- Preventing the discharge into groundwater of substances in List I;
- Limiting the discharge of substances in List II so as to prevent pollution.

List I substances are those that are most harmful to humans or the environment, and include sheep-dip, pesticides, solvents and hydrocarbons. List II covers most other pollutants.

Anyone disposing of listed substances to land (unless covered by certain exclusions) must have written authorisation from the Agency before doing so. Conditions attached to the authorisation will minimise the environmental risks. Other activities that do not involve disposal but may nevertheless cause a discharge of a listed substance to ground must comply with approved Codes of Practice, and the Agency may, if necessary, issue a notice to further control or prohibit the activity. Such activities might include storage and handling (as opposed to disposal) of hydrocarbons, solvents and other chemicals, animal carcass burial, use of sheep-dips and other pesticides and sewerage systems.

**Cryptosporidium** – Although we do not consider there to be a risk from this within the catchment, we still recognise that there is concern amongst the general public. In recognition of the increased awareness of the potential risk to public health posed by this organism a task group was formed in 1997 with representatives from SWW Ltd, MAFF, Environmental Health Departments and the Environment Agency. This group has assessed the risk of *Cryptosporidium* entering the water supply in the South West. SWW Ltd will review procedures for the spreading of sewage sludge in catchments where there are abstractions. In response to an agreement with the British Retail Consortium and to concerns from various government agencies, the water industry is rapidly phasing out the use of raw sewage sludge to agricultural land. By January 2000 all sludges in the Exe Catchment will be treated by one of the approved treatment methods such as mesophilic anaerobic digestion which is an effective means of destroying the viability of *Cryptosporidium* oocysts. We will continue to promote good agricultural practice in the catchment.

**Groundwater Quality Data** – The Agency has a need to monitor the quality of groundwater through a number of responsibilities. These include our general duty to monitor pollution of controlled waters, and our responsibility to monitor under the Regulations which implement the EC Nitrate Directive (see Appendix Four for more detail) although the DETR has decided that for the time being the Directive sampling will all come from water company boreholes. At present we have no nationally agreed network for groundwater sampling, but studies have been carried out to say what the needs would be. A programme is being devised to develop this national strategy over the next three years. The collection of groundwater quality data in the River Exe Catchment is at present limited to the areas of major aquifer that are within it.

The effect of this lack of data is that the Agency is not able to comment authoritatively on the state of groundwater, except in the exploited aquifers such as Vennbridge and Duckaller, or to note any significant trends in change of quality, which might indicate an adverse effect due to human activity. However the Agency is now working towards the implementation of a new national strategy for groundwater quality monitoring, which will lead to improved data collection and reporting.

**Regeneration of bankside trees** – In recent years there has been a decline in general riverbank management due in part to rising labour costs and the advent of a wide range of machinery capable of undertaking work which was previously manual in nature. Bankside trees which in the past would have been managed by coppicing or pollarding have developed full crowns and have been destabilised through heavy winds and flood events. Once they have fallen into the river they can expose riverbanks to erosion by water or livestock poaching. The establishment of buffer zones to encourage natural regeneration can to some extent redress the loss. The introduction of riverbank management by riparian owners will be encouraged in addition to bankside fencing and planting in appropriate locations (see also Issue 15f - Rivers, Streams, Floodplains & Fluvial Processes, **Action 15f (xvi)**).

**Loss and decline of key habitats and species** – Many habitats and species have declined or been lost as a result of intensive agricultural practices in the catchment. These items are mainly covered within Issue 15.

**Action Table 1 - Impact of Farming**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
a Map soil vulnerability and risk to watercourses. 	Agency	2 k	●	●			
b Raise awareness of soil conservation with farmers. 	Agency, MAFF, NFU, FWAG, Landowners	unknown	●	●	●	●	
c Research soil erosion and degradation and disseminate findings. 	U of Exeter, IGER, Agency	unknown	●	●	●	●	
d Produce 'Best Practice' leaflets for land management and target dissemination. 	Agency, NFU, MAFF, FWAG	1 k p.a.	●	●	●	●	●
e Promote the Agency's 'Diffuse Pollution From Agriculture' leaflet among farmers in Kenn and Alphin Brook Catchments. 	Agency	unknown	●				
f Review the results of monitoring of the River Clyst from Clyst Hydon to Clyst St Lawrence to see if RQO failure recurred in 1999. 	Agency	unknown	●				
g Review the results of monitoring of the River Clyst at the B1381 Bridge at Broadclyst to see if RQO failure recurred in 1999. 	Agency	<1 k	●				
h Monitor the effects of the farm campaign on the River Culm to determine whether further action is required to achieve LT RQO. 	Agency	<1 k	●	●			

Actions		Action By Lead/Other	Cost to Agency (£)	Financial Year				
				00	01	02	03	04
i	Review the 1999 monitoring data on the Dart and Creedy to see if failures recur following the farm visits campaign. 	Agency	<1 k	●				
j	Review the 1999 monitoring data and decide if further action on the River Dart from B3137 Bridge Bradley to the Exe Confluence is required. 	Agency	unknown	●	●			
k	Review the 1999 water quality monitoring data for the Holly Water and Binneford Water to determine whether further action is required following pollution prevention visits 1999/00. 	Agency	<1 k	●	●			
l	Investigate the causes of failure on the Polly Brook, the Clyst from Clyst St Lawrence to Ashclyst farm and the Shobrooke Lake. 	Agency	unknown	●				
m	Review water quality data for the Spratford and Sheldon Streams following completion of farm visits campaign. 	Agency	unknown	●	●			

**Issue 2: Impact of Effluent Discharges**

Associated Plans: *The Exe Estuary Management Plan*<sup>21</sup>

We regulate the disposal of effluent direct to surface or groundwater by determining and enforcing discharge consents. Discharge consents can only be used to control point source discharges, for example:

Continuous discharges – sewage works, industrial etc.

Intermittent discharges – sewer overflows, surface water runoff etc.

Discharges to ground – soakaways etc.

Rivers and coastal waters can naturally render the main constituents of many effluents harmless and with proper controls over effluent disposal the environment will not be harmed.

Effluent discharges from sewage treatment works can lead to failure of chemical targets that have been set to maintain certain levels of use e.g. water for drinking or bathing. In addition, discharges can have an aesthetic impact and cause rivers and estuaries to become enriched with increased levels of nutrients. Nutrients accelerate the growth of algae which can lead to fish kills under extreme circumstances. We have identified where discharges of sewage effluent are causing problems and how we can resolve them.

The Exe Estuary Management Plan has a related policy, "Policy 5: Encourage the implementation of measures to improve the water quality within the Exe Estuary", with supporting action points to meet this policy.

**Sewage treatment improvement plans** – the water companies' improvement plan for the period 1995-2000 is known as Asset Management Plan 2 (AMP2). AMP2 was developed in 1994 along guidelines agreed between the National Rivers Authority (now the Environment Agency), the Department of the Environment (now the Department of the Environment, Transport and the Regions) the water services companies and the Office of Water Services (OFWAT).

A number of SWW Ltd's sewage discharges are known to cause or contribute to the exceedence of water quality targets. These discharges will be improved through the Water Companies' investment programme for the period 2000-2005 known as Asset Management Plan 3 (AMP3). AMP3 has been developed along guidelines agreed between the Environment Agency, the Department of the Environment, Transport and the Regions (DETR) the water services companies and the Office of Water Services (OFWAT).

The Environment Agency has agreed with DETR which sewage discharges require improvement during AMP3. OFWAT has now completed a review of water prices which allows for this programme of environmental investment and enables the companies to make the environmental improvements by 2005. Many of these schemes will be delivered before 2005.

A new STW at Dawlish will replace the current crude discharge and provide secondary treatment and UV disinfection to sewage flows from Dawlish, Dawlish Warren, Cofton, Cockwood and Holcombe. These improvements are being funded through AMP2 and AMP3. The scheme will be commissioned by the end of March 2001 construction is underway. Improvement work also in AMP2, is in progress to improve the unsatisfactory combined sewer overflows, which spill into the Dawlish Water. Although the UV disinfection is funded under AMP3 it is being installed along with the rest of the scheme and will be completed by the end of March 2001.

The following table shows Sewage Treatment Works (STWs) in the catchment where we expect improvements to be completed in AMP3.

**Table 2 Proposed AMP3 Sewage Treatment Works**

STW	Receiving Water	Required Treatment Level	Investment Driver	Latest End Date
Exton North	Exe Estuary	Secondary	UWWTD appropriate treatment	31 March 2005
Exton North	Exe Estuary	Secondary	UWWTD appropriate treatment	31 March 2005
Countess Wear	Exe Estuary	UV disinfection	Shellfish Waters Directive	31 August 2001
Dawlish	Sea	UV disinfection	UWWTD	31 March 2001
Exeter Argyll Road	Duryard Stream	Improved treatment	UWWTD appropriate treatment. Ensuring RQO compliance (requires numeric consent)	31 March 2003
Dulverton	River Barle	Improved treatment	UWWTD appropriate treatment. Ensuring RQO compliance (requires ammonia consent)	31 March 2004
Cullompton	River Culm	Improved treatment	UWWTD	31 March 2001
Hemyock	River Culm	Improved treatment	UWWTD appropriate treatment. Ensuring RQO compliance (requires ammonia consent)	31 March 2002
Starcross	Exe Estuary	UV disinfection	Shellfish Waters Directive	31 August 2002
Dunkeswell	Dunkeswell Stream	Aesthetic impact from storm discharge	UWWTD appropriate treatment	31 December 2004
Brushford	River Barle	Improved treatment	UWWTD	31 March 2004
Shute	Trib. of River Creedy	Improved treatment	UWWTD	31 December 2004

*Note: UWWTD in the investment driver column indicates that improvements are necessary to meet the requirements of the EC Urban Waste Water Treatment Directive. Please see Appendix Four for further information.*

AMP3 also includes a programme of improvements for intermittent sewage discharges, ie those which only operate in storm or emergency conditions, for example combined sewer overflows. There are 108 combined sewer overflows in the Exe Catchment. In total SWW Ltd will be improving 306 intermittent discharges under AMP3.

The Government has approved the inclusion of the above works in the environmental obligations required to be undertaken for the period 2000-2005 (AMP3). South West Water Ltd are required to include these works in their Strategic Business Plan for improvements in AMP3. Whilst 2005 is technically the latest end date by which improvements must be completed, we have agreed earlier completion dates for many of these schemes, see above table.

Four of the STWs in the catchment for which we proposed improvements were viewed as a lower priority by government and we would not expect them to be completed in AMP3. These are: Bampton, Tiverton, Uffculme and Kenn & Kennford.

**EC Bathing Waters Directive** – there are six identified EC Bathing Waters in the catchment, Exmouth, Dawlish Warren, Dawlish (Town), Dawlish (Coryton Cove), Sandy Bay and Teignmouth (Holcombe). Exmouth and Dawlish Coryton Cove failed the Directive's imperative standards in 1999. Teignmouth (Holcombe) failed to comply with the Directive in 1994 and 1997. For a full compliance history see Appendix Four.

Historically bathing waters were affected by discharges of crude sewage from coastal outfalls off Exmouth and Dawlish. South West Water Limited completed a 'Clean Sweep' scheme at Exmouth in 1995, which eliminated the crude outfall. Sewage flows from Exmouth, Lympstone and Budleigh Salterton are now passed to a site at Maer Lane Exmouth, to receive secondary treatment and year-round ultraviolet disinfection prior to discharge.

The main cause of the Teignmouth (Holcombe) failure has been attributed to contamination of the stream which flows onto Holcombe beach; overflows from SWW Ltd pumping station and a combined sewer overflow (CSO) at Smugglers Lane which discharges onto the beach. The continuous discharge from Holcombe at SX 9608 7535 can impact on the bathing water quality at Teignmouth (Holcombe) and also that at Dawlish (Coryton Cove). Sewage from Teignmouth will be transferred to the new STW at Dawlish, currently under construction. Once this scheme is complete (by the end of March 2001), it is envisaged that bathing water quality at Holcombe will be much improved. We are currently drawing conclusions on the causes of bacterial contamination of the Holcombe Stream following an investigation in 1999. Once this work is complete actions will be recommended accordingly. **Action 2a**

The Agency has assessed possible causes of the failure at Dawlish (including modelling the effect of local oceanography on dispersal of effluent from the Dawlish long sea outfall). The conclusion is that the most likely causes of failure are the crude discharges from the Dawlish long sea outfall and Shell Cove. These discharges will be improved as part of the new Dawlish sewage scheme, which will be completed by the end of March 2001.

At Exmouth East Devon District Council are expected to rectify household misconnections from the Littleham Council Estate into the Littleham Brook by the end of 2000. The Littleham Brook discharges onto Exmouth beach. SWW Ltd are also being pursued by the Agency for breaches of discharge consent at Exmouth STW in relation to UV operation. **Action 2b and 2c.**

In the light of concerns raised about debris on Dawlish Warren beach, we will review the incidence of sewage debris on Dawlish Warren beach following completion of the AMP2 Dawlish scheme in March 2001. We are also currently trying to identify other sources of debris found on the beach. The Agency anticipates that the improvements through the new Dawlish scheme will reduce the incidence of debris on Dawlish Warren beach. **Action 2d.**

In the summer of 1999 there was an outbreak of E. coli 0157 at Dawlish, which resulted in the tragic death of a child. The South and West Devon Health Authority Outbreak Control Team (including the Environment Agency and Teignbridge DC Environmental Health Officers) undertook an investigation in an attempt to ascertain the source of the outbreak. As part of these investigations the Agency was asked to carry out extensive sampling in the Exe Estuary, along the coast between Exmouth and Teignmouth, and sewage outfalls in the area. This was undertaken on 25, 26 and 27 August 1999.

The results of the survey showed no evidence of the source of the E. coli 0157 bacteria that caused the outbreak. Two samples from the head of the Exe Estuary did contain very low levels of a particular strain of E. coli 0157. Analysis by the Agency's microbiology laboratory at Exeter and further checks by the Public Health Laboratory in London have confirmed that these were different strains of bacterium to those responsible for the outbreak at Dawlish.

The source of the fatal infection was never identified. The South and West Devon Health Authority and the Environmental Health Officers of Teignbridge District Council have confirmed that no evidence has been found to link the outbreak to a sewage source. The public health experts concluded that the bacteria must have been present in a very localised area at Dawlish Warren at the end of July 1999.

The Environment Agency has recently determined the consent for South West Water Ltd's new sewage treatment works for Dawlish. The consent requires the installation of secondary treatment and ultra violet disinfection, which will be completed by the end of March 2001. The Agency decision on the level of treatment was based on its own technical appraisal of requirements, in particular the need to comply with the EC Bathing Water Directive at Coryton Cove (Dawlish). The Agency's decision is also in accordance with comments made by the Coroner at the recent Dawlish inquest.

**Failure of the EC Dangerous Substances Directive:** The receiving water site downstream of Dunkeswell STW failed the standard for copper in 1997 and 1998. This non-compliance has not been linked to any reported pollution incident but a possible reason for failure could be an electroplating workshop (which is now closed) on the nearby industrial site which discharged to the sewer (see also Appendix Four). **Action 2k.**

**Failure of the EC Dangerous Substances Directive:** The receiving water downstream of Dulverton STW has repeatedly failed the copper standard since 1994. The non-compliance has not been linked to any reported pollution incident. An Agency investigation has shown that exceedences are likely to be linked to past mining activity in the area and not to the STW. However, as a precautionary action, copper will be included in the final effluent analysis for Dulverton STW and in upstream monitoring. See Appendix Four for a full explanation of the EC Dangerous Substances Directive. **Action 2k.**

**RQO non-compliance: The River Creedy from Ashridge Bridge to Creedy Bridge** – marginally failed its RQO of RE2 as a result of elevated BOD. Problems were discovered with a storm overflow discharge from the Sandford sewerage network. The storm overflow was removed in 1998 and there were no new failures of the RE2 BOD standard in that year. Diffuse farm drainage may also be a contributory factor, pollution prevention visits were carried out on farms in the catchment in 1999. We will review the 1999 monitoring data and decide if further action is required. **Action 2e.**

**RQO non-compliance: The River Exe from Collipriest Tiverton to below Tiverton STW** – significantly failed to meet its RQO of RE1 as a result of elevated BOD. There are numerous factors which could contribute to the failure, they include discharges from a textile factory, Tiverton STW, sewer and pumping station storm overflows and the input from the River Lowman which joins the Exe on this stretch. Further work is required to deal with all of these potential causes equitably and achieve the RQO. **Action 2f.**

**RQO non-compliance: The Dunkeswell Stream from source to the Madford Confluence** – significantly failed to meet its RQO of RE1 as a result of both elevated BOD, and total ammonia (NH<sub>3</sub>). Dunkeswell STW was improved recently; a new storm overflow prevents works inundation, which improves final effluent quality and the final effluent outfall has been relocated. Further improvements are planned for the storm overflow discharge under AMP3. Effects of the improvements so far should be seen in the 1999 compliance results. A farm campaign for the Dunkeswell, Madford and Bolham catchments was completed in February 1999. Follow-up visits were completed in autumn 1999. **Action 2g.**

**RQO non-compliance: The River Clyst from source to Clyst Hydon** – significantly failed to meet its LT RQO of RE2 in 1998 as a result of elevated NH<sub>3</sub> and BOD and low DO. There are two discharges of sewage effluent very close to the monitoring point, the EDDC STW at Park Close and the package treatment plant serving the school and three residential properties. This has caused the monitoring results to be unrepresentative of this stretch as a whole and consequently in October 1999 the monitoring point was relocated out of the effluent mixing zone. Improvements were made to the EDDC STW discharge at Park Close in 1999. Improvements have also been made to the consented farm effluent discharge from Langford Court South, where the farmyard has been covered to prevent contaminated yard runoff occurring. **Action 2h.**

**RQO non-compliance: The North Brook from source to the Normal Tidal Limit** – marginally failed to meet its LT RQO of RE2 as a result of elevated BOD. There are many combined sewer overflows (CSOs) which discharge into the North Brook. The sewer is overloaded, consequently it discharges frequently and for prolonged periods during rainfall events. Our investigations have shown that poor water quality results in the North Brook are rainfall related (and therefore, by implication, CSO related). Improvements to the North Brook CSOs are proposed within the AMP3 period. Exeter City Council plan to investigate Mincinglake closed landfill site which is at the head of the North Brook. This should determine whether the site is having any adverse impact on the stream water quality. The site is in split ownership, ECC being just one of the four landowners. **Action 2i.**

**RQO non-compliance: The River Culm from below Cullompton STW to 'Below Weir'** – marginally failed to meet its LT RQO of RE2 as a result of elevated BOD. There are three significant discharges into this failing stretch of the Culm, Devon Valley Mill, Hele Village STW and Bradninch STW. By far the largest in terms of BOD load is the Devon Valley Mill discharge. We will be liaising with the paper mill owners over the coming year to seek improvements to this discharge. **Action 2j.**

**RQO non-compliance: The River Culm from 'Below Weir' to downstream of Silverton Mill** – marginally failed to meet its LT RQO of RE2 as a result of elevated BOD. In terms of BOD load the most significant discharge into this stretch has ceased as Silverton Mill closed for paper-making in August 1999. However there are approximately 50 houses whose sewage effluent is still treated at the Paper Mill's effluent treatment plant, this treatment will need downsizing accordingly to provide the appropriate treatment. It is expected that this stretch will comply with its LT RQO in future years. **Action 2j.**

**Aesthetics** – Following complaints of aesthetic pollution from the West Exe sewage pumping station in Tiverton, South West Water Ltd have conducted repairs to the pumping station storm tank to prevent escape of rag and have also installed a 6 mm screen in addition to the existing 10 mm screen. The success of these measures will be monitored as part of our routine duties to ensure that there are no further problems.

**Restrictions on Development** – There are a number of locations where consented discharges are having an environmental impact, and we recommend that development be constrained: Morebath, Halberton, Pennymoor, Uffculme, Dunkeswell, Exton, Stoke Canon, Kenn and Kennford, and Tedburn St Mary (including Pathfinder Village).

We expect improvements at Dunkeswell and Exton (North and South) STWs to be completed in AMP3. Improvements at Uffculme and Kenn and Kennford were viewed as a lower priority by the government and we do not expect them to be completed in AMP3.

Halberton, Exton and Pennymoor have received funding for improvements from a separate (non-AMP) budget for STWs with Descriptive Consents. Improvements have now been made at Halberton and Pennymoor STWs.

We are currently working to resolve the development restriction issue at Stoke Canon, Tedburn St Mary (including Pathfinder Village) and Morebath through a review of the embargoed status of these works. Some improvements have been carried out at Morebath.

**Action Table 2 - Impact of Effluent Discharges**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
<p>a Transfer flows for Teignmouth to new STW at Dawlish by the end of March 2001. Draw conclusions on Holcombe Stream investigation and recommend actions accordingly.</p>  	SWW Ltd, Agency	n/a	●				
<p>b Ensure EDDC rectify the household misconconnections from the Littleham Council Estate.</p>  	EDDC, Agency	<1 k	●				
<p>c Ensure SWW Ltd work to achieve no further breaches of UV conditions on their discharge consent for Exmouth STW.</p>  	SWW Ltd, Agency	<1k	●				
<p>d Investigate sources of debris found on Dawlish Warren beach (2000). Following AMP2 scheme completion, review incidence of sewage debris on beach (2001).</p>  	Agency	<1 k	●	●			
<p>e Review the 1999 monitoring data and decide if further action is required for the River Creedy from Ashridge Bridge to Creedy Bridge.</p>  	Agency	<1 k	●				
<p>f Investigate causes of failure of the River Exe from Collipriest Tiverton to below Tiverton STW.</p>  	Agency	unknown	●				
<p>g Review the results of monitoring of the Dunkeswell Stream from its source to the Madford Confluence to see if RQO failure recurs in 1999.</p> 	Agency	unknown	●				
<p>h Review the results of monitoring of the River Clyst from source to Clyst Hydon to see if RQO failure recurs in 1999 as a result of the improvements.</p> 	Agency	unknown	●				

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year					
			00	01	02	03	04	
i Review monitoring results on the North Brook following AMP3 sewerage improvements and review the results of the ECC closed landfill investigation. 	Agency	unknown		●	●	●		
j Liaise with the paper mill to seek improvements to Devon Valley Mill discharge. Review monitoring results of the River Culm 'Below Weir' and 'd/s Silverton Mill' to see if failures recur. 	Mill Owners, Agency	unknown	●					
k Include copper in the final effluent analysis for Dunkeswell and Dulverton STWs and in upstream monitoring. 	Agency	unknown	●	●				

**Issue 3: Impact of Waste Generation and Disposal**

Associated Plans: Devon County Waste Strategy<sup>9</sup>, Devon County Waste Local Plan<sup>10</sup>; UK National Waste Strategy<sup>11</sup>

The National Waste Strategy<sup>12</sup> sets out the government's policy framework for the management of waste. It identifies ways in which waste can be managed in a more sustainable way, and sets out targets for achieving that aim. The strategy sets out the following hierarchy of options for the management of waste: reduce, re-use, recover and dispose.

In the past the disposal of waste to landfill has been an attractive option, because it is initially inexpensive and suitable for many types of waste. However landfill sites have the potential to cause pollution, particularly older sites which have had fewer pollution control measures built into their original design.

**Waste reduction** – We are keen to promote the reduction of waste at source. An initiative in this catchment is the East Devon Waste Minimisation Programme, which aims to minimise waste generated by local companies. The business environment association PAYBACK in partnership with Business Link and ourselves drives the scheme.

New legislation aims to make those that produce waste more responsible for how it is managed. The Producer Responsibility Obligations (Packaging Waste) Regulations 1997 came into force on 6 March 1997. They require certain companies who handle packaging to ensure that a percentage of that packaging is recovered and recycled. In the future, producer responsibility is likely to be applied to other waste streams such as vehicles, electrical goods and batteries.

Under the EC Directive on Packaging Waste (94/62 EC), at least 50 per cent of the UK's packaging waste must be re-utilised through recycling and other recovery methods by 2001. The Producer Responsibility Obligations (Packaging Waste) Regulations 1997 implements this Directive in the UK.

There are numerous companies in the catchment that, owing to their size and quantity of packaging they handle, are obliged to recover a proportion of their packaging waste in accordance with the Regulations. This number will increase following the 7 April 2000 registration date, owing to the lowering of the turnover threshold at which companies become obligated.

There are many more companies, such as the large supermarket chains, which are also obligated under the Regulations but which are group-registered centrally from their Head Offices. The Agency is required by the Regulations to visit these sites on a regular basis to ensure that the requirements of the Regulations are being complied with.

**Fly-tipping** – Uncontrolled and illegal tipping of waste, known as fly-tipping, can pose hazards to wildlife, may attract vermin and can cause pollution as well as ruining the appearance of an area. Media attention is often focused on fly-tipping and the identification of problem sites. This is not currently a major concern in the catchment. No further action is proposed.

**Ashley Closed Waste Disposal Site (Tiverton)** – Supplementary Credit Approval (SCA) funding was obtained by Devon County Council to control the leachate breakout from the site, which was flowing over the transfer station. Drains have been installed at the edge of the site to intercept the leachate and direct it to the leachate lagoon. Leachate is conveyed from the lagoon to a nearby STW for treatment. Current proposals from Devon County Council indicate that they can reduce leachate escape from the site which is currently entering the surface water system and being carried into the River Exe. It is hoped that Devon County Council will install this scheme in the near future.

There is still a problem on site with controlling the flow of leachate from the lagoon, which has periodically overflowed into a tributary of the River Exe following prolonged or heavy rainfall. Supplementary Credit Approval has been obtained by DCC to enable the surface water and leachate drainage system to operate independently. This should help to reduce the risk of the leachate system becoming surcharged. This work will be undertaken during 2000 and will be monitored to gauge the need for any further work. **Action 3a.**

**Broadpath Landfill (Uffculme)** – This site is currently disposing of its leachate via road tanker to the SWW Ltd Sewage Treatment Works (STWs) in Devon which are licensed to receive waste. However once improvements have been made to the sewerage network in Uffculme and to Uffculme STW itself, it is likely that the leachate generated from Broadpath landfill site will be disposed of at SWW Ltd's Uffculme STW. SWW Ltd's consultants are currently working on the proposals for improvements.

**Punchbowl Closed Waste Disposal Site (Crediton)** – Urgent remediation is needed on this site. The Agency is working with DCC to secure the remediation of all its closed sites on a risk assessment basis. The main concerns with this site are stability and leachate management so it is included within Devon County Council's priority list. The DETR has recently approved the Supplementary Credit Approval funding bid put forward by DCC for Punchbowl. Therefore consultants have been appointed to complete a remediation statement (to be agreed with the Agency), and prepare detailed design and contract documents to achieve those measures. Native crayfish populations in the River Creedy may be at risk from discharges from this site. **Action 3b.**

**RQO non-compliance: The Hollacombe Lake from source to the Pitt Stream Confluence** – significantly failed to meet its LT RQO of RE2 as a result of low DO and elevated total ammonia. Leachate escaping from Punchbowl Landfill has been implicated as the cause. A risk assessment was carried out at the site in 1999 and Devon County Council subsequently allocated the site a high priority status. Consultants have been appointed by DCC to work on a remediation programme for the site. Once complete, dates for carrying out the remediation work will be confirmed. **Action 3b.**

**Salterton Road (Exmouth)** – High concentrations of methane are still being detected on site, which is a concern due to the close proximity of housing. DCC recently improved the gas management system using money obtained from SCA funding. This should provide additional control over landfill gas migration when it is implemented. No further action is proposed.

**Tiverton Disused Gas Works** – The Agency secured SCA funding for controlling contamination of the River Lowman from the Tiverton disused gasworks site. The funding has been used to install a system to prevent the contamination entering the river and for further investigative works into the source of the contamination. Ownership of the site is by four separate companies, who will have to work together to maintain the system. Full remediation of the site will have to take place when the land is redeveloped. No further action is proposed.

**Landspreading of paper sludge and abattoir waste** – A variety of paper sludges produced by two paper mills in the catchment are currently applied to farmland. Under a clause in the 1994 Waste Management Licensing Regulations (paragraph 7 of schedule 3) this activity can be exempt from requiring a Waste Management Licence if criteria are met. In order to comply with the exemption the activity has to demonstrate agricultural benefit without causing harm to human health or the environment. The sludges are stockpiled in fields until sufficient material has been collected, then it is spread on the land and ploughed in. Paper sludge is a mixture of cellulose fibre, clay and ash, and is essentially non-hazardous.

