

local environment agency plan

RIVER TORRIDGE & HARTLAND STREAMS

CONSULTATION DRAFT

SEPTEMBER 1998



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Map 4 - Torridge and Hartland Streams Issues 1, 2, 4, 5, 6, 7.



Your Views

We hope that this report will be read by everyone who has an interest in the environment of the River Torridge and Hartland Streams Catchment.

Your views will help shape this plan.

Have we correctly identified all the problems in the catchment?

Do you agree with the proposed actions to address the issues?

Are there any issues you wish to highlight/comment upon?

Please send your response by **14 December 1998** to:

Mike Chapman, LEAPs Team Leader

The Environment Agency, Devon Area, Exminster House, Miller Way,
Exminster, Devon, EX6 8AS

Alternatively you may contact us via E-mail at:

mike.chapman@environment-agency.gov.uk

We will republish this plan in May 1999, taking account of the comments received.

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Note (1) This is not a legally or scientifically binding document.

Foreword

The River Torridge and Hartland Streams 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 who have a role to play in the management of the River Torridge and Hartland Streams.

This plan embodies the Agency's commitment to deliver improvements to the environment.

We need your help. This Consultation Draft is being widely circulated both within and outside the catchment and we are keen to draw on the expertise and interests of local people and their representatives.

Please comment, your views are important. Your support for the plan would be welcomed as would any information, issues or concerns you may have.

Following on from the Consultation Draft the final Plan will be produced with an agreed programme of work for future protection and enhancement of this much-loved area. We will use these plans to ensure that improvements in the local environment are achieved and regularly report our progress.

Geoff Bateman

GEOFF BATEMAN
Area Manager (Devon)



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1. The Environment Agency

1.1 Our Vision

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

1.2 Our Aims

- 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 conserve and improve river navigation
- 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; and
- being efficient and businesslike in all we do

1.3 Introduction

The Environment Agency has a wide range of duties and powers relating to different aspects of environmental management. These duties are described in more detail in Appendix One. 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' ¹.

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 1992²⁴ 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.

1.4 Local Environment Agency Plans

We are committed to a programme of Local Environment Agency Plans (LEAPs) in order to produce a local agenda of integrated action for environmental improvement. These will also allow us to deploy our resources to best effect and optimize benefit for the local environment.

LEAPs 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. The outcome of the process is a local programme of integrated action for environmental improvement in order to optimize benefit for the local environment.

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.

The LEAP process involves several stages as outlined below.

The Consultation Draft

The publication of the LEAP Torridge and Hartland Streams Consultation Draft marks the start of a three-month period of formal consultation enabling external organizations and the general public to work with us in planning the future of the local environment.

At the end of the consultation period we will produce a Statement on Public Consultation which will give the results of the process.

The Plan

The final Plan will take into account the results of consultation and will be produced by May 1999. It will contain a list of actions that take account of costs and benefits, identifying timescales and partner organizations. Agreed actions will be incorporated into the Agency's annual business plans.

The Annual Review

We will monitor implementation of the Plan and report on progress in a published Annual Review. The Annual Review will also identify any additional actions needed to maintain progress in light of any changes in the plan 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. At this stage we will produce a new Consultation Draft to reflect these changes to further improve the local environment.

2. The Catchment

2.1 Physical Features

General

This Local Environment Agency Plan comprises the entire catchment of the River Torridge and all its tributaries; the coastal streams which drain to the Hartland Coast; and Lundy Island (Map 1). The plan area includes the Torridge side of the Taw/Torridge Estuary and any issues relating to the joint estuary are covered in this plan (a separate plan will be developed to cover the Taw Catchment which will also include issues relating to the joint estuary).

The plan area will be subsequently referred to as 'the catchment'. The entire catchment covers an area of 925 km².

The majority of the catchment is drained by the River Torridge system. The main River Torridge rises on a gently rolling plateau near the coast at Baxworthy Cross at a level of 200m AOD (Above Ordnance Datum). The River Torridge is 77 km long and falls steeply down to the Estuary at Bideford.

The River Okement, a major tributary of the Torridge, rises on the granite massif of Dartmoor at a level of 600m AOD.

The Taw/Torridge Estuary is a significant feature of the catchment; the upper estuary reaches are narrow, meandering and muddy whilst at its confluence with the River Taw from the east it forms a broader joint estuary.

To the west of the catchment lie a group of streams which drain to the North Devon coast between Welcombe and Abbotsham. These streams include the Clovelly Stream, Abbey River, Speke's Mill Stream and Welcombe Stream.

Lundy Island lies 18 km off the North Devon coast. This granite mass rises some 142m from the sea. The island has some small streams, many of which are seasonal, and some areas of standing open water.

River Flow

The majority of the catchment is underlain by rocks with generally low permeability. In these rocks groundwater flow is effectively restricted to weathered zones and rock fractures, yielding relatively small amounts of groundwater. Despite the restricted underground flow, groundwater still plays an important role in the catchment hydrology by helping to maintain river baseflow during dry weather. However, the scale of this baseflow support is limited and river flow through the fracture networks in such rocks can be rapid.

River flows are characterized by rapid rises following heavy rainfall, which fall sharply once the rain has passed. As there is little input from groundwater flows throughout the catchment, the river flows reduce rapidly in response to spells of dry weather.

There are nine surface water gauging stations within the Torridge catchment. The site at Torrington is located the furthest downstream. The maximum instantaneous flow at the station was recorded on 29 December 1979 as 730 cubic metres per second. The maximum recorded daily mean flow of 334 cubic metres per second occurred on the same day. The minimum daily mean flow of 0.120 cubic metres per second was recorded on 28 August 1976. The Q95 for Torrington for the period 1964 to 1997 is 0.889 cubic metres per second.

The Abbey River and the other coastal streams in the catchment have similar hydrological characteristics; they are steep and fast-flowing and rise and fall sharply after rain or during droughts. The streams have adapted to this relatively flashy response by developing a network of steeply sloping straight channels.

Geology

The geology of the catchment is dominated by deposits from the Carboniferous period (see Map 8). The oldest rocks of this period are those of the Lower Carboniferous period which occur between Meldon and the East Okement River. The deposits of the Upper Carboniferous period, known as the Culm Measures, include the Bude and Crackington formations which were formed in layers alternating between shale and turbiditic sandstone; the sandstones predominating in the Bude formation and the shales in the Crackington formation. Intruding into this sedimentary sequence are minor deposits of doleritic and basaltic rock which lie just to the north of the Dartmoor granite.

Towards the end of the Carboniferous period the Bude and Crackington formations were subject to intense pressures causing deformation and folding which subsequently led to faulting. This has resulted in a sequence of steeply inclined interbedded sandstones, mudstones and shales which are visible along the coast.

During the Tertiary period further displacement took place causing additional faulting. The most important of these is the Sticklepath fault which runs through the catchment in a NW-SE direction from Bideford Bay to Torbay. Along this fault is situated the Petrockstow Basin. Here sand, clay and lignite accumulated along the river beds, forming the deposits which are now quarried for ball clay.

In contrast to the majority of the catchment, Lundy Island is mainly composed of a coarse-grained megacrystic granite of the Tertiary period, with only the Castle Hill peninsula composed of sedimentary deposits, known locally as Morte slates.

2.2

Wildlife

The River Torridge contains areas of regional, national and international importance for wildlife. A range of semi-natural habitats support a variety of species, many of which now have restricted distributions. Several formal designations apply to parts of the catchment; these relate to nature conservation, landscape and heritage. However many important features in the catchment remain without designation.

The Taw/Torridge Estuary and much of the associated land is of special ecological interest. The major part of the area is designated a Site of Special Scientific Interest (SSSI) and lies within a County Nature Conservation Zone. The area is valued for its wading birds, wildfowl and a range of maritime and estuarine habitats.

Perhaps the most important habitat is the remaining area of Culm grassland. This marshy grassland habitat occurs on the gley soils of the Culm Measures and is of international importance for the plant and animal communities it supports. In England it is almost entirely restricted to north-west Devon and north Cornwall, with approximately half the Devon resource lying in the catchment. It is estimated that only about 10% remains of the area that existed at the turn of the century.

The River Torridge supports major salmon, sea trout and brown trout fisheries. Salmon, which are important both economically and as a species of international importance, were once recorded in good numbers in the catchment but have suffered a serious decline since the 1960s, particularly the spring fish run. The main spawning areas for salmonids are the upper reaches of the River Torridge, the River Lew, the River Waldon and in particular the River Okement.

Some coarse fish are also found in the catchment, the most common species is dace, which are found in the middle and lower reaches of the River Torridge. Many of the streams which drain to the Hartland Coast support brown trout populations; migratory fish are not able to access any of the streams because of the waterfalls and shingle banks at their mouths. Other species including bullheads, stone loach and minnows are found in many of the watercourses.

The Torridge also has a run of elvers during the spring months. Many thousands of these juvenile eels enter the system from the estuary, and work their way upstream, well into the freshwater river. Adult eels are widespread and common across the catchment.

The Torridge Estuary is a designated bass nursery area, which provides protection for juvenile bass during the period 1 May to 1 October each year. Several other common sea fish species are found in the estuary and are exploited by local fishermen throughout the year.

The River Torridge and Hartland Streams Catchment supports one of the best otter populations in England. This population is of international importance and otters are expanding from this area to occupy less populated catchments to the east.

2.3 Archaeology & Heritage

The area has a high heritage value and a number of formal designations apply indicating national or local importance. Many buildings, structures and other sites are Scheduled Ancient Monuments, while several of the older towns and villages contain Conservation Areas and listed buildings.

There are approximately 120 Scheduled Ancient Monuments in the catchment, 13 of which are on Lundy Island. These include bridges, castles, dykes and fortified settlements.

The area is known to have a number of organic archaeological remains². In the Westward Ho! area finds date from the Mesolithic and Neolithic periods and include structural timbers, hazelnuts and split bones. At Wrangworthy Cross structural timbers were found and at Great Torrington a mass of leaves and a wooden sheath were discovered: both sites date from the Bronze Age. Further finds are listed for Darracott Moor and the River Torridge.

2.4 Land Use

The catchment is predominantly rural in nature and is sparsely populated with a few small towns, villages, hamlets and isolated farmsteads. The largest populations are at Bideford, Great Torrington, Hatherleigh, Okehampton, Bradworthy, Hartland and Clovelly. The catchment population (1991 Census) is approximately 54,000.

There is some quarrying for stone and ball clay, and a limited amount of light industry mainly associated with industrial estates around the larger urban areas.

Meldon Reservoir on the West Okement River is the only reservoir used for public water supply in the catchment.

Approximately 83% of the catchment area is farmed³. Most of the agricultural area is grassland, supporting dairy and other livestock; a smaller area is under crops and fallow. Other agricultural uses include farm woodland, rough grazing and set-aside (see Table 1).

There are thirteen licensed waste disposal sites in the catchment, of which six are in operation, six are closed and one has remained dormant and unused for the last five years. The operational sites are used for domestic, inert and industrial materials.

Table 1 - Agricultural Land Use in the Catchment

	Area (ha)	%
Grassland	57,341	74
Crops & Fallow	11,640	15
Farm Woodland	3,223	4
Rough Grazing	3,264	4
Set-aside	953	1
Other Land	1,246	2

Tourism, which is concentrated mainly around the North Devon coast and on Dartmoor, is a major source of income to the catchment. The dramatic coastline and historic villages, such as Clovelly, attract many thousands of visitors a year. The South West Coast Path provides easy access to this area for walkers and brings considerable numbers of people to the area. The development of the Tarka Trail and the reopening of the old railway routes to pedestrian and cycle traffic have added a new opportunity for access to the countryside. The

Tarka Trail forms a strong recreational focus bringing people into contact with the river and its environs. Other popular activities include angling both freshwater and sea, bird-watching, boating, swimming and canoeing.