Abattoir waste in liquid and sludge form is also currently applied to farmland under the same exemption. Abattoir waste is not stockpiled on site but is injected into the soil as soon as it arrives at the farm. Both paper and abattoir wastes can cause aesthetic and odour nuisance in addition to causing pollution to surrounding land and watercourses if uncontrolled runoff occurs. Uncontrolled waste spreading can also have an impact on conservation, damaging flora and fauna. However, this process is regulated by the Agency to prevent such incidents occurring. **Action 3d.**

The Groundwater Regulations introduced in January 1999 seek to control materials which might adversely impact on groundwater. This new legislation has the potential to restrict landspreading of various wastes particularly at high-risk times of the year e.g. winter. To overcome this, the Agency is co-ordinating trials to compost carbon-rich sludges with nitrogen-rich abattoir wastes. The compost, which will also contain locally available materials, such as feathers and straw which speed the composting process and improve the structure of the resulting compost, will have agricultural benefit when applied to farmland, but with greatly reduced environmental risks than the original waste. The compost will not smell or create nuisance and can be spread as soon as it arrives at the farm. The alternative is the disposal of these wastes to a suitably licensed landfill facility. **Action 3c.**

**Action Table 3 - Impact of Waste Generation and Disposal**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
<p>a Ensure DCC instigates a comprehensive site investigation at Ashley, Tiverton to determine a sustainable remediation package which can be implemented to an agreed time scale.</p> 	DCC, Agency	unknown	●				
<p>b Complete and implement the remediation statement which will include improvements to the Punchbowl Landfill leachate collection system.</p> 	DCC, Agency	unknown	●	●	●		
<p>c Co-ordinate discussions between paper sludge, abattoir wastes and other producers for composting trials and subsequent recycling of the end-product to land.</p> 	Agency, Paper Mill, Abattoir, others	<1 k	●				
<p>d Review the practice of spreading wastes to agricultural land and determine if agricultural benefit results, with materials being recycled. If not, the activity will not qualify for an exemption from requiring a waste management licence.</p> 	Agency	<1 k	●				

**Issue 4: Potential for Eutrophication**

Associated Plans: *The Exe Estuary Management Plan*<sup>21</sup>

Elevated levels of nutrients in a watercourse, particularly nitrate and phosphate, can result in the increased production of algae and higher plants. If algal production becomes excessive then this can affect the chemical, biological and aesthetic quality of a waterbody. This is called eutrophication. The major sources of nutrients in a watercourse are agricultural activities and sewage effluent.

We are developing a national strategy for dealing with eutrophication, which will focus on a partnership approach to the management of this problem.

The Urban Waste Water Treatment Directive requires higher standards of treatment for discharges to sensitive areas. Sensitive areas are those waters that receive discharges from the equivalents of 10,000 people or more and are or may become eutrophic in the future. The DETR determine if a watercourse is sensitive based on studies undertaken by the Environment Agency. If sites are designated as sensitive, the Environment Agency is responsible for ensuring that discharges to them are improved if required.

The River Creedy has been identified as a Sensitive Area (Eutrophic) from Crediton STW to the Exe Estuary. The qualifying STW is Crediton with a population equivalent of 12,500. To reduce the nutrient input from the STW, phosphorus reduction plant was installed at Crediton STW in 1998. We are continuing to monitor nutrients to support the case for continued designation and to provide sufficient information to allow any improvements to be shown.

**Failure of EC Freshwater Fish Directive: Exeter Canal** – The Exeter Canal failed the cyprinid standard of the EC Freshwater Fish Directive in 1997 due to low dissolved oxygen (DO) levels, although it passed in 1996 and 1998. Monitoring data shows that the lowest DO results were found in early morning in the summer months. Both suggest plant growth as a cause. Prolific duckweed growth was noted at the time. In addition when this material dies the process of decomposition within the canal reduces the amount of dissolved oxygen. Lack of flow in the canal exacerbates the low DO problem, re-aeration being much slower in still waters than in fast-moving rivers. In places the canal is 7 metres deep which makes re-aeration difficult.

Plant respiration at night is a natural process that depletes the water's dissolved oxygen and in a canal such DO results are not entirely unexpected. Clearance of macrophyte and algal vegetation from the canal needs to be explored further through development of the forthcoming Canal Management Plan. The Agency is contributing to a comprehensive multi-functional Canal Management Plan in partnership with Exeter City Council and other organizations. The aim is to provide a co-ordinated plan to ensure that existing uses and practices can be carried out with a minimum of conflict. The Canal Management Plan will be a major element of Exeter City Council's Leisure Strategy. For a full explanation of the EC Freshwater Fish Directive, see Appendix Four. Canals are also mentioned under Issue 15h. **Action 4a.**

**RQO non-compliance: The Exeter Canal from source to the Normal Tidal Limit** – marginally failed to meet its RQO of RE3 as a result of depressed DO and high pH. Investigations indicated excessive weed growth as the cause of low DO.

The Exe Estuary is being investigated as a potential Sensitive Area (Eutrophic) SA(E): nutrient data and algae are being collected from 1998-2000 at several sites in the Exe Estuary to support a submission to the DETR that the estuary be designated a Sensitive Area (Eutrophic) in the 2001 review under the Urban Waste Water Treatment Directive.

**Failure of EC Freshwater Fish Directive: Grand Western Canal.** The Grand Western Canal failed the cyprinid standard of the EC Freshwater Fish Directive in 1994, due to low dissolved oxygen (DO) and high pH and failed again in 1997 due to low dissolved oxygen. Poor water quality in the canal has been an on-going problem particularly at the basin end. The canal has very little flow with only a small feeder spring. It is believed that enriching inputs from intensive duck feeding (basin end) and fishing (bait) and inputs from agricultural land exacerbate the problem. These activities have been known to contribute to algal blooms which result in DO and pH problems. Accumulated sediment in the canal can act as a nutrient sink. More frequent weed cutting (and removal) can help to reduce the problem. Weed cutting is the responsibility of Devon County Council, however the Agency would support DCC undertaking a more frequent weed cutting programme. Increasing the flow from dewatering of Fenacre Quarry may also help to alleviate the situation, provided satisfactory water quality can be ensured. The water from Fenacre Quarry would be used as a remedial measure in the event of particularly low water levels in the canal. A small sluice at the Tiverton end of the canal was restored in 1998 to allow a small flow to be created. It is hoped that this may bring about some improvement to the water quality in the longer term. For a full explanation of the EC Freshwater Fish Directive, see Appendix Four. Canals are also mentioned under Issue 15h. **Action 4b and 4c.**

**RQO non-compliance: The Grand Western Canal from source to Fenacre Bridge** – marginally failed to meet its RQO of RE4 and significantly failed to meet its LT RQO of RE3 as a result of depressed DO. The cause is suspected to be excessive growth of algae.

**RQO non-compliance: The Grand Western Canal from Fenacre Bridge to the Basin end** – significantly failed to meet its LT RQO of RE3 as a result of elevated BOD and low DO. The cause is likely to be algae.

**Action Table 4 - Potential for Eutrophication**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
a Contribute to Exeter Canal Management Plan in partnership with a number of other organisations. 	ECC, Agency, EN, EH	10k	●				
b Following installations of a flushing sluice in Grand Western Canal review 1998 monitoring data to see if failure recurs. 	Agency	unknown	●				
c Support the development of a prescriptive management plan for the Grand Western Canal with DCC including weed cutting programme. 	DCC, Agency	unknown	●				

## Issue 5: Impact of Development

*Associated Plans: Devon County Structure Plan<sup>13</sup>, Somerset and Exmoor National Park Joint Structure Plan<sup>14</sup>, Exmoor National Park Local Plan<sup>15</sup>, Mid Devon District Local Plan<sup>16</sup>, West Devon Borough Local Plan<sup>17</sup>, Teignbridge District Local Plan<sup>18</sup>, West Somerset District Local Plan<sup>19</sup>, Exeter Local Plan<sup>20</sup>*

The local planning authorities control development within the catchment. In order to influence the location and the type of development we maintain involvement in the planning process, which we see as an integral part of our work to protect and enhance the environment. We are involved at all levels of the planning system, however, it must be recognised that our actual controls in respect of development are limited.

We welcome early contact by the local planning authorities on development plan preparation and provide support, information and guidance where appropriate. We also welcome informal approaches by local planning authorities and developers to discuss the potential impact of a proposal. Wherever appropriate surface water should be managed on development sites using sustainable urban drainage systems. These systems will involve the discharge of surface water to soakaways/infiltration trench systems, swales and lagoons.

In recognition of the need to work closely with local planning authorities, we have signed a Memorandum of Understanding which outlines the general intentions of both the Local Authority Associations and the Agency to build a relationship based upon co-operation, openness and the exchange of information.

In considering responses on development plans and planning applications, we have an underlying duty with respect to sustainable development. We take the view that achieving sustainable development does not mean environmental protection at all costs, but instead, it involves encouraging environmentally compatible economic activity and discouraging or controlling environmentally damaging activities.

Increased development can put pressure on our water resources and sewage treatment works that can lead to failure of water quality targets (see Issue 2), increase the risk of flooding, cause air quality problems and generate extra waste (see Issue 3). However, development can also bring benefits such as the redevelopment of brownfield sites and the clean-up of contaminated land. We will use the planning process to ensure that where damage does occur, appropriate mitigating measures are taken.

The Devon County Structure Plan First Review 1995 – 2011, adopted February 1999, proposes the development of 75,800 dwellings in Devon to 2011. In relation to the Exe Catchment the local plans of relevance are those of East Devon DC, where 10,200 houses are required; Mid Devon DC, where 7,200 houses are required; Exeter CC, where 6,000 houses are required; and Teignbridge DC, where another 9,000 houses are required. There are no housing requirements of relevance to the catchment in the Somerset and Exmoor National Park Joint Structure Plan or the Exmoor National Park Local Plan.

The Devon County Structure Plan also provides for 755 hectares of employment land in Devon to 2011. This is made up of 80 ha in East Devon; 65 ha in Mid Devon; 100 ha in Exeter; and 60 ha in Teignbridge, with the possibility of some small scale local employment in Exmoor National Park to meet social and economic needs.

Cullompton, Tiverton, Crediton and Dawlish will be among the towns that have new housing allocations. A new town near Broadclyst with an initial 2,000 houses but with capacity for growth is also planned to help meet the housing demand. New housing and industry put an additional burden on the sewerage and sewage treatment works infrastructure. One of the policies of the Structure Plan (S6), which has to be reflected in all Local Plans, is that: "Planning Authorities should not provide for development unless the infrastructure which is directly required to service the development can be made available at the appropriate time. In determining the location of development, the adequacy of infrastructure will be taken into account. Provision for new development will be made where the infrastructure required to service it is in place or will be provided in phase with development in an environmentally acceptable way. Developers will be expected to contribute to, or bear the full cost of, such new or improved infrastructure and facilities where it is appropriate for them to do so".

**Contaminated land** – The precise nature of contaminated land in the catchment is not fully known. New statutory guidance enacted via the 'Contaminated Land Regulations' (which implement the contaminated land provisions of the Environmental Protection Act 1990) require local authorities to identify contaminated land within their area. (Records are held by the Environmental Health Department). Once these sites have been identified, it will be necessary to decide if remedial work is required. Any contaminated land issues will be reported in future Annual Reviews.

**Development and flood risk** – We advise planning authorities on development and flood risk matters but our advice may not be acted upon.

The Government expects the Environment Agency to ensure that planning authorities have sufficient information on flood risk matters to enable them to make informed and sound planning decisions. This information may come from the Agency or it may have to be provided by the potential developer.

Clearly, close collaboration is required between the Agency and the planning authorities. Effective floodplain protection must recognize the conflicts, which exist between development and natural uses of the floodplain, and seek to reconcile them in a way, which is both balanced and sustainable. This requires taking a comprehensive, holistic view of floodplain land use planning.

To assist in this, we have produced up-to-date and consistent maps of floodplains as part of our survey duties under section 105(2) of the Water Resources Act 1991. Copies of these maps have been distributed to all local planning authorities.

The first stage, 'Level A', of the survey has been completed and shows the indicative floodplain areas for all the main rivers in the LEAP area. Work has started on the 'Level B' studies, which are concentrated in areas of proposed development or sensitive flood risk areas. Level B studies are concentrated in a specific area and involve a greater amount of hydraulic modelling and investigation. Because the Level B studies are more closely related to development closer liaison and consultation with the planning authorities will be required. **Action 5a.**

**Flood Warning** - A Flood Warning Service is currently provided on the Rivers Exe, Clyst, Culm, Creedy, Barle, Bathern, Haddeo, Lowman and Yeo within this LEAP area. Tidal warnings are issued for the South Devon Coast.

Major Incident Plans for warning of and response to flooding in Exeter and Tiverton have been prepared by the Devon County Emergency Planning Officer and are triggered by warnings from the Agency.

A study into the current levels of service provided by Fluvial Flood Warning across the region on main rivers has been completed and will enable levels of service to be compared across the whole Agency region. Priorities for improvements will be identified and a programme of future work together with costs will be produced. It is intended that a similar study into tidal levels of service will be carried out. We liaise with members of the public who receive direct warning and also local authorities and the Emergency Services on a regular basis. **Action 5b.**

Any person or organization who want to receive direct flood warnings should contact us. Leaflets are available which give information on the current service provided. Recorded information about current flood warnings in force at any time is available via FLOODLINE 0845 9881188. Information packs on Floodline including advice on what action to take before, during and after a flood are also available from the Agency on request.

**Loss of habitat from road development** - A significant number of road schemes have been discussed and in some cases details agreed and consent given over the past 30 years. Portions of these schemes have been shelved but some could be implemented in the future. Full co-operation from and consultation with Devon Country Council and the DETR will be required for some of these schemes which will be below the current environmental standard.

**Development and Historic, Geological and Archaeological Features** - The catchment is important for 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 we are supporting the identification and documentation of County Geological Sites carried out by the Devon and Somerset Regionally Important Geological Site (RIGS) Groups. Thirteen RIGS have been identified within the Devon section of the catchment. We now also have RIGS information for Somerset, although the total number of sites has yet to be confirmed. When planning our own operations we will carry out assessments to ensure our own activities do not harm, but 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 artefacts. 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 focussing on 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. **Action 5c.**

**Restriction of tidal and fluvial floodplains** - The need for flood defence schemes may have implications for the natural functioning of tidal and fluvial flood plains. Where possible the Agency will seek alternative solutions rather than interfere with natural functioning of these systems. Where this is unavoidable, we will need to undertake mitigation measures which might include the provision of compensation areas, through managed retreat for example (see also Issues 15f and 15k). Any significant works would require an Environment Impact Assessment. Any new tidal schemes proposed would include an allowance for sea level rise due to climate change (see also Issue 8).

**Need for environmental protection within Local Plans** - Planning Policy Guidance on Nature Conservation (PPG9) recognizes the importance not only of designated sites but also of undesignated areas and, in particular, linear features such as rivers which are important for migration or dispersal of wildlife.

Local authorities are required to include policies to protect these features. We will encourage protective policies, e.g. for rivers, in our submission to local plans.

**Action Table 5 - Impact of Development**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year					
			00	01	02	03	04	
a Carry out Level B studies after close liaison with relevant planning authorities. 	Agency, LPAs	70 k		●	●	●		
b Implement improvements according to regional priority list for flood warning. 	Agency	10 k			●	●		
c Support production of document(s) covering entire area to provide a better understanding of archaeological/historic value of catchment, particularly water-based historic and archaeological features. 	Agency, DCC, U of Exeter, EN, LPAs	unknown	●	●				

**Issue 6: Recreation**

Associated Plans: *The Exe Estuary Management Plan<sup>21</sup>; Lyme Bay and South Devon Shoreline Management Plan<sup>22</sup>*

Many people spend their spare time enjoying our rivers and coasts. We have a duty to promote the use of inland and coastal waters and associated land for recreational purposes, and to take account of the needs of the less able. In carrying out this duty we carefully balance the potential conflicts between conservation and recreation. We will not encourage new access routes or promote the use of particular rights of way without considering the needs of landowners or other countryside interests.

The catchment has considerable potential for recreation both within and adjacent to watercourses and waterbodies. There is a significant increase in the population during the summer months. This increase is not only restricted to urban areas (particularly around coastal resorts), but also includes rural areas where many farm properties and specific centres cater for tourists. Many people choose to live in the West Country to take advantage of the recreational opportunities. Whilst new housing development is proposed to take account of the trend of falling numbers per household, some of this increase in housing may be taken up by net inward migration to the county, which is difficult to predict. It is likely that recreational pressure will increase. Recreational activities within the Exe Estuary are dealt with fully in the Exe Estuary Management Plan.

**Canoeing** - Canoeing access agreements negotiated by the British Canoe Union (BCU) currently exist on discrete reaches of the Culm, Exe and Barle, however access to the latter two are restricted to the winter months to avoid disturbance to the important game fishery. Opportunities may exist for canoeing during other periods of the year and, providing potential conflicts can be resolved, it may be possible for additional access agreements to be developed with the agreement of interested parties. We would hope to fill the role of unbiased broker in any discussions. It is important to note, however, that a significant length of Devon's rivers is within private ownership. Any agreements for access will be dependent upon attaining the full support of riparian owners. **Action 6a.**

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 more popular sites for relatively little cost. **Action 6b .**

The Agency launched a telephone service called Rivercall during 1998, to provide information to river users (particularly canoeists and fisherman) on the river levels. The scheme has not been as successful as anticipated. Disappointment was expressed at the way the information on river levels was provided. An improved Rivercall system has subsequently been launched, using a new provider. Calls for information for the South West region can now be made on 0906 619 7766. We welcome your views on the new system. **Action 6d.**

**Other water-based activities** - The Exwick Flood Defence Scheme has been used for limited water-based activities. Various rafting events have taken place, disabled water-skiers have used the scheme and boat equipment has been tested. We are not able to permit unrestricted use on the flood relief channel as this has resulted in conflicts in the past. We need to investigate the possibility of creating more opportunities for better use of the scheme.

Rowing takes place mainly on the lower reaches of the River Exe, Exeter Canal and at Wimbleball, under the control of local clubs and the University of Exeter. Dinghy sailing is also found on Wimbleball Reservoir.

Proposals are currently being developed for a white-water canoe facility towards the southern edge of Exeter. Exact details of the scheme are at present unclear, however it is likely that it will also include rowing facilities. Such a scheme would represent an important resource for Exeter and the South West. The scheme will almost certainly require an environmental impact assessment and we will advise and comment thoroughly throughout this process.

The Exe Estuary Management Plan has two related policies, "Policy 2: The safe use of the Exe Estuary for water-based recreation will be encouraged, whilst ensuring that damage to the environment is prevented and that conflicts with other activities remain minimised". An example of this policy in action is the emerging voluntary access code for watercraft around Warren Point. "Policy 3: Land-based and intertidal recreational activities will be encouraged to take place without damaging the estuarine and riverside resources, wildlife or disturbing other users". Each policy has associated action points.

**Walking** - The Exe Valley Way comprises a largely road-based route along the Exe Valley, however there are still sections of the route which are not readily accessible on foot. For instance there is poor connection between city routes and outer countryside. Concern has also been raised regarding the safety of the route, with potential conflicts between walkers, cyclists and motor vehicles. There is a need to develop this route both in terms of safety and access. As managers of the South West Coast Path, Teignbridge District Council has developed a Local Plan for the trail, which includes sections through the Exe Catchment. Proposals are also being progressed to develop a usable link between Dawlish Warren village and Starcross. **Action 6c.**

The Agency owns land in and around the Exwick Flood Relief Scheme. Although highly effective in meeting flood defence needs, the scheme is considered visually intrusive by today's design standards and has minimal wildlife value. It is also felt that the full recreational potential of the scheme has not been realised. The Agency will investigate opportunities to improve the recreational and conservation value of the scheme and its environs. The Agency-owned Alphin Brook scheme is also visually intrusive but has recently received tree-planting enhancements. Further enhancements are currently being developed to include the creation of wetlands and the provision of cycle routes in co-operation with Devon County Council. A number of individuals and organizations have expressed, through the LEAP Steering Group meetings, an interest in developing further habitat enhancements along the Alphin Brook and Exwick Flood Relief Scheme. We will consult further, once we have undertaken this next phase of habitat enhancements and include additional partners as appropriate. Both schemes are used by the public for walking and exercising dogs etc. and provide an important recreational resource within Exeter. **Actions 6e and 6g.**

At Tiverton the Agency owns a major flood defence scheme which includes walkways alongside the River Exe 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. **Action 6f.**

**Cycling** - As part of the National Cycle Network, a route is being developed by Sustrans, with Devon County Council, through South Devon (Route 2) which will connect Plymouth to South Hams, Totnes, Newton Abbot, Torbay, Teignmouth, Exeter, Exmouth and Seaton. It is proposed that this route will run along both sides of the Exe Estuary. Whilst we support such an important initiative in principle, the route must not compromise the ecological integrity of the Estuary. We have made contact with Sustrans and will continue to protect our interests, as the scheme develops, through the provision of advice. The Exe Estuary Co-ordinator will also be involved in discussions. The catchment also includes a significant stretch of the recently developed West Country Way – Route 3 (a millennium project) from Long Holcombe via Tiverton to Sampford Peverell. It is envisaged that this route will eventually extend to Land's End and will link with routes in South Wales and the South Coast. **Action 6h.**

**Action Table 6 - Impact of Recreational Use on the Catchment**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
a Mediate between interested parties to investigate opportunities for extending existing and creating new canoe access agreements. 	Agency, BCU, RFOs, Fishing Associations	<1 k	●	●	●	●	●
b Encourage discussion between interested parties to investigate the possibilities for improving canoe ingress and egress points within the catchment. 	Agency, BCU, DCC, LPAs, RFOs, RETA, Fishing Associations, Fishing Lease Holders	<1 k	●	●			
c Encourage access improvements for walkers along the Exe Valley Way. 	DCC, ECC, Agency, Fishing Associations	<1 k	●	●			
d Review and develop Rivercall system. 	Agency, BCU, Fishing Associations	unknown	●	●			
e Develop and implement a management plan for the Exwick Flood Relief Channel. 	Agency, Others	5 k	●	●	●	●	●
f Review possibilities with other agencies for carrying out enhancements to Tiverton scheme. 	Agency, MDDC, Others	<1 k	●	●			
g Develop and implement enhancements for Alphinbrook scheme. 	Agency, Others	5 k	●	●	●		
h Support principle of development of South Devon Cycle Route and appraise options linking Agency-owned land. 	Sustrans, EEMP, DCC, LPAs, Agency	unknown	●	●	●		

**Issue 7: Unknown Causes of Water Quality Non-compliance**

There are five stretches of water which fail water quality standards, based on the data from 1996-1998, for which the cause is unknown.

**RQO non-compliance: Aylesbeare Stream from source to the Clyst Confluence** – marginally failed to meet its LT RQO of RE2 as a result of low DO, the cause of which is unknown. Flow here is very low in the summer and this failure could be due to an algae problem. Improvements were made to the sludge tanks in March 1999 at Aylesbeare STW. We will review the 1999 monitoring data and, if no improvements are seen, an investigation into the causes of the problem may be required. **Action 7a.**

**RQO non-compliance: The Madford River from source to Dunkeswell Abbey** – marginally failed to meet its RQO of RE1 due to BOD. Further improvements to Dunkeswell STW are programmed in AMP3. We will review the 1999 water quality data to see if the farm campaign (winter 1998/99) had any effect and decide if further action is required. **Action 7b.**

**RQO non-compliance: The Madford River from Dunkeswell Abbey to the Culm Confluence** – significantly failed to meet its LT RQO of RE1 due to BOD and total ammonia. The cause is unknown but it may possibly be Dunkeswell STW. A Numeric Consent has now been issued and the outfall relocated to Madford River. A farm campaign started on 1 December 1998. Further improvements to the STW will be delivered in AMP3. We will review the 1999 water quality data and decide if any further action is required. **Action 7b.**

**RQO non-compliance: The River Bathern from Ranscombe to the Exe Confluence** – significantly failed its RQO of RE1 due to BOD. The cause is thought to be a combination of farm drainage and STW discharges. Investigations are planned for this year, 2000. **Action 7c.**

**Failure of Surface Water Abstraction Directive: Wimbleball Reservoir** – this site failed the Directive due to phenols in 1997. Failure was the result of a single exceedence not related to any pollution event. Historical water quality trends are good, as is the biological status of the site. No further action is deemed necessary, other than investigation should further exceedences occur over the coming years. For a full explanation of the Surface Water Abstraction Directive, see Appendix Four. **Action 7d.**

**Action Table 7 - Impact of Unknown Causes of Water Quality Non-compliance**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
a Review 1999 monitoring data to determine need for further action, following improvements at Aylesbeare STW. 	Agency	unknown	●				
b Review 1999 monitoring data for the River Madford from source to the Culm Confluence and decide if any further action is required. 	Agency	unknown	●				
c Investigate causes of failures on the River Bathern. 	Agency	unknown	●	●			
d Review Surface Water Abstraction Directive data for 1999 at Wimbleball Reservoir and, if further failure occurs, initiate investigation. 	Agency	unknown	●				

**Issue 8: Addressing Climate Change**

Associated Plans: *The Exe Estuary Management Plan<sup>21</sup>; Lyme Bay and South Devon Shoreline Management Plan<sup>22</sup>*

Evidence suggests that there are significant changes taking place within the global climate. The greenhouse effect, caused by increasing levels of CO<sub>2</sub> will result in global warming, however this may in turn affect ocean currents, redirecting the Gulf Stream away from the British Isles leading to localised cooling of the climate.

Global climate change is a natural process and the planet has experienced many such changes. These changes have driven evolutionary forces and contributed to the enormous diversity of life present today. It is however the speed of change which is causing concern: that evolution cannot keep pace and more specifically that it is being driven by the actions of man. This may result in the extinction, without the corresponding evolution, of new species.

**Flora and fauna** - Whilst the precise impact of global climate change on the British Isles is not yet clear, it is evident that changes are already taking place amongst the flora and fauna. Evidence suggests that many birds and amphibians are breeding earlier than normal and that many butterfly species are emerging earlier. Climate change is also thought to be a major influence on survival of salmon at sea, and may be one of the reasons for the decline of this species. which is occurring throughout the North Atlantic (see also Issue 15f – Rivers, Streams, Floodplains & Fluvial Processes). In order to obtain a better understanding of these changes, the Environmental Change Network has been established to collect, store, analyse and interpret long-term data based on a set of key physical chemical and biological variables which drive and respond to environmental change. The Agency is one of fourteen sponsoring organizations, supporting the Network at a national level. A total of 53 sites have been selected throughout the British Isles, one of which is on the River Exe at Thorverton where data has been gathered specifically for the scheme since 1993.

With the rate of climate change increasing there is a broad consensus of scientific opinion that suggests that such changes are occurring as a result of the impact of human activities on the global atmosphere. Emissions of a range of gases, notably carbon dioxide and methane, are adding to the natural 'greenhouse' effect that may cause global warming (see also Issue 15m – Estuary and Associated Habitats). We need to monitor the change so that we can respond to it. **Action 8a.**

**Exeter Power** – An authorisation was issued to Exeter Power Limited, under section 6 of the Environmental Protection Act 1990, to carry out a combustion process using a gas turbine plant at Marsh Barton Industrial Estate for the generation of 49.9 MW of electricity. The station is presently under construction. The power station will operate in the 'mid-merit' mode which means it will not be running continuously, but according to peaks in demand, this will be approximately 50 to 60 per cent of the time. The stack height will be 18 metres. All documents relating to the application and authorisation have been placed on the public register at Exeter City Council.

Some processes we regulate produce greenhouse gases, for example incinerators which produce carbon dioxide. Through our regulation we will help to ensure that the Government's emission reduction targets are met. We will also set an example by reducing our own fossil fuel consumption.

**Flood Defence** - It is believed that a major effect of global warming will be to cause a rise in sea level in the future. New sea and tidal flood defence schemes are designed to take account of the predicted rise. Agency guidelines allow for a rise of 5 mm per year up to the year 2030 and 7.5 mm per year thereafter. For a new scheme with an estimated life of 60 years this would amount to an allowance of about 370 mm.

Existing defences, which do not include an allowance for sea-level rise, may need to be reassessed in the future. Such a reassessment would look at all the practical options including managed retreat where appropriate (see also Issue 5).

The sea-level rise which could result from global warming is likely to have a significant impact on the Exe Estuary, because of the limited opportunities for managed retreat, the estuary being flanked on both sides by railway lines and flood defence structures. The Estuary is one of Devon's most outstanding wildlife resources with a variety of habitats supporting large numbers of species. It is unclear which habitats would be most at risk from sea-level rise within the Exe Estuary. However a recent Agency research document<sup>23</sup> on the shoreline management of habitats, considers wet grassland at most risk, with coastal lagoon and reedbed vulnerable to a lesser extent. There is concern that although much of the saltmarsh within the estuary is likely to be able to keep pace with a sea-level rise of up to 10 mm/year (provided there is adequate supply of sediment), the saltmarsh at Dawlish Warren is likely to be lost. The saltmarsh here is possibly the most biologically diverse saltmarsh community on the estuary and would be squeezed out against hard defences (see Issue 15m – Estuary and Associated Habitats).

Other effects of climate change include an increase in the frequency and severity of storm events, which will have a major impact on coastline topography. There may also be changes in ocean currents, which will in turn change local processes of erosion and deposition. These, and other potential aspects of coastal change attributable to climate change, are more fully addressed within the Lyme Bay and South Devon Shoreline Management Plan<sup>22</sup>.

Following the pre-feasibility study for Powderham Bank the recommendation indicated a scheme was viable. As a consequence Powderham Bank now appears in the Agency's Flood Defence Medium Term Plan for 2005/2006. In the intervening period bank maintenance will continue.

The Exe Estuary Management Plan has a related policy, "Policy 7: Ensure that the maintenance, planning and implementation of coastal defence strategies contribute to the sustainable use of the Exe Estuary by giving due consideration to the environment and the potential risks associated with flooding and erosion", with action points to meet this.