3. Our Proposed Targets for Water Quality

3.1 Managing Water Quality

We manage water quality by setting targets called River Quality Objectives (RQOs). We are now consulting on RQOs for the catchment and we welcome your comments.

RQOs 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 also manage water quality by applying standards set in EC Directives and other international commitments. Failures to comply with these standards and RQOs are outlined under the appropriate issues.

We have proposed 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 replaces 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 summarized below:

Table 2 The River Ecosystem Classification Scheme

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 Two.)

The RQOs we 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 may also set a Long Term 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 catchment have been divided into 53 classified stretches and the RQOs that we intend to set are shown on Map 2 and in Table 38 (see Appendix Three).

3.2 Compliance with Proposed RQOs

Map 3 shows where current water quality fails to meet its proposed RQO. This assessment is based on three years of routine monitoring data collected between 1995 and 1997 and held on the Public Register. We have shown failures to meet proposed RQOs as *significant* and *marginal*. Significant failures are those where we are 95% certain that the river stretch has failed to meet its proposed RQO.

Marginal failures are those where we are less certain (between 50% and 95%) that the stretch has failed to meet its proposed RQO.

Of the 53 monitored stretches (285.1 km) in the catchment, one stretch (2 km) significantly fails to meet the proposed RQO. Nine stretches (55.2 km) marginally fail to meet their proposed RQO.

We have also assessed whether river stretches meet their proposed long term RQO. Three stretches (13.9 km) significantly fail to meet their proposed long term RQO. Three stretches (17.8 km) marginally fail to meet their proposed long term RQO.

RQO non-compliances are addressed in Issues 1, 2, 3, 4, 5 and 6.

'Set Aside' of Data

In certain circumstances we can 'set aside' data, that is we will not take into account some or all of the results of a particular determinand when we assess compliance with an RQO.

Metals and pH - We will set aside data where high concentrations of metals or low pH are caused by the natural geology of the catchment. This allows us to protect good water quality reflected by other parameters in the RE Classification.

Biochemical oxygen demand (BOD) - Substantial growths of planktonic algae can occur in slow-flowing, nutrient-rich rivers. Where the algal growth is dense, the algal cells themselves can exert a high BOD during laboratory analysis. These elevated BOD values do not necessarily represent the BOD exerted in rivers, or that resulting directly from effluent discharges. If this impact is not excluded from classification and the compliance assessment, spurious results may be reported and there is a risk that investment, put in place to improve discharges, will not be targeted efficiently.

In those river stretches where the Agency has evidence that 'exceptional conditions' exist because planktonic algae are the predominant cause of unusually high BOD results, the affected BOD data may be set aside when assessing compliance with the RQO.

Map 3 and Table 38 in Appendix Three show where these determinands have been set aside for the 1997 classification.

4. Issues and Proposed Actions

The Agency's 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 organizations involved in the protection and management of the environment. As a first step towards achieving our aims and objectives and delivering our strategy in this catchment, issues and proposed actions have been raised which now require to be consulted on. These issues are presented on the following pages.

Issue 1

Impact of Farming

Background

Historical changes in agricultural land use between 1952 and 1988, in the catchment of the River Torridge and its tributaries, have been investigated.⁴ Livestock farming has intensified over this period, resulting in a substantial increase in the area of grassland (25%) and numbers of dairy cattle (160%) since the 1970s. Much of the increase in permanent grassland was achieved by draining the naturally waterlogged soils. Consequently the area of rough grazing decreased by 57% over this period.

These changes have been linked to a number of environmental effects including the dramatic decline in the numbers of salmon returning to the River Torridge system and a sharp rise in farm-related pollution incidents over this period⁵.

In the last ten years the agricultural land-use changes have been less dramatic and there has been considerable investment in farm waste storage and handling, largely aided by MAFF grant aid, which ceased in 1994. This investment, together with pollution prevention work, has resulted in a decline in point source farm-related pollution incidents in the Torridge catchment. Diffuse pollution however still represents a significant problem in the catchment.

Effects/Actions

RQO non-compliance: The River Torridge from Hele Bridge to Newbridge - marginally failed to meet its proposed RQO of RE2 in 1997 as a result of elevated BOD. The most likely cause of poor water quality is diffuse pollution from agricultural sources.

RQO non-compliance: The River Lew - All four stretches of the River Lew failed to meet their proposed RQOs and/or long term RQOs in 1997 as a result of elevated BOD: source to Hole Stock Bridge marginally failed to meet its proposed RQO of RE1; Hole Stock Bridge to Great Rutleigh marginally failed to meet its proposed long term RQO of RE1; Great Rutleigh to Hatherleigh Bridge marginally failed to meet its proposed RQO of RE2 and significantly failed to meet its proposed long term RQO of RE1; and Hatherleigh Bridge to the Torridge confluence significantly failed to meet its proposed long term RQO of RE1. In addition, the Hookmoor Brook and the Northlew Stream, both tributaries of the River Lew, marginally failed to meet their proposed RQOs of RE1 because of elevated BOD.

Poor water quality in the River Lew and its tributaries is partly a natural phenomenon; the area is relatively flat and the watercourses receive little aeration and are also prone to low flows. In addition, the area is intensively farmed and pollution can significantly exacerbate existing water quality problems.

A further tributary of the River Lew, the Pulworthy Brook from Lewmoor Bridge to the Lew confluence significantly failed its long term RQO of RE3 due to low dissolved oxygen. Historically there have been severe water quality problems in this watercourse. West Devon Meats used to spread waste from their meat-processing activities onto fields adjoining the Pulworthy Brook, which resulted in pollution of this watercourse. More recently this waste has been tankered from the site. An investigation in 1997 found problems with low dissolved oxygen levels during the summer; but there was no evidence that drainage inputs from land surrounding the lower stretch of the brook affected water quality. The monitoring site for this stretch is not considered representative of the whole stretch and a more suitable site has been identified just upstream of the Lew confluence.

RQO non-compliance: The Dipple Water from the source to the Torridge confluence - marginally failed to meet its proposed RQO of RE1 as a result of elevated BOD. The most likely cause of this poor water quality is farm inputs.

Farms in the upper Torridge and Waldon catchments were approached in Autumn 1997 by ADAS to produce Farm Waste Management Plans. There was a good response to this initiative, and we will be monitoring water quality to see if the expected improvements occur.

Potential eutrophication of the River Torridge - There are concerns that the River Torridge is eutrophic; agriculture is a possible cause (see Issue 3).

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. Synthetic pyrethroids are highly toxic to aquatic life (up to 100 times more toxic than organophosphates) and they have caused some serious pollution incidents in other parts of the country.

The controls to minimize the risk to the environment from sheep dipping are limited; however the Government is intending to introduce Groundwater Regulations which will provide a means for comprehensive control. In the meantime we are working with farmers, trade associations, MAFF and other organizations to reduce pollution.

Farm waste - Farm-related pollution incidents form a high proportion of the total number of reported incidents in the catchment, in some years as much as 45%. Although the number of farm-related incidents has fallen in the last two years, there is still a need for improved farm waste management and in particular to tackle the problem of diffuse pollution, for example from waste spread to land.

We intend to run a trial programme on the River Lew subcatchment (where there are 122 farms) called PRIM - Pollution Reduction by Inspection and Management. The programme will involve conducting farm inspections and discussion with the farmer on pollution prevention, followed up by the production of a maintenance regime based on a year planner, specific to that farm and its particular problems.

Decline of the salmonid fishery - The salmonid fishery of the River Torridge effectively collapsed in the 1970s. A number of fishing restrictions and a farm pollution campaign were implemented. Despite these initiatives, rod and net catches of salmon and sea trout continued to decline and the distribution and abundance of juvenile fish throughout the river remained poor.

The NRA in conjunction with MAFF instigated a five-year research programme on the river in 1990³. The study concluded, amongst other things, that:

- There is an impact on embryo survival in intensively farmed subcatchments, relating to spawning gravel quality.
- Riverbed gravels in the intensively farmed areas contained fine sediment concentrations likely to be damaging to salmonid embryo survival and dissolved oxygen levels present in these gravels were low enough to be lethal to embryos.

The report recommended:

- Remedial measures that will help to minimize the runoff of fine sediment from the land are likely to improve spawning conditions.
- Control of animal access points and the maintenance of bank stability, through fencing and the establishment of adequate bankside vegetation, have the potential to reduce greatly sediment delivery from the immediate riparian area.

We are working with others to deliver these recommendations and we are continuing this research by sponsoring a PhD studentship at the University of Exeter. Artificial salmon redds have been installed on the River Waldon to investigate the process of sediment intrusion into these redds, and to relate this to suspended solids concentrations in river water. Sources of sediment are also being determined. The findings of this project will help prioritize where remedial work may be carried out to reduce sediment pollution.

In 1997 the Agency set up a pilot project on the River Waldon - chosen for its known chronic suspended sediment problems and identified low juvenile salmonid production - to attempt to influence sediment input to the river by bankside fencing and riparian habitat restoration and improvement. A proposal was developed in conjunction with the Westcountry Rivers Trust to seek EU funding for the project. This proposal now forms part of a South West peninsula-wide initiative which aims to expand the Westcountry Rivers Trust's work on the River Tamar, which set about developing sustainable land management practices, conserving and restoring key river and wetland habitats. The proposal is currently being assessed by MAFF and the Heritage Lottery Fund.

The Torridge fishery has also suffered from fish kills resulting from farm pollutions. There have been several significant incidents in recent years which have resulted in substantial fish mortalities.

Regeneration of bankside trees - In a number of areas of the Torridge catchment there has been a problem with the regeneration of bankside trees. The main reason for this lack of regeneration is erosion to the river bank caused by cattle grazing close to the water's edge. Trees are important in stabilizing riverbanks as their roots help to bind the bank materials together; the underwater roots also provide spawning areas for some coarse fish, as well as cover for all fish. Overhanging branches similarly provide cover and act as reservoirs of terrestrial invertebrate food items for many fish. Bankside trees also afford habitats for other important biota, e.g., otters, bank voles, emergent aquatic invertebrates etc. Where damage has occurred the riverside margins should be fenced off and formal drinking areas created. This will allow the natural vegetation and tree cover to regenerate.

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 are mainly covered in Issue 17. In an attempt to reverse some of these losses we are supporting The Torridge Headwaters Environmental Enhancement Pilot Project. This partnership undertaking between Devon Wildlife Trust, the North Tamar Leader Project, English Nature, Torridge District Council and the Environment Agency has run since July 1996. Working with the community who live and work in the upper reaches of the Torridge, the Project sets out to integrate a rich and healthy environment with the needs of a working landscape. Providing a free advisory and information service to farmers, community groups and local schools, the Project also facilitates access to grants to support the costs of farming with wildlife and the environment in mind.

The Project was set up with the aim of safeguarding and expanding key habitats (particularly Culm grassland), looking after and creating more landscape features like hedges and copses, protecting the environmental quality of the river and its tributaries and taking care of other important features like archaeological remains. The Project is intended as a pilot exercise, being carried out in order to learn lessons and develop models which could be applied elsewhere in the future, in order to generate wider environmental benefits for Devon.