**Action Table 8 - Addressing Climate Change**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
a Identify potential habitat loss (and gain) within the Exe Estuary and coastline likely to result from sea-level rise and monitor actual change. 	EN, Agency	unknown	●	●	●	●	●

## Issue 9: Decline of Spring Salmon Stocks

*Associated Plans: Strategy for the Management of Salmon<sup>24</sup>*

In March 1998 the Agency reported that the 1997 catches were amongst the worst on record and that nationally salmon stocks were depleted. Of particular concern has been the long-term decline of the larger, early-running salmon, which are believed to be genetically different from later-running stocks.

In June 1998, the North Atlantic Salmon Conservation Organization (NASCO) received international scientific advice that stocks of multi-sea-winter salmon (MSW) are dangerously low, believed to be due largely to changes in ocean climate. NASCO subsequently set the lowest ever quotas for the Greenland and Faroes fisheries. The Greenland net fishery, which can take substantial numbers of our larger salmon, agreed to a subsistence quota of about 20 tonnes (compared to a catch of about 2700 tonnes in the 1960s).

Other countries are also concerned about the state of salmon stocks. For example, last year the Irish Government introduced new regulations for their large driftnet fishery, including delaying the start of the fishing season to 1 June, and confining netting to 6 miles from the coast. Tagging studies by the Agency prior to these new regulations showed that the Irish driftnet fishery was a major exploiter of salmon returning to English and Welsh rivers.

The contracting parties of NASCO, including the European Union (which represents the United Kingdom), agreed to examine measures in their home waters taking full account of the advice to achieve a significant reduction in the exploitation of larger salmon in 1999.

The Agency responded immediately to this advice in July 1998 and sought the views of its Regional Fisheries, Ecology and Recreation Advisory Committees (RFERACs) on the need for baseline national measures, including byelaws.

The Government also reviewed the international advice and concluded that additional measures were needed to reduce exploitation of early-run, multi-sea-winter salmon. In September 1998, Elliot Morley, the Minister for Fisheries and the Countryside, wrote to the Agency asking it to take forward appropriate measures to reduce exploitation by both nets and rods so that these could be ready for adoption as soon as possible.

After a further consultation with the RFERACs in October 1998, the Agency developed a package of measures to protect salmon stocks, namely:

- River-by-river measures: continued development during 1999, and beyond;
- Promotion of national baseline byelaws for 1999 to protect early-run salmon;
- Enhanced promotion of catch-and-release technique, and voluntary release of salmon by anglers.

The national byelaws were approved by the MAFF in early April, and became effective on 15 April 1999. The byelaws, which affect both the rod and net fishery, will run for a ten-year period although there will be a major review after five years. The byelaws applicable to the Exe Catchment are as follows:

- No netting prior to 1 June;
- Catch and release of all rod caught salmon before 16 June;
- Use of artificial baits only prior to 16 June.

The national byelaws are considered to be the lowest common denominator across the country addressing the national problem of a decline in early-run salmon. **Action 9a.**

Measures to address other local stock problems will continue to follow a river-by-river approach based on the programme of individual Salmon Action Plans developed by the Agency with local fisheries interests. Although current grilse runs in the catchment appear to be healthy, the problem of declining spring fish runs has been apparent for several years. In response to this in 1996 The River Exe and Tributaries Association (RETA) introduced voluntary measures to protect early-running MSW salmon before 1 June, and after 16 August. **Action 9b.**

The programme of Salmon Action Plans, recently reinforced by a Ministerial direction, is in its second year. All principal salmon rivers are scheduled to have a plan by 2002. The plan for the Exe will be developed during 2000/2001, a key component of which is the setting of a spawning target for the Exe salmon stock. Compliance with the spawning target will then be assessed annually, and will form the basis of future stock management proposals. **Actions 9c, 9e and 9f.**

The River Exe has benefited from the buy-out of the net fishery prior to 1 June in 1997 and 1998. As the new byelaws protect salmon before 1 June, the buy-out is no longer appropriate. In these circumstances South West Water Limited which has funded the buy-out as mitigation for the construction of Wimbleball reservoir, will need to identify an alternative means of providing suitable mitigation.

In order to ensure that this requirement is adequately fulfilled, a group has been set up comprising members of the Agency, RETA and SWW Ltd. The latter have agreed to provide an annual sum of money in lieu of the smolt stocking. It will be the remit of the group (called the Exe Mitigation Group) to administer these funds to ensure maximum benefit to the salmon fishery. The group has been developing a project which will minimise the impact of wastes on the Exe salmon fishery, and has recently received approval from ENTRUST to utilise landfill operators' contributions under the Landfill Tax Regulations to fund the project. The approval to make use of these funds is for a project that will run for five years, commencing 2000. The next stage will be to approach landfill operators to seek their support for the project. **Action 9d.**

Illegal exploitation of salmonids in the Exe has in the past been a major cause of concern. Levels of poaching on the freshwater river have declined in recent years, but there are still concerns regarding illegal exploitation in the estuary, by fishermen using drift nets. Although they are legally entitled to drift for sea fish, they will inevitably capture salmonids. The Agency monitors this activity very closely, and if problems are detected, a byelaw could be created to ban all forms of netting in the estuary. **Action 9g.**

Concern has been expressed over the presence of non-native fish species in the catchment and it is almost certainly the case that unconsented releases of fish have previously occurred. We will continue to enforce Section 30 of the Salmon and Freshwater Fisheries Act 1975 to regulate fish movement and stocking activities throughout the catchment.

**Action Table 9 - Decline of Salmon Stocks**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
a  Implement and enforce national salmon byelaws.	Agency	unknown	●	●	●	●	●
b  Encourage voluntary catch and release of MSW salmon not protected by byelaws.	Agency, RETA, Netsmen, RFOs	< 1 k	●	●	●	●	●
c  Produce Salmon Action Plan.	Agency, RFOs, RETA	unknown	●	●			
d  Provide adequate mitigation for Wimbleball Reservoir construction.	SWW Ltd, Agency, RETA, Fisheries Associations	unknown	●	●	●	●	●
e  Investigate distribution, spawning activity and behaviour of spring salmon in the river to give us better information about their protection and enhancement.	Agency, RETA, RFOs	unknown	●	●			
f  Work with CEFAS to investigate the effect of reported fish diseases on fish stocks in the catchment.	Agency, CEFAS, RETA	unknown	●	●	●	●	●
g  Assess option for a byelaw to limit the extent of drifting for sea-fish in the Exe Estuary to minimise illegal exploitation of salmonids.	DSFC, Agency, MAFF, Netsmen	unknown	●				

**Issue 10: Decline in Brown Trout Populations**

In common with many rivers in Devon, there have been concerns expressed by fisheries interests in the Exe Catchment that there has been a decline in the numbers of larger brown trout. The Agency has funds allocated to investigate this problem, and has embarked upon a three-year project in collaboration with the Wild Trout Society.

Phase One of the investigation was completed during 1999 and evidence demonstrated a decline on the rivers Taw, Torridge, Dart and Axe. As the project enters its second phase, specific studies will be carried out on these rivers to try to identify causes of the decline. Although no decline was detected on the Exe using the information available, it is recognised that a problem may still exist. Any recommendations resulting from investigations of the other rivers may therefore be equally applicable to the Exe. **Action 10a.**

One early action arising from the study was to initiate a catch return system to provide more information about brown trout fishing. A number of clubs and hotels on the Exe system have agreed to participate in the scheme during the 2000 season. The Agency will also be formulating a national brown trout strategy over the next 1-2 years. This strategy will ensure a nationally consistent approach to the management of brown trout stocks.

**Action Table 10 - Decline in Brown Trout Populations**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
a  Continue investigation into the decline of brown trout in the Devon rivers. Apply recommendations to the Exe where appropriate.	Agency, Wild Trout Society, RFOs, RETA, Fisheries Associations	20 k	●	●			

**Issue 11: Barriers to Fish Migration**

The Agency is currently exploring options for improving conditions for fish migration at St James' Weir at the tidal limit of the River Exe. A salmon tracking study undertaken over a three-year period identified the weir as being a problem for fish migration during periods of low flow. Among the options being considered is the installation of a new fish pass located in the right-hand bank, which would operate in low flows to complement the existing baulk fish pass. This option would however be expensive, and alternative low-cost solutions will also be considered. The tracking study also identified Exwick Weir as a problem to migration under certain flow conditions, and the Agency is considering solutions for this site. **Action 11a.**

Many of the weirs on the River Creedy have now fallen into a state of disrepair, and do not present a significant obstruction to the passage of fish. Fordton Weir at Crediton requires some modification if it is to be easily passable, and Head Weir at Quickes Farm creates some difficulty unless the sluices are operated sympathetically at times when fish are moving. **Action 11b.**

Following significant improvements to the water quality of the River Culm, the Agency has negotiated with mill owners on the river to install fish passes on the major weirs to allow migratory fish access throughout the river. The weirs at Silverton and Hele mills can be overcome by the installation of baulk passes at relatively low cost. Silverton Weir is now completed and Hele Weir is due for installation in the summer 2000. Further upstream at Higher and Lower Kingsmill Weirs, more complex and costly fish passes will be required, and the Agency is in the process of preparing designs for these sites. **Action 11c.**

The River Lowman also has potential as a salmon spawning and nursery area. There are a number of major obstructions which need to be removed before fish can gain access. The first stage is to conduct an outline survey of the weirs to recommend and cost possible solutions. **Action 11d.**

**Smolt entrapment and escape of rainbow trout** – There are a number of obstructions in the catchment that cause difficulties for salmon smolts migrating downstream. In the case of fish farms, there is also the risk of escapement of stock into the river, which creates problems for fish native to the river through increased competition for food and habitat, and through predation of fry and parr. The Agency undertakes electric fishing operations to cull large numbers of rainbow trout from the river, following escapes which may be due either to inadequate screening, or flooding of the farm site.

Many of these problems can be resolved effectively by the installation of screens, which prevent the smolts from entering the abstraction site, and contain stock within the confines of the farm. Following changes to fisheries legislation, many abstractors are now required to have screening installed at their own cost to the satisfaction of the Agency, and fisheries staff will be visiting problem abstraction sites and ensuring that appropriate screening is in place. **Action 11e.**

**Lack of information in relation to salmon runs** – In managing its salmon fisheries, we use salmon spawning targets as a means of assessing the condition of the fishery. Currently annual compliance is assessed using the rod catch, and estimating what percentage of the run is taken by the rod fishery, and what remain to go on to spawn. A more accurate assessment could be made if a fish counter were installed which could provide a good indication of the numbers and timing of the salmon run. There are few sites on the River Exe that could be considered, mainly due to cost, but further investigations may identify a suitable site. **Action 11f.**

**Action Table 11 - Barriers to Fish Migration**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
a  Develop and implement solutions to improve conditions for fish migration at St James', Perry and Exwick Weirs.	Agency, SWW Ltd, Weir Owners, RETA	unknown	●	●			
b  Improve conditions for fish migration on the River Creedy at Fordton Weir and Head Weir on the Creedy.	Agency, Weir Owners	5 k	●	●	●		
c  Improve conditions for fish migration on the River Culm at Hele, Silverton, Higher and Lower Kingsmill.	Agency, Mill Owners	unknown	●	●	●	●	
d  Assess obstruction to fish migration on River Lowman.	Agency	unknown	●	●			
e  Fisheries staff to visit problem abstraction sites and ensure that effective screens are installed.	Abstractors, Agency	unknown	●	●	●	●	
f  Investigate options for installing a fish counter in the lower Exe.	Agency, RETA	unknown	●	●	●	●	

**Issue 12: Fish-eating Birds**

In common with many rivers in the area, there has been a marked increase in the numbers of cormorants observed in the catchment. Concerns are regularly expressed by various fishing interests that this increase in levels of predation is adversely affecting the fishery. Research has been undertaken over the last four years into the perceived short and long-term damage to inland fisheries in England and Wales, as well as the effectiveness of predation control measures. The research included investigations into feeding behaviour, population assessment, and distribution and movement of cormorants.

MAFF, DETR and selected organizations will meet to establish whether the current government policy needs to be revised in the light of the report's findings. We will only be in a position to determine our own approach to the recommendations made in the report once this review has taken place. We shall not support licensed killing of fish-eating birds unless and until proof of serious damage has been established and culling is shown to be the most effective means of addressing this issue. **Action 12a.**

**Action Table 12 - Fish-eating Birds**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
a Establish Agency approach to the issue of fish-eating birds following MAFF/DETR decision regarding Government policy in the light of R&D findings. 	MAFF, Agency, Fisheries Associations, RETA	unknown	●	●			

**Issue 13: Increasing Demand for Water Resources**

Associated Plans: *Tomorrows Water<sup>25</sup>; The Review of the Water Abstraction Licensing System in England & Wales<sup>26</sup>; Progress in Water Supply Planning<sup>27</sup>; Taking Water Responsibly<sup>28</sup>*

Water is an essential but finite resource. One of the Agency's roles is to protect the water environment (rivers, lakes and wetlands) from over-abstraction whilst considering the needs of the public, agriculture and industry for water.

We are not responsible for the supply of water to households and industry but we have a central role in water resources planning in England and Wales. We contribute to protecting the environment by looking at current use of water in the home and at work and the water that is available for these uses without damaging the environment. This may involve correcting any imbalances or over-abstraction. We continue to protect the environment by comparing future demands for water with water availability and balancing the two in an environmentally sustainable manner. To achieve this we work closely with the water companies, requiring them to submit detailed Water Resource Plans.

**Managing current demand** - To manage water resources the Agency issues abstraction licenses for specified volumes of water from identified sites for specified uses. The abstraction licence may include additional conditions to control abstraction where environmental damage could otherwise occur. The abstraction licensing system for England and Wales was reviewed during 1997/98 and a number of changes were proposed. Taking Water Responsibly<sup>28</sup>, a paper detailing the Government decisions following consultation, was published in March 1999. The full nature and impact of changes will not be confirmed until the final papers are approved by Parliament. We will need to implement any changes that arise from this process and amend licensing polices as appropriate.

The demand for water in the catchment is currently supplied from a number of surface and groundwater sources. The major source from which South West Water Limited (SWW Ltd) abstract is the River Exe at Bolham (Tiverton) and Northbridge (Exeter). Water is pumped from Exebridge to Wimbleball Reservoir in winter to aid refill. Releases from the Reservoir are made at times of low flow to support these abstractions. The Reservoir is also used as a direct source of supply by Wessex Water Services Limited (WWSL). Water is also pumped from the River Exe at Exebridge to augment flows in the River Taw. This transfer to the Taw headwaters will end in November 2000 when the current abstraction licence expires. Both companies have small-scale groundwater abstractions. The developed water resources within the LEAP are shown on Map 4.

**Meeting future public water supply demand** -The geographical areas used for water resources planning are known as 'water resources zones'. The resources zones for the Exe LEAP area, like many others, extend over large geographic areas beyond the LEAP boundary. It is therefore difficult to assemble meaningful resource/demand data specific to the LEAP area. Most of the area is served by the Wimbleball Resource Zone of SWW Ltd with the north of the area around Dulverton, Exton and Exford falling within the North Resource Zone of WWSL. This zone also supplies water to most of Somerset, parts of Dorset, and parts of Wiltshire.

Each company provided water resources plans to the Agency in March 1999. These plans looked forward to 2025, setting out current and forecast demands compared with resources available. The companies also set down how they plan to address any imbalance between supply and demand. The Agency considered the plans submitted by both companies covering the LEAP area to be acceptable. The companies are now required to review the plans annually and submit revisions to us. In parallel with the water resources planning process, the Third Periodic Review of Prices was concluded by OFWAT at the end of 1999. This looked at the balance between supplies and demand up to ten years ahead and set the price limits for the water companies and how they can spend the money for the five-year period from April 2000. **Action 13a.**

The Agency is developing new national and regional water resources strategies with a planning horizon of 2025. Consultation closed at the end of January 2000 and publication is scheduled for December 2000.

Before any new public water resources can be developed or existing resources developed further, the Agency must be satisfied that water companies have looked in detail at a range of appropriate options. These include:

- Encouraging people to use water more efficiently (demand management),
- Increasing the efficient use of sources (resource management),
- Reducing leakage towards an acceptable level (distribution management).

**Demand management** – Demand management involves a number of different initiatives. Charging customers based on volumetric use can help encourage efficient use of water. Meters are essential to achieve this and are installed in all new domestic properties connected to the water company supply. Since April 2000 all domestic customers can also opt for a meter and volumetric charging. SWW Ltd customers who have a garden sprinkler are asked to register it with the company on the understanding that they may be metered at a later date.

Water companies have a duty to promote efficient use of water and the Agency expects that they should pursue this duty with imagination and vigour. They are also required to provide water efficiency plans to OFWAT which contain strategies to deliver water savings by the customer. We comment on these plans.

**Distribution management** – Saving water through leakage control reduces the amount of water that needs to be abstracted. Water companies are set leakage targets each year by OFWAT. SWW Ltd have a leakage target for 2000/01 to keep leakage below 84 million litres per day (Ml/d). This target remains unchanged from 1999/00. Their actual leakage figure for 1998/99 was 91.5 Ml/d and below the target for that year. WWSL's target for 1999/00 and 2000/01 are 89 Ml/d and 85 ml/d respectively. This compares with their actual leakage in 1998/99 of 100.3 Ml/d which was below the target for the year.

**So what can you do to help?** - The average family uses around 146 cubic metres (32,000 gallons) of water each year. There are many opportunities to reduce this, for example:

- Turning taps off, showers rather than baths;
- Washer replacement, rapid repair to leaks;
- Low flush toilets, normal rather than power showers, water-efficient washing machines and dishwashers;
- Water butts, trigger switches on hosepipe nozzles, drought resistant garden plants, mulch on flower beds to retain moisture and restrict weed growth.

The workplace and industry also offers many opportunities to reduce water use (and save money). Those outlined above may be suitable together with process/site-specific measures. Examples of these and other water-efficiency measures are detailed in the document 'Saving Water on the right tracks 2'<sup>29</sup> which can be obtained from the Agency.

Rainwater collected from roofs and recycled household waste wash water (greywater) can be used for toilet flushing and garden watering. It offers potential for large water savings but to encourage more rapid development and take-up of suitable systems there is a need for water quality standards to be established for this use.

**Non-public water supply abstractions and demand** – It is possible that there may be local environmental problems associated with full uptake of private abstractions in the LEAP area. The Agency will continue to monitor the net use of licensed water abstractions and have a regard to the amount of licensed volume take-up and its effects. Future abstraction needs will continue to be assessed and addressed through abstraction licensing procedures. These take into account the justified need for water and the demonstrated extent of provision of water-efficiency measures within the proposals. **Action 13a.**

**Spray irrigation** – a region wide reassessment of available catchment resources is planned. This process started in April 2000 and is known as Catchment Abstraction Management Strategies (CAMS). It forms a major part of a wide consultation exercise. From 2001 we will be investigating and assessing the availability of water resources within all catchments. The priority order of investigation has not been determined but assessment may lead to changes in licence conditions. The licences near Thorverton will be looked at within this process. **Action 13b.**

**Exmoor National Park Authority** – The Agency is determining Exmoor National Park Authority’s application to abstract water as part of their Simonsbath sawmill project.

**Dulverton, Beasley Weir** – There is continuing interest in reactivating the former Dulverton Hydroelectric site near Brushford for the commercial production of electricity, but no application has been made to the Agency.

**Habitats Directive and review of authorisations** – Under European Regulation 50 of the Conservation (Natural Habitats &c.) Regulations 1994, the Agency is required to review any existing authorisations likely to have an effect on Natura 2000 sites (SPAs and SACs). The Agency is also required to ensure that no new authorisations are issued which might adversely impact the integrity of these sites. We are working closely with English Nature to undertake this process for the East Devon Pebblebed Heaths SPA and candidate SAC, which has been identified as a priority (see Issue 15i Lowland Heath). We will also need to review authorisations for the Exmoor Heaths candidate SAC, although the precise timing of this review is not yet clear. The process for both abstraction and impounding licences is:

Stage I – Identify authorisations which are relevant to the review for a European Site. This will identify any authorisation for an activity within the boundary of a European Site and any authorisation for an activity outside the boundary which is known to be affecting the site. It also identifies authorisations outside the boundary which have the potential to affect the site.

Stage II – Assessing which relevant authorisations, if any, are likely to have a significant effect on the European Site.

Stage III – Where one or more authorisations are likely to have a significant effect conducting an ‘appropriate assessment’ to establish whether they are having an adverse effect on the integrity of the European Site.

Stage IV – Affirming, amending or revoking authorisations as appropriate.

**Action Table 13 - Increasing Demand for Water Resources**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
a Revise the Regional Water Resources Development Strategy based on information received in the companies’ water resources plans and estimates of non water company use and demand. 	Agency	50 k for Region	●	●			
b Reassess availability of catchment resources within CAMS at Thorverton. 	Agency	unknown		●			

**Issue 14: Improving Air Quality**

Associated Plans: National Strategy for Air Quality<sup>10</sup>; The UK Forestry Standard<sup>7</sup>; Forests and Water Guidelines<sup>11</sup>; Devon BAP<sup>18</sup>; Exmoor BAP (Consultation Draft 1999)<sup>32</sup>

Air pollution can damage flora, fauna and buildings and can have significant effects on soils and water. It can also pose a serious risk to public health.

In 1990 the Government published a national Strategy for Air Quality<sup>30</sup> including a framework of standards and objectives for the pollutants of most concern and a timetable for achieving objectives. Obligations are placed on local authorities to carry out periodic reviews of air quality in their areas. Stage I air quality reviews have been carried out and the councils, associated with this catchment, have progressed to Stage II reviews. Where standards are not being met or are not likely to be met they will be required to designate local air quality management areas and make action plans to improve air quality in these areas. **Action 14c.**

We will be working closely with local authorities to help achieve the objectives of the Strategy, principally through our regulation of emissions to air from controlled ('Part A') major industrial processes. Local authorities are responsible for the regulation of smaller, less complex ('Part B') industrial processes and reducing traffic pollution.

**Effect on sensitive species** - Air pollution has been shown to have an adverse affect on lichen flora. Habitats most likely at risk include oak woodland and wet woodland where lichen communities are often well developed. We do not have sufficient information on the impact of air pollution within the catchment and need to assess the situation.

**Action 14a, 14b and 14f.** (See also Issue 15a – Western Oakwoods).

Lichens are particularly sensitive to atmospheric sulphur. Estimated annual mean sulphur dioxide concentrations for the catchment<sup>30</sup> are  $<5 \mu\text{g}/\text{m}^3$ , this is lower than the standard of  $10 \mu\text{g}/\text{m}^3$  proposed for the protection of sensitive lichens<sup>33</sup>. More information is required to establish the status of these sensitive communities in the catchment.

**Eutrophication** – In upland areas, where nutrients are usually quite limited, there is growing concern that the deposition of atmospheric nitrogen can act as a fertilizer and cause changes to plant growth and eutrophic conditions. The Institute of Terrestrial Ecology is carrying out a national monitoring programme for atmospheric ammonia, in order to obtain a more accurate assessment of potential aerial nitrogen deposition. We will continue to work with other agencies to gain a better understanding of the problem. **Action 14d.**

**Acidification** – Moorland areas are typically acid due to the underlying geology and soils. The acidity of Exmoor, however, may be exacerbated by atmospheric acid deposition. The main sources of acid deposition are sulphur dioxide and oxides of nitrogen, which dissolve in water to produce acid rain. These compounds come mainly from burning fossil fuels.

Emissions of nitrogen oxides are thought to be responsible for about one third of the acidity of rainfall, and the proportion appears to be increasing. Road vehicles are responsible for about half of the emissions of nitrogen oxides in the UK. Agency-regulated processes account for an estimated 22 per cent of total UK nitrogen oxide emissions. By 2005 we aim to reduce these emissions by 33 per cent from 1995 levels.

Effects-based emissions control policies have been developed in the UK through a critical load approach. This approach involves assigning a critical load of acidity to particular ecosystems, that is the amount of acid deposition below which harmful effects do not occur according to present knowledge.

The critical loads for soils in 1995 were exceeded over most of Exmoor ( $0.2 - 0.5 \text{ keq H}^+ \text{ per ha per year}$ ), while other areas in the catchment exceeded their critical loads to a lesser degree ( $0.0 - 0.2 \text{ keq H}^+ \text{ ha per year}$ ). The predicted exceedences in 2005 are greatly reduced; these reductions are due to agreed international emission reductions<sup>34</sup>.

Agency-regulated processes account for an estimated 70 per cent of total UK sulphur dioxide emissions. By 2005 we aim to reduce these emissions by 75 per cent from 1993 levels.

The critical load model assumes land use remains unchanged. However changes in land use could have significant effects on the level of acid deposition. Forestry, in particular coniferous forests, can increase the level of acid deposition where they are present; this is primarily due to the way the forest canopy 'scavenges' pollutants from the atmosphere. It is important that any proposals for forestry development within the areas, which are exceeding their critical loads, are subject to an environmental impact assessment. This is in line with the UK Forestry Standard<sup>7</sup>. **Action 14e.**

The Institute of Freshwater Ecology (IFE) is undertaking a National Research and Development Project for the Environment Agency. The project is entitled 'Monitoring of Acid Waters – Phase I Indicator Species'. The project is looking at and developing appropriate methods for the monitoring of acid waters. The project includes 35-40 sites in the South West Region.

**Action Table 14 - Improving Air Quality**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
a Promote survey work to check distribution of indicator species. 	EN, ENPA, Agency	unknown	●	●	●	●	●
b Encourage and co-operate in development of clear quality standards to protect key species. 	Agency, EN, JNCC, ENPA, ITE	unknown	●	●			
c Continue to review air quality in the area, in line with the National Air Quality Strategy. 	LAs, ENPA, Agency	unknown	●	●			
d Conduct research to improve understanding of effects of airborne acidification and eutrophication on semi-natural habitats and species.   	Universities, Agency, EN, IFE, ITE, ENPA	unknown	●	●	●	●	●
e Ensure all proposals (>10,000 ha) for afforestation within the areas of critical load exceedence receive an environmental impact assessment in line with The UK Forestry Standard.   	Agency, Forestry Commission	< 1 k p.a.	●	●	●	●	●
f Investigate the impact of air pollution and woodland management on lichen communities on Exmoor. 	Agency, ENPA, EN	unknown	●	●			

**Issue 15: Enhancing Biodiversity**

Associated Plans: Biodiversity: The UK Steering Group Report, Volume 2: Action Plans 1995<sup>35</sup>; UK Biodiversity Group – Tranche 2 Action Plans, Volume 1 – Vertebrates and vascular plants; The Biodiversity of the South-West: an audit of the South-West biological resource 1996<sup>36</sup>; Action for biodiversity in the South-West: a series of habitat and species plans to guide delivery 1997<sup>37</sup>; The Nature of Devon: A Biodiversity Action Plan 1998<sup>38</sup>; Natural Areas: Nature conservation in context<sup>39</sup>; A profile & strategy for the conservation of lowland heathland in Devon 1998; The Exe Estuary Management Plan<sup>21</sup>; Exmoor BAP (Consultation Draft 1999)<sup>32</sup>; East Devon's Heathlands BAP<sup>40</sup>; The Blackdown Hills Landscape<sup>41</sup>; The East Devon Landscape<sup>42</sup>; Countryside Character Volume 8 South West<sup>3</sup>.

Biodiversity is the variety of wildlife and habitats. Since the signing of the Biodiversity Convention in June 1992<sup>2</sup>, Biodiversity Action Plans have been produced, to protect and enhance biodiversity, initially at a national level and subsequently at regional and local levels, with increasing levels of detail. These plans focus on the nation's threatened and declining species and habitats, and include information on status, causes of decline, objectives, targets and costed actions. The Agency has worked at a regional and local level contributing to the production of these plans for the South West and Devon (see list above). Each National Action Plan identifies a Contact Point (responsible for stimulating action), a Lead Partner (responsible for preparing detailed work plans, directing resources etc.) and a Responsible Agency (allocating responsibility for actions).

We are the UK Contact Point and/or Lead Partner for 35 "priority" species included within the UK Biodiversity Action Plan. These priority species are either globally threatened or rapidly declining within the UK (i.e. by more than 50 per cent in the last 25 years); of these species, three are known to be present within the catchment, namely the otter, white-clawed crayfish and river jelly lichen. Evidence suggests that three others, the water vole, allis shad and twaite shad may also occur. We also have an unsubstantiated record that another species, river jelly lichen, occurs in the upper reaches of the catchment. As Contact Point for the otter, water vole, crayfish and river jelly lichen the Agency is responsible for stimulating action to achieve targets, monitoring results and reporting progress to the national group. As Lead Partner for river jelly lichen and joint Lead Partner for the otter, allis and twaite shad, the Agency is responsible for preparing detailed work plans, directing resources and overseeing plan implementation.

In addition, other "priority" species listed within the National Action Plan, require specific actions by the Environment Agency as a responsible body and several occur within the catchment. These include the great crested newt, the reed bunting, the marsh fritillary and the pipistrelle bats (two species). The Agency will ensure that actions are delivered either through existing operational programmes, existing policy framework or through the development of new policies, procedures or Research & Development projects. We also play an important part in controlling and undertaking work likely to affect a range of habitats and species at a local level and will use our influence to protect and enhance biodiversity.

In addition to the above, a draft Biodiversity Action Plan for Exmoor National Park<sup>32</sup> has recently been produced by Exmoor National Park Authority. English Nature have also developed the concept of Natural Areas, through which the country has been divided up into areas each with their own unique identity arising from the interaction of wildlife, landform, geology, soils, land use and human impact (see section 2.2 Physical Features).

Biodiversity can also be protected through the designation of sites. Wetlands of international importance are protected under the Convention on Wetlands of International Importance and designated as Ramsar sites. Within Europe, the Habitats Directive (EC/92/43) was devised to protect nature conservation interests throughout the continent through the establishment of a series of sites known as the Natura 2000 network. The sites are designated under either the Habitats Directive as Special Areas of Conservation (SACs) or the European Wild Birds Directive (EC/709/409) as Special Protection Areas (SPAs). The Directive requires that all Competent Authorities must use their powers to ensure sites are maintained at favourable conservation status.

There are currently three sites from the Natura 2000 network which lie wholly or partially within the Exe Catchment. These are the Exe Estuary SPA (wintering wildfowl and waders) and Ramsar site, the East Devon Pebblebed Heaths candidate SAC (dry and wet heath), SPA (breeding birds) and the Exmoor Heaths candidate SAC (dry heath). Like all other Competent Authorities, the Agency will exercise its powers to contribute towards the conservation objectives. We are currently reviewing existing authorisations and activities that we licence throughout the Devon Area. This review will enable us to identify activities likely to be affecting the integrity of any sites protected under the Directive. See Issue 15i.

In addition to the internationally protected sites within the catchment, there are sites of national conservation importance which are protected under the Wildlife and Countryside Act 1981, being designated as National Nature Reserves or Sites of Special Scientific Interest. Sites of county importance are designated as either County or Local Wildlife sites and may also be designated as Local Nature Reserves (where various degrees of management are undertaken). Whilst these sites are afforded no statutory protection, local authorities generally recognise their importance, which will be reflected in appropriate policies, within their Local Plan, conferring various degrees of protection.

English Nature has identified the Exe Estuary and Lyme Bay as a Sensitive Marine Area (SMA). This is a non-statutory designation drawing attention to the importance of the marine animal and plant communities. In total, 27 subtidal marine areas have been identified around England. The designation relies upon the co-operation of users and the local community to achieve sustainable management through local action. The Exe Estuary SMA has already resulted in the development of an Estuary Management Plan<sup>21</sup>.

The Agency has supported the production of the County Wildlife Site Inventory for Teignbridge and seeks to support the updating of inventories for this and other districts within the catchment where possible. **Action 15a**.

Under Article 10 of the Habitats Directive (see above) member states are also required to encourage the management of linear features such as watercourses and hedges which often provide a corridor link between important habitats. Government guidance is also given within Policy Planning Guidance for Nature Conservation (PPG 9), which describes how Government policies for the conservation of our natural heritage are to be reflected in land use planning.

In line with biodiversity planning, we have identified certain habitats, species and geological features in the catchment (Table 3), which are of particular relevance in the context of biodiversity or are most likely to be influenced by our operational or regulatory work. Many of the actions required from the Agency to protect and enhance these habitats will be carried out as part of our routine work. Other actions, which are contained within this report, have been developed specifically to protect the habitats, species and geological features presented below.

**Action Table 15 - County Wildlife Sites**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
(i) Support updating of wildlife inventories. 	DWT, LPAs, DCC, EN, Agency	unknown	●	●	●	●	●

**Table 3 - Key Habitats, Species and Geological Features in the Catchment**

Key Habitats/Associated Species/Geological feature	Reason for Inclusion	Current Perceived Threats to Habitat (& additional threat to Species – other than habitat loss)	Associated Issue
<b>Western Oakwoods</b>	Internationally important	Loss due to felling/replanting with conifer, lack of management, invasion of non-native species (Rhododendron and Cherry Laurel), grazing pressure.	14
Pipistrelle Bats Endemic Whitebeams Lichens	Threatened in Europe Nationally threatened Threatened in Europe	Air pollution.	
<b>Wet Woodland</b>	Nationally important	Clearance, grazing pressure, inappropriate management, air pollution.	1, 14
Invertebrates Lichens	Rich communities Declining		
<b>Blanket Bog</b>	Internationally important	Inappropriate management (overgrazing, poor burning), agricultural drainage. Habitat loss.	1
Golden Plover	Declining in UK		
<b>Rhôs Pasture</b>	Nationally threatened	Lack of/inappropriate management, habitat fragmentation. Agricultural improvement/ intensification, afforestation, neglect, pond creation.	1
Reed bunting Curlew Barn Owl Marsh Fritillary	Declining in UK & Europe Declining in UK & Europe Declining in UK & Europe Threatened in Europe	Disturbance. Disturbance. Disturbance.	
<b>Upland Heath</b>	Threatened in Europe	Inappropriate management (poor burning practice, overgrazing), invasion of bracken/rhododendron.	1
Skylark	Declining in UK & Europe		

Key Habitats/Associated Species/Geological feature	Reason for Inclusion	Current Perceived Threats to Habitat (& additional threat to Species – other than habitat loss)	Associated Issue
<b>Rivers, Streams and Fluvial Processes</b>		Loss of riparian habitat/geomorphological features through neglect, inappropriate/lack of management and alder root disease.	2
Otter	Threatened in Europe	Road deaths.	
Water Vole	Nationally threatened	Unknown distribution, predation by mink.	1,8
Sand Martin	Declining in UK & Europe	Bank protection.	9,11
Kingfisher	Declining in UK & Europe	Bank protection.	
Atlantic Salmon	Internationally threatened	Climate change/possible international exploitation.	
River, Brook and Sea Lamprey	Internationally threatened	Threat not fully understood.	
Allis/Twaite Shad	Threatened in Europe	Unknown distribution.	
White-clawed Crayfish	Threatened in Europe	Pollution incidents, potential threat from crayfish plague, lack of information on distribution.	
River Jelly Lichen	Internationally threatened	Lack of information on distribution.	
<u>Exposed Riverine Sediments (ERS)</u>	Wildlife value	Inappropriate in-river works, lack of understanding of importance.	
<u>River Channel Features</u>	Wildlife/Geomorphological value	Inappropriate in-river works.	
<b>Ponds</b>	Nationally threatened	Loss through neglect or infilling. Loss of conservation value through stocking with fish or waterfowl and introduction of alien invasive plant species.	1
Great Crested Newt	Nationally threatened		
<b>Canals</b>	Important recreation and conservation resource	Lack of co-ordinated/appropriate management, bank erosion, eutrophication.	4
Water Vole	Nationally threatened	Mink predation.	
<b>Lowland Heath</b>	Nationally threatened	Neglect, afforestation.	1, 13
Nightjar	Severe decline in UK/Europe		
Woodlark	Historical decline in UK/Europe		
Heath fritillary	Declining in UK and Europe		
<b>Lowland Farmland</b>	Nationally threatened	Agricultural intensification, housing development.	1, 5
Barn Owl	Declining in UK & Europe	Road casualties.	
Skylark	Declining in UK & Europe	Changing agricultural practices.	
Woodlark	Historical decline in UK/Europe	Changing agricultural practices.	
Cirl Bunting	Rare UK breeder, high % of UK population	Changing agricultural practices.	
<b>Coastal &amp; Floodplain Grazing Marsh</b>	Nationally threatened	Light-industrial/housing development. Agricultural intensification. Nutrient enrichment of ditches. Unsympathetic water level management.	2,5
Reed Bunting	Declining in UK		
Curlew	Declining in UK & Europe		
Golden Plover	Declining in the UK		
Lapwing	Declining in the UK		
Redshank	Declining in UK & Europe		
Cetti's Warbler	Rare UK breeder, high % of UK population		
Barn Owl	Declining in UK & Europe		
Hairy Dragonfly	Locally important species		

Key Habitats/Associated Species/Geological feature	Reason for Inclusion	Current Perceived Threats to Habitat (& additional threat to Species – other than habitat loss)	Associated Issue
<b>Reedbed</b> Cetti's Warbler Water Rail Bittern Reed Bunting	Nationally rare Rare UK breeder Historical decline in UK Severe decline in UK & Europe Declining in UK	Lack of management.  Habitat loss. Not currently present in Exe Catchment, but suitable habitat occurs.	1
<b>Estuary &amp; associated habitats (mudflats and saltmarsh)</b> <i>Ophelia bicornis</i> Eelgrass ( <i>Zostera</i> ) Wildfowl & Waders (particularly Dark-bellied Brent-geese)	Internationally threatened  Nationally rare Locally important Internationally important	Nutrient enrichment, climate change, recreational pressure, channel dredging and sea-level rise.	2,8 6
<b>Sand Dunes</b>  Sand Lizard Sand Crocus  Glaucous Bulrush Ringed Plover Wintering Wildfowl & Waders <u>Dawlish Warren</u>	  Nationally rare Nationally rare, only UK mainland site Regionally rare Regionally rare breeder Internationally important	Recreational pressure, sea-level rise, falling groundwater levels, dune ridge erosion, potential impact of VHD on rabbit and subsequent dune management.   Possibly under-recorded.	  8,6 13
<b>Sea Cliffs &amp; Slope</b> Earth science interest	Potential for loss through increased erosion	Interference of natural coastal processes.	
<b>Coastal Reefs</b> Invertebrates	Decline in habitat quality and extent	Fishing activities involving dredging.	

**15a Western Oakwoods** – The Western oakwoods of Devon contain a diverse assemblage of species and are considered to be of international importance. These woods occur extensively within the upper reaches of the Exe Catchment, where the generally steep-sided valleys are dominated by Sessile Oak and associated species. The rapid spread of non-native species such as Rhododendron and Cherry Laurel can smother ground vegetation, reduce regeneration of trees and shrubs and lead to the loss of overall species diversity. Other threats include neglect and the impact of air pollution on lower plant communities, notably lungwort lichens, which are particularly sensitive to air pollution. As part of our regular duties we can protect the conservation interests of oak woodlands where they border watercourses and wetlands. (See also Action 14f).

**15b Wet Woodland** – Although the wet climate and heavy soils of Devon are suited to the development of this habitat, its current extent is unknown, but believed to be patchy. Often containing a rich ground flora, with diverse invertebrate (particularly Diptera [flies]) and lichen communities, the habitat has declined in extent due to grazing pressure and clearance through agricultural improvement. The advent of *Phytophthora* root disease of Alders may have an additional impact on this habitat. As part of national and county action plans we are working to arrest further decline, by protecting and recreating this habitat. In addition, the Millennium Forest, a new initiative for the creation of extensive areas of new woodland to the north of Exeter is at an early stage of development. Proposals are being developed by local planning authorities and we will work to support this initiative as there may be opportunities for wet woodland creation (see also Issue 15f Rivers, Streams, Floodplains & Fluvial Processes – Action 15f (iv) and target). **Actions 15b (i) and 15b (ii).**

Target: Determine extent of resource by 2001, recreate 5 hectares wet woodland by 2005.

**Action Table 15b - Wet Woodland**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
(i) Promote and implement actions from the Devon BAP for Wet Woodland – assist with assessment of extent of resource, seek potential new sites and promote use as buffer strips. 	EN, DWT, Agency, FRCA, FWAG, NFU, CLA, Forestry Commission	<1 k p.a.	●	●	●	●	●
(ii) Seek potential sites for the Millennium Forest. 	LPAs, Agency	unknown	●	●	●		

**15c Blanket Bog** – Blanket bog is an internationally important habitat with 10-15 per cent of the global resource occurring within Britain. The communities on Exmoor, although small, are especially important in that they lie near the southern limit of the British range. Blanket bog comprises a complex mixture of plant communities and is also an important resource for breeding birds. Unsympathetic management of this habitat through burning, excessive grazing levels and agricultural improvement through drainage has led to degradation. We are currently running, in conjunction with Exmoor National Park Authority, Exeter University and English Nature, the Moorland Improvement and Restoration on Exmoor (MIRE) Project, to investigate water-management techniques in upland areas to restore blanket bog and associated habitats, and influence streams and river hydrology. The information and experience accrued from the pilot project will be used as a basis for planning further work on other areas on Exmoor. **Actions 15c (i) and 15c (ii).**

*Target: Identify extent and quality of blanket bog on Exmoor by 2002, restore 50 hectares of degraded habitat by 2010.*

**Action Table 15c - Blanket Bog**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
(i) Continue to develop MIRE Project on Exmoor, implement findings. 	Agency, ENPA, EN, U of Exeter	5 k p.a.	●	●	●	●	●
(ii) Support measures from the Exmoor draft BAP for Blanket Bog to include: the protection and enhancement of sites through inclusion in management schemes. 	ENPA, Agency	>2 k p.a.	●	●	●	●	●

**15d Rhôs Pasture** –Rhôs pasture (often referred to as Culm Grassland – referring to the “Culm Measures”, of north and west Devon, where they are typically found, rather than the “River Culm”) is an internationally important species-rich wet grassland. It comprises a mixture of marshy grassland, bog, wet heath and scrubby woodland found on the poorly drained areas of north and west Devon and the spring lines of the Blackdowns (spring-line mire). The damp climate and heavy soils of Devon provide the right conditions for the development of this community and the county contains 80 per cent of this resource in England. **Action 15d (i).**

Rhôs pasture is of particular importance to the marsh fritillary butterfly in providing its preferred larval foodplant devil’s-bit scabious. The species is threatened in Europe and the UK is a major stronghold for the species with Devon holding 20 per cent of the UK population. It is clear, however, that agricultural improvement and lack of appropriate management (resulting in scrub encroachment) has caused a decline in the extent of these habitats. Many other vulnerable species are associated with this habitat including the curlew, which breed here and barn owl which hunt for small mammals within the rough grassland areas. **Actions 15d (ii) 15d (iii).**

The Agency is supporting the Somerset Wildlife Trust in carrying out work at their Ringdown and Brimley Hill Mire Reserves in the Upper Culm Catchment, within the Blackdown Hills AONB. Work to be carried out includes installation of fencing for grazing control and scrub clearance to assist in the restoration of spring-line mire habitats at both sites.

*Target: Enter 80 per cent of total resource into protective management by 2005, restore 50 hectares of Rhôs pasture (including spring-line mire) on appropriate sites by 2005. Maintain existing marsh fritillary populations and restore one large population (1000+ adults) each to the Culm Measures and the Blackdown Hills.*

**Action Table 15d - Rhôs Pasture**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
(i) Promote and implement actions from the Devon BAP for Rhôs Pasture – includes supporting updating of 'Culm' inventory and encourage sympathetic management and/or restoration of sites and in addition discourage inappropriate creation of lakes/ponds within Rhôs pasture. 	DWT, SWT, EN, LPAs, FWAG, Agency	<3 k p.a.	●	●	●	●	●
(ii) Marsh Fritillary and Curlew – includes promoting sympathetic management and/or restoration of sites. 	DWT, FWAG, EN, ENPA, FRCA, Agency, SWT, DBWPS	2 k p.a.	●	●	●	●	●
(iii) Barn Owl – promote appropriate management of riparian feeding habits, provide nest boxes to encourage recolonisation. 	Agency, BOT, Landowners, H&OT, Blackdown Hills Project	1 k p.a.	●	●	●	●	●

**15e Upland Heath** – A significant proportion of the world's resource of this habitat occurs within Britain and the catchment contains areas of international importance on Exmoor. Whilst heather normally dominates most upland heath communities, a wide variety of other plant species also occur and the habitat supports a range of breeding fauna including the nationally declining skylark. Current threats to the habitat are primarily from inappropriate burning or grazing management and invasion of bracken and rhododendron. The Agency is also collaborating on the Dartmoor Hydrology Project, which is investigating the effects of burning and over-grazing on soils and their hydrology. This will contribute to a better understanding of the management of upland heath and associated habitats. **Action 15e (I).**

*Target: Restore all sub-optimal upland heathland on Exmoor within the catchment to a favourable condition by 2010 and recreate at least 20 hectares to former sites with a priority to link existing fragments.*

**Action Table 15e - Upland Heath**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
(i) Promote and implement actions from the South-west and Exmoor BAPs for Upland Heath – encourage/facilitate heath restoration, promote understanding of the need for controlled grazing and burning. 	MAFF, ENPA, EN, Agency	<1 k	●	●	●	●	●

**15f Rivers, Streams, Floodplains & Fluvial Processes** – There is a wide range of river-based habitats and physical features associated with the River Exe, many of which are of national/international importance (see Table 3).

Most of the River Barle is designated as an SSSI because of its national importance as the best example of an acidic upland river grading into a sandstone type. We will continue to work with English Nature on the development and implementation of the Conservation Strategy and Consenting Protocol for this SSSI, to ensure that conservation interests are protected, notwithstanding our statutory responsibilities. A need has been identified within the Conservation Strategy for additional water quality monitoring and we will seek to undertake this work with support from English Nature. **Action 15f (ii).**

The geomorphological processes displayed through floodplain development of the River Exe at Brampford Speke are also considered to be of national importance and this reach of the Exe is designated an SSSI. The Exe Catchment has a varied underlying geology, with a wide range of associated soils from source to estuary. The rivers can rise and fall with great speed, which, combined with localised variations in the general dynamic nature, leads to the occurrence of a great variety of in-stream features and the development of wet habitats within the floodplain. The Agency has devised a River Habitat Survey (RHS) to assess the character and quality of such river habitats with a series of reference sites being selected throughout the United Kingdom, 49 of which occur within the catchment (see Issue 16 Lack of information on river habitat). Old river channels (palaeochannels) often contain a wealth of animal and plant remains which can be used to gain an understanding of historical climatic conditions. We can also learn a great deal about human history through the study of old structures and human artefacts. The University of Exeter has been undertaking a study to assess the archaeological potential of palaeochannels, looking at sites on the Exe and Barle. These investigations, which include assessment of changing vegetation in response to climate, are continuing and are supported by funding from the Agency. **Actions 15f (iii) and 15f (iv).**

The floodplain of the Exe and its tributaries (in particular the lower reaches of the River Exe, Creedy, Clyst and Culm) regularly flood and, whilst most of the farmland within the floodplain is agriculturally improved, it is potentially important for wildlife (especially birds). There may be opportunity for habitat enhancements and we will assess the options for environmental gain. The Agency is working on a project to restore suitable areas within the floodplain adjacent to the Exe Estuary, where there may be the potential for the restoration and creation of a range of wetland habitats, by decreasing the connectivity of drainage systems for example. The first phase of this project – identification of potential sites - has been completed and we will now work to develop proposals and implement them. **Action 15f (v).**

*Target: Restore 10 hectares of flood plain by 2005. (See also Issue 15b target)*

It has recently been recognised that areas of sand and gravel deposited by the river and known as Exposed Riverine Sediments (ERS) are particularly valuable as habitats for invertebrates. These sediments are vulnerable to erosion control works and some flood defence activities. We are currently undertaking Research & Development to improve understanding and initiate appropriate action to protect these features. **Action 15f (xii).**

Riverbank erosion is a natural process, which is important in creating new habitats for wildlife as in ERS above and eroding banks for nesting birds and specialised bees and wasps. The geomorphological interest of the meandering reaches of the lower Exe and Culm can only develop through bank erosion. However, riverbank erosion can destabilise structures within and adjacent to the river such as weirs, property, roads and farm buildings where there can be serious implications for water quality. The Agency will endeavour to strike an appropriate balance, when consenting or undertaking bank erosion control works. In cases where erosion control is required, we will encourage the use of soft engineering techniques (e.g. using willow), where appropriate, in preference to the use of hard solutions such as blockstone. Soft engineering benefits wildlife, whereas hard engineering can often redirect erosion problems elsewhere.

With regard to in-river works, we are concerned that some proposals such as the installation of croys (groynes) can lead to a change in the character of the river and associated banks. We are currently developing a policy on in-river structures to address this problem.

The lack of riverbank management (see Issue 1 – Regeneration of bankside trees), resulting in the loss of trees, combined with the spread of alder root disease may contribute to higher levels of riverbank erosion than have naturally occurred in the past. We will work to provide guidance for riparian owners on the best practice for riverbank management. **Actions 15f (i) and 15f (xvi).**

Alder root disease (*Phytophthora cambivora*) occurs throughout the Exe Catchment and has continued to spread across the UK although there was a decline in the rate of spread during 1997. Evidence from the Forestry Commission suggests trees with severe crown symptoms may recover in subsequent years and that coppicing gives new growth a chance to develop. Recent information from the Forestry Commission suggests that there may be a positive correlation between the disease and nitrate levels. Best advice to date is that no planting of alder should be undertaken in areas liable to flooding where the disease is present and riparian owners should encourage natural regeneration of alder where possible. We will continue to provide management advice to minimise the impact of the disease. **Action 15f (xv).**

Associated with river-based habitats and features are a number of plants and animals of conservation concern for which we propose actions, in line with Biodiversity Action Planning (see Table 3). Otters have partially recovered from the major decline of the 1960s and 1970s, although their distribution within the Exe Catchment is still patchy. The catchment holds an important feeder population for catchments to the east, which are currently more sparsely populated. Road casualties play a major role in restricting an eastward spread and, with this in mind, we have been instrumental in ensuring that ten otter underpasses have been included within the A30 improvements between Exeter and Honiton. Information from on-going work carried out by the Agency on road kills suggests that the A396, passing up the Exe Valley, is a particular hotspot for road deaths. We will look to analyse this data and investigate the need for solutions such as underpasses, culvert and bridge ledges and fencing. **Action 15f (vi).**

*Target: Implement habitat enhancements at five strategic sites within the catchment by 2005. Restore breeding otters to 1970s levels.*

The nationally endangered water vole occurs within the catchment with records for the River Clyst, River Culm, Dawlish Water, Exeter and Grand Western Canals. Sympathetic management at these sites will play an important role in protection and possible recovery of the species. A survey is planned within the Exe Catchment to investigate the interactions between the otter, the mink and the water vole as part of a national survey. Work has already been undertaken nationally on water vole distribution and the next stage will investigate mink populations. **Action 15f (vii).**

*Target: Identify current distribution by 2001, restore 2 km of suitable habitat by 2005.*

The Agency supported a countywide survey of breeding sand martins and kingfishers during 1997. The results confirm that both species are breeding within the Exe Catchment. Riverbank erosion control and other river maintenance activities may not only destroy nests but can stabilize eroding faces, leading to abandonment of sites. Where we have control over riverbank work and where appropriate, we will ensure favourable status for these species.

The Atlantic Salmon is a species undergoing international decline and it is believed that changes in temperature patterns in the North Atlantic, as a result of climate change, may be responsible. Occasional sightings of the internationally threatened allis and twaite shad have been reported near the Exe Estuary and we need to determine the status of the species with regard to the Exe. Similarly the exact status of the endangered brook, river and sea lamprey within the catchment is unknown, although we have records for all species within the catchment. **Actions 15f (ix), 15f (x) and 15f (xi).**

*Target: Determine status of each Lamprey species within the catchment by 2001.*

The Exe Catchment contains populations of the nationally endangered freshwater white-clawed crayfish on the River Creedy and River Yeo, with historical records for the River Culm. All these sub-catchments are included within 'no-go' areas, where the keeping of non-native crayfish, which transmit crayfish plague, will be effectively prohibited. **Action 15f (viii).**

*Target: Determine current status of freshwater crayfish within the catchment. Maintain existing populations on Creedy/Yeo system.*

We have recently confirmed the presence of river jelly lichen on the River Barle, through a survey jointly funded with English Nature. The species also occurs within the middle reaches of the River Exe (pers.comm. County Lichen Recorder). We will continue to gather information on the species to improve our understanding of its distribution. **Action 15f (xiii).**

In addition to the above issues, the Exe Catchment has seen the spread of non-native plant species. Several plants are causing concern, including Japanese knotweed and Himalayan balsam, which have spread along the banks of many watercourses, parrot's feather (*Myriophyllum aquaticum*) and water fern (*Azolla filiculoides*) which occur within waterbodies in the catchment. We have recently discovered floating pennywort (*Hydrocotyle ranunculodes*) within certain ditches on Exminster Marshes and are taking action to control this. All these species spread rapidly at the expense of our native flora, reducing biodiversity and many are widely available for sale. With their ability to grow rapidly, these non-native plants can also have impacts upon flood defence by obstructing free passage of water. We have written to the relevant trade associations urging them to encourage garden centres and other suppliers to withdraw these plants from sale and help increase public awareness. We are currently involved with English Nature in the control of Japanese knotweed on the River Barle SSSI in conjunction with the Exmoor National Park Authority. Control through the application of herbicide is proving effective, however, it is apparent that total control will require a long-term commitment. **Action 15f (xiv).**

*Target: Prevent the spread of aquatic non-native invasive plant species. Restrict the spread of Japanese knotweed and giant hogweed.*

**Action Table 15f - Rivers, Streams, Floodplains & Fluvial Processes**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
(i) Promote and implement actions from the Devon and/or Exmoor BAPs for Rivers & Streams – provide guidance on best practice for riverbank management, promote the creation of riparian buffer strips through advice and provision of fencing, establish criteria for designation of rivers and streams as County Wildlife Sites and examine potential for creating demonstration sites for best working practice techniques.  	Agency, DWT, WRT, FWAG, EN, RFOs, RETA, ENPA	unknown	●	●	●	●	●
(ii) River Barle SSSI – increase environmental monitoring within the River Barle SSSI, in line with requirements identified within the Conservation Strategy. 	Agency, EN, ENPA	<1 k p.a.	●	●	●	●	●
(iii) Promote and implement actions from the Devon BAP for Fluvial Processes – promote measures to conserve, enhance or interpret earth science features linked to the water environment. In addition continue to support palaeochannels project. 	Agency, EN, U of Exeter	3 k	●	●	●	●	●
(iv) Earth Science Features – support the identification/documentation of sites, promote understanding of the importance of geomorphology in natural river processes, and encourage measures to conserve, enhance or interpret earth science features linked to the water environment. Support identification, documentation and protection of County Geological Sites (RIGS). 	Agency, RIGS Groups, LPAs, ENPA	1 k p.a.	●	●	●	●	●
(v) Promote and implement actions from the Devon BAP for Floodplains – develop proposals for priority restoration sites and implement to include floodplain woodland. Ensure no net loss of floodplain.  	Agency, RSPB, FA, LPAs	3 k	●	●	●	●	●
(vi) Promote and implement actions from Devon BAP for Otter – promote habitat creation/restoration. In addition continue post-mortem programme and identify road casualty blackspots by 2000. 	Agency, DWT, Agency, EN, DCC, LPAs, RFOs, RETA	3 k	●	●	●	●	●
(vii) Promote and implement actions from the Devon BAP for Water Vole – support survey to identify core populations, provide management advice, identify sites for habitat restoration and population re-establishment. 	LPAs, Wild Cru, DWT, Agency, DCC	2 k	●	●	●	●	●

**Action Table 15f - Rivers, Streams, Floodplains & Fluvial Processes**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
(viii) Promote and implement actions from the Devon BAP for Freshwater White-clawed Crayfish – survey, collate records, initiate appropriate habitat management. 	Agency	2 k	●	●	●	●	●
(ix) Promote and implement actions from the Devon BAP for Atlantic Salmon – develop policy, safeguard sites, manage and protect species, provide advice, research & development. 	Agency, MAFF, NFU, FRCA, ROs, RFOs, RETA	unknown	●	●	●	●	●
(x) River/Brook/Sea Lamprey – improve distribution records, assess status within catchment. 	Agency	2 k p.a.	●	●	●	●	●
(xi) Promote and implement actions from the National BAP for Allis/Twaite Shad – increase public awareness of the shad, encourage recording for estuary and lower river. 	Agency, DSF	< 1 k	●	●	●	●	●
(xii) Invertebrates of ERS – implement recommendations of ERS invertebrate R&D. 	Agency, EN	2 k p.a.	●	●			
(xiii) Promote and implement actions from the National BAP for River Jelly Lichen – continue to determine status on the River Barle and River Exe; if appropriate develop actions and targets for protection. 	Agency, ENPA, EN	1 k	●	●	●	●	●
(xiv) Invasive Plants – continue to monitor, encourage/facilitate control, raise public awareness of the issue, and continue to support control on River Barle SSSI and Exminster Marshes.  	Agency, LPAs, ROs, RFOs, RETA	5 k p.a.	●	●	●	●	●
(xv) Alder root disease ( <i>Phytophthora</i> ) – continue to raise public awareness, encourage reporting of diseased trees and provide management guidance and investigate methods to minimise the impact of the disease. 	Agency, RFOs, RETA	1 k	●	●	●	●	●
(xvi) Promote bankside fencing schemes to encourage the establishment of buffer zones along watercourses and the development of trees, where appropriate.  	Agency, Landowners, Fishing Associations	unknown	●	●	●	●	●

**15g Standing Open Water Including Ponds** – This habitat ranges in extent from Wimbleball Reservoir in the north-east of the catchment to small ponds within the farmed landscape particularly around the Rivers Culm and Clyst. Ponds are not a common feature of the Devon landscape, but provide an important habitat for a wide range of associated flora and fauna. In particular ponds within the Clyst sub-catchment support great crested newts, which are generally uncommon in the West Country. Current threats to remaining ponds include loss through infilling and neglect. **Action 15g (i).**

*Target: Maintain and increase extent of existing resource. Establish current status of great crested newt, to develop appropriate conservation targets.*

**Action Table 15g - Standing Open Water Including Ponds**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			99	00	01	02	03
(i) Promote and implement actions from the South-west BAP for Standing Open Water – ensure favourable management, encourage appropriate creation of new sites, and raise in addition public awareness of invasive plants. 	DWT, Agency, FWAG, LPAs, EN	2 k	●	●	●	●	●

**15h Canals** – Two canals lie within the catchment, namely the Exeter Ship Canal, which lies partly within the Exe Estuary SPA (Ramsar and SSSI) and the Grand Western Canal at Tiverton. Whilst canals represent an important recreational resource, they can also have significant wildlife value. Historically, the water vole has been found on both canals (see relevant actions under Rivers & Streams), but with the decline in populations, attributable to a number of causes including predation by the mink, disturbance and habitat loss, water voles may no longer be present. Concern has been expressed with regard to management of the canals, which in some cases has had a negative impact on nature conservation interests. We support the need for the development of management plans although, to date, there has been little progress to develop a plan for the Exeter Canal, to which we have contributed a significant amount of money. Works have continued on the Exeter Canal with insufficient consideration given to environmental impacts. We will also seek to support the development of a prescriptive management plan for the Grand Western Canal, see Issue 4: Potential for Eutrophication (for actions). Please also refer to Action Table 15f (vii) (for Water Vole action).