The Project concentrates on a 35 square kilometre area within the Upper Torridge Catchment, from the sources of the river downstream to Haytown Bridge and encompasses the valley through which the river flows.

The Project targets the following key habitats and species: Rhos pasture (Culm grassland); rivers, streams, floodplain and fluvial processes; alder/willow wet woodland; species-rich hedges; brown hare; dormouse; nightjar; Atlantic salmon; otter; curlew; marsh fritillary.

River flows - There are concerns that the River Torridge Catchment has become more 'flashy' (i.e. responding more quickly to rainfall, leading to reduced low flows and increased high flows) as a consequence of land drainage schemes in the catchment. Flows in the catchment have been investigated⁶; however the analysis showed no evidence of an increase in flashiness in the River Torridge at Torrington. However, other research⁷ in the UK has shown that land drainage elsewhere may increase high and low flows. It is possible that this has occurred in the Torridge Catchment but that the changes are highly site specific. To be able to give a more detailed analysis it would be necessary to undertake more detailed modelling of the catchment hydrology, possibly using a rainfall/runoff model.

Table 3 Proposed Actions for Impact of Farming

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Develop initiatives to further reduce farm-related pollution incidents in the catchment: PRIM - Pollution Reduction by Inspection and Management - trial on the River Lew.	Agency, Farmers, NFU	10k	●	●			
Review success of Farm Waste Management Plan initiative in the catchment.	Agency, ADAS	2k		●			
b. Relocate monitoring site for Pulworthy Brook to a more representative site.	Agency	< 1k	●				
c. Investigate causes of low summer dissolved oxygen levels in the Pulworthy Brook.	Agency	2k		●			
d. Promote awareness of the danger to the water environment from synthetic pyrethroids.	Agency, MAFF, NFU, Farmers	unknown	●	●			
e. Conduct research to determine sediment dynamics and sediment sources in artificial salmon redds.	University of Exeter, Agency, NERC	4k	●	●			
f. Support bid for funds for a Devon/Cornwall project to help farmers to reduce impact of farming on the water environment.	West Country Rivers Trust, Agency, others	unknown	●	●			
g. Encourage and support fencing of poached areas to stabilize banks and promote tree regeneration.	Agency, Farmers	unknown	●	●	●	●	●
h. Continue to support Torridge Headwaters Project.	Agency, DWT, EN	unknown	●	●			
i. Consider further investigations into 'flashiness in the catchment'.	Agency	unknown	●				
j. Conduct consultation on Groundwater Regulations.	DETR	n/a	●				

Issue 2 Impact of Effluent Discharges

Background

We regulate the disposal of effluent direct to surface or groundwater by determining 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, some 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.

Sewage treatment improvement plans - Improvement schemes for SWWSL discharges are subject to available funding approved by OFWAT, the water industry's regulator. A strategic business plan, known as Asset Management Plan 2 (AMP2), was developed, based on guidelines agreed between the NRA, the former DoE, the water services companies and OFWAT in 1994. This plan will run from 1995 to 2000.

OFWAT have recently initiated a five-year review which will result in AMP3, running from 2000 to 2005. We are currently identifying those discharges where improvements are required.

Effects/Proposed Actions

Failures of EC Bathing Water Directive - The bathing water at Instow failed to comply with the microbiological standards of the Directive in all years in the period 1990 - 1997, except for 1995 and 1996. This non-compliance is due to unsatisfactory discharges of sewage to the Taw/Torridge Estuary.

SWWSL are working on a 'Clean Sweep' scheme for the Taw/Torridge Estuary; once this scheme is completed Ashford STW will be the only continuous discharge of sewage by SWWSL to either the Taw or the Torridge Estuaries. This discharge receives ultraviolet disinfection all year, as does the other continuous discharge of sewage from the Royal Marine Base at Chivenor. It is anticipated that the sewage discharges from Bideford Fine Screening Installation, Yelland and Westleigh will be removed from the estuary in 2000 and treated at the proposed new STW at Cornborough. The 'Clean Sweep' scheme will significantly reduce the microbiological loading to the estuaries, and should ensure that sewage discharges will not compromise compliance with the EC Bathing Water Directive at Instow.

The proposed new STW at Cornborough will take sewage from Northam Fine Screening Installation in addition to that from Bideford and Yelland. Northam currently discharges sewage continuously at Rock Nose; removal of this discharge will result in water quality improvements at Westward Ho!

RQO non-compliance: The River Okement from Brightley Bridge to South Dornaford - marginally failed to meet its proposed long term RQO of RE1 in 1997 due to high total ammonia levels. This stretch receives the discharges from Okehampton STW; improvements are required at the works in order to meet the long term RQO. In addition, frequent discharges from the STW storm overflow impact on water quality in the River Okement. The unsatisfactory state of this discharge means we recommend that development in Okehampton involving connection to the public foul sewer is restricted.

Okehampton STW has been put forward for funding in AMP3; there are two parts to the proposed scheme:

- a) Urban Waste Water Treatment Directive component which will reduce the frequency of storm spills from the works.
- b) RE compliance component which will consent the works for ammonia and secure improvements to treatment that will ensure compliance with the long term RQO of RE1.

Any improvements will be subject to available funding being approved by OFWAT.

RQO non-compliance: The River Lew from Hatherleigh Bridge to the Torridge confluence - significantly failed to meet its proposed long term RQO of RE1 as a result of elevated BOD and ammonia. These are thought to be caused by a combination of farm inputs (see Issue 1), poor water quality in the Pulworthy Brook (see Issue 1) and discharges from Hatherleigh STW. Recent work undertaken by SWWSL at the STW should lead to some improvement in water quality.

Potential eutrophication of the River Torridge - There are concerns that the River Torridge is eutrophic; sewage discharges are a possible cause (see Issue 3).

Restriction of Development - There are a number of locations where consented discharges are having an environmental impact. We recommend that development involving connections to the public foul sewer is restricted at Kingscott, Little Torrington, Merton, Milton Damerel, Monkleigh, Petrockstow, Riddlecombe, Roborough, Instow, Appledore, Bideford, Bideford-East-the-Water, Northam, Buckleigh Field and Westward Ho!

We have been negotiating with SWWSL regarding improvements to these discharges.

First time sewerage - A septic tank serving 17 properties at Peters Marland discharges into a tributary of the River Mere; this has an aesthetic effect on water quality and is likely to affect chemical and biological quality as well. The Environment Act 1995 introduced new duties on water service companies to provide public sewers for certain domestic properties where environmental or amenity problems exist or are likely to arise. Any Parish or District Council or group of residents may apply to SWWSL for such a scheme. The Agency can provide information to relevant bodies, and will act as an arbitrator if there is disagreement over the need for a scheme or implementation of the new duty.

Table 4 Proposed Actions for Impact of Effluent Discharges

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Complete 'Clean Sweep' scheme for Taw/Torridge Estuary (South scheme).	SWWSL	n/a	●	●			
b. Seek improvements to Okehampton STW through AMP3.	Agency	< 1k p.a.	●	●			
c. Object to further development leading to increased sewage flow at Kingscott, Little Torrington, Merton, Milton Damerel, Monkleigh, Petrockstow, Riddlecombe, Roborough, Instow, Appledore, Bideford, Bideford-East-the-Water, Northam, Buckleigh Field and Westward Ho!	Agency, SWWSL	< 1k p.a.	●	●	●	●	●
d. Seek improvements to sewerage system at Peters Marland.	Owners, occupiers, Parish/District Council, SWWSL, Agency	n/a	●				

Issue 3 Potential Eutrophication of the River Torridge

Background

Elevated levels of nutrients, principally nitrates and phosphates, in a watercourse can result in the increased production of algae and higher plants. This is called eutrophication. If algal production becomes excessive then this can affect the chemical, biological and aesthetic quality of the estuary. 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.

Effects

In 1995 a stretch of the River Torridge from Newbridge to the Normal Tidal Limit which is designated as salmonid under the EC Freshwater Fisheries Directive did not meet the Directive standards for pH. In the same year, five stretches of the River Torridge from Hele Bridge to Rothern Bridge marginally failed to comply with their RQOs of RE2 as a result of elevated BOD.

In both cases, non-compliance was due to the prevailing drought conditions over the summer period; levels were linked to algal activity and this was confirmed by investigations. There is provision in the RE classification for BOD results to be set aside when assessing compliance with the RQO where the Agency has evidence that algae are the cause of those elevated results (see Section 3.2). This provision was used in 1995.

We have collected biological and chemical data from the Torridge to confirm the nutrient status of the river. Should the analysis of the data show that the river is eutrophic, further action may be required.

Table 5 Proposed Action for Potential Eutrophication of the River Torridge

Actions	Action By Lead <i>Other</i>	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Complete investigation of nutrient status of the River Torridge and take action if appropriate.	Agency	unknown	●	●			

Issue 4 Impact of Waste Generation and Disposal

Associated Plans: Devon County Waste Strategy

Background

In the UK we generate 430 million tonnes of waste per annum. This is enough to fill a hole the size of Lake Windermere every nine months. The total annual quantity of controlled waste produced in Devon in 1993/94 was over 2 million tonnes. Industrial waste made up 52% of this figure, commercial waste accounted for 27.5%, domestic waste 20.2% and special waste 0.3%. The Environment Agency is currently intending to conduct a National Waste survey, which will allow more accurate figures to be calculated⁸.

The National Waste Strategy⁹ will set 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: reduction; re-use; recovery - recycling, composting, energy; disposal.

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.

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. Following the introduction of the landfill tax on 1st October 1996 much media attention has been focused on fly-tipping and the identification of problem sites. There are two levels of tax, £2 per tonne for inactive (inert) wastes and £7 per tonne for all other wastes; the tax for the latter is set to rise to £10 per tonne from October 1999.

Examples

RQO non-compliance: The Hookmoor Brook from source to Lew confluence - marginally failed to meet its proposed RQO of RE1 in 1997 as a result of elevated BOD. The main cause of poor water quality is likely to be farming (see Issue 1). However there are also problems with leachate from Peacewater tip. This is a closed landfill site, managed by Devon County Council. The Hookmoor Brook has been culverted under the landfill and downstream of the site the stream bed is stained orange-brown (ochreous) indicating possible contamination by metals in the leachate from the site. Devon County Council carried out remediation work in 1994 and 1995 to raise the pH of the leachate and precipitate out the metals. However ochreous staining of the stream remains a problem; leachate is ponding at the lowest corner of the site and is believed to be entering the stream. We are currently working with DCC to agree further remediation work.

Impact of water quality of Deep Moor landfill - Water quality in the upper reaches of the Peagham Stream has historically been impacted by leachate and surface runoff from Deep Moor landfill. This site has been receiving household, industrial and commercial waste since 1970. Prior to 1989, the site was operated by the County Council according to dilute and disperse landfill principles. This process allows leachate from the site to migrate into the underlying strata where it is diluted by groundwater flow and its pollution potential is dissipated by degradation and adsorption onto the underlying geology. These filled areas were unlined and do not have the benefit of an engineered cap to prevent infiltration of rainwater. Although perimeter leachate drainage was subsequently installed and a clay cover was placed over the waste it is likely that some rainwater drains through these areas of the landfill before entering the Peagham Stream. At this location, adjacent to the headwaters of the stream, the flow available to dilute impacts is limited. As a consequence, historically there have been significant water quality problems downstream of the site due to high levels of ammonia and suspended solids in the watercourse.

In order to comply with increasing environmental standards and waste management legislation, Devon Waste Management, the current operators of Deep Moor landfill, have installed a leachate collection system on the site. The leachate is pre-treated to reduce levels of BOD and ammonia and since 1994 has been discharged to Great Torrington STW via a purpose-laid pipeline. At the sewage treatment works further treatment takes place to ensure compliance with the discharge consent standards for Great Torrington STW. In addition, a settlement lagoon has been installed to control the impact of surface water drainage from the site.

Assessment of water quality data in the Peagham Stream immediately downstream of Deep Moor landfill suggests that whilst water quality has improved as a result of these remedial works, local water quality problems are still occurring. Data collected by Devon Waste Management between 1995 and 1997 at a site in the Peagham Stream above the B3227 Road Bridge shows that water quality significantly failed to meet the proposed RQO of RE2 as a result of elevated levels of ammonia. However, water quality at our routine monitoring site on the lower end of the Peagham Stream at Town Mills complies with the proposed RQO of RE2.

As a result of Agency concerns regarding water quality in the Peagham Stream downstream of Deep Moor, Devon Waste Management were requested to draw up a schedule of improvements and investigations at the site aimed at ensuring the impact of Deep Moor does not cause the Peagham Stream to fail the proposed RQO of RE2. The first phase of this programme will be completed in 1998; subsequent phases will incorporate retrospective capping and remediation of unlined phases of the site.

The Agency and Devon Waste Management consider that the works completed in 1998 should adequately address a number of identified sources of pollution, although it is possible that some of the scheduled investigations work will lead to a requirement for further capital works which may need further investment or programming. The current agreed programme includes investigation of leachate breakout and groundwater contamination, installation of further leachate monitoring and improvements to the handling and treatment of the surface drainage system. It is expected that significant improvements in water quality will occur as a result of these remediation works and investigations. We have set a date of 2001 to achieve compliance with the proposed RQO of RE2 in the upper stretch of the Peagham Stream; compliance is normally assessed on three years of data which would include 1999, 2000 and 2001. This compliance date allows the 1998 improvement programme to take effect.

Waste reduction - We are keen to promote the reduction of waste at source; an initiative taking place in North Devon aims to minimize waste generated by local companies. Two companies, Coutant-Lambda Ltd and S & T (Barnstaple) Ltd, took part and completed a six-month scheme driven by PAYBACK business environment association in partnership with Business Link, Local Authorities and ourselves. Several areas were identified where these companies could reduce the amount of waste they generate.

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. There are four companies in the catchment, affected by these regulations, who are registered with the Agency or a compliance scheme. In the future, producer responsibility is likely to be applied to other waste streams, and a larger number of companies will be affected.

Fly-tipping - A piece of land near the Old Mines Road, Bideford is permanently occupied by fly-tipped waste as is some undeveloped land off Kingsley Park, Westward Ho! As yet it is not clear who owns these sites and who is responsible for the fly-tipping. We will investigate the land ownership and try to identify the origin of the waste. Once responsibility has been identified clean-up can be undertaken.

Fly-tipping occurs repeatedly in the lay-by on Gammaton Road just prior to entering East-the-Water, Bideford. Torridge District Council have removed illegally dumped waste on several occasions; investigations to identify those responsible for dumping have been unsuccessful. Any information relating to fly-tipping at this site would be gratefully received.

Survey of closed landfills - The Environment Agency has collected details of closed landfill sites and rubbish tips using information obtained from Parish and District Councils; so far there are 637 identified sites in Devon.

The sites have been prioritized according to proximity to buildings and watercourses. The top priority sites are currently being visited to establish their potential to pollute the environment and cause harm to human health and to verify the information supplied by the Councils.

Winkleigh closed landfill site - This is a County Council managed site, which took household, commercial and industrial waste until 1991. The site operated

under a type of authorization called a resolution which is no longer effective. The leachate management and control practice undertaken at the site since its closure has been recirculation by spray irrigation onto the waste mass. We are currently working with Devon County Council for an improved remediation strategy. A sustainable leachate management system is required to reduce the site's impact on the adjacent tributary of the River Okement.

Threat of erosion to landfill site - The restored landfill site at Northam Burrows is on the seaward end of the Northam Burrows Nature Reserve. It is not engineered to the standards required for today's completed landfills, such as having a properly engineered clay cap: the waste is simply covered by plant-colonized sand. The only protection offered to the landfill site from wave erosion is a shingle/pebble ridge between it and the sea. There is a low point in this ridge which has been breached in the past. There are concerns that if this were to happen again landfill waste could be scoured out. This has serious implications for Northam Burrows and the Taw/Torridge Estuary SSSI. If landfill waste were to enter the estuary this could damage the site, which is of national importance for its wading-bird populations. In addition, rare plants grow along its shores and such pollution would present a threat to these fragile ecosystems.

This issue is being examined as part of the Bideford Bay - Bridgwater Bay Shoreline Management Plan (see Issue 18) and we are currently negotiating with the County Council over improvements to this site.

Breach of waste management licence - Pillhead Copse landfill, Bideford, is licensed to take inert materials only. Historically there have been problems with the disposal of wood and other non-inert materials at this site. The occurrence of the problem seems to have reduced since a recent increase in the frequency of site inspections. There is a potential for putrescible materials in the landfill to cause pollution of a stream which is adjacent to the site, although our monitoring data shows no evidence of this as yet.

A length of this same stream has been culverted and will be covered by the landfill as the tipping progresses. At certain times the culvert is unable to take all the stream flow and flooding occurs.

Options for disposal of waste within the catchment - As in all areas of the County, the quantities of waste presented for disposal in the catchment show little evidence of any significant reduction, in spite of the increased rates of recycling which are being achieved. Deep Moor landfill is the only large co-disposal site accepting domestic and commercial waste in the Torridge catchment and provides a vital service to the residential and business communities of North Devon.

Deep Moor has a limited life span and alternative capacity needs to be identified for the waste which remains after the processes of waste minimization, re-use and recovery. Deep Moor or an alternative facility will be required to fulfil this need.

Table 6 Proposed Actions for Impact of Waste Generation and Disposal

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Implement remediation work to stop pollution of the Hookmoor Brook by Peacewater tip.	DCC, Agency	n/a	●				
b. Install routine water quality monitoring site on the Peagham Stream above the B3227 Road Bridge.	Agency	<1k	●				
c. Carry out first phase of programme of investigations and improvements at Deep Moor landfill.	DWM, Agency	unknown	●				
d. Subsequent phases of programme of investigations and improvements to be implemented.	DWM, Agency	unknown		●	●	●	
e. Support PAYBACK initiative to reduce waste at source.	PAYBACK, Business Link, Local Authorities, Agency	t.b.c.	●				
f. Provide advice to those companies affected by the Producer Responsibility Obligations.	Agency	t.b.c.	●				
g. Investigate any new information relating to fly-tipped sites near end of Old Mines Road, Bideford and Kingsley Park, Westward Ho! and seek to prosecute offenders if possible. Investigate options for cleaning up the site and preventing future fly-tipping.	Agency	t.b.c.	●				
h. Investigate closed landfill sites and take action as appropriate	Agency, LAs	< 1k	●				
i. Implement remediation work at Winkleigh closed landfill site	DCC, Agency	n/a	●	●			
j. Encourage the public to give information about suspected illegal waste tipping.	Agency	unknown	●	●	●	●	●
k. Assess risk to and consequence of potential wave erosion at Northam Burrows landfill.	Agency, DCC	t.b.c.	●	●			
l. Ensure improvements to waste management and disposal, and culverted section of stream, occur at Pillhead Copse landfill	Agency	< 1k	●	●			
m. Investigate the role of Deep Moor landfill in terms of its contribution to waste management in Devon.	Agency	< 1k		●			

Issue 5 Impact of Mineral Extraction

Associated Plans: *Devon Minerals Local Plan*¹⁰

Background

Meldon Quarry is situated in the headwaters of the West Okement River. Historically there have been severe water quality problems in the catchment as a result of a combination of low pH and high levels of metals. Discharges from the quarry have significantly contributed to the problem.

Ball clay is extracted from a number of sites in the Merton area by two companies, Watts Blake Bearne Company and English China Clays.

Effects

Fish mortalities - Historically there have been incidents of high fish mortality related to both low pH and high metal levels, and to high pH as a result of problems with the addition of neutralizing compounds at the quarry. Fish kills have mainly occurred at the end of long, dry summers when water levels are low and water temperatures are high.

Non-compliance with EC Dangerous Substances Directive - We monitor a site downstream of the discharge from Meldon Quarry under this Directive. Environmental Quality Standards (EQSs) for copper and zinc were exceeded at this site in all years in the period 1995-1997. In addition, the EQSs for nickel and pH were exceeded in 1995.

Data analysis has shown the EQSs for copper and zinc were exceeded upstream of the Meldon Quarry discharge in the period 1995-1997 due to the natural geology of the catchment. However the quarry discharge is known to significantly increase metals in the watercourse, contributing to EQS failures at the Dangerous Substances monitoring site.

Action

In 1990, a major fish kill led to the then quarry owners, British Rail, installing a crude treatment system and applying for consents to cover the existing discharges to the West Okement River. These consents were issued in 1991; subsequently British Rail appealed to the DoE (now the DETR) against the consents, and in particular regarding conditions for metals. This Appeal has not yet been determined.

Since 1990 work has been undertaken to improve discharges from the quarry; the number of discharges has been reduced to one and the discharge is now partially treated to reduce its acidity and remove metals. Further treatment has been proposed by the present quarry owners, Bardon Aggregates, and discussions have taken place between the operators and the Agency to resolve the Consenting Appeal. The Agency hopes to issue a new consent for Meldon Quarry in 1998.

We have attempted to solve the problem of fish kills through:

- i) Improvements to Meldon Quarry discharge
- ii) An agreement with Meldon Quarry to use their treatment system to increase pH in the river if requested by us
- iii) Doubling the compensation release from Meldon Reservoir
- iv) Transfer of juvenile fish from West Okement to East Okement and elsewhere.

There have been no reported problems since 1995.

Other impacts on water quality - Effluent from ball clay quarries in the catchment is discharged at five points to the Rivers Mere and Little Mere. This effluent can have a high suspended solids content which has an aesthetic impact on water quality, causing a milky discoloration in the receiving watercourses. The Agency has been working with both operators to review consents to reduce this impact.

Table 7

Proposed Actions for Impact of Mineral Extraction

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Pursue the review of the consent to discharge for Meldon Quarry.	Agency, DETR, Bardon Aggregates	0.5k	●				
b. Continue to transfer fish from West Okement to the East Okement and elsewhere.	Agency	2k p.a.	●	●	●	●	●
c. Review revised ball clay discharge consents and environmental impact	Agency	2k	●	●			

Issue 6 Unknown Causes of Non-compliance with River Quality Objectives

There are four stretches of watercourse in the catchment which marginally fail their river quality objectives (based on data from 1995-1997), for which the cause is unknown.

RQO non-compliance: The River Okement from Woodhall Bridge to the Torridge Confluence - marginally failed to meet its proposed RQO of RE1 in 1997 due to elevated BOD.

RQO non-compliance: The River Torridge from Putford Bridge to Gidcott - marginally failed to meet its proposed long term RQO of RE1 in 1997 as a result of a single high BOD result in 1995.