The Exeter Canal supports a number of plant species, which are rare in Devon, although many are now believed to be non-native. Canals can be particularly vulnerable to colonisation by invasive plants. The Exeter Canal for example has experienced rapid spread of the water fern (*Azolla filiculoides*), although this species is vulnerable to winter frosts.

**15i Lowland Heath** – Lowland heath is a habitat of international importance and the UK contains approximately 20 per cent of the total area occurring in Europe. Within the Exe Catchment, three significant areas of lowland heath are found. These are on the Exmoor fringes, the East Devon Pebblebed Heaths (western fringes) and around the Haldon Ridge. The habitat often occurs within a complex association of other habitats and a correspondingly rich complement of plant and animal species, many of which are rare. Lack of or inappropriate management, accidental and uncontrolled fires, afforestation and recreational pressure have all contributed to the loss of this habitat. There are now three BAPs specifically addressing lowland heath within the catchment. These cover Devon, Exmoor and East Devon and we are identified as a partner for a number of the actions.

We are currently in the process of reviewing all current authorisations to determine which, if any are likely to have a significant effect on the East Devon Pebblebed Heaths. This work is being undertaken in co-operation with English Nature and once completed we will determine whether authorisations are having an effect through appropriate assessment. (See Issue 13). **Actions 15i (i) and 15i (ii).**

*Target: Maintain all existing high quality lowland heath in favourable condition, initiate restoration of sub-optimal heath to favourable condition by 2010, recreate 30 hectares of heathland on sites where it formerly occurred with a priority to link existing habitat by 2010.*

**Action Table 15l - Lowland Heath**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
(i) Promote and implement actions from the Devon, Exmoor and East Devon Heathlands BAPs for Lowland Heath – support and contribute towards implementing heathland restoration initiatives within the catchment. 	Agency, EN, ENPA	2 k	●	●			
(ii) East Devon Pebblebed Heaths – investigate impact of abstractions on the integrity of the site, devise and implement any appropriate actions required.  	Agency, EN, Licence Holders	unknown	●	●			

**15j Lowland Farmland** – The greatest proportion of the Exe Catchment comprises farmland and whilst agricultural improvement has seen the development of increasingly larger fields, the existing matrix of hedgerows trees and small copses provides an important wildlife resource. Beef and dairy production has historically accounted for much of the farming activity although arable production is increasing, most notably the growing of maize and rapeseed. Much of the farming community is presently facing considerable difficulties and if we are to ensure protection of habitats within the farmed landscape, it will be necessary to encourage more resources to be directed into agri-environment schemes.

**15k Grazing Marsh** – The lower floodplain of the Exe borders the estuary and contains Exminster Marshes. Situated between the railway and the Exe Estuary, these grazing marshes lie wholly within the Exe Estuary SPA (SSSI & Ramsar). A network of ditches, hedgerows and isolated trees, which contribute to habitat diversity and overall species richness, run through the marshes. In addition to having a rich ditch flora and associated dragonfly fauna, the marshes are internationally important to wildfowl and waders providing roosting, feeding and breeding areas. A small area of grazing marsh also occurs on the east side of the estuary at the mouth of the River Clyst. The Agency, together with English Nature and landowners, have produced a Water Level Management Plan for Exminster Marshes. We have also been working with the RSPB to ensure control and maintenance of water levels within parts of Exminster Marshes owned by this charity. A freshwater lagoon has been created (autumn 1998) in the southern part of the marshes. On the other side of the estuary at the mouth of the River Clyst lies another RSPB reserve Bowling Green Marsh, where works have been undertaken to raise water levels to enhance the wetland value of the marsh. The floodplain bordering the upper Clyst is defended with flood banks and subject to a wide range of management practices, with some areas managed as rough grassland under Countryside Stewardship. Opportunities may exist for further enhancement in this area by raising water levels. We are in addition working to identify areas along the margins of the Exe Estuary where grazing marsh or other estuarine habitats could be restored or created. Targets will be developed for this project as it progresses. **Actions 15k (i), 15k (ii), 15k (iii) and 15k (iv)**.

*Target: Maintain quality of grazing marsh and restore 50 hectares or more on appropriate sites. Increase area of wetland margin habitat under sympathetic management by 25 per cent by 2005.*

**Action Table 15k - Grazing Marsh**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
(i) Promote and implement actions from the Devon BAP for Grazing Marsh – contribute to management of marshes and adjacent habitats to maintain range and numbers of Cetti’s warblers.  	Agency, Landowners, EN, RSPB	2 k	●	●	●	●	●
(ii) RSPB Lagoon Project – contribute to management of the operation of this project and monitor effects. 	Agency, RSPB	<1 k	●	●	●	●	●

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
(iii) Creation of wetland habitat within Agency-owned sites on Exminster. 	Agency, EN	unknown	●	●	●		
(iv) Continue to develop an agreed Water Level Management Plan for Exminster Marshes and achieve objectives through implementation of actions. 	Agency, Landowners, EN, RSPB	t.b.c.	●	●	●	●	●

**15I Reedbed** – Although typically species-poor, reedbeds are an important habitat supporting a distinctive complement of many rare breeding bird species and often large populations of amphibians. The reedbeds within the catchment are generally concentrated around the Exe Estuary and, whilst not being large enough (less than 10 ha) to support many critical species, they do support a population of Cetti's warblers. This habitat is not particularly common in Devon and there has not been a significant decline in extent. Potential problems do exist, however, particularly loss caused by scrub invasion through lack of management and inappropriate water-level management. Reedbeds represent a sustainable method of water treatment for relatively little cost and with significant wildlife benefits so we are keen to promote this important feature. **Actions 15I (i) and 15I (ii).**

Target: Maintain quality of habitat. Create 2 hectares or more of additional reedbed by 2005.

**Action Table 15I - Reedbed**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
(i) Promote and implement actions from the Devon BAP for Reedbed – encourage appropriate management of existing reedbeds to ensure no loss of existing reedbed >0.5ha, identify areas for reedbed creation and implement, promote and advise on the use of reedbeds for wildlife and pollutant/sewage effluent treatment.  	Agency, LPAs, SWW Ltd, RSPB, DWT, EN	2 k	●	●	●	●	●
(ii) Continue to develop management plans for Agency landholdings to maximise conservation value of reedbeds. Complete by 2001. 	Agency, EN	2 k	●	●			

**15m Estuary and Associated Habitats** – The Exe Estuary is internationally important for wintering wildfowl and waders including dark-bellied brent-geese, wigeon, ringed plover and black-tailed godwit and also a noteworthy winter population of over 500 avocets. Extensive areas of intertidal mud (762 ha) support huge populations of invertebrates, which feed the over-wintering bird populations. The intertidal sand (232 ha) supports a specialised invertebrate fauna capable of dealing with the abrasive conditions including the rare *Ophelia bicornis*, the Exe Estuary being one of only two locations in Britain for this Mediterranean species. A small area of saltmarsh (58 ha) is also present, providing some botanical diversity within the estuary. Whilst studies have shown that vertical accretion of saltmarsh is likely to be able to keep pace with expected sea-level rises (see Issue 8), we are concerned about the saltmarsh on the back of Dawlish Warren. This may be vulnerable to erosion because of the effect of coastal squeeze in the presence of hard engineering structures. Whilst we have decided to 'hold the line' and maintain defences on the seaward side of Dawlish Warren<sup>22</sup>,

we have decided not to repair the defences behind the Warren, which may help to lessen the effect of coastal squeeze and reduce the extent of saltmarsh loss. The fate of other estuarine habitats is less certain and without managed retreat there is likely to be a significant loss of other intertidal habitats as sea levels rise. Many of the intertidal areas support communities of eelgrass (*Zostera* spp) and green seaweed (*Enteromorpha* spp) which are the favoured food of many wildfowl. Following extensive consultation, a Management Plan for the Exe Estuary<sup>21</sup> was produced in 1998. The plan seeks to promote the sustainable use of the Exe Estuary and provide a framework for its co-ordinated management. There are many issues of particular relevance to the estuary, these include nutrient enrichment, sea-level rise through climate change, recreational pressure and channel dredging. We will ensure that issues and actions for this LEAP and the EEMP are integrated and that all issues relevant to the estuary are co-ordinated through the Exeter Estuary Management Partnership. The Estuary Management Plan has a range of policies for the estuary that we support. Relevant policies include Policy 1, 12, 13 and 25 to 28. See also Issue 15k Grazing Marsh – proposals for habitat recreation/restoration along the Exe margins. **Actions 15m (i), and 15m (ii).**

*Target: Maintain and increase quality and extent of estuarine habitats (to include creation of 2 hectares of saltmarsh via managed retreat).*

**Action Table 15m - Estuary and Associated Habitats**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
(i) Promote and implement actions from the Devon BAP for Estuaries – investigate opportunities for the creation/restoration of saltmarsh (and other estuarine habitats) through managed retreat.  	Agency, Landowners, EN, RSPB	2 k	●	●	●	●	●
(ii) Promote and implement actions from the Devon BAP for Estuaries – contribute to the development and implementation of the Exe Estuary Management Plan, and support the development of conservation objectives for the Exe Estuary SPA.  	Agency, EN, DWT, RSPB, LPAs, EEMP	<1 k	●	●	●	●	●

**15n Sand Dunes** – Dawlish Warren represents a substantial sand dune system, which protects the mouth of the Exe Estuary. It supports several nationally rare plant species and is the only UK mainland location for the sand crocus. The coastal land form development and geology are of particular earth science importance. In addition to the international protection afforded to the Exe Estuary, the Warren is also designated an SSSI and Local Nature Reserve (LNR). A draft Management Plan has been produced for Dawlish Warren and was implemented during 1999. Part of the Warren, the inner spit, has been managed as a golf course for over 100 years and there is concern that falling groundwater levels may be affecting the conservation value of the meadow within the Warren. Following studies of groundwater movements (carried out jointly by the Agency, Teignbridge District Council and Plymouth University) it was proposed to develop a pumping system to take excess water from the golf course into a wet scrape within the meadow at the Warren: the Dawlish Warren Hydrology Project. The project was completed in March 2000, with a wind turbine being used to power a pump to transfer water from the golf course to the meadow. This will assist in maintaining groundwater levels in the reserve and will also add to the botanical diversity of the meadow within the reserve. The scheme will be managed by Teignbridge District Council with collaboration from The Warren Golf Club and was funded by additional funds from the Agency, English Nature and the Devon Wildlife Trust. A small, surviving dune system also occurs on the east side of the estuary at the Maer in Exmouth (also an LNR). Whilst there are considerable recreational pressures within the Exe Estuary from watercraft, land-based activities can also have an impact. For instance concern has been raised about walkers disturbing wintering waders and wildfowl. Conflicts such as these will be addressed within the Exe Estuary Management Plan<sup>21</sup>. **Actions 15n (i) and 15n (ii).**

Target: Restore water tables at Dawlish Warren to favourable conservation status level by 2010.

**Action Table 15n - Sand Dunes**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
(i) Promote and implement actions from the South-west BAP for Sand Dunes – in addition assist with the implementation and development of the Dawlish Warren LNR management plan. 	TDC, Agency, EN, DCC, Plymouth University	12.5 k	●	●			
(ii) Monitor the Dawlish Warren Hydrology Project. 	TDC, Golf Club, Agency, EN, DWT	>1 k p.a.	●	●	●	●	●

**15o Sea Cliffs and Slope** – Sea cliffs and slope are of particular significance in the South West due to the high proportion of coastline to land. The cliffs associated with the estuary are comprised of sandstone, siltstones and mudstones and occur on the coast at Orcombe (Exmouth), Langstone (Dawlish) Point, and within the estuary near Lympstone. Sea cliffs are important in providing a mosaic of habitats and have significant geological/geomorphological interest. We will continue to ensure that Agency works do not compromise the biodiversity and earth science interest of cliffs. Specific management of the coast and associated processes is addressed within the Lyme Bay & South Devon Shoreline Management Plan<sup>22</sup>.

**15p Coastal Reefs** – A series of rocky reefs are situated within Lyme Bay; of these, one (the ‘Exeters’) occurs (partially) within the Exe Catchment. Concern was raised from 1990 onwards (ref: An investigation into the effects of scallop dredging in Lyme Bay (1992) Munro, C) that fishing activity, particularly scallop dredging, was resulting in damage to these reefs within the Bay. A survey undertaken during 1992 (ref: Lyme Bay: A report on the nature conservation importance of the inshore reefs of Lyme Bay (1993) DWT), indicated that damage had occurred to the reef and that diversity of invertebrate species was low. A working group of interested parties (Devon Wildlife Trust, English Nature, PESCA, Devon Sea Fisheries, South West Fish Producers Association, local fishing industry and the Dorset Coastal Forum) has been established to determine the way forward. We will continue to support investigations into the status of the reefs within Lyme Bay and assist, where possible, to devise and implement achievable solutions to the problem. **Action 15p (i).**

**Action Table 15p - Coastal Reefs**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
(i) Encourage the management of scallop dredgers and beam trawlers in a manner that minimises potential damage to marine life.  	MAFF, EN, DSFC, DWT, PESCA, SWFPA, Agency	1 k	●	●	●	●	●

**Issue 16: Lack of Information on River Habitat**

To make more informed management decisions in the catchment, we need to improve our knowledge of river habitat. River Habitat Survey (RHS) is a system for assessing the physical character and quality of rivers. The RHS system is based upon a database of information gathered from over 5,600 reference sites between 1994 and 1997. By recording data using a standard methodology, an assessment of habitat quality and the extent of artificial channel modification can be made.

Collecting this information on rivers is relevant not only to us, but also to a wide range of other organizations and individuals. We have been able to use RHS for a number of applications including river rehabilitation assessment opportunities, investigation into sediment sources and sinks for flood defence purposes, assessment of river habitat quality for fish and the provision of evidence to support the protection of a length of river against development. RHS could also be used for the identification of issues for LEAPs.

Seventy-one sites have been surveyed within this catchment, although many more sites are required. Before we can use RHS to its best ability, we need coverage representing approximately 25% of total river length. Until we can achieve this level of coverage we will use RHS on a site-specific basis, collecting information as we need it. **Action 16a.**

**Action Table 16 – Lack of Information on River Habitat**

Actions	Action By Lead/Other	Cost to Agency (£)	Financial Year				
			00	01	02	03	04
(a) Ensure that any RHS data collected within the catchment is added to existing database. 	Agency	>1 k p.a.	●	●	●	●	●

## 5. A Better Environment Through Partnership

We outline here the main ways this plan links to the community, and to other plans and initiatives in the catchment.

### 5.1 The LEAP Steering Group

This group represents a range of commercial, local authority and environmental interests. The group comment upon the Consultation Draft and Action Plan prior to public release. They will monitor the implementation of the Action Plan and provide us with specific advice on the importance of issues within the catchment. They act as a communication link between the local community and ourselves, and they will help to promote and develop initiatives of benefit to the environment within the catchment. The steering group members are:

	Representing
Mr R Archer	Royal Society for the Protection of Birds/Biodiversity
Mr A Box	British Canoe Union
Mr J Berry	National Farmers Union
Mr P Burrows	Mead Specialty Paper
Mr K Campbell	Exeter & District Angling Association
Mr I Cook	Devon Fisheries Forum/Area Environment Group
Mr W Copp	Council for the Protection of Rural England (Devon)
Mr S Day	English Nature
Dr A Foxford	Environmental Health Services Mid Devon District Council
Mr R Hill	Exe Estuary Management Partnership (Devon County Council)
Mr A Kilby	The River Exe & Tributaries Association
Mr D Lloyd	Exmoor National Park
Mr H Maund	Trout Farmers (British Trout Association)
Mr E J Newton	Business
Mr J Nott	Exeter City Council
Mr R Retaillick	National Federation of Anglers
Mr H Thresher	Crediton Fly Fishing/Trout Fishing
Mr I W Voysey	River Exe Netsmen Association
Mr M Williams	South West Water Limited

### 5.2 Links with Development Plans

We can control some of the factors influencing the quality of the environment, but we have limited control over the way that land is developed. This is the responsibility of local planning authorities.

Local authorities prepare statutory development plans. The policies in these plans will guide the way that land is developed in the future. We provide advice and guidance to local planning authorities and work with them to develop and adopt policies, which minimize the impact of any development upon the environment. We will reinforce these policies, where we can, when commenting on planning matters or in making our own decisions. LEAPs are one way we aim to influence the content of local authority plans.

The Town and Country Planning System in England operates at several levels. Broadly these are: National, Regional, Countywide, District and Site-specific. Generally decisions taken at one level need to accord with those taken at a higher level; increasingly international obligations, e.g. through the European Union or the United Nations, are influencing the planning system. Such influence is particularly important in environmental issues and is normally evident through amendments to the relevant national legislation.

The Devon County Structure Plan First Review 1995-2011<sup>13</sup> provides a framework for development and land use within Devon for the period up to 2011. It proposes the development of about 75,800 dwellings in Devon and provides for about 755 hectares of employment land, between 1995 and 2011. The plan contains policies and advice to ensure protection and conservation of the environment in a sustainable way.

The Exe Catchment area falls within the jurisdiction of eight local authority areas and the Exmoor National Park. Only four of these councils Mid Devon District Council, East Devon District Council, Teignbridge District Council, Exeter City Council and the Exmoor National Park cover a significant area of the catchment. They are required to prepare a 'Local Plan' for their own area, which gives more detail and a basis for the Councils' day-to-day decisions on planning applications and other matters connected with land use.

To ensure consistency across the planning districts within the catchment, all districts are issued with Environment Agency liaison documents. These documents give information on our liaison with local planning authorities, our own procedures and the types of Plans and developments requiring Agency consultation. Specific advice is also provided on settlements where there are sewerage infrastructure deficiencies, which could be or are affecting water quality.

### 5.3 Integrated Coastal Zone Management

Devon and Cornwall have some of Europe's finest natural and historic coastlines. There are many bodies in this area, which have formed partnerships and development coastal initiatives over a number of years, including Estuary Management Plans, Heritage Coasts, Shoreline Management Plans, Marine Action Plans etc. Components of LEAPs also relate to the coastal zone.

**The Atlantic Living Coastlines Project** seeks to draw these threads together and produce a strategy for Integrated Coastal Zone Management. This project is funded from the EU TERRA fund with funding matched by existing expenditure on coastal zone management in the area (including the Agency's LEAPs for Devon and Cornwall). It is intended that the outputs of the project will be extended to other coastal regions across Europe. The Agency is represented on the project's sponsors group and a special focus group which has been set up to examine the use of data and technology in coastal zone management.

**A Shoreline Management Plan (SMP)** is a document which sets out a strategy for coastal defence for a specified length of coast, taking account of natural coastal processes, human and other environmental influences and needs.

SMPs are part of an initiative on the future planning of our coastline, backed by MAFF, the Association of District Council, English Nature and ourselves.

The Agency, in partnership with local authorities, County Councils and English Nature have prepared the Lyme Bay and South Devon SMP<sup>22</sup>, which was adopted in January 1999. The SMP covers the coastal cell from Portland Bill to Rame Head and sets out a strategy for coastal defence. This LEAP considers conservation and recreation issues and the preservation and enhancement of the landscape interest of the coastline in relation to sea defence and coastal protection policies.

**The Exe Estuary Management Plan<sup>23</sup>** has been produced by a partnership of Devon County Council, Exeter City Council, East Devon District Council, Teignbridge District Council, the Environment Agency and English Nature. The partnership also includes focus group of local community representatives covering local interest in seven areas (Conservation; Recreation & Access; Agriculture & Land Use; Fisheries; Commerce & Water Quality; Local Community and Harbour Services). It provides a framework for the sustainable use of the Exe Estuary, balancing the demands made on its natural resources, and describes potential management issues together with policy guidance to resolve them. It sets the basis for specific management measures that are detailed and implemented by an annual Action Plan.

The actions and the policies in the Estuary Management Plan are co-ordinated with issues and actions in this document where they relate to the Exe Estuary and vice versa.

### 5.4 Links with Non-statutory Plans

The protection and management of the environment requires the Agency and other organizations to work together in partnership. This LEAP gives the basis for a greater understanding of the Agency's work, enabling such partnerships to be developed.

The Agency is working with various bodies, which also seek to develop partnerships and collaborative work through other non-statutory plans. These include:

- Natural Area Profiles for: Exmoor and the Quantocks, Devon Redlands, The Culm, Blackdowns, Vale of Taunton and the Quantock Fringes.
- Devon Biodiversity and Earth Science Action Plan
- A profile and strategy for the conservation of lowland heathland in Devon (1998) DWT
- Devon's Local Agenda 21 Network Issues Report
- Exmoor Biodiversity Action Plan (in production)
- Blackdown Hills AONB Management Plan

- East Devon AONB Management Plan
- Lyme Bay and South Devon Shoreline Management Plan
- Exe Estuary Management Plan
- Exeter City Council Leisure Strategy

### 5.5 Local Environment Agency Plans and Catchment Management Plans

The former NRA prepared a sequence of plans, called Catchment Management Plans, which covered river catchments in England and Wales. This LEAP will supersede previous plans and covers all the duties relating to environmental management and improvement for which the Environment Agency has responsibility in this catchment.

The National Rivers Authority Catchment Management Plans for the Exe Catchment were: River Exe Catchment Management Plan- Consultation Report December 1995, Action Plan August 1996, First Annual Review October 1997.

### 5.6 Links with Local Agenda 21

Agenda 21 is the global action plan endorsed at the United Nations Conference on Development and the Environment in 1992<sup>1</sup>. It has been designed to achieve sustainable development within all levels of our society – from national government to individuals in their homes and workplaces.

Local authorities are assisting their local communities in developing strategies and action plans for sustainable development.

In East Devon the Agenda 21 process is led by East Devon District Council. They have produced an Environmental Stewardship Strategy, and are progressing transport and energy initiatives.

Exeter City Council compiled a LA21 strategy for Exeter in 1996; after a period of public consultation this will be reviewed in 2001. Mid Devon District Council is taking the lead in establishing a LA21 steering group for the area involving all sectors of the local community.

Exmoor National Park Authority endorses the Statement on National Parks, Sustainability and Work on Local Agenda 21; this statement provides a commitment to the pursuit of sustainability and Local Agenda 21 and forms the basis for future action.

The Agency is committed to encouraging more sustainable lifestyles for all, through our work and in partnership with others. This is captured in our vision, which is 'a better environment in England and Wales for present and future generations'.

In Devon, we have nominated an officer with responsibility for Agenda 21 who will liaise with the above local authorities and other individuals or groups to progress sustainable development in the county. We are already involved in a number of groups and projects across Devon.

### 5.7 The Environment Agency and Public Information

We are committed to being an open organization; we will provide information about our decisions and actions and ensure consultation for our customers on plans and reports. Our customer charter sets out how we aim to achieve this commitment. We must maintain a set of public registers which hold information on the activities we regulate and the monitoring we carry out; in addition to the information we place in registers, we make available to the public most other environmental information that we hold.

We have produced an information guide available to the public, which sets out what information is accessible and how to obtain it. Information is usually provided free of charge, but for large and complex requests we may charge for staff time and materials. Confidential information, incomplete or draft reports, and information where disclosure may lead to environmental damage are generally not available. Some environmental details and information about our public registers are available on the Internet on <http://www.environment-agency.gov.uk>.

If you wish to obtain more information about anything presented in this Action Plan, please contact the Team Leader LEAPs at our Exminster office.

## 6. Duties, powers and interests of the Environment Agency

The Environment Agency has a wide range of interests in the areas of water management, waste management and pollution prevention and control. Whilst many of these interests are supported by statutory duties and powers, much of the Agency's work is advisory, with the relevant powers resting with other bodies such as local planning authorities. The following table summarises the Agency's duties, powers and interests and their relationship to land-use planning.

Agency Duty	The Agency has powers to:	The Agency has an interest (but no powers) in:	Partnership
<p><b>Water Resources</b></p> <p>The Agency has a duty to conserve, redistribute, augment and secure the proper use of water resources.</p>	<ul style="list-style-type: none"> <li>● Grant or vary water abstraction and impoundment licences on application with appropriate conditions imposed to safeguard the needs of the environment whilst allowing reasonable and justified use of available and sustainable water resources – with the aim of achieving an equitable balance between competing demands.</li> <li>● Revoke or vary existing licences to reinstate flows or levels to surface waters or groundwater which have become depleted as a result of abstraction. Compensation may be payable if such powers are used.</li> <li>● Secure the proper use of water resources through its role in water resources planning, and the assessment of reasonable need for abstractions and the promotion of more efficient use of water resources.</li> <li>● Monitor and enforce abstraction and impoundment licence conditions.</li> <li>● Issue conservation notices to direct appropriate practices with regard to water resources issues associated with exempt dewatering activities.</li> </ul>	<ul style="list-style-type: none"> <li>● The more efficient use of water by water companies, developers, industry, agriculture and the public and the introduction of water-efficiency measures and suitable design and layout of the infrastructure.</li> <li>● Protecting the water environment from any adverse impact due to proposed major developments.</li> </ul>	<ul style="list-style-type: none"> <li>● The Agency uses its position as a statutory consultee to the planning authorities to secure conditions and agreements that protect the water environment and that encourage water conservation measures.</li> <li>● The Agency also seeks to influence planning decisions for new development by ensuring that planning authorities allow for any lead time required for resource development.</li> <li>● The Agency is committed to water-demand management and will work closely with water companies and developers, local authorities and relevant organizations to promote the efficient use of water.</li> <li>● The Agency acknowledges that new resources may be needed in the future and supports a twin-track approach of planning for water resource development alongside the promotion of demand-management measures.</li> </ul>

Agency Duty	The Agency has powers to:	The Agency has an interest (but no powers) in:	Partnership
<p><b>Flood Defence</b></p> <p>The Agency has a duty to exercise general supervision over all matters relating to flood defence throughout each catchment.</p>	<ul style="list-style-type: none"> <li>● Control, through Land Drainage consents, of development within 8 m of main river (Water Resources Act 1991, Section 109) or construction of a structure that would affect the flow of an ordinary watercourse (Land Drainage Act, 1991 Section 23).</li> <li>● Produce flood risk maps for all main rivers under S105 of Water Resources Act 1991.</li> <li>● Undertake works to main rivers using permissive powers.</li> <li>● Issue flood warnings relating to main river to the public, local authorities and the police.</li> <li>● Consent mineral working within 16 m of main rivers.</li> </ul>	<ul style="list-style-type: none"> <li>● Granting of planning permission throughout a catchment but especially floodplains where development can significantly increase flood risk. This permission is granted by local planning authorities.</li> <li>● Installation of surface water source control measures e.g. flood attenuation structures.</li> <li>● Supervising the maintenance of ordinary watercourses which is a local authority remit, but may impact on main rivers.</li> <li>● Installation of buffer zones which reduce flood risk and have significant environmental benefits.</li> <li>● Urban and rural land use and measures that can reduce flood risk or the need for watercourse maintenance.</li> </ul>	<ul style="list-style-type: none"> <li>● As a statutory consultee on planning applications within main river floodplains the Agency offers advice based on knowledge of flood risk. It also advises on the environmental impacts of proposed floodplain development.</li> <li>● The Agency will encourage best practice, including source control measures and common standards, among local authorities and riparian owners to protect and enhance the environment.</li> <li>● The Agency works with the civil authorities to prepare flood warning dissemination plans and supports their endeavours to protect communities at risk.</li> </ul>
<p><b>Water Quality</b></p> <p>The Agency has a duty to monitor, protect, manage and, where possible, enhance the quality of all controlled waters including rivers, groundwaters, lakes, canals, estuaries and coastal waters through the prevention and control of pollution.</p>	<ul style="list-style-type: none"> <li>● Issue discharge consents to control pollution loads in controlled waters.</li> <li>● Regulate discharges to controlled waters in respect of water quality through the issue and enforcement of discharge consents.</li> <li>● Issue 'works notices' and enforcement notices where action is required to reduce the risk of pollution.</li> <li>● Prosecute polluters and recover the costs associated with incidents.</li> <li>● Serve prohibition notices (with or without conditions) on highway authorities to require treatment and pollution measures for highway runoff.</li> </ul>	<ul style="list-style-type: none"> <li>● The greater use of source control measures to reduce pollution by surface water runoff.</li> <li>● Prevention and education campaigns to reduce pollution incidents.</li> <li>● The provision of highway runoff control measures, which is a highway authority remit.</li> </ul>	<ul style="list-style-type: none"> <li>● The Agency will liaise with local authorities, developers, the Highways Agency, industry and agriculture to promote pollution prevention and the adoption of source control measures. As a statutory consultee on planning applications, the Agency will advise local planning authorities on the water quality impact of proposed developments.</li> </ul>