RQO non-compliance: The West Okement River from Meldon Reservoir to below Meldon Dam - marginally failed to meet its proposed RQO of RE1 in 1997 due to low pH. The cause of this is unknown: it may be found to arise from the natural geology of the area and a set aside provision could be made.

RQO non-compliance: The River Duntz from the source to the Yeo (Bideford) - marginally failed to meet its proposed RQO of RE2 as a result of elevated BOD.

Table 8 Proposed Actions for Unknown Causes of Non-compliance with RQOs

Actions	Action By		Cost to Agency (£)	Financial Year				
	Lead	Other		98	99	00	01	02
a. Investigate causes of poor water quality in the River Okement and take action as appropriate	Agency		< 1k	●				
b. Review results of monitoring of the River Torridge at Gidcott to see if RQO failure recurs.	Agency		< 1k	●				
c. Investigate causes of low pH in the West Okement River and take action as appropriate.	Agency		< 1k		●			
d. Review results of monitoring of the River Duntz at the Yeo (Bideford) confluence to see if RQO failure recurs.	Agency		< 1k	●				

Issue 7 Addressing Climate Change

Background

The climate has always been changing, but the rate of change appears to be increasing in recent years. There is a broad consensus of scientific opinion that such changes are occurring because 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 which may cause global warming.

Effects

It is estimated that climate change will result in the melting of the polar ice caps and glaciers and sea levels world-wide will rise by more than 500mm in the next 100 years. We take account of sea-level rise estimates when planning coastal flood defence schemes. The current allowances for the South West Region of the Agency are a rise of 5 mm/year until the year 2030 and 7.5 mm thereafter.

As predicted sea-level rise occurs, one of the concerns is that coastal habitats are lost as they are 'squeezed' between the sea and the 'land' defences which protect people and property from flooding.

Proposed Action

There are two proposed coastal flood defence schemes in the catchment: Bideford Quay and Bideford East-the-Water (see Issue 12). The Bideford Quay scheme has been designed to take account of sea-level predictions over the 50-year life of the scheme. The East-the-Water scheme will be funded by the developer of the residential scheme which it is designed to protect. We will provide appropriate consent and advice.

We are planning to conduct flight surveys of the North Devon coast to help us examine current and future areas at risk from flooding. In addition to this flooding information we hope to be able to combine it with previously gathered information on vegetation in the Taw/Torridge Estuary. The resulting data could be used to examine the problem of 'coastal squeeze'. If significant areas of habitat are to be lost, mitigating measures will be required.

Some processes we regulate produce greenhouse gases, for example landfill sites which produce methane. 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 energy and fossil fuel consumption.

Deep Moor landfill - Devon Waste Management have been undertaking methane production trials at Deep Moor landfill with a view to installing power generation equipment at the site. A 30-day gas abstraction trial indicated that there was sufficient landfill gas generation within the waste mass to produce 2MW of electricity. On the basis of this trial a bid was put forward to the Non Fossil Fuel Obligation for a grant to install the equipment needed to abstract gas on a commercial scale. The production of electricity is proposed to commence in February 1999. The installation of this plant will significantly reduce methane emissions from the site (see also Issue 4).

Table 9 Proposed Actions for Addressing Climate Change

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Map flood risk areas by conducting flight survey of the coast.	Agency	< 1k	●				
b. Combine survey information to produce habitat map to examine the possible habitat losses due to 'coastal squeeze'.	Agency, Taw/Torridge Estuaries Project	< 1k	●	●			
c. Pursue installation of methane gas recovery systems, with high temperature flaring and power generation, at Deep Moor landfill site.	Devon Waste Management	n/a	●				

Issue 8 Exploitation of the Salmonid Fishery

Associated Plans: River Torridge Salmon Action Plan¹¹

Background

Both salmon and sea trout catches (rod and net) in the catchment have declined since a high point in the 1960s. Although declines have also been observed in other South West rivers, catches in the River Torridge continued to fall during the 1980s when catches in other rivers started to improve, which indicated that there was a problem specific to the River Torridge.

Many of the factors which influence numbers of migratory fish returning to the river to spawn are beyond our control: for instance, distant water fisheries and the Irish

drift-net fishery. This places particular importance on measures adopted locally to maximize the number of fish returning to spawn, and to ensure that conditions in the river system are favourable for successful spawning and survival (the latter is addressed in the other issues).

As a result of the continued concerns over the state of salmon stocks on the River Torridge, the Agency applied to MAFF for new regulations to restrict the exploitation of salmon and sea trout on both the Taw and Torridge. Following a public inquiry on the proposals in January 1997, a number of amendments were made and the new regulations were approved in September 1997. They have been implemented this year. The new regulations include restrictions on both the rod and the net fisheries and last for 5 years.

Poaching can have a dramatic effect on fish stocks if uncontrolled. We maintain a programme of regular enforcement to minimize the numbers of fish taken illegally, and presently the extent of poaching carried out is thought to be limited. However the importance of maintaining an enforcement presence on the river and at sea is recognized as a necessary requirement to prevent levels of illegal activity escalating.

We have produced a national strategy for the management of salmon¹²; part of this strategy is to develop individual action plans for all major salmon rivers in England and Wales. We have produced a Salmon Action Plan for the River Torridge which was sent out for public consultation in December 1997. The final plan will be published at the end of this year. The current Net Limitation Order for the Taw/Torridge Estuary setting the maximum number of nets which may be licensed for the capture of migratory fish at 14 expires in 2006.

We are only empowered to control the overall cropping levels in a river system, and are not able to determine the proportion of fish which may be taken by the net and the rod fisheries. This is a decision that can only be made by Government, requiring legislative change. Our current powers to regulate licensed fishing are limited to the conservation of the resource, and to improving the management of individual stocks.

It has become apparent following a marked decline in the numbers of spring fish returning to rivers that particular importance needs to be given to protecting this component of the salmon run. Irrespective of the catch restrictions associated with the Net Limitation Order, additional specific control measures to maximize the numbers of spring fish returning to spawn should be considered on either a voluntary or a mandatory basis, if the spring run continues to decline.

On some of the Cornish rivers rod fishermen/riparian interests have 'bought out' the net fishery by paying the net fishermen not to fish at certain times during the season. This is clearly an effective means of increasing escapement to the freshwater river, and should be considered in the Torridge catchment. The Agency would act as an 'honest broker' between netting and rod fishing interests if such negotiations were initiated.

Table 10 **Proposed Actions for Exploitation of Salmonid Fishery**

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Ensure compliance with new regulations for the net and rod fishery.	Agency	17k	●	●	●	●	●
b. Encourage wider adoption of catch and release of rod caught salmon especially autumn and spring fish.	Agency, Rod and Net Fishing Interests	< 1k	●	●	●	●	●
c. Agency to act as honest broker if required during negotiation between rod fishery and netsmen leading to net buy-out	Agency	< 1k	●	●	●	●	●

Issue 9 Barriers to Fish Migration

Associated Plans: River Torridge Salmon Action Plan¹¹

Many of the historical man-made barriers in the catchment now have fish passes installed. A recent survey of obstructions identified just two weirs which are complete barriers to fish migration, one on the Bideford Yeo and one on the Jacobstowe stream. The benefits of installing passes on these weirs need to be assessed; both are likely to require significant engineering works.

Coarse woody debris sometimes accumulates to form trash dams. These can provide an important in-stream habitat for a range of species, particularly invertebrates. However, under extreme events, they can obstruct the passage of migratory fish and back up water to drown out spawning riffles, and reduce the rate of flow resulting in sediment deposition. Therefore, we need to consider removing them when they reach this stage.

There are abstractions at some sites in the system which create problems for the downstream migration of smolts, when the fish are drawn into the abstraction intake. The installation of screens is an effective means of alleviating the problem. The 1995 Environment Act amended section 14 of the Salmon and Freshwater Fisheries Act, which now requires certain abstractors, including fish farms, to install screens to the satisfaction of the Agency. We will be carrying out assessments at abstraction sites and the abstractor will be made aware of any problems at the site. In most cases, the Agency will expect abstractors to have adequate screening designed and in place by 1999. However at some sites this may result in considerable expenditure, under which circumstances extra time may be allowed.

Table 11 Proposed Actions for Barriers to Fish Migration/Movement

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Evaluate cost benefit of improving fish passage to weirs at Yeo Vale on the Bideford Yeo and Jacobstowe on the Jacobstowe Stream.	Agency	2k	●				
b. Subject to findings of above, implement fish pass construction.	Agency Fishery/weir owners	unknown		●	●		
c. Remove trash dams and other obstacles after fully considering the wider ecological impact.	Agency, Riparian/ Fishery owners	3k	●	●	●	●	●
d. Identify sites which create problems for the downstream migration of smolts.	Agency	2k p.a.	●	●			
e. Following National Guidance on screening criteria, advise abstractors of Agency screening requirements and work towards implementation.	Agency, Abstractors	2k p.a.	●	●	●	●	●

Issue 10 Fish-eating birds

Background

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. However we shall not support licensed killing of fish-eating birds until and unless proof of serious damage has been established and culling is proved to be the most effective means for preventing significant loss of fish stocks.

The MAFF, DETR and the Environment Agency manage and fund the national research programme into fish-eating birds. The contractors undertaking the research report on progress annually. The most significant research is investigating the perceived short and long term damage caused by cormorants to inland fisheries in England and Wales. Interim findings from two of the four regions included in the investigation have been presented. In the Midlands at Holme Pierrepont, feeding success was high. Favoured prey were coarse fish of less than 10 cm in length. The lake contains large populations of fast growing fish which appear unaffected by predation. On the Trent, feeding success was much lower, but preferred species were again small coarse fish, mainly roach. At Grimsargh reservoir in the North West, feeding success was high with most of the prey coarse fish of less than 15 cm in length.

Research is also being undertaken into the effectiveness of predation control measures; the population, distribution, and movement of fish-eating birds; and the feeding behaviours of cormorants, using radio tracking.

An interim report on the research programme is due in December 1998.

Table 12 Proposed Action for Fish-eating Birds

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Progress research into the effects of fish-eating birds. Disseminate findings of research and develop actions if appropriate.	MAFF, Agency, Landowners,	unknown Anglers	●	●			

Issue 11

Introduction of Non-native Flora and Fauna

Background

When species are introduced into an area in which they do not normally occur, serious problems can result. These species, free from the constraints of their natural environment (e.g., predators and diseases) may thrive in the new area. Problems caused can include the loss of native flora and fauna, loss of recreational/amenity value and even damage to man-made structures.

Species populations which have been isolated for some time may develop a distinct genetic make-up, adapted to particular local conditions. The introduction of members of the same species from a different locality may adversely affect these isolated populations.

Man is usually the vehicle for the movement of flora and fauna, either deliberately or unwittingly.

Examples

Invasive terrestrial plants - Several plant species are causing concern at the way in which they are spreading. Some, like Himalayan balsam, Japanese knotweed and giant hogweed, are terrestrial plants which are often, but not exclusively, found alongside watercourses. They often spread at the expense of other, native plants, creating dense single-species stands which are of lower wildlife value. Himalayan balsam and Japanese knotweed die back in winter to leave bare banks which are vulnerable to erosion. Japanese knotweed does not set viable seed in this country but is able, rather like bindweed, to grow from small pieces of root or stem. It can be spread with soil from one site to another and presents problems for control and disposal. Giant hogweed is less common than the other two species but also has a significant health risk attached; contact with the sap or coarse hairs can result in severe blistering of skin and even sensitization to sunlight, which causes problems in subsequent years. We cannot undertake to eradicate these plants at all sites but we can advise on the best methods of control and will control them where they are growing on land which we own or manage.

Invasive aquatic plants - There are several non-native aquatic plants which are causing problems in the catchment. Many exotic plants have been sold by garden centres and other suppliers for use in ponds or even fish tanks. The plants the Agency is particularly concerned with are Parrot's Feather (*Myriophyllum aquaticum*), Fairy Fern (*Azolla filiculoides*), Australian Swamp Stonecrop (*Crassula helmsii*) and Floating Marsh Pennywort (*Hydrocotyle ranunculoides*). The rapid growth of these plants leads to deoxygenation of the water at the expense of other organisms and reduces biodiversity. Although they may look attractive, the plants present a public safety hazard as they form dense mats on the surface of the water which can be mistaken for solid ground. It is extremely easy for these plants to be spread unwittingly as the tiniest fragment introduced on another plant will soon flourish. All are present in the catchment, although quantification of this is difficult as most cases tend to be in private gardens.

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 of the associated problems.

Brown trout stocking - Historically, fishing interests have stocked parts of the catchment with farmed brown trout originating from a variety of sources. This practice, which is carried out to improve angling quality, may have an adverse effect on the native population through increasing competition for food and habitat, and by increasing predation of native juveniles. These introductions will modify the genetic make-up of remaining native stocks. The farmed fish may also be more susceptible to disease, which could then be passed on to the native

population. Farmed fish are less adept at avoiding predators; this coupled with an artificially high level of stock may also attract predators such as cormorants to the area.

It is particularly important to ensure protection is given to the pristine trout stocks in areas inaccessible to migratory fish and where no stocking has taken place, for example the East Okement upstream of Cullever Steps and the West Okement upstream of Shelstone Tor.

Table 13 Proposed Actions for Introduction of Non-native Species

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Record all occurrences of invasive species on Agency-owned sites or flood defence banks we manage and implement control programmes.	Agency	3k p.a.	●	●	●	●	●
b. Collaborate with Japanese knotweed control programmes considered by others.	TDC, DCC	unknown	●	●	●	●	●
c. Encourage control of invasive plants by riparian owners and other interested bodies.	Agency	< 1k	●	●	●	●	●
d. Raise awareness of problem of introduced aquatic plants among general public and distributors, and discourage suppliers from making these species available.	Agency, Garden Centre Trade Associations	1k p.a.	●	●	●	●	●
e. Encourage removal of invasive aquatic plants where already established.	Agency	< 1k p.a.	●	●	●	●	●
f. Check ponds for presence of alien species as part of routine operations.	Agency	1k p.a.	●	●	●	●	●
g. Discourage stocking of farmed fish and promote habitat improvements as preferred method of increasing brown trout stock levels. In areas where there are discrete brown trout stocks consent will be refused to maintain genetic integrity.	Agency, Riparian owners, Fishing Associations	< 1k p.a.	●	●	●	●	●

Issue 12 Impact of Urban Development

Associated Plans: *Devon County Structure Plan¹³ ; West Devon Borough Local Plan¹⁴; Torridge District Local Plan¹⁵; North Devon District Local Plan¹⁶; Dartmoor National Park Authority Local Plan¹⁷*

Background

Development in the catchment is largely restricted to the towns of Hartland, Torrington and in particular Bideford. We concentrate here on identified current and potential future problems associated with the development in the catchment, which are of direct interest to the Agency. Apart from the problems identified here development also generates extra waste and increases demand for water resources. These problems are dealt with separately under Issue 2 and Issue 13.

Although development can cause environmental problems it can also bring benefits, such as the redevelopment of brownfield sites and the clean-up of contaminated land. The planning process can be used to ensure that, where damage does occur, appropriate mitigation measures are taken.

Examples

Contaminated land - The precise nature of contaminated land in the catchment is not fully known. New statutory guidance¹⁸ which will be enacted via the forthcoming 'Contaminated Land Regulations' will require local authorities to identify contaminated land within their area. 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.

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 comprehensive floodplain land use planning which takes a holistic view.

To assist in this, we are in the process of producing up to date and consistent maps of floodplains as part of our survey duties under section 105(2) of the Water Resources Act 1991.

The first stage, 'Level A', of the survey has now been completed and this shows the indicative floodplain areas for all the main rivers in the Area. Work has now 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.

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. A proportion of these schemes have been shelved but some could be implemented in the future. Full co-operation from Devon County Council and the DETR will be required for some of these schemes which will be below the current environmental standard.

Restriction of tidal and fluvial floodplains - The construction of flood defence schemes will result in the loss of the natural functioning of tidal and fluvial floodplains which have conservation value. The Agency will need to investigate the possibility of providing additional compensation areas.

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. Some river corridors are identified in the West Devon Local Plan and will be protected as a result. We are keen to work with Torridge District Council to achieve similar results in the Torridge area.

In addition, the identification of sites of county and local wildlife importance would be an important advance in achieving the protection of non-statutory sites. We would wish to co-operate in any survey programme carried out across Torridge District (see Issue 20).

Flooding problems at Bideford, Bideford East-the-Water and

Taddiport Bridge - It is planned that flooding at Bideford will be alleviated by the Bideford Quay Scheme which involves extending the quay. The proposal has been subject to much public debate and was programmed for commencement in September 1998. MAFF have raised some concerns over the current proposals and further discussion will be required to resolve the issues they have raised. The Agency remains committed to providing a flood defence scheme for Bideford.

A proposed residential development at East-the-Water will require a flood defence scheme to be constructed. This will need to be funded by the developer but will require consent and advice from the Environment Agency.

Property upstream of Taddiport Bridge has been flooded in the past due to the constriction of flow at the bridge. A scheme was proposed to alleviate the problem at the bridge but was objected to by a local resident. The objection could not be resolved or withdrawn and as a result of this a further scheme involving individual property protection has been proposed.

Managed retreat - Flood and coastal defences have in the past involved claiming land from the estuary on which the defences are built. This approach has led to the gradual reduction of foreshore within the estuary over the last 200 years. There is a changed philosophy in the management of flood and coastal defences that optimizes on the natural process and demands a more holistic view of the coastal processes that prevail in any area. This can involve the managed re-alignment of the coastline to liberate sediment or dissipate wave or tidal energy to reduce problems elsewhere.

There should be considerable conservation benefits from managed retreat identified at Landcross, Annery Kiln and Hallspill, through the creation of saltmarsh habitat.

Recent MAFF-funded agri-environment schemes are intended to benefit the environment by encouraging less intensive farming. One such scheme encourages re-creation of saltmarsh from grassland. The Taw/Torridge Estuary Project has identified sites where this can be achieved by removing tidal defence banks without affecting non-target areas. In addition they are working to promote the added value of saltmarsh-reared lamb, which will provide an economic return for farmers as well as ensuring the habitat is sustainably managed.

The banks at Hallspill are maintained by the Agency whilst the banks at Annery Kiln and Landcross are privately owned. In the latter two cases the applicants will require the consent of the Environment Agency under the Land Drainage Byelaws for breaching the banks.

Table 14 Proposed Actions for Impact of Urban Development

Actions	Action By Lead <i>Other</i>	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Ensure all road schemes meet current environment standard.	DCC/DETR/LAs, Agency	unknown	●	●	●	●	●
b. Identify areas where flood control standards could be relaxed to improve/enhance wetland habitats.	Agency	< 1k p.a.	●	●	●		
c. Construct flood scheme for Bideford Quay.	Agency, MAFF, TDC	1,700k		●	●		
d. Advise on flood scheme design at East-the-Water.	Agency, Developers, TDC	unknown	●	●			
e. Progress flood scheme for properties at Taddipport Bridge.	Agency, MAFF, TDC	unknown	unknown				
f. Provide necessary advice/support for managed retreat at Landcross, Annery Kiln and Bideford.	Agency, Taw/Torridge Est. project, Landowners, MAFF	< 1k p.a.	●	●	●	●	●

Issue 13 Increasing Demand for Water Resources

Associated Plans: *Tomorrow's Water*¹⁹

Background

Our aim is to ensure that there is enough water available for public and private water supply now and in the future. We discharge our water resource duties primarily through the licensing of abstraction and impoundment proposals. The licensing process seeks to achieve the right balance between the needs of the environment and those of the abstractor.

In this catchment 92% of licensed abstraction is for public supply. There are very few licensed private water abstractions as a local exemption from licensing order applies in the catchment.²⁰ This order recognizes that groundwater abstraction from the minor aquifers in the Torridge/Hartland streams is unlikely to be significant. The result is that most groundwater abstraction in the catchment is exempt from the conventional abstraction licensing legislation.

Examples

Future forecasts - Forecasts have been made for private and public supply up to the year 2021¹⁹. These forecasts are based on Strategic Supply Zones; the catchment falls within the Roadford Supply Zone. In forecasting demand we have used two scenarios. Under the 'high scenario' which assumes a high growth rate in water consumption and that current leakage levels remain static a slight deficit in supply is forecast by 2021. Further forecasts are currently being made until the year 2025.

Before any further resources could be developed we would have to be satisfied that SWWSL have applied a range of appropriate demand management and resource management options as well as reducing their leakage to an economic

level. Demand management involves a number of different initiatives including metering: meters are installed in all new domestic properties and customers can have their homes metered at subsidized prices should they wish. Other initiatives include asking people to register their garden sprinkler with the company on the understanding that they may be metered at a later date.

The water companies have a duty to apply and demonstrate water efficiency to their business and customers. They have published water efficiency plans which promote efficient water use by the customer.

More efficient management of existing resources can increase the quantity of water that is delivered to the customer. This includes leakage control. SWWSL aim to reduce their leakage to 15% by the year 2000 and are currently on target to meet this reduction.

Expiry of the Newbridge abstraction licence - The demand for water in the catchment is currently supplied by a number of sources from outside the area, including the abstraction at Newbridge on the River Taw. This abstraction is currently supported by the transfer of water from the River Exe to the River Taw which is only licensed until the year 2000. SWWSL will need to secure at least equivalent resources to meet demand in North Devon if a continuation of abstraction from the current site on the River Taw is not feasible. This is likely to consist of a combination of resource development and demand management measures. There are a number of resource options to be considered from within the whole of the Roadford Zone. Should any of these options have an impact on the Torridge catchment it would have to be carefully evaluated against the need to maintain a reliable supply to North Devon as well as all other options available.

Visual impact at Meldon Reservoir - Water for the compensation release which flows from Meldon Reservoir tends to be drawn from deep within the reservoir. This water is iron rich and downstream from the outflow the iron precipitates out as iron ochre which has a visual and possibly biological effect on the West Okement at this point.

Table 15 Proposed Actions for Increasing Demand for Water Resources

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Publish updated regional water resources strategy	Agency	unknown			●		
b. Ensure impacts of all options are balanced against the need to secure future supplies as a consequence of the expiry of the Newbridge licence.	Agency	unknown		●			
c. Initiate discussions with SWWSL regarding visual impact downstream of Meldon outflow.	Agency, SWWSL	< 1k	●				

Issue 14

Risk of *Cryptosporidium* Entering Public Water Supply

Cryptosporidium is a microscopic animal which can infect the gut of mammals, birds and reptiles. One species *Cryptosporidium parvum* can cause the disease Cryptosporidiosis, a symptom of which is prolonged severe diarrhoea in humans. *Cryptosporidium parvum* is thought to be widely present in the environment and may be found extensively in cattle and sheep.

Occasionally outbreaks of Cryptosporidiosis occur in human populations, and the public water supply is often implicated in these situations. The risk of *Cryptosporidium* entering the water supply is thought to be greatest where there is a direct river abstraction, particularly in an agricultural catchment. South West Water Services Ltd can abstract water for public supply at Gammaton, Melbury and Meldon Reservoirs, the Red-a-Ven and Black-a-Ven Brooks and the West Okement River.

In recognition of the national increased awareness of the potential risk to public health posed by this organism a task group was formed in 1997 with representatives from SWWSL, MAFF, Environmental Health Departments and the Environment Agency. This group has assessed the risk of *Cryptosporidium* entering the public water supply in the South West and SWWSL will be reviewing procedures for the spreading of sewage sludge in catchments with potable supplies. The Environment Agency, in conjunction with MAFF, will also be promoting the Code of Good Agricultural Practices in the same catchments.

Issue 15

Flood Warning

A Flood Warning Service is currently provided on the Rivers Torridge, Okement, Waldon, Lew and Kenwith Stream and for the North Devon Coast within this LEAP area.

A study into the current levels of service provided by Fluvial Flood Warning across the Region on main rivers is now being carried out and is programmed to be completed in May 1999. The study is being effected Area by Area and Devon is programmed to be looked at later this year (1998). The completion of the study will enable levels of service to be compared across the whole Agency region.

The study will identify risk areas, lead time and benefit cost assessment amongst other things, using the Section 105 survey (see Issue 12) and other data. Once the study is complete priorities for improvements will be identified and a programme of future work together with costs will be produced. A study is also programmed for completion by the year 2000 into the Tidal levels of service currently provided. This will similarly drive the Regional capital programme for improvements to the Tidal Flood Warning system. As far as the recipients of flood warnings are concerned the feedback is of a service well received. We liaise with members of the public who receive direct warning and also local authorities and the Emergency Services on a regular basis.

Any person or organization who wants to receive direct flood warnings should contact us. Leaflets are available which give information on the current service provided. Information on flood warnings in force at any time is available via FLOODCALL 0645 881188 and using the quickdial code 04211.

Table 16

Proposed Actions for Effectiveness and Scope of Flood Warning in the Catchment

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Conduct fluvial flood warning study on main rivers.	Agency	10k	●				

Issue 16

Improving Air Quality

Associated Plans: National Strategy for Air Quality²¹

Background

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 Quality²¹ including a framework of standards and objectives for the pollutants of most concern and a timetable for achieving objectives. Obligations will be placed on local authorities to carry out periodic reviews of air quality in their areas. 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.

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.

Effects

There are no known impacts of air pollution in the catchment; however data are limited and there are a number of concerns which require further investigation.

Effect on sensitive species - Some lower plants (lichens, mosses and liverworts) are particularly sensitive to air pollution. Within the catchment there are two habitats which are particularly important for lower plants, namely western oakwoods and parkland. The Western Oak Woodlands found near the coast at Clovelly and Hartland have developed extensive internationally important lichen, moss and liverwort communities due to the damp conditions and clean air brought by the prevailing winds from the Atlantic Ocean. The nationally rare western lichen species *Enterographa hutchinsiae* and the critically endangered species *Porina guaranitica* are both found in the area.

Parkland is a particularly British landscape feature which is uncommon in mainland Europe. Two areas, Clovelly Deer Park and Dunsland Park SSSI, have extensive lichen communities.

Lichens are particularly sensitive to atmospheric sulphur. Estimated annual mean sulphur dioxide concentrations for the catchment are $<5\mu\text{g}/\text{m}^3$ ²¹; this is lower than the standard of $10\mu\text{g}/\text{m}^3$ proposed for the protection of sensitive lichens²². 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.

Acidification - Moorland areas are typically acid due to the underlying geology and soils. The acidity of Dartmoor, 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% of total UK nitrogen oxide emissions. By 2005 we aim to reduce these emissions by 33% from 1995 levels.

Effects-based emissions control policies have been developed in the UK through a critical loads 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.

Map 6 shows modelled critical load exceedences for soils in 1995 and 2005. The data for 2005 is based on the predicted emissions of sulphur dioxide and oxides of nitrogen from the major sources. It can be seen that the critical loads are exceeded over Dartmoor. The predicted exceedences in 2005 are greatly reduced; these reductions are due to agreed international emission reductions.

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

The critical loads 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 Forest and Water Guidelines²³.

There are no confirmed effects from atmospheric acidification in the catchment; however there is concern that the ecology of Dartmoor, in particular its watercourses, blanket bog habitat and associated species, may be affected by acid deposition.

The Institute of Freshwater Ecology is currently conducting a research project for the Agency, which seeks to develop a biological monitoring system for assessing acidification. A number of the sampling sites are in the catchment and the study could be used as a basis for examining any catchment-specific effects.

Table 17 Proposed Actions for Improving Air Quality

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Review air quality in the area, in line with National Air Quality Strategy.	TDC, DNPA, NDDC, WDBC, Agency	unknown	●	●			
b. Improve knowledge of status of lichen communities in the catchment.	DWT, EN, DCC, Agency	unknown	●	●	●	●	●
c. Conduct research to improve understanding of effects of airborne acidification and eutrophication on semi-natural habitats and species.	Universities, Agency, EN, IFE, ITE, DNPA	unknown	●	●	●	●	●
d. Ensure all proposals (>10k) for afforestation within the areas of critical load exceedence receive an environmental impact assessment in line with the Forest and Water Guidelines.	Agency, Forestry Authority	< 1k p.a.	●	●	●	●	●

Issue 17 Enhancing Biodiversity

Associated Plans: Biodiversity: The UK Steering Group Report, Volume 2: Action Plans 1995; The Biodiversity of the South-West: An Audit of the South-West Biological Resource February 1996, Action for Biodiversity in the South-West: A Series of Habitat and Species Plans to Guide Delivery June 1997; The Nature of Devon: A Biodiversity Action Plan for Devon; North Devon District Council Biodiversity Action Plan; Dartmoor National Park Authority Biodiversity Action Plan

Biodiversity, or the variety of life, is being lost. In the UK alone over 100 species have been lost this century. The global decline in biodiversity was recognized at the Rio Summit in 1992²⁴, where the Biodiversity Convention was signed by over 150 world leaders. The convention requires each country to 'develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity'. The UK responded with a process of Biodiversity Action Planning, which aims to reverse this decline by prioritizing habitats and species for action, ensuring that conservation efforts are directed where they are most needed. In Devon, Biodiversity Action Planning also includes the conservation of important earth science features and processes.

Biodiversity: The UK Steering Group Report²⁵ was published in 1995 and since then a number of regional plans have been produced including Action for Biodiversity in the South West (1997)²⁶. In Devon a steering group involving a large number of organizations involved in conservation have produced The Nature of Devon: A Biodiversity Action Plan for Devon²⁷. Of the planning authorities covered by this LEAP, North Devon District Council and Dartmoor National Park Authority are producing their own Biodiversity Action Plans.

We are taking part in this process in the following ways;

- We are the UK contact point for 15 species in the UK Biodiversity Action Plan²⁵; one of these species, the otter, is present in this catchment. As a contact point we are responsible for stimulating action to achieve targets, monitoring results and reporting progress to the national group.
- We are a joint lead partner for the otter and the freshwater pearl mussel, both present in this catchment. As a lead partner we are responsible for preparing detailed work plans, directing resources and overseeing plan implementation.
- As part of producing LEAPs we are identifying, with others, key habitats, species and geological features on a catchment basis on which we will concentrate our conservation efforts (Table 19). Many of the actions in this plan will help towards the conservation of these features, habitats and species; the associated issues are given in Table 19. We will also set catchment-specific targets for some of the key habitats and species, which will enable us to measure our progress in conserving and enhancing biodiversity.

We have additional responsibilities, in addition to our normal conservation duties, placed upon us under the European Habitats and Species Directive. There is only one site proposed for designation under this directive in the catchment: the Lundy Island proposed Marine Special Area of Conservation (pSAC), which has been proposed because it contains habitat types and species which are rare or threatened within a European context, such as reef habitats.

The Government has decided that all candidate sites under the Habitats Directive should be treated as already designated. This means that the Conservation Regulations 1994 (which were how the habitats regulations were translated into British law) already apply to Lundy's Marine SAC.

The Environment Agency is a 'competent authority' under the regulations. As a competent authority we have a number of obligations, including reviewing all existing authorizations and activities that we license within the area. In practice this also means looking at consents which are outside of the site but have the potential to affect it. Any new authorizations which are made must contribute towards the conservation objectives of the site.

Concerns have been raised in the past by the Lundy Island Marine Advisory Group regarding options for the disposal of waste and sewage on the island.

Table 18 Proposed Actions for Biodiversity - General

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Complete process of identifying key features, habitats and species in Devon catchments, and set catchment-specific targets where appropriate.	Agency, RSPB, DWT, EN	2k	●				
b. Review activities on Lundy which fall within Agency's remit.	Agency, Landmark Trust, EN	1k	●	●			

Table 19 Key Habitats, Species and Geological Features in the Catchment

Key Habitats/Associated Species/Geological features	Reason for inclusion	Threats in this Catchment	Associated Issues
Blanket Bog Dunlin Golden Plover	Internationally important Threatened in Europe Localized breeder	Overgrazing, burning, drainage Disturbance, habitat loss	1
Rhōs Pasture Narrow bordered bee hawkmoth Marsh Fritillary Whorled Caraway Barn Owl	Nationally important Threatened in Europe	Agricultural improvement/intensification, neglect/undergrazing, pond creation. Intensification	1
Upland Heath Red Grouse Skylark	Internationally important Local decline National decline	Overgrazing, burning Changes in management Habitat loss	1
Rivers and Streams Otter, Freshwater Pearl Mussel Salmon Kingfisher	Threatened Threatened in Europe Nationally threatened	Invasive plants, pollution, mineral extraction Disturbance, pesticides Exploitation	1, 8, 11
Lowland Farmland Skylark	Nationally threatened	Agricultural specialization and intensification	1
Lowland Heath (Lundy) Lichens	Threatened	Overgrazing	1
Reedbed Otter Water Rail Reed Bunting Warblers	Threatened across Europe National decline	Disturbance, pesticides Habitat loss	1
Estuaries, Estuarine Habitats and Saltmarsh Curlew Golden Plover Lapwing Dunlin Salmon Sea-lavender <u>Shingle ridge</u> (Northam Burrows)	Threatened Threatened geomorphological feature	Development, recreation Sea-level rise leading to coastal squeeze	1, 7, 12
Coastal and Floodplain Grazing Marsh Golden Plover	Nationally threatened	Floodplain development pressures and disturbance. Agricultural intensification	1, 12
Sand Dunes Water Germander Rock Sea-lavender Sharp Rush	Nationally threatened	Sea-level rise leading to 'coastal squeeze'. Tourism - trampling of dune ridges and disturbance to wildlife.	7, 19
Sea Cliff and Slope Lundy Cabbage <u>Hanging valleys</u> <u>Wave-cut platform</u>	Threatened, support endemic population	Recreation, overgrazing, invasive non-native species - Rhododendron	1, 11, 19
Rocky Seabed (Lundy) Pink Sea Fan Kelp - <i>Laminaria ochroleuca</i> Cup Corals - sunset coral, Weymouth carpet coral Sea slug - <i>Caloria elegans</i>	Threatened	Fishing, dredging, recreation, water quality	17, 19
Woodland Pasture and Parkland Goldenhair lichen Lungworts (<i>Lobarion</i> sp.)	Possibly threatened - extent of habitat poorly quantified	Atmospheric pollution, changing agricultural practices, removal of old trees	1, 16

17a Blanket bog - Dartmoor is internationally important for this wetland habitat. Poor moorland management has allowed much blanket bog to become degraded; drainage, burning and grazing at inappropriate intensity have resulted in lost value. A small area of this habitat on Dartmoor is within the Torridge catchment.