Agency Duty	The Agency has powers to:	The Agency has an interest (but no powers) in:	Partnership
<p><b>Air Quality</b></p> <p>The Agency has a duty to implement Part 1 of the Environmental Protection Act 1990.</p>	<ul style="list-style-type: none"> <li>● Regulate the largest technically complex and potentially most polluting prescribed industrial processes such as refineries, chemical works and power stations including enforcement of, and guidance on, BATNEEC and BPEO.</li> <li>● Have regard to the government's National Air Quality Strategy when setting standards for the releases to air from industrial processes.</li> </ul>	<ul style="list-style-type: none"> <li>● The vast number of smaller industrial processes which are controlled by local authorities.</li> <li>● Control over vehicular emissions and transport planning.</li> </ul>	<ul style="list-style-type: none"> <li>● The Agency provides data on IPC processes and advice on planning applications to local authorities. The Agency is willing to offer its technical experience to local authorities on the control of air pollution. The Agency wishes to liaise with local authorities in the production of their Air Quality Management Plans. The Agency will advise and contribute to the government's National Air Quality Strategy.</li> </ul>

<p><b>Radioactive Substances</b></p> <p>The Agency has a duty under the Radioactive Substances Act 1993 to regulate the use of radioactive materials and the disposal of radioactive waste.</p>	<ul style="list-style-type: none"> <li>● To issue certificates to users of radioactive materials and disposers of radioactive waste, with an overall objective of protecting members of the public.</li> </ul>	<ul style="list-style-type: none"> <li>● The health effects of radiation.</li> </ul>	<ul style="list-style-type: none"> <li>● The Agency will work with users of the radioactive materials to ensure that radioactive wastes are not unnecessarily created, and that they are safely and appropriately disposed of. The Agency will work with MAFF to ensure that the disposal of radioactive waste creates no unacceptable effects on the food chain.</li> <li>● The Agency will work with the Nuclear Installations Inspectorate to ensure adequate protection of workers and the public at nuclear sites. The Agency will work with the HSE on worker protection issues at non-nuclear sites.</li> </ul>
---	--	--	--

<p><b>Waste Management</b></p> <p>The Agency has a duty to regulate the management of waste, including the treatment, storage, transport and disposal of controlled waste, to prevent pollution of the environment, harm to public health or detriment to local amenities.</p>	<ul style="list-style-type: none"> <li>● Vary waste management licence conditions.</li> <li>● Suspend and revoke licences.</li> <li>● Investigate and prosecute illegal waste management operations.</li> </ul>	<ul style="list-style-type: none"> <li>● The siting and granting of planning permission for waste management facilities. This is conducted by the waste industry and local planning authorities. The Agency, as a statutory consultee on planning applications, can advise on such matters.</li> </ul>	<ul style="list-style-type: none"> <li>● The Agency will work with waste producers, the waste management industry and local authorities to reduce the amount of waste produced, increase re-use and recycling and improve standards of disposal.</li> </ul>
--	---	--	---

Agency Duty	The Agency has powers to:	The Agency has an interest (but no powers) in:	Partnership
<b>Contaminated Land</b>			
<p>The Agency has a duty to develop an integrated approach to the prevention and control of land contamination, ensuring that remediation is proportionate to risks and cost-effective in terms of the economy and environment.</p>	<ul style="list-style-type: none"> <li>● Regulate the remediation of contaminated land designated as special sites.</li> <li>● Prevent future land contamination by means of its IPC, Water Quality and other statutory powers.</li> <li>● Report on the state of contaminated land.</li> </ul>	<ul style="list-style-type: none"> <li>● Securing with others, including local authorities, landowners and developers, the safe remediation of contaminated land.</li> </ul>	<ul style="list-style-type: none"> <li>● The Agency supports land remediation and will promote this with developers and local authorities and other stakeholders.</li> </ul>
<b>Conservation</b>			
<p>The Agency will further conservation, wherever possible, when carrying out water management functions; have regard to conservation when carrying out pollution control functions; and promote the conservation of flora and fauna which are dependent on an aquatic environment.</p>	<ul style="list-style-type: none"> <li>● The Agency has no direct conservation powers but uses its powers with regard to water management and pollution control to exploit opportunities for furthering and promoting conservation.</li> </ul>	<ul style="list-style-type: none"> <li>● The conservation impacts of new development. These are controlled by local planning authorities.</li> <li>● Protection of specific sites or species, which is a function of English Nature. The Agency does, however, provide advice to local authorities and developers to protect the integrity of such sites or species.</li> <li>● Implementation of the UK Biodiversity Plan for which it is the contact point and/or lead partner for 35 'priority' species.</li> </ul>	<ul style="list-style-type: none"> <li>● The Agency supports action to sustain or improve natural and man-made assets so that they are made available for the benefit of present and future generations. Many development schemes have significant implications for conservation. The Agency will work with developers, local authorities, conservation bodies and landowners to conserve and enhance biodiversity.</li> </ul>
<b>Landscape</b>			
<p>The Agency will further landscape conservation and enhancement when carrying out water management functions; have regard to the landscape when carrying out pollution control functions; and promote the conservation and enhancement of the natural beauty of rivers and associated land.</p>	<ul style="list-style-type: none"> <li>● The Agency must further the conservation and enhancement of natural beauty when exercising its water management powers and have regard to the landscape in exercising its pollution control powers.</li> </ul>	<ul style="list-style-type: none"> <li>● The landscape impact of new development, particularly within river corridors. This is controlled by local planning authorities.</li> </ul>	<ul style="list-style-type: none"> <li>● The Agency produces River Landscape Assessments and Design Guidelines which it uses when working with local authorities and developers to conserve and enhance diverse river landscapes.</li> </ul>

Agency Duty	The Agency has powers to:	The Agency has an interest (but no powers) in:	Partnership
<p><b>Archaeology</b></p> <p>The Agency has a duty to consider the impact of all of its regulatory, operational and advising activities upon archaeology and heritage, and implement mitigation and enhancement measures where appropriate.</p>	<ul style="list-style-type: none"> <li>● The Agency must promote its archaeological objectives through the exercise of its water management and pollution control powers and duties.</li> </ul>	<ul style="list-style-type: none"> <li>● Direct protection or management of sites of archaeological or heritage interest. This is carried out by local planning authorities, County Archaeologists and English Heritage.</li> </ul>	<ul style="list-style-type: none"> <li>● The Agency will liaise with those organizations which have direct control over archaeological and heritage issues to assist in the conservation and enhancement of these interests.</li> </ul>
<p><b>Fisheries</b></p> <p>The Agency has a duty to maintain, improve and develop salmon, trout, freshwater and eel fisheries.</p>	<ul style="list-style-type: none"> <li>● Regulate fisheries by a system of licensing.</li> <li>● Make and enforce fisheries byelaws to prevent illegal fishing.</li> <li>● Promote the free passage of fish and consent fish passes.</li> <li>● Monitor fisheries and enforce measures to prevent fish entrapment in abstractions.</li> <li>● Promote its fisheries duty by means of land drainage consents, water abstraction applications and discharge applications.</li> </ul>	<ul style="list-style-type: none"> <li>● The determination of planning applications which could affect fisheries.</li> </ul>	<ul style="list-style-type: none"> <li>● Many development schemes have significant implications for fisheries. The Agency will work with anglers, riparian owners, developers and local authorities to protect fisheries.</li> </ul>
<p><b>Recreation</b></p> <p>The Agency has a duty to promote rivers and water space for recreational use.</p>	<ul style="list-style-type: none"> <li>● The Agency contributes towards its recreation duty through the exercise of its statutory powers and duties in water management.</li> </ul>	<ul style="list-style-type: none"> <li>● Promotion of water sports. The Sports Council and other sport bodies carry this out.</li> </ul>	<ul style="list-style-type: none"> <li>● The Agency will work with the Countryside Commission, the Sports Council, British Waterways and other recreational and amenity organizations to optimise recreational use of the water environment.</li> </ul>

## Appendix One

### The RQO Classification

The water quality targets that we use in all rivers are known as River Quality Objectives (RQOs). RQOs are used for managing water quality and are based on the River Ecosystem (RE) classification scheme (NRA 1994), which replaces the former NWC scheme. In 1996 the Environment Agency put forward proposals to the Secretary of State for the Environment for Statutory Water Quality Objectives (SWQOs) to be set in eight pilot catchments across the country. These proposals are still being considered by the Secretary of State.

These classes reflect the chemical quality needed by different types of river ecosystem including the types of fishery they can support. We set RQOs based on the need to protect current water quality and future use.

### Standards for the Five River Ecosystem Use Classes

Use Class	DO % sat 10%ile	BOD (ATU) mg/l 90%ile	Total Ammonia mgN/l 90%ile	Un-ionised Ammonia mgN/l 95%ile	pH 5%ile & 95%ile	Hardness mg/l CaCO <sub>3</sub>	Dissolved Copper µg/l 95%ile	Total Zinc µg/l 95%ile	Class Description
1	80	2.5	0.25	0.021	6.0 - 9.0	≤10 >10 and ≤50 >50 and ≤100 >100	5 22 40 112	30 200 300 500	Water of very good quality suitable for all fish species.
2	70	4.0	0.6	0.021	6.0 - 9.0	≤10 >10 and ≤50 >50 and ≤100 >100	5 22 40 112	30 200 300 500	Water of good quality suitable for all fish species.
3	60	6.0	1.3	0.021	6.0 - 9.0	≤10 >10 and ≤50 >50 and ≤100 >100	5 22 40 112	300 700 1,000 2,000	Water of fair quality suitable for high- class coarse fish populations.
4	50	8.0	2.5		6.0 - 9.0	≤10 >10 and ≤50 >50 and ≤100 >100	5 22 40 112	300 700 1,000 2,000	Water of fair quality suitable for coarse fish populations.
5	20	15.0	9.0						Water of poor quality which is likely to limit coarse fish populations.

## Appendix Two

## River Quality Objectives (see also Map 3)

River	Stretch	RQO	LT RQO
Exe	Source – Below Exford STW	1	
Exe	Below Exford STW – Chilly Bridge	1	
Exe	Chilly Bridge – Exebridge	1	
Exe	Exebridge – Halfpenny Bridge	1	
Exe	Halfpenny Bridge – Collipriest Tiverton	1	
Exe	Collipriest Tiverton – Below Tiverton STW	1	
Exe	Below Tiverton STW – Bickleigh Castle	2	1
Exe	Bickleigh Castle – Thorverton Gauging Station	2	1
Exe	Thorverton Gauging Station – Stafford Bridge	2	
Exe	Stafford Bridge – Normal Tidal Limit	2	
Kenn	Source – A38 Bridge Kennford	3	2
Kenn	A38 Bridge Kennford – Normal Tidal Limit	2	
Polly Brook	Source – Normal Tidal Limit	2	
Alphin Brook	Source – Dymonds Bridge	2 (1999)	
Alphin Brook	Dymonds Bridge – Footbridge Alphington	2	
Alphin Brook	Footbridge Alphington – Normal Tidal Limit	2	
Exeter Canal	Source – Normal Tidal Limit	3	
Clyst	Source – Clyst Hydon	4	2
Clyst	Clyst Hydon – Clyst St Lawrence	4	2
Clyst	Clyst St Lawrence – Ashclyst Farm	3	2
Clyst	Ashclyst Farm – B1381 Bridge Broadclyst	3	2
Clyst	B1381 Bridge Broadclyst – A30 Bridge Clyst Honiton	2 (1999)	
Clyst	A30 Bridge Clyst Honiton – Normal Tidal Limit	2 (1999)	
Grindle Brook	Source – Clyst Confluence	3	2
Aylesbeare Stream	Source – Clyst Confluence	3	2
Cranny Brook	Yellands – Barnshayes	2	
Cranny Brook	Barnshayes – Crannaforde Crossing	3	2
Cranny Brook	Crannaforde Crossing – Clyst Confluence	3	2
Ford Stream (Exe)	Source – Cranny Brook Confluence	3	2
North Brook	Source – Normal Tidal Limit	3	2
Creedy	Source – Ashridge Bridge	2	
Creedy	Ashridge Bridge – Creedy Bridge	2 (2000)	
Creedy	Creedy Bridge – Westacott Cottages	3	2
Creedy	Westacott Cottages – Exe Confluence	2	
Jackmoor Brook	Source – Creedy Confluence	2	
Shobrooke Lake	Source – Creedy Confluence	2	
Yeo (Creedy)	Binneford – Gunstone Mills	2	
Yeo (Creedy)	Gunstone Mills – Creedy Confluence	2	
Culvery River	Source – Yeo (Creedy) Confluence	2	
Ford Brook (Exe)	Source – Yeo (Creedy) Confluence	1	
Hollacombe Lake	Source – Pitt Stream Confluence	5	2
Pitt Stream	Source – Yeo (Creedy) Confluence	2	
Troney	Source – Yeo (Creedy) Confluence	2	
Cole Brook (Exe)	Source – Troney Confluence	2	
Holly Water	Source – Creedy Confluence	2 (2000)	
Binneford Water	Source – Creedy Confluence	2	
Culm	Source – Bridgehouse Bridge Clayhidon	2	1
Culm	Bridgehouse Bridge Clayhidon – Culmstock	2	1
Culm	Culmstock – Uffculme	2	

Culm	Uffculme – Skinner's Farm Willand	2	
Culm	Skinner's Farm Willand – Higher Upton Farm	3	2
Culm	Higher Upton Farm – Below Cullompton STW	3	2
Culm	Below Cullompton STW – Below Weir	3	2
Culm	Below Weir – Downstream Silverton Mill	3	2
Culm	Below Silverton Mill – Exe Confluence	3	2
Weaver	Source – Higher Weaver	3	2
Weaver	Higher Weaver – Culm Confluence	2	
Spratford Stream	Source – Leonard Moor Bridge	2 (1999)	
Spratford Stream	Leonard Moor Bridge – Above Strong Rawle & Strong	2	
Spratford Stream	Above Strong Rawle & Strong – Below Strong Rawle & Strong	3	2
Spratford Stream	Below Strong Rawle & Strong – Five Bridges	3	2
Spratford Stream	Five Bridges – Culm Confluence	3	2
Sheldon Stream	Source – Culm Confluence	2	
Madford River	Source – Dunkeswell Abbey	1	
Madford River	Dunkeswell Abbey – Culm Confluence	2	1
Bolham River	Source – Madford Confluence	2	1
Dunkeswell Stream	Source – Madford Confluence	1 (2000)	
Dart (Exe)	Source – B3137 Bridge Bradley	2	
Dart (Exe)	B3137 Bridge Bradley – Exe Confluence	2	
Grand Western Canal	Source – Fenacre Bridge	4	3
Grand Western Canal	Fenacre Bridge – End	5	3
Lowman	Source – Craze Lowman	2	
Lowman	Craze Lowman – Exe Confluence	2	
Uplowman Stream	Source – Lowman Confluence	2	
Bathern	Ranscombe – Exe Confluence	1	
Iron Mill Stream	Source – Exe Confluence	1	
Brockey River	Source – Exe Confluence	1	
Barle	Source – Simonsbath	1	
Barle	Simonsbath – Tarr Steps	1	
Barle	Tarr Steps – Below Dulverton Laundry	1	
Barle	Below Dulverton Laundry – Exe Confluence	1	
Dane's Brook	Source – Barle Confluence	1	
Sherdon Water	Source – Barle Confluence	1	
Haddeo	Source – Wimbleball Reservoir Inflow	1	
Haddeo	Wimbleball Reservoir – Exe Confluence	1	
Pulham	Source – Haddeo Confluence	1	
Quarme	Source – Exe Confluence	1	
Dawlish Water	Source – Mean High Water	2	

## Appendix Three

### The Biological Monitoring Working Party (BMWP) Score, Average Score Per Taxon (ASPT) and Ecological Quality Indices

These biotic indices are used to relate the invertebrates present in a watercourse to its water quality.

#### The BMWP Score

This score was developed by the Biological Monitoring Working Party for the 1980 Water Quality Survey of England and Wales and is internationally accepted as a means of assessing water quality.

The system allocates invertebrate families (or taxa) a score between 1 and 10, according to their tolerance to organic pollution (i.e. the lower the number, the more tolerant the organism is to pollution). The BMWP score is the sum of the scores of each family (taxon) recorded in the sample. The Average Score Per Taxon (ASPT) is obtained by dividing the BMWP score by the total number of families (N-taxa), giving an average BMWP score for that sample. The higher the value for ASPT, generally speaking the better the water quality indicated for that sample site.

#### Ecological Quality Indices and the Biological Classification

Biological class is obtained by calculating the Ecological Quality Indices (EQI) for the number of families (N-Taxa) and the ASPT. The EQI is the ratio between the observed value calculated for the sample and predicted value obtained using a computer model, RIVPACS III+ (River Invertebrate Prediction and Classification System). This predicts the fauna and scores to be expected for the site under clean, unpolluted conditions, using various physical and chemical parameters. If the observed values are significantly below those predicted, the indications are that the site is impacted by pollution or physically degraded.

The biological classes and their lower EQI limits are shown below:

Biological Class	Class Description	Lower Class Limits	
		EQI ASPT	EQI N-taxa
a	Very Good	1.00	0.85
b	Good	0.90	0.70
c	Fairly Good	0.77	0.55
d	Fair	0.65	0.45
e	Poor	0.50	0.30
f	Bad	<0.50	<0.30

The worst predictor determines the GQA classification.

## Appendix Four

**EC Surface Water Abstraction Directive** - The EC Directive concerning the quality required of surface water intended for the abstraction of drinking water in the Member States (75/440/EEC) protects the quality of surface water used for public supply. This Directive ensures that water abstracted for public supply meets certain quality standards and is given adequate treatment before entering public water supplies.

The Directive sets out standards that must be achieved, for water for public supply, which is to be given different levels of treatment.

We are responsible for monitoring the quality of designated surface water abstractions and reporting the results to the DETR, who decide whether the standards in the Directive have been met. Where standards are not met, we are responsible for identifying sources of pollution and making sure that improvements are made.

SITE	FAILING DETERMINANDS	POSSIBLE CAUSE OF FAILURE	ACTION TAKEN
Thornes intake at Kenton	Colour 1996, 1997, 1998	Runoff following heavy rain	Waiver applied for. No further action.
Thornes intake at Kenton	Dissolved Iron 1997, 1998	None of the exceedences at this site were connected to any reported pollution incidents. Exceedences were associated with periods of high rainfall when the river was in spate. Conclusion was heavy rain caused runoff which contributed to the dissolved iron failure.	Waiver applied for no further action deemed necessary.
Wimbleball Reservoir	Dissolved and Emulsified Hydrocarbons 1995, 1997. See Note 1 below.		No action is proposed for this non-compliance.
Wimbleball Reservoir	Phenols 1997	A result of a single exceedence not related to any pollution event. Historical water quality trends are good as is biological status of site.	No further action deemed necessary, other than to investigate should further exceedences occur during the year.
River Exe intake at Bolham	Dissolved and Emulsified Hydrocarbons 1994. See Note 1 below.		No further action deemed necessary.

Note 1: Failures for dissolved and emulsified hydrocarbons are methodological failures, not issue related failures. A new lower Limit of Detection is now in place and results so far confirm the apparent failures are unlikely to have been real. The results using the lower Limit of Detection are compliant.

**EC Nitrate Directive** - This Directive requires member states to designate areas where groundwater or surface water are vulnerable to pollution by agricultural nitrates. These areas are called Nitrate Vulnerable Zones (NVZs). In the River Exe Catchment there is one such designation, for the groundwater supplies at Duckaller and Vennbridge. Within NVZs farmers are obliged to follow an Action Plan to limit the amount of nitrate applied to the land. The Action Plans came into force in December 1998, the Agency is responsible for ensuring that they are complied with.

The Directive requires us to review the quality of groundwater and surface water every four years, to see if additional NVZs should be proposed by MAFF. The next such review is due in 2001.

The former scheme for agricultural nitrate control (Nitrate Sensitive Areas) has now ended.

**EC Bathing Waters Directive** - The EC Directive concerning the quality of bathing water (76/160/EEC) seeks to protect public health and the amenity value of popular bathing waters by reducing pollution. The Directive contains standards for nineteen microbiological, physical and chemical parameters to assess bathing water quality. Compliance is assessed mainly by testing against standards for faecal indicator bacteria.

We are responsible for monitoring the quality of identified, popular bathing waters and providing the results to the DETR who decide whether the standards in the Directive have been met. Where identified bathing waters fail to meet the Directive, we are responsible for identifying sources of pollution that are causing failures, and making sure that improvements are made.

There are six identified EC Bathing Waters in the catchment, Exmouth, Dawlish Warren, Dawlish (Town), Dawlish (Coryton Cove), Sandy Bay and Teignmouth (Holcombe). Compliance history is given below. None of these bathing waters failed in 1998.

	1991	1992	1993	1994	1995	1996	1997	1998	1999
Exmouth	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Fail
Dawlish Warren	Pass								
Dawlish (Town)	Pass	Fail	Pass						
Dawlish (Coryton Cove)	Pass	Fail							
Sandy Bay	Pass	Pass	Fail	Pass	Pass	Pass	Pass	Pass	Pass
Teignmouth (Holcombe)	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Pass	Pass

Improvements at Dawlish will be carried out under the Urban Waste Water Treatment Directive by the end of March 2001.

The Agency priority is to ensure compliance with the mandatory standards of the Bathing Waters Directive. We will also seek compliance with guideline standards where this is achievable taking into consideration costs and benefits.

**EC Urban Waste Water Treatment Directive** – The EC Directive *concerning urban wastewater treatment* (91/271/EEC) specifies minimum standards for sewage treatment and sewage collection systems.

This Directive specifies that secondary treatment must be provided for all discharges serving population equivalents greater than 2,000 to inland waters and estuaries, and greater than 10,000 to coastal waters. Discharges below these population equivalents receive appropriate treatment as defined in the AMP2 guidance note. We are responsible for making sure that discharges receive the level of treatment specified in this Directive. See Issue 2, Table 2 and Issue 4.

This Directive also requires higher standards of treatment for discharges to *sensitive* areas. Sensitive areas are those waters that receive discharges from population equivalents of greater than 10,000, and are or may become eutrophic in the future.

The DETR decide if a watercourse is sensitive based on monitoring information provided to them by the Environment Agency. We also ensure that discharges to sensitive areas receive a higher level of treatment if required.

**EC Dangerous Substances Directive** – The EC Directive *on pollution caused by certain substances discharged in the aquatic environment of the community* (76/464/EEC) protects the water environment by controlling discharges to rivers, estuaries and coastal waters. This Directive describes two lists of compounds: List I contains substances regarded as particularly dangerous because they are toxic, they persist in the environment and they bioaccumulate (build up in animal tissue). List II contains substances which are considered to be less dangerous, but which still can have a harmful effect on the water environment. See Issue 2.

Several industries in the Exe Catchment are authorised by SWW Ltd to discharge List I substances to the sewer. These substances are passed to STWs with sewage for treatment. The Agency monitors sites in the receiving water downstream of STWs consented to discharge List I substances. Since 1994 there have been no List I Environmental Quality Standard (EQS) exceedences at any of the sites monitored in the Exe.

We monitor four sites downstream of discharges containing List II substances in the Exe Catchment.

**EC Freshwater Fish Directive** – The EC Directive *on the quality of waters needing protection or improvement in order to support fish life* (78/659/EEC) ensures that water quality in designated stretches of water is suitable for supporting certain types of fish.

This Directive contains two sets of quality standards. One set of standards protects cyprinid or coarse fish populations for example roach and chub. The other set of standards that are stricter, protects salmonid or game fish populations for example, salmon and trout.

We are responsible for monitoring the quality of identified fisheries and reporting the results to the DETR who decide whether the standards in the Directive have been met. Where the requirements of this Directive are not met, we are responsible for identifying sources of pollution and making sure that improvements are made. See Issue 4.

**EC Shellfish Waters Directive** – The Shellfish Waters Directive *on the quality required of shellfish waters (79/923/EEC)* protects shellfish populations (defined as bivalve and gastropod molluscs) from harm caused by pollution. We are responsible for monitoring the quality of designated shellfish waters and reporting the results to the DETR who decide whether the standards in the Directive have been met. Where standards are not met, we are responsible for identifying sources of pollution and making sure that improvements are made. See Section 3.3.

**EC Shellfish Hygiene Directive** – The EC Shellfish Hygiene Directive *laying down the health conditions for the production and the placing on the market of live bivalve molluscs (91/492/EC)* protects the health of consumers of live bivalve molluscs such as mussels and oysters. This Directive defines levels of treatment required before the product is placed on the market, depending on shellfish flesh quality. It also classifies bivalve mollusc shellfish harvesting areas into four categories according to the concentrations of bacteria found in the shellfish flesh.

The Ministry of Agriculture, Fisheries and Food (MAFF) and the Department of Health (DoH) share responsibility for this Directive in England and Wales. We have only a minor role in implementing this Directive. The Shellfish Hygiene Directive does not provide the Environment Agency with direct powers to control the quality of polluting discharges. However, the Agency will apply its policy of 'no deterioration' to protect shellfish beds which are subject to the Shellfish Hygiene Directive from discharges. See Section 3.3.

## Appendix Five – List of Consultees who Responded

### National Organizations

The Atlantic Salmon Trust  
 British Canoe Union  
 Clean Rivers Trust  
 Council for the Protection of Rural England  
 English Nature  
 Farming and Wildlife Advisory Group  
 Forestry Commission  
 The Hawk and Owl Trust  
 The Inland Waterways Association  
 Institute of Freshwater Ecology  
 National Farmers Union  
 The Ramblers' Association  
 Royal Holloway Institute for Environmental Research  
 Royal Society for the Protection of Birds  
 Royal Yachting Association  
 Sport England

### Regional and Local Organizations

Bickleigh Parish Council  
 Bradninch Town Council  
 City of Plymouth  
 Culmstock Parish Council  
 Devon Bird Watching and Preservation Society  
 Devon County Council  
 Devon Sea Fisheries Committee  
 Devon Wildlife Trust  
 East Devon District Council  
 Estuary Management Partnership  
 Exe Valley Fishery  
 Exminster Parish Council  
 Exmoor National Park Authority  
 The Exmoor Society  
 Exmouth Town Council  
 Faraway Wildlife  
 Lympstone Parish Council  
 Mead Specialty Paper  
 Morebath Parish Council  
 Pynes Fishing Limited  
 Renewable Heat and Power Limited  
 The River Exe & Tributaries Association  
 Sandford Parish Council  
 Somerset Archaeological and Natural History Society  
 Somerset Rural Development Area  
 South West Water Limited  
 Teignbridge District Council  
 Wessex Water Services Limited  
 West Country Tourist Board  
 West Dorset District Council  
 Willand Parish Council  
 Further responses were received from members of the public.

## Appendix Six – Actions from the Consultation Draft July 1999

Consultation Draft Issue Number	Proposed Action	Number in this Action Plan
Issue 1	New Action for Action Plan	1a
	New Action for Action Plan	1b
	New Action for Action Plan	1c
	New Action for Action Plan	1d
	a. Investigate cause of elevated BOD on River Exe from Bickleigh Castle to Thorverton Gauging Station.	passed 1998 dropped
	b. Promote the Agency's new 'Diffuse Pollution From Agriculture' leaflet among farmers in Kenn and Alphinbrook Catchments.	1e
	c. Review the results of monitoring of the River Clyst from Clyst Hydon to Clyst St Lawrence to see if RQO failure recurred in 1998.	1f
	d. Check for any further illegal discharges to the River Clyst upstream of Clyst St Lawrence.	completed
	e. Improve drainage at a farm in the vicinity of the monitoring point on the Clyst at the (A38) B1381 Bridge Broadclyst.	1g
	f. Feeder streams upstream of the River Culm are currently subject to farm campaigns (winter 1998/99). Investigate impact of pig units.	completed new 1h
	g. Arrange pollution prevention farm campaigns in the Creedy catchment (including the River Yeo).	completed
	New Action for Action Plan	1i
	h. Promote good agricultural practice for slurry/dung spreading on the River Weaver.	passed 1998 dropped
	i. Review the 1998 monitoring data and decide further action on the River Dart from B3137 Bridge Bradley to the Exe Confluence.	1j
j. Arrange pollution prevention visits for the Binneford Water.	1k	
New Action for Action Plan	1l	
New Action for Action Plan	1m	
Issue 2	a. Investigate causes of failure of the River Exe from below Tiverton STW to Bickleigh Castle.	passed 1998 dropped
	New Action for Action Plan	2a
	New Action for Action Plan	2b
	New Action for Action Plan	2c
	New Action for Action Plan	2d
	New Action for Action Plan	2e
	New Action for Action Plan	2f
	b. Review the results of monitoring of the Dunkeswell Stream from its source to the Madford Confluence to see if RQO failure recurs in 1998.	2g
	c. Negotiate with EDDC and farmer over improvements to the discharges from EDDC STW at Clyst Hydon and farm effluent from Langford Court South.	2h
	d. Conduct two wet weather and two dry weather surveys of the North Brook in 1999.	completed
	e. Improvement to the North Brook CSO are planned within the AMP3 period. Investigations into the impacts of Mincinglake Closed Landfill site.	2i
	f. Continue to monitor performance at Cullompton STW, with its new humus tank, and review the results of monitoring of the River Culm 'Below Weir' and monitoring 'd/s Silverton Mill' to see if the RQO failures recur.	2j
	g. Include copper in the final effluent analysis for Dunkeswell and Dulverton STWs and in upstream monitoring.	2k
	Issue 3	a. Pursue DCC to instigate a comprehensive site investigation at Ashley, Tiverton to determine a sustainable remediation package which can be implemented to an agreed time scale.