Table 20 Proposed Actions for Blanket Bog

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
Implement actions from Biodiversity Action Plans for Devon and/or Dartmoor and North Devon BAP for:							
• Blanket bog - includes prevention of uncontrolled burning, protect hydrology;	Agency	2k	●	●	●	●	●
• Golden plover and dunlin - need to set targets for increasing breeding populations.	RSPB, DBWPS, EN	n/a	●				

17 b Rhôs pastures - These species rich grasslands, known as the 'Culm grasslands', have a very restricted distribution. 90% of the resource which remained at the turn of the century has now been lost. The catchment contains a very significant proportion of the remaining resource. Agricultural improvement is probably the largest single threat to this habitat and its associated species, but neglect and inappropriate management are also problems. The Southern Damselfly is a globally threatened species associated with Rhôs pasture, although not present in this catchment. It is hoped that as a result of the management of this habitat potential re-introduction sites may be identified.

Table 21 Proposed Actions for Rhôs Pastures

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
Implement actions from Biodiversity Action Plans for Devon and/or North Devon BAP for:							
• Rhôs pasture - includes promoting management agreements, scrub clearance;	DNPA, Agency, EN, NDJCCS	3k	●	●	●	●	●
• Marsh fritillary - includes habitat restoration, correct grazing regime;	DNPA, BC, Agency, NDJCCS	2k	●	●	●	●	●
• Southern damselfly - includes protection of hydrology, possible re-introduction;	DNPA, Agency	2k	●	●	●	●	●
• Barn owl - provide nestboxes to encourage colonization by barn owls in areas of potential barn owl habitat, secure appropriate management of feeding habitat via land management advice and agri-environment schemes.	Agency, Barn Owl Trust, NDJCCS	1k	●	●	●	●	●

17c Upland heath - Large areas of Dartmoor are covered by heather moorland, much of which is in poor condition as a result of overgrazing and/or burning. Skylark numbers have dropped dramatically nationally and it is essential that upland heath is retained to provide suitable habitat. The catchment contains a small area of this habitat, which is within the National Park. Uptake of the Dartmoor ESA scheme on Dartmoor may help, particularly if agreements can be achieved on commons.

Table 22 Proposed Actions for Upland Heath

Actions	Action By		Cost to Agency (£)	Financial Year				
	Lead	Other		98	99	00	01	02
<hr/>								
Implement actions from Biodiversity Action Plans for Devon and/or Dartmoor BAP for:								
<ul style="list-style-type: none">Upland heath - includes prevention of uncontrolled burning and overgrazing	EN		n/a	●	●	●	●	●

17d Rivers and streams - The rivers and river valley habitat in the catchment support a diverse flora and fauna including salmon, otters and the freshwater pearl mussel. The freshwater pearl mussel is a bivalve mollusc that lives in fast flowing, nutrient poor rivers with clean, sandy and stony bottoms. The freshwater pearl mussel is a rare, globally threatened species which has been lost from all but seven English rivers. In Devon, it is now only known from the River Torridge and here only in moderate numbers. The River Torridge has been chosen by English Nature and the Environment Agency as one of several catchments within England where investigations will be carried out as part of a national project into the threats to pearl mussels. The main threats to this habitat and its associated species are covered elsewhere in this plan.

Table 23 Proposed Actions for Rivers and Streams

Actions	Action By		Cost to Agency (£)	Financial Year				
	Lead	Other		98	99	00	01	02
Implement actions from Biodiversity Action Plans for Devon and/or Dartmoor and/or North Devon for:								
<ul style="list-style-type: none">Rivers, streams, floodplains and fluvial processes - includes pollution control, production of water level management plans, increase floodplain woodlands where possible;	Agency, EN, LAs, Riparian owners		5k	●	●	●	●	●
<ul style="list-style-type: none">Otter - includes continued post-mortem examinations, habitat reinstatement;	Agency, DWT, Riparian owners		3k	●	●	●	●	●
<ul style="list-style-type: none">Freshwater pearl mussel - ensure suitable conditions in relevant watercourses to encourage recruitment. Encourage further research and monitoring in Devon and promote awareness of threats to species and their current legally protected status.	Agency, EN, LAs, SWWSL		2k	●	●	●	●	●

17e Lowland farmland - Parts of the catchment are a typical lowland farming landscape, with a mixture of improved pasture and arable. Field boundaries are important features, as are the small areas of semi-natural habitat. Changing agricultural practices have resulted in changes to the flora and fauna of farmland.

Table 24 Proposed Action for Lowland Farmland

Actions	Action By		Cost to Agency (£)	Financial Year				
	Lead	Other		98	99	00	01	02
Implement actions from Biodiversity Action Plans for Devon and/or North Devon for:								
<ul style="list-style-type: none"> Lowland farmland - promote extensive agricultural systems that have less impact on biodiversity, work with others to reduce nutrient levels, identify and target key watercourses where creation of buffer zones should be encouraged to take up excess fertilizer runoff. 	Agency, NFU, MAFF, CLA		2k	●	●	●	●	●

17f Lowland heath - Although very valuable for a variety of species, lowland heath has been lost very rapidly. Pressures are mainly overgrazing and recreation. On Lundy, the plateau vegetation comprises mainly dry heath, with a notable area of waved *Calluna* heath which is rich in lichens.

Table 25 Proposed Action for Lowland Heath

Actions	Action By		Cost to Agency (£)	Financial Year				
	Lead	Other		98	99	00	01	02
Implement actions from Biodiversity Action Plans for Devon and/or North Devon and Dartmoor BAP for:								
<ul style="list-style-type: none"> Lowland heathland - increase uptake of ESA scheme on Dartmoor, support and contribute towards implementing heathland restoration initiatives. 	Agency, MAFF		2k	●	●	●	●	●

17g Estuaries, estuarine habitats and saltmarsh - The Taw/Torridge Estuary supports nationally important numbers of Curlew, Golden Plover and Lapwing. Estuaries are under pressure from shoreline development and expansion of recreational activities.

Table 26 Proposed Actions for Estuaries, Estuarine Habitats and Saltmarsh

Actions	Action By		Cost to Agency (£)	Financial Year				
	Lead	Other		98	99	00	01	02
Implement actions from Biodiversity Action Plans for Devon and/or North Devon BAP for:								
<ul style="list-style-type: none"> Estuaries, estuarine habitats and saltmarshes - includes protection from development. 	Agency, LAs		2k	●	●	●	●	●
<ul style="list-style-type: none"> Curlew - ensure good advice and publicity to user groups on estuaries of the sensitivity of feeding and roost sites. 	Agency, Taw/Torridge Estuary Project		2k	●	●	●	●	●

17h Coastal and floodplain grazing marsh - The grazing marshes of the South West form some of its most dramatic lowland landscapes and are an essential part of our biological and cultural heritage. Threats to this habitat include floodplain development pressures, agricultural intensification, land drainage and flood defence works leading to direct loss of habitat or hydrological continuity. The main objective is to promote agricultural schemes, which can aid rehabilitation and maintenance of grazing marsh habitat.

Table 27 Proposed Actions for Coastal and Floodplain Grazing Marsh

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
Implement actions from Biodiversity Action Plans for Devon and/or North Devon BAP for:							
<ul style="list-style-type: none"> Grazing marsh - re-create grazing marsh where it has been lost and create new areas where opportunities arise, e.g., as part of managed retreat at Northam Burrows. 	Agency, Taw/Torridge Estuary Project	2k	●	●	●	●	●

17i Sand dunes - Although often thought of as dry, arid areas, sand dune systems are typically of great importance for wetland wildlife. This is because the water table in the slacks, that is in the hollows between the dunes, is usually near the surface, or even at times above. These wet slacks often support highly specialized wetland plant communities which, because the habitat is so restricted, contain many rarities. Sand dunes are scattered around most of the European coast, but are considered a highly threatened habitat throughout the continent. The key threats of this habitat are: falling water tables due to drainage of the land itself or of adjacent land and/or abstraction; dune stabilization and sea defence works, leading to no new slacks being created from blow-outs; and golf course management, leading to habitat loss and change. The University of Plymouth carried out hydrological research on the dune system at Northam Burrows to identify possible causes for falling water tables. Data showed that the efficiency of the drainage network was influencing the local groundwater regime and it was concluded that the proposed managed retreat project involving tidal inundation would encourage the wetting-up of the system.

Table 28 Proposed Action for Sand Dunes

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
Implement actions from Biodiversity Action Plans for Devon and/or North Devon for:							
<ul style="list-style-type: none"> Sand dunes - ensure coastal defence works are, through shoreline management plans and related strategies, sympathetic to natural processes, encourage and support research into the cause of falling water tables and possible solutions, encourage and support research into prevailing coastal processes and the effect of coast defences. 	LAs, MAFF, Agency, EN	2k	●	●	●	●	●

17j Sea cliff and slopes - The sea cliffs and slopes of the South West support one of the richest plant and animal communities. Marsland to Clovelly Coast SSSI is designated for its vegetated sea cliffs. Many cliff sites support a number of rare or uncommon plant species. The cliffs of Lundy support the endemic Lundy Cabbage. There are important geological features associated with this habitat. Threats to this habitat include: visitor pressures and recreational activities which can have detrimental effects on cliff vegetation and nesting birds; overgrazing; and interruption of natural processes of erosion, by defences or cliff stabilization projects. On Lundy, the cabbage is facing a threat from the invasive non-native rhododendron.

Table 29 Proposed Action for Sea Cliff & Slopes

Actions	Action By		Cost to Agency (£)	Financial Year				
	Lead	Other		98	99	00	01	02
Implement actions from Biodiversity Action Plans for Devon and/or North Devon for:								
<ul style="list-style-type: none"> Sea Cliff and slopes - support and implement strategies (Shoreline Management Plans) for managing coastal zone, avoid disrupting dynamics of natural coastal zone processes by coastal defence and other constructive works, support identification of County Geological Sites of coastal nature. Lundy cabbage - control rhododendron on cliffs of Lundy. 	Agency, TTEP, LAs, Devon RIGS Group, DCC, EN, NDJCCS		2k	●	●	●	●	●

17k Rocky seabed - The physical and biological processes responsible for maintaining the diversity of marine life on the rocky seabed are still poorly understood. Lundy is the most important site featuring this habitat in the catchment, reflected in its designation as England's only statutory Marine Nature Reserve. The main threat to this habitat is from fishing gear (towed gear including beam trawls/dredges) causing direct damage to habitats and species, especially in boulder fields and areas of softer bedrock.

Table 30 Proposed Action for Rocky Seabed

Actions	Action By		Cost to Agency (£)	Financial Year				
	Lead	Other		98	99	00	01	02
Implement actions from Biodiversity Action Plans for Devon and/or North Devon for:								
<ul style="list-style-type: none"> Rocky seabed - continue to manage use of scallop dredgers and beam trawlers in a way that minimizes potential damage