Consultation Draft Issue Number	Proposed Action	Number in this Action Plan
	b. Complete and implement the remediation statement which will include improvements to the Punchbowl Landfill leachate collection system.	3b
	c. The Agency is co-ordinating discussions between paper sludge and abattoir wastes producers in order to carry out composting trials with the aim of subsequently recycling the end-product to land.	3c
	d. The Agency is currently reviewing the spreading of wastes to agricultural land and to determine whether or not there is indeed agricultural benefit, and that the activity involves the recycling of materials and is not a disposal route for unwanted waste streams. If not, the activity will not qualify for an exemption from requiring a waste management licence.	3d
Issue 4	a. Draw up an Exeter Canal Management Plan in partnership with a number of other organizations.	4a
	b. Following installations of a flushing sluice in Grand Western Canal review 1998 monitoring data to see if failure recurs.	4b
	c. Support the development of a prescriptive management plan for the Grand Western Canal with DCC including weed cutting programme.	4c
Issue 5	a. Carry out Level B studies after close liaison with relevant planning authorities.	5a
	b. Consultants to complete Flood Warning Levels of Service Study.	Completed
	c. Implement improvements as regional priority list – figures not available until priority lists produced in 1999. Implement Major Incident Plans for Tiverton and Exeter.	5b Tiverton and Exeter incident plans completed
	d. Support production of document(s) covering entire area to provide a better understanding of archaeological/historic value of catchment, particularly water-based historic and archaeological features.	5c
	e. Work with site owners to ensure that industrial sites upstream of Pynes Intake identified during risk assessments take necessary remedial action.	no failure since 1994, dropped
Issue 6	a. Mediate between interested parties to investigate opportunities for extending/creating existing/new canoe access agreements.	6a
	b. Encourage discussion between interested parties to investigate the possibilities for improving canoe ingress and egress points within the catchment.	6b
	c. Encourage access improvements along the Exe Valley Way.	6c
	d. Review and develop Rivercall system.	6d
	e. Develop and implement a management plan for the Exwick Flood Relief Channel.	6e
	f. Review possibilities with other agencies for carrying out enhancements to Tiverton scheme.	6f
	g. Develop and implement enhancements for Alphinbrook scheme.	6g
	h. Support principle of development of South Devon Cycle Route and appraise options linking Agency-owned land.	6h
Issue 7	a. Review 1998 and 1999 monitoring data to determine need for further action, following improvements at Aylesbeare STW.	7a
	b. Review 1998 monitoring data for the River Madford from source to the Culm Confluence and decide if any further action is required.	7b
	c. Investigate causes of failures on the River Bathern and the River Haddeo.	7c Haddeo passed 1998
	d. Review Surface Water Abstraction Directive data for 1999 at Wimbleball Reservoir and, if further failure occurs, initiate investigation.	7d
Issue 8	a. Identify areas for habitat creation within estuarine environments to compensate for losses.	15m (i)
	b. Implement habitat creation within estuarine environments to compensate for losses.	15m (ii)
	New Action for Action Plan.	8a
Issue 9	a. Implement and enforce national salmon byelaws.	9a

Consultation Draft Issue Number	Proposed Action	Number in this Action Plan
	b. Encourage voluntary catch and release of MSW salmon not protected by byelaws.	9b
	c. Develop Salmon Action Plan.	9c
	d. Provide adequate mitigation for Wimbleball Reservoir construction.	9d
	e. Investigate distribution, spawning activity and behaviour of spring salmon in the river to give us better information about their protection and enhancement.	9e
	f. Work with CEFAS to investigate the effect of reported fish diseases on fish stocks in the catchment.	9f
	New Action for Action Plan	9g
Issue 10	a. Undertake investigation into the decline of brown trout in the Devon rivers.	10a
Issue 11	a. Develop and implement solutions to improve conditions for fish migration at St James' and Exwick Weirs.	11a
	b. Improve conditions for fish migration at Fordton Weir and Head Weir on the Creedy.	11b
	c. Improve conditions for fish migration at Hele, Silverton, Higher and Lower Kingsmill.	11c
	d. Assess obstruction to fish migration on River Lowman.	11d
	e. Fisheries staff to visit problem abstraction sites and ensure that effective screens are installed.	11e
	Action 16a moved to Issue 11.	11f
Issue 12	a. Progress research into the effects of fish-eating birds. Disseminate findings of research and develop actions if appropriate.	12a
Issue 13	a. Revise the Regional Water Resources Development Strategy based on information received in the companies' water resources plans and estimates of non water company use and demand.	13a
	New Action for Action Plan	13b
Issue 14	a. Promote survey work to check distribution of declining species.	14a
	b. Encourage and co-operate in development of clear quality standards to protect key species.	14b
	c. Review air quality in the area, in line with National Air Quality Strategy.	14c
	d. Conduct research to improve understanding of effects of airborne acidification and eutrophication on semi-natural habitats and species.	14d
	e. Ensure all proposals (>10,000 ha) for afforestation within the areas of critical load exceedence receive an environmental impact assessment in line with the Forests and Water Guideline, Third Edition.	14e
	New Action for Action Plan.	14f
Issue 15	(i) Support updating of wildlife inventories.	15 (i)
Issue 15a	No action.	Same
Issue 15b	(i) Promote and implement actions from the Devon BAP for Wet Woodland – assist with assessment of extent of resource, seek potential new sites and promote use as buffer strips.	15b (i)
	(ii) Seek potential sites for millennium forest.	15b (ii)
Issue 15c	(i) Continue to develop MIRE Project on Exmoor, implement findings.	15c (i)
	(ii) Support measures from the National Habitat Statement for Blanket Bog, following targets within forthcoming Exmoor BAP.	15c (ii)
Issue 15d	(i) Promote and implement actions from the Devon BAP for Rhôs Pasture – includes supporting updating of 'Culm' inventory and encourage sympathetic management and/or restoration of sites and in addition discourage inappropriate creation of lakes/ponds within Rhôs pasture.	15d (i)
	(ii) Marsh Fritillary and Curlew – includes promoting sympathetic management and/or restoration of sites, agree targets by 2000.	15d (ii)
	(iii) Barn Owl – promote appropriate management of riparian feeding habitats, provide nest boxes to encourage recolonisation.	15d (iii)
Issue 15e	(i) Promote and implement actions from the South-west and Exmoor BAPs for Upland Heath – promote understanding of the need for controlled grazing and burning.	15e (i)

Consultation Draft Issue Number	Proposed Action	Number in this Action Plan
Issue 15f	(i) Promote and implement actions from the Devon and/or Exmoor BAPs for Rivers & Streams – provide guidance on best practice for riverbank management, promote the creation of riparian buffer strips through advice and provision of fencing, establish criteria for designation of rivers and streams as County Wildlife Sites, examine potential for creating demonstration sites for best working practice techniques, produce Consenting Protocol and Conservation Strategy for River Barle SSSI.	15f (i)
	New Action for Action Plan	15f (ii)
	(ii) Promote and implement actions from the Devon BAP for Fluvial Processes – promote measures to conserve, enhance or interpret earth science features linked to the water environment. In addition continue to support palaeochannels project.	15f (iii)
	(iii) Earth Science Features – support the identification/documentation of sites, promote understanding of the importance of geomorphology in natural river processes, and encourage measures to conserve, enhance or interpret earth science features linked to the water environment. Support identification and documentation of County Geological Sites (RIGS).	15f (iv)
	(iv) Promote and implement actions from the Devon BAP for Floodplains – develop proposals for priority restoration sites and implement to include floodplain woodland.	15f (v)
	(v) Promote and implement actions from Devon BAP for Otter – promote habitat creation/restoration. In addition continue post-mortem programme and identify road casualty blackspots by 2000.	15f (vi)
	(vi) Promote and implement actions from the Devon BAP for Water Vole – support survey to identify core populations, provide management advice, identify sites for habitat restoration and population re-establishment.	15f (vii)
	(vii) Promote and implement actions from the Devon BAP for Freshwater White-clawed Crayfish – survey, collate records, initiate appropriate habitat management.	15f (viii)
	(viii) Promote and implement actions from the Devon BAP for Atlantic Salmon – develop policy, safeguard sites, manage and protect species, provide advice, research and development.	15f (ix)
	(ix) River/Brook/Sea Lamprey – improve distribution records, assess status within catchment.	15f (x)
	(x) Promote and implement actions from the National BAP for Allis/Twaite Shad – increase public awareness of the shad, encourage recording for estuary and lower river.	15f (xi)
	(xi) Invertebrates of ERS – implement recommendations of ERS invertebrate R&D.	15f (xii)
	(xii) Promote and implement actions from the National BAP for River Jelly Lichen – in addition, determine status on the River Barle; if appropriate develop actions and targets for protection.	15f (xiii)
	(xiii) Invasive Plants – continue to monitor, encourage/facilitate control, raise public awareness of the issue, and continue to support control on River Barle SSSI.	15f (xiv)
	(xiv) Alder root disease ( <i>Phytophthora</i> ) – continue to raise public awareness, encourage reporting of diseased trees and provide guidance.	15f (xv)
	New Action for Action Plan	15f (xvi)
Issue 15g	(i) Promote and implement actions from the South-west BAP for Standing Open Water – ensure favourable management, encourage appropriate creation of new sites, and raise in addition public awareness of invasive plants.	15g (i)
Issue 15h	See Actions 4a, 4b and 4c.	Same
Issue 15i	(i) Promote and implement actions from the Devon and Exmoor BAPs for Lowland Heath – support and contribute towards implementing heathland restoration initiatives within the catchment.	15i (i)

Consultation Draft Issue Number	Proposed Action	Number in this Action Plan
	(ii) East Devon Pebblebed Heaths – investigate impact of abstractions on the integrity of the site, devise and implement appropriate actions.	15i (ii)
Issue 15j	No specific Action.	Same
Issue 15k	(i) Promote and implement actions from the Devon BAP for Grazing Marsh – in addition continue to develop Water Level Management Plan for Exminster Marshes and achieve objectives through implementation of actions, contribute to management of marshes and adjacent habitats to maintain range and numbers of Cetti's warblers.	15k (i)
	(ii) RSPB Lagoon Project – contribute to management of the operation of this project and monitor effects.	15k (ii)
	(iii) Creation of wetland habitat within Agency-owned sites on Exminster	15k (iii)
	New Action for Action Plan	15k (iv)
Issue 15l	(i) Promote and implement actions from the Devon BAP for Reedbed – encourage appropriate management of existing reedbeds, to ensure no loss of existing reedbed >0.5ha, promote and advise on the use of reedbeds for wildlife and pollutant/sewage effluent treatment.	15l (i)
	(ii) Continue to develop management plans for Agency landholdings to maximise conservation value of reedbeds. Complete by 2001.	15l (ii)
Issue 15m	(i) Promote and implement actions from the Devon BAP for Estuaries – investigate opportunities for the creation/restoration of saltmarsh through managed retreat.	15m (i)
	(ii) Promote and implement actions from the Devon BAP for Estuaries – contribute to the development and implementation of the Exe Estuary Management Plan, and support the development of a management statement for the Exe Estuary SPA.	15m (ii)
Issue 15n	(i) Promote and implement actions from the South-west BAP for Sand Dunes – in addition assist with the implementation of the Dawlish Warren management plan.	15n (i)
	(ii) Implement the Dawlish Warren Hydrology Project.	15n (ii)
Issue 15o	No specific Action.	Same
Issue 15p	(i) Encourage the management of scallop dredgers and beam trawlers in a manner that minimises potential damage to marine life.	15p (i)
Issue 16	a. Install and operate fish counter at Thorverton Weir.	Moved now under 11f
	New Issue 16 for Action Plan	16 a

## Glossary

**Above Ordnance Datum (AOD)** - land levels are measured relative to the average sea level at Newlyn in Cornwall. This average level is referred to as 'Ordnance Datum'. Contours on Ordnance Survey maps of the UK show heights in metres above Ordnance Datum.

**abstraction** - removal of water from surface or groundwater.

**acidification** - the detrimental effect of acid rain on soils and freshwater.

**algae** - a diverse group of simple aquatic plants, some microscopic, which may grow in rivers and the sea in great profusion (blooms).

**alien** - plant or animal not native to the country concerned.

**alluvial** - referring to materials eroded, transported and deposited by the action of river flow.

**ammonia** - a chemical found in water often as the result of discharge of sewage effluents. High levels of ammonia affect fisheries and abstractions for potable water supply.

**aquifer** - layer of porous rock able to hold or transmit water.

**Area of Outstanding Natural Beauty (AONB)** - designated by the Countryside Commission under the National Parks and Access to the Countryside Act 1942, to conserve and enhance the natural beauty of the landscape, mainly through planning controls.

**augmentation** - the addition of water by artificial input. Usually to 'top up' low river flows in the summer either by groundwater pumping or via reservoir release.

**biodiversity** - variety of wildlife and habitats.

**buffer zone** - strip of land, 10-100 m wide, alongside rivers which is removed from intensive agricultural use.

**catchment** - the total area from which a single river and its tributaries collect surface runoff.

**coarse fish** - cyprinid fish and other commonly associated species such as pike, perch and eels of angling significance. The term does not normally refer to minor species such as bullhead, stone loach, minnow and stickleback.

**confluence** - the point at which two rivers meet.

**controlled waste** - defined by the Control of Pollution Act 1974, Part 1 section 30. It includes household, industrial and commercial waste.

**Conservation Area** - the Planning (Listed Buildings and Conservation Areas) Act 1990 imposes on local planning authorities a duty to designate as conservation areas any 'areas of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance'. Conservation Area status is the main mechanism available to effect conservation policies over a particular neighbourhood or area, as opposed to individual buildings. Designation introduces a general control over the demolition of unlisted buildings and provides the basis for policies designed to preserve or define an area's special architectural or historic interest.

**controlled waters** - defined by the Water Resources Act 1991 Part III section 104. They include groundwaters and inland waters, estuaries and coastal waters to three nautical miles from the shore.

**critical load** - the annual quantity of acidity, in hydrogen ion equivalents per hectare per year, which can be neutralized by soil or freshwater's natural buffering capacity.

**Culm grassland** - this is a local name for the Rhôs pastures found on the Culm Measures. These are characterised by species-rich pastures, typical of poorly drained acid soils, supporting a suite of purple moor-grass and rush communities. They typically form a mosaic of vegetation communities together with heathland, other species-rich grasslands and wet woodland (see also Rhôs pasture).

**dangerous substances** - substances defined by the European Commission as in need of special control because of their toxicity, bioaccumulation and persistence. The substances are classified as List I or II according to the Dangerous Substances Directive.

**demand management** - activities to manage the amount of water required from a source of supply; includes measures to control waste and/or discourage use.

**determinand** - a general name for a characteristic aspect of water quality. Usually a feature which can be described numerically as a result of scientific measurement, e.g. pH, BOD, DO, etc.

**diffuse pollution** - pollution without a single point source, e.g. acid rain, pesticides, urban runoff, etc.

**diversity** - relates to the number of species present and their abundance.

**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 the environment which should not be exceeded in order to protect the environment or human health. An EQS is set by the EC through EC Directives and also by the government.

**eutrophication** - the enrichment of water by nutrients, such as compounds of nitrogen or phosphorus. It causes an accelerated growth of algae and higher forms of plant life.

**fissure** - a crack or open break in rocks.

**flashy** - stream water levels responding rapidly to changes in rainfall.

**floodplain** - parts of river valleys or coastal plains which are inundated during floods.

**game fish** - e.g. salmon and trout.

**groundwater** - water contained in the void spaces in pervious rocks and also within the soil.

**Groundwater Protection Policy** - an Environment Agency policy to protect groundwater from pollution.

**habitat** - natural home of plant or animal.

**hydrology** - the study of the interaction between rainfall, river flow and groundwater.

**Integrated Pollution Control (IPC)** - an approach to pollution control in the UK which takes account of potential effects upon all environmental media. Applies to prescribed processes and uses the principles of BATNEEC and BPEO.

**invertebrates** - animals without a backbone, e.g. insects, worms and spiders.

**landfill site** - site used for waste disposal into/onto land.

**leachate** - solution formed when water percolates through a permeable medium.

**lichen** - a group of lower plants consisting of a fungus which enfolds an alga, the two living together to their mutual benefit.

**Local Nature Reserve (LNR)** - nature reserves established, and usually managed, by District/Borough Councils. Local authorities are empowered to designate such sites under the National Parks and Access to the Countryside Act 1949.

**Main River** - designated under the Water Resources Act 1991 by the Ministry of Agriculture, Fisheries and Food. Formal consent is required for all activities that interfere with the bed or banks of the river or obstruct the flow.

**margin** - a term used to describe the junction of the water and the bank.

**mire** - area of peatland; includes bog (acid) and fen (alkaline).

**National Nature Reserve (NNR)** - sites owned or leased and managed by English Nature and established as reserves under the National Parks and Access to the Countryside Act 1949.

**numeric consent** - a discharge consent with numeric conditions e.g. 10 mg/l BOD as opposed to descriptive conditions, such as "shall be regularly maintained and serviced".

**outfall** - the point where a river or pipe discharges.

**permissive powers** - powers which confer the right to do things but not the duty.

**pH** - a measure of the concentration of hydrogen ions in solution. Water with a pH less than 7 is acid and water with a pH of more than 7 is alkaline.

**phenols** - a class of aromatic organic compounds derived from a benzene ring structure. Toxic by ingestion, inhalation and skin absorption.

**poaching** - trampling by livestock causing land to break up into wet muddy patches.

**Q95** - standard minimum flow criteria applied to rivers, the flow that on average is equalled or exceeded for 95 per cent of the time.

**Ramsar Convention** - a convention on wetlands of international importance, especially as waterfowl habitat, held at Ramsar in Iran in 1974. Designated sites are considered in a similar fashion to SPAs and SACs.

**reach** - a length of channel.

**restoration** - the return to a pristine state.

**Rhøs pasture** - Rhøs is a Welsh word which means 'a wet, often heathy grazing pasture'. Nationally the word Rhøs has come to be used to describe this type of unimproved pasture, a characteristic mix of wet heath, rush pasture, fen meadow, mire and scrub. On the Culm Measure of north-west Devon and north-east Cornwall the habitat is known as Culm Grassland.

**riparian** - relating to or situated on the bank of a river or stream.

**riparian owner** - owner of land next to river; normally owns river bed and rights to mid-line of channel.

**River Quality Objective (RQO)** - the level of water quality that a river should achieve in order to be suitable for its agreed uses.

**runoff** - water leaving a river catchment. Normally regarded as rainfall minus evapotranspiration (evaporation and loss of water by plants) but commonly used to mean rainwater flowing across the land (also known as overland flow).

**septic tank** - an underground tank used to treat sewage from properties without mains drainage. The sewage is settled and some bacterial treatment occurs. Discharge of effluent is usually to a soakaway system.

**set-aside** - the EC set-aside scheme was first introduced for the crop year 1991/1992 as part of the Common Agricultural Policy reform. Farmers are compensated for setting aside land used for the production of arable crops.

**sewage** - liquid waste from cities, towns and villages which is normally collected and conveyed in sewers for treatment and/or discharge to the environment.

**sewerage** - a system of underground pipes designed to carry sewage to Sewage Treatment Works.

**siltation** - the deposit of material carried in suspension.

**Site of Special Scientific Interest (SSSI)** - sites of national importance designated under the Wildlife and Countryside Act 1981 by English Nature in England. Sites may be designated to protect wildlife, geology or land forms.

**sludge** - the accumulation of solids from treatment processes.

**smolt** - young salmon migrating to sea for the first time.

**soakaway** - system for allowing water or effluent to soak into ground, commonly used in conjunction with septic tanks.

**Special Area of Conservation (SAC)** - areas designated under the EC Habitats Directive.

**spring-line mire (Rhøs pasture)** - wet boggy areas concentrated along spring lines occurring mostly on Exmoor and within the Blackdown Hills.

**strata** - layers of rock, including unconsolidated materials such as sands and gravels.

**surface water** - general term used to describe all the water features such as rivers, streams, springs, ponds and lakes.

**sustainable development** - development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

**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.

## Abbreviations and Units

ADAS	ADAS Consulting Limited
Agency	Environment Agency
AMP	Asset Management Plan
AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
ATU	Allyl Thiourea
BATNEEC	Best Available Technology Not Entailing Excessive Cost
BAP	Biodiversity Action Plan
BCU	British Canoe Union
BPEO	Best Practicable Environmental Option
BOD	Biochemical Oxygen Demand
BTO	British Trust for Ornithology
CAMS	Catchment Abstraction Management Strategies
CEFAS	Centre for Environment Fisheries and Aquaculture Science
CLA	Country Landowners Association
DCC	Devon County Council
DETR	Department of the Environment, Transport and the Regions
DO	Dissolved Oxygen
DoH	Department of Health
DSFC	Devon Sea Fisheries Committee
DWT	Devon Wildlife Trust
EC	European Council
ECC	Exeter City Council
EEMP	Exe Estuary Management Plan or Exe Estuary Management Partnership
EH	English Heritage
EN	English Nature
ENPA	Exmoor National Park Authority
ENTRUST	Environmental Trust Scheme Regulatory Body Ltd – responsible for promoting and regulating the landfill tax credit scheme
EQI	Environmental Quality Indices
EQS	Environmental Quality Standard
ESA	Environmentally Sensitive Area
EU	European Union
FA	Fishing Associations
FRCA	Farming and Rural Conservation Agency
FWAG	Farming and Wildlife Advisory Group
GQA	General Quality Assessment
IFE	Institute of Freshwater Ecology
IGER	Institute of Grassland and Environmental Research
IPC	Integrated Pollution Control
ITE	Institute of Terrestrial Ecology
JNCC	Joint Nature Conservation Committee
LA	Local Authority
LEAP	Local Environment Agency Plan
LPA	Local Planning Authority
MAFF	Ministry of Agriculture, Fisheries and Food
MDDC	Mid Devon District Council
MSW	Multi-Sea-Winter Salmon
NFU	National Farmers Union
NRA	National Rivers Authority
NVZ	Nitrate Vulnerable Zone
NWC	National Water Classification
OFWAT	The water industry regulator
PAYBACK	Business environment association.
PESCA	European initiative providing funding to promote the economic development of fishing dependent areas
PPG	Planning Policy Guidance
RE	River Ecosystem
RETA	The River Exe and Tributaries Association
RFOs	Riparian and Fishery Owners
RIGS	Regionally Important Geological Site
RO	Riparian Owners
RQO	River Quality Objective
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SCA	Supplementary Credit Approval

SMA	Sensitive Marine Area
SMP	Shoreline Management Plan
SPA	Special Protection Area
SSA	Strategic Supply Area
SSSI	Site of Special Scientific Interest
STW	Sewage Treatment Works
SWFPA	South West Fish Producers Organization
SWW Ltd	South West Water Limited
SWT	Somerset Wildlife Trust
TDC	Teignbridge District Council
UK	United Kingdom
UNESCO	United Nations Educational, Scientific & Cultural Organization
U of Exeter	University of Exeter
UWWTD	Urban Waste Water Treatment Directive
VHD	Viral Haemorrhagic Disease
WRT	Westcountry Rivers Trust
Wild Cru	Wildlife Conservation Research Unit (University of Oxford)
WWSL	Wessex Water Services Limited

## Units

°C	degrees centigrade
g	grams
ha	hectare
km	kilometres
km <sup>2</sup>	square kilometres
l	litre
m	metre
m <sup>3</sup> /day	cubic metres per day
m <sup>3</sup> /s	cumecs: cubic metres per second
mg	milligrams
MI	megalitre
MI/d	megalitres per day
MI/yr	megalitres per year
mm	millimetre
MW	megawatts
ng/l	nanogram per litre
ppb	parts per billion
µg/m <sup>3</sup>	micrograms per cubic metre
<	less than
≤	less than or equal to
>	greater than
≥	greater than or equal to
%	percentage

## References

- <sup>1</sup>Our Common Future, The World Commission of Environment and Development, 1987 (The Brundtland Commission)
- <sup>2</sup>United Nations Earth Summit, Rio de Janeiro 1992
- <sup>3</sup>Countryside Character Volume 8 South West (1999), Countryside Commission, ISBN 086170 6145
- <sup>4</sup>Soils and their use in South West England, by D C Findlay et al 1984, Bulletin/Soil Survey of England and Wales; no: 14, Harpenden, ISBN 0708402984 - Soil map of England and Wales; scale 1/250 000/Soil Survey of England and Wales 1983, Harpenden
- <sup>5</sup>Farming and Rural Conservation Agency River Exe LEAP Agricultural Background Report, October 1997, T J A Child
- <sup>6</sup>Aspects of Devon History , R R Sellman, 1985
- <sup>7</sup>The UK Forestry Standard, The Government's Approach to Sustainable Forestry, Forestry Commission 1998, ISBN 0 – 85538 – 366 - 6
- <sup>8</sup>Sheep Dip Strategy, R & D Technical Report P237, Environment Agency 1999
- <sup>9</sup>A Waste Management Strategy for Devon: Consultation Draft, DCC/Local Authorities/Environment Agency, October 1996
- <sup>10</sup>Devon County Waste Local Plan: Consultation Draft October 1998, Devon County Council, ISBN 1-85522-6510
- <sup>11</sup>UK National Waste Strategy due to be published May/June 2000 following 'Less Waste More Value' consultation paper of Spring 1999
- <sup>12</sup>Less Waste More Value, Consultation paper on waste strategy for England and Wales, DETR, Spring 1998
- <sup>13</sup>Devon Structure Plan First Review 1995 - 2011, Adopted February 1999, Devon County Council
- <sup>14</sup>Somerset and Exmoor National Park Joint Structure Plan Review, Adopted 20 April 2000, Somerset County Council
- <sup>15</sup>Exmoor National Park Local Plan Adopted Version 1997, Exmoor National Park Authority, ISBN 0861833317
- <sup>16</sup>Mid Devon Local Plan , Adopted July 1998, Mid Devon District Council
- <sup>17</sup>West Devon Borough Council Local Plan Review – Options for Development and Topic Papers, August 1998, West Devon Borough Council
- <sup>18</sup>Teignbridge Local Plan First Review 1995 – 2011 Issues Paper, September 1998, Teignbridge District Council
- <sup>19</sup>West Somerset District Local Plan, Consultative Report, April 1995, ISBN 0-86183-280-9; West Somerset District Local Plan, Deposit Version, August 1998
- <sup>20</sup>Exeter Local Plan First Alteration, Adopted November 1993, Exeter Local Plan Second Alteration, Adopted November 1997, Exeter City Council
- <sup>21</sup>The Exe Estuary Management Plan Approved Document 1998, Exe Estuary Project Devon County Council, ISBN 1-85522-614-6
- <sup>22</sup>Lyme Bay and South Devon Shoreline Management Plan, Adopted by the Coastline Group, January 1999
- <sup>23</sup>Implications of Future Shoreline Management on Habitats – R & D Technical Report W150, Environment Agency & English Nature, 1998, (R&D Project W1-032)
- <sup>24</sup>A Strategy for the Management of Salmon in England and Wales, National Rivers Authority, February 1996
- <sup>25</sup>Tomorrow's Water: Regional Water Resources Development Strategy, National Rivers Authority, April 1995
- <sup>26</sup>The Review of the Water Abstraction Licensing System in England & Wales, June 1998, Department of the Environment, Transport and the Regions

<sup>27</sup>Progress in Water Supply Planning, October 1998

<sup>28</sup>Taking Water Responsibly – Government decisions following the consultation on changes to the water abstraction licensing system in England and Wales, March 1999, Department of the Environment, Transport and the Regions. Available from DETR, Free Literature, P O Box 236, Wetherby, West Yorkshire, LS23 7NB.

<sup>29</sup>Saving Water on the right track 2, A summary of current water conservation initiatives in the UK, March 1999, The National Water Demand Management Centre, Environment Agency

<sup>30</sup>The UK National Air Quality Strategy, HMSO, 1990

<sup>31</sup>Forests and Water Guidelines Third Edition, Forestry Commission, 1993, ISBN 0 11 710321 7

<sup>32</sup>Exmoor Biodiversity Action Plan, Consultation Draft, October 1999, Exmoor National Park Authority (1999)

<sup>33</sup>Reducing the impact of air pollution on the natural environment, Joint Nature Conservation Committee, 1995

<sup>34</sup>Critical Loads Mapping and Data Centre, ITE Monks Wood – Data acknowledgement: CLAG Soils sub-group, Hull University

<sup>35</sup>Biodiversity: The UK Steering Group Report, Volume 2: Action Plans 1995, HMSO, ISBN 011 753228 2

<sup>36</sup>The Biodiversity of the South-West: An Audit of the South-West Biological Resource, February 1996, Dorset Wildlife Trust/Royal Society for the Protection of Birds/Devon Wildlife Trust/Gloucestershire Wildlife Trust/Somerset Wildlife Trust/Wiltshire Wildlife Trust/Cornwall Wildlife Trust/The Wildlife Trust Bristol, Bath & Avon/South West Regional Planning Conference

<sup>37</sup>Action for Biodiversity in the South-West: A Series of Habitat and Species Plans to Guide Delivery, June 1997, Dorset Wildlife Trust/Royal Society for the Protection of Birds/English Nature/Environment Agency/ Gloucestershire Wildlife Trust/Somerset Wildlife Trust/Wiltshire Wildlife Trust/Cornwall Wildlife Trust/Devon Wildlife Trust/The Wildlife Trust Bristol, Bath & Avon/South West Regional Planning Conference, ISBN 0 9031 38 972

<sup>38</sup>The Nature of Devon: A Biodiversity Action Plan, Biodiversity Devon Partnership, July 1998, ISBN 1 85522 637 5

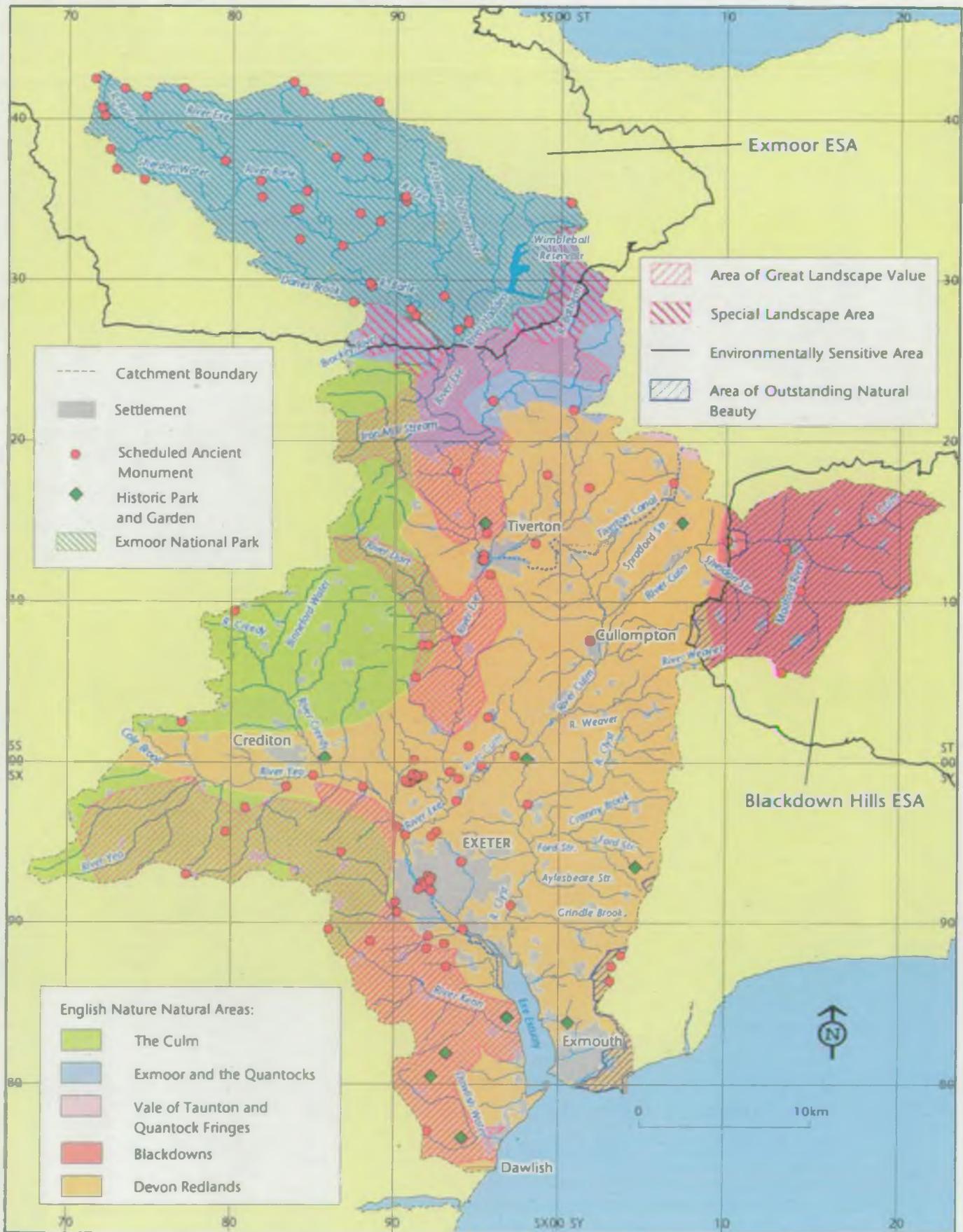
<sup>39</sup>Natural Areas: Nature Conservation in Context, English Nature CD-Rom 1998, (Exmoor & the Quantocks, Vale of Taunton & Quantock Fringes, Blackdowns, Devon Redlands, Lyme Bay and The Culm), ISBN 1 8571641810

<sup>40</sup>East Devon's Heathlands – A Biodiversity Action Plan, East Devon District Council

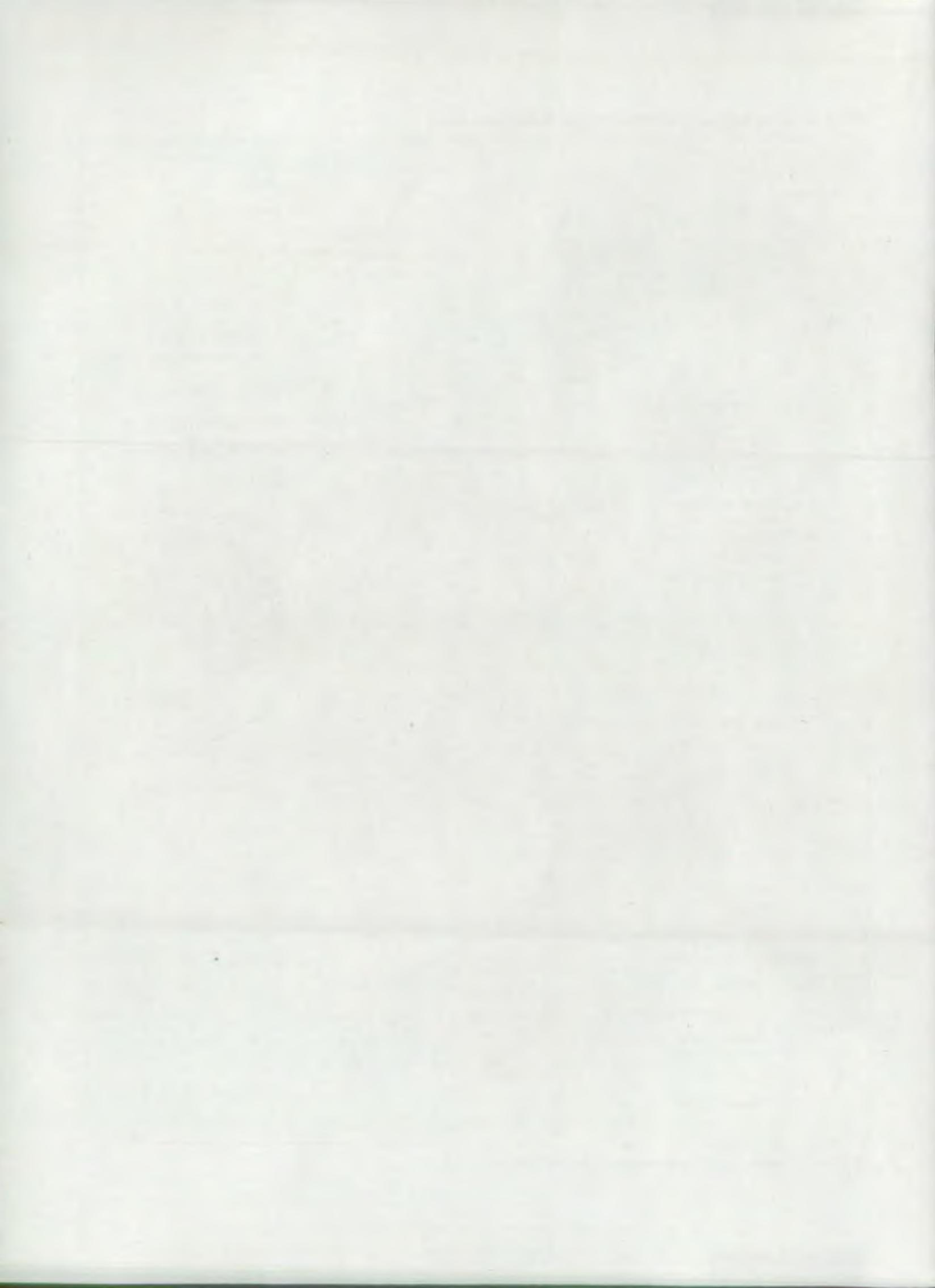
<sup>41</sup>The Blackdown Hills Landscape, Countryside Commission, 1989, ISBN 0 86170 212 3

<sup>42</sup>The East Devon Landscape, Countryside Commission, 1993, ISBN 0 86170 411 8

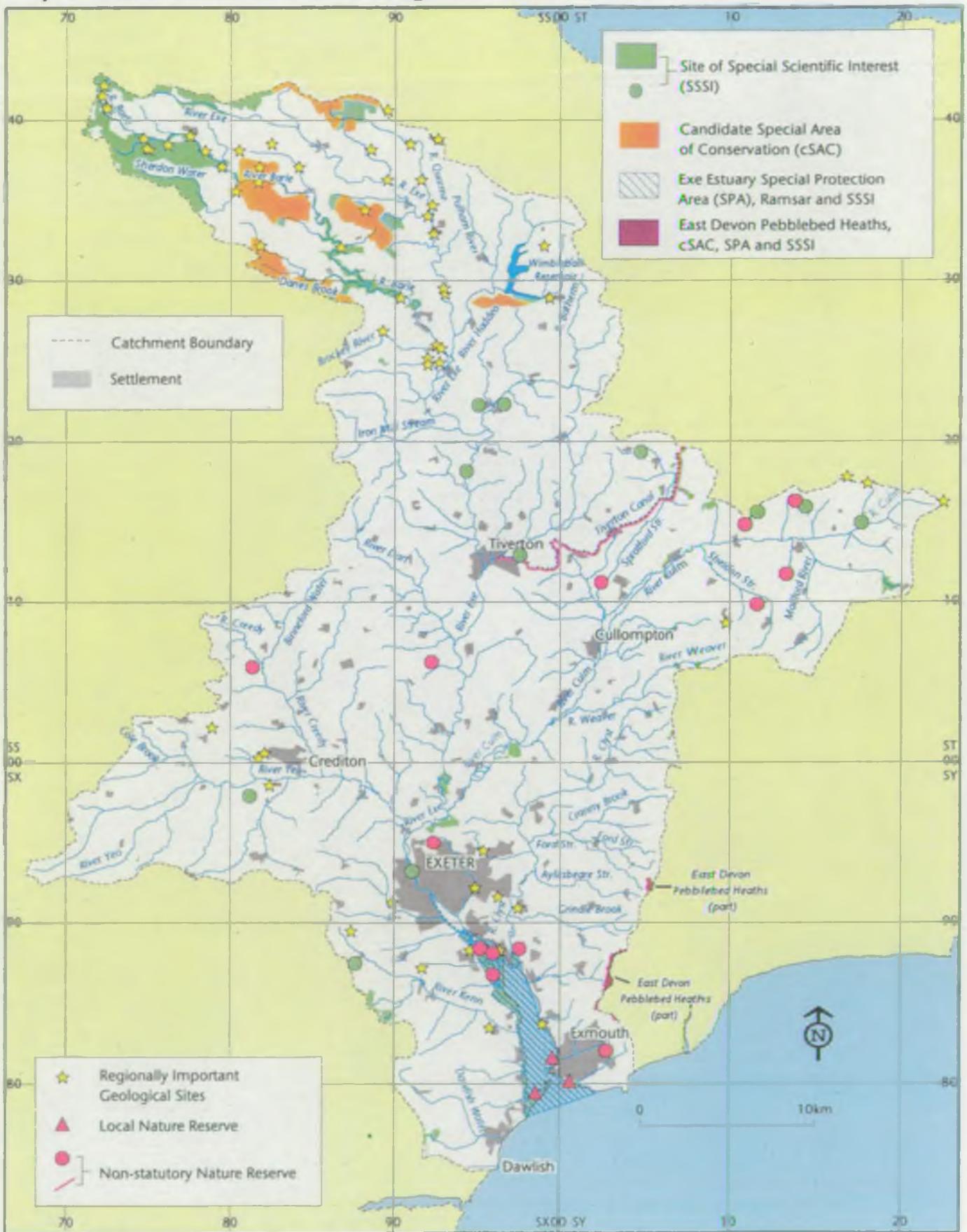
### Map 5 - Landscape and Heritage Designations



© Crown Copyright. All rights reserved, 03177G0006



### Map 6 - Nature Conservation - Designated Sites



© Crown Copyright. All rights reserved, 03177G0006

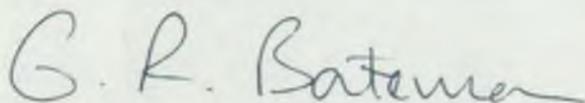


## Foreword

The Exe Local Environment Agency Plan (LEAP) aims to promote integrated environmental management of this important area of Devon. It seeks to develop partnerships with a wide range of organizations and individuals that have a role to play in the management of the River Exe and associated land.

This plan embodies the Agency's commitment to deliver improvements to the land, air and water environment.

We are very grateful for the contributions made during the consultation period and are convinced that they represent the spirit of partnership that will be required to implement the plan.



**GEOFF BATEMAN**

Area Manager (Devon)

ENVIRONMENT AGENCY



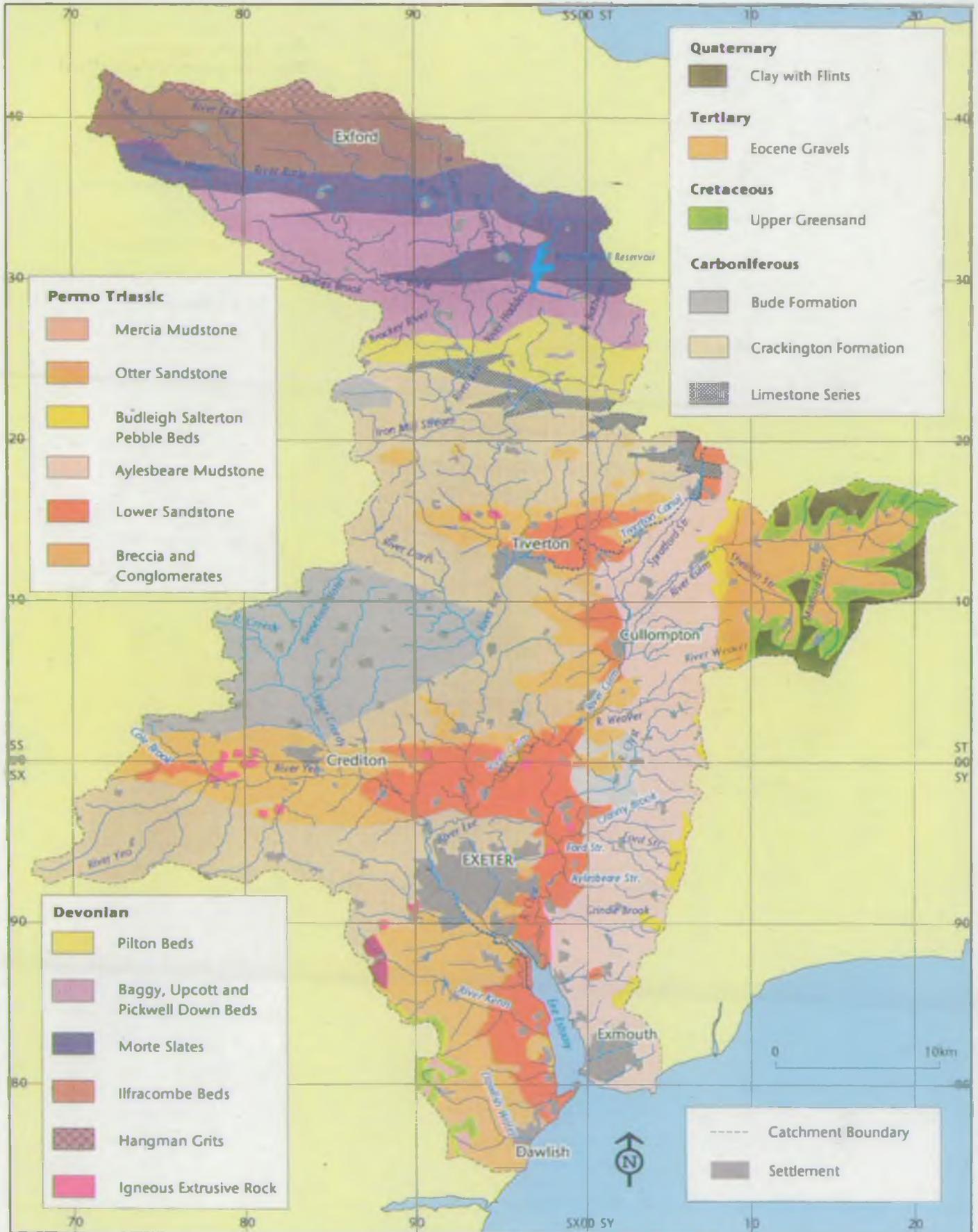
125081

# Contents

<b>1. Introduction</b>	<b>1</b>
1.1 The Environment Agency	1
1.2 Local Environment Agency Plans	1
1.3 Action Tables	2
<b>2. The LEAP Area</b>	<b>3</b>
2.1 Key Statistics for the Exe Catchment	3
2.2 Physical Features	3
2.3 Wildlife - Habitats and Species	6
2.4 Archaeology and Heritage	6
2.5 Land Resources, Uses and Activities	7
<b>3. Our Targets for River Water Quality</b>	<b>9</b>
3.1 Managing Water Quality	9
3.2 Compliance with RQOs	9
3.3 EC Directives	10
3.4 Biological Quality	10
<b>4. Issues and Proposed Actions</b>	<b>11</b>
Issue 1: Impact of Farming	11
Issue 2: Impact of Effluent Discharges	16
Issue 3: Impact of Waste Generation and Disposal	21
Issue 4: Potential for Eutrophication	23
Issue 5: Impact of Development	25
Issue 6: Recreation	27
Issue 7: Unknown Causes of Water Quality Non-compliance	29
Issue 8: Addressing Climate Change	30
Issue 9: Decline of Spring Salmon Stocks	32
Issue 10: Decline in Brown Trout Populations	34
Issue 11: Barriers to Fish Migration	34
Issue 12: Fish-eating Birds	35
Issue 13: Increasing Demand for Water Resources	36
Issue 14: Improving Air Quality	38
Issue 15: Enhancing Biodiversity	40
Issue 16: Lack of Information on River Habitat	56
<b>5. A Better Environment Through Partnership</b>	<b>57</b>
5.1 The LEAP Steering Group	57
5.2 Links with Development Plans	57
5.3 Integrated Coastal Zone Management	58
5.4 Links with Non-statutory Plans	58
5.5 Local Environment Agency Plans and Catchment Management Plans	59
5.6 Links with Local Agenda 21	59
5.7 The Environment Agency and Public Information	59
<b>6. Duties, Powers and Interests of the Environment Agency</b>	<b>60</b>
Appendix One	65
Appendix Two	66
Appendix Three	68
Appendix Four	69
Appendix Five - List of Consultees who Responded	72
Appendix Six - Actions from the Consultation Draft July 1999	73
Glossary	78
Abbreviations and Units	81
References	83

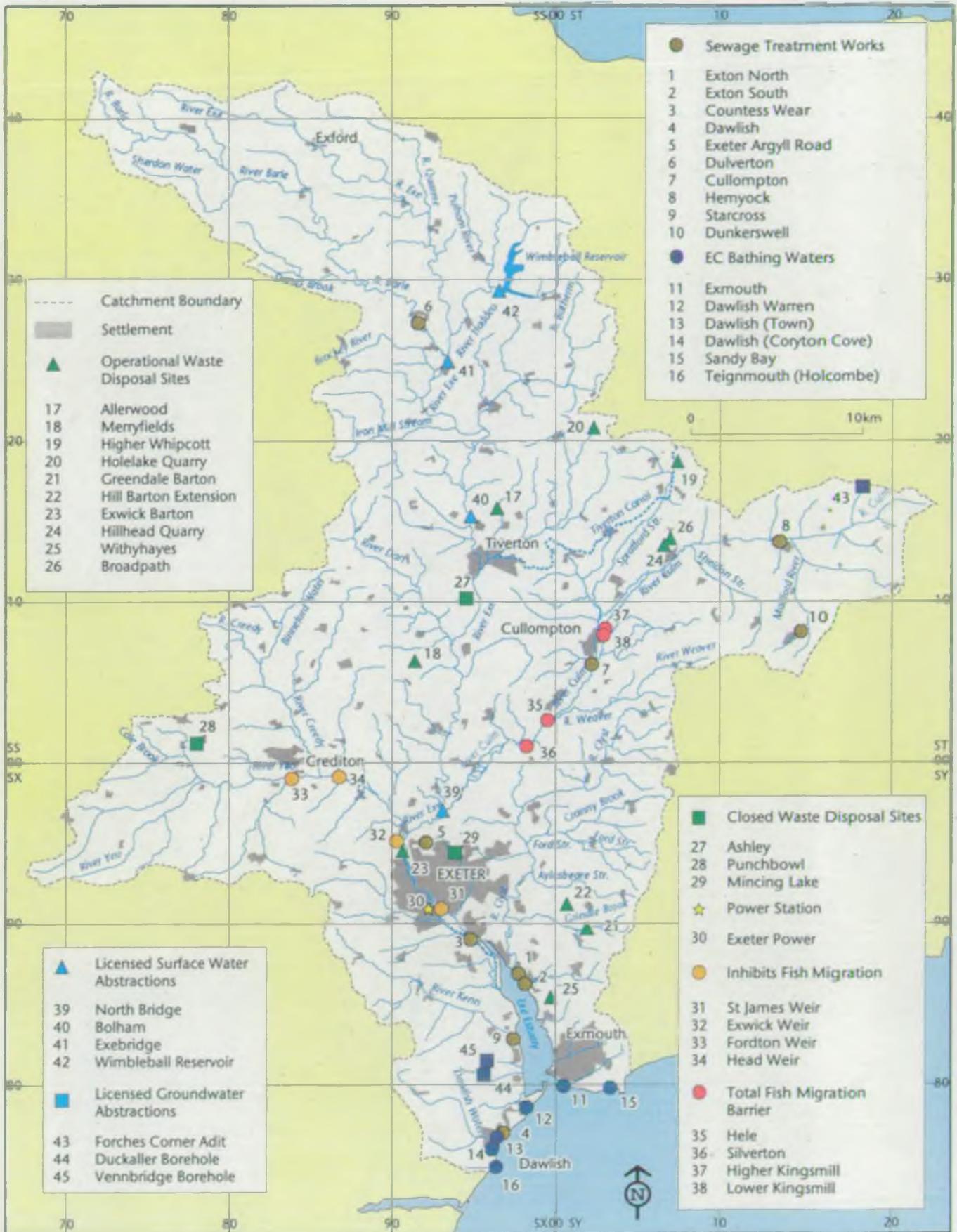


Map 2 - Exe Simplified Geology



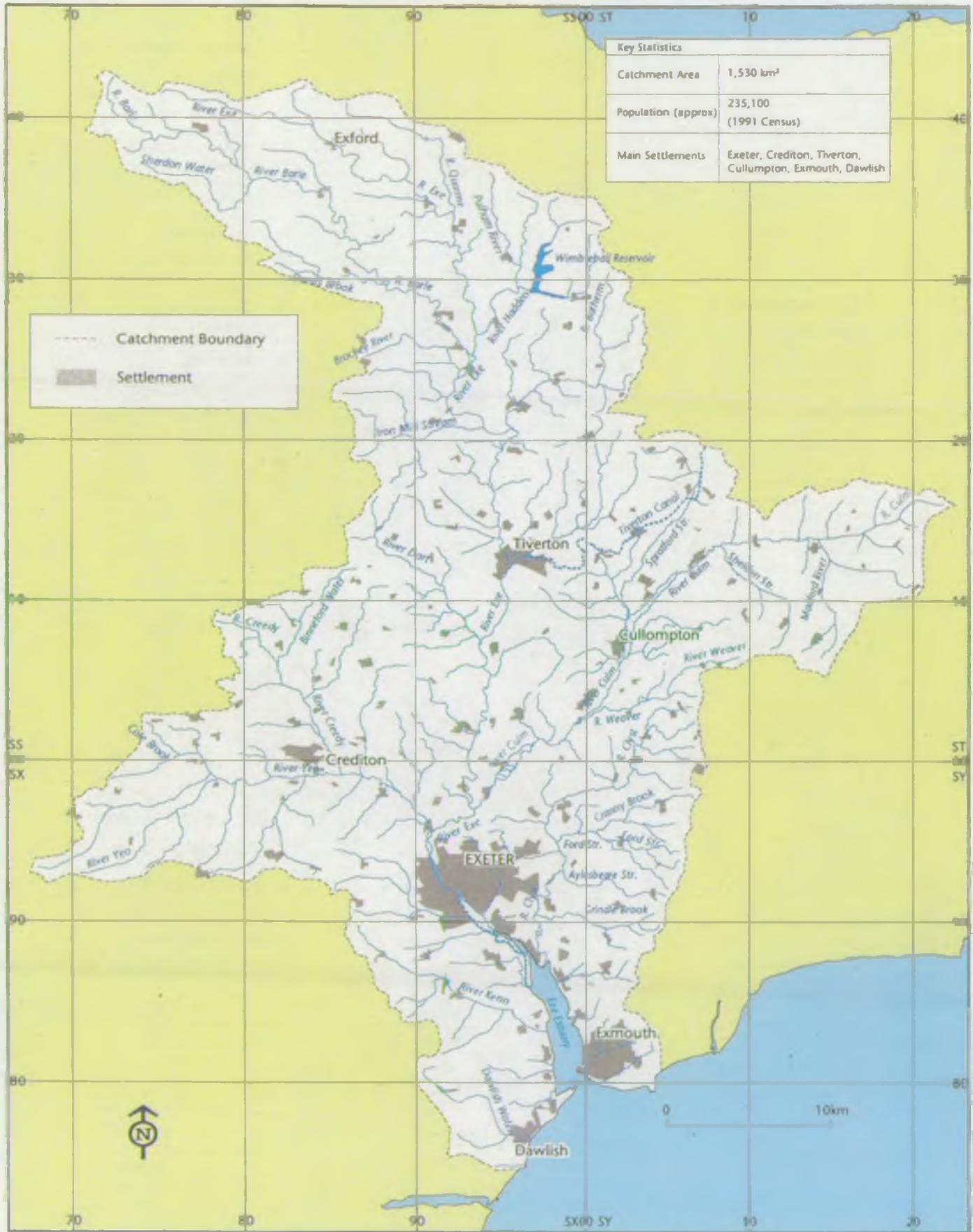
© Crown Copyright. All rights reserved, 03177G0006

Map 4 - Exe Issues 2, 3, 8, 11, 13



© Crown Copyright. All rights reserved, 03177G0006

Map 1 - Exe basemap



© Crown Copyright. All rights reserved, 03177G0006

## 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.

Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol BS12 4UD  
Tel: 01454 624 400 Fax: 01454 624 409

### ENVIRONMENT AGENCY REGIONAL OFFICES

#### ANGLIAN

Kingfisher House  
Goldhay Way  
Orton Goldhay  
Peterborough PE2 5ZR  
Tel: 01733 371 811  
Fax: 01733 231 840

#### NORTH EAST

Rivers House  
21 Park Square South  
Leeds LS1 2QG  
Tel: 0113 244 0191  
Fax: 0113 246 1889

#### NORTH WEST

Richard Fairclough  
Knutsford Road  
Warrington WA4 1HG  
Tel: 01925 653 999  
Fax: 01925 415 961

#### MIDLANDS

Sapphire East  
550 Streetsbrook Road  
Solihull B91 1QT  
Tel: 0121 711 2324  
Fax: 0121 711 5824

#### SOUTHERN

Guildbourne House  
Chatsworth Road  
Worthing  
West Sussex BN11 1LD  
Tel: 01903 832 000  
Fax: 01903 821 832

#### SOUTH WEST

Manley House  
Kestrel Way  
Exeter EX2 7LQ  
Tel: 01392 444 000  
Fax: 01392 444 238

#### THAMES

Kings Meadow House  
Kings Meadow Road  
Reading RG1 8DQ  
Tel: 0118 953 5000  
Fax: 0118 950 0388

#### WELSH

Rivers House/Plas-yr-Afon  
St Mellons Business Park  
St Mellons  
Cardiff CF3 0LT  
Tel: 01222 770 088  
Fax: 01222 798 555



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.

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

### ENVIRONMENT AGENCY GENERAL ENQUIRY LINE

**0845 933 3111**

### ENVIRONMENT AGENCY EMERGENCY HOTLINE

**0800 80 70 60**



**ENVIRONMENT  
AGENCY**



*All enquiries to:*  
**Devon Area**  
**Exminster House**  
**Miller Way**  
**Exminster**  
**EX6 8AS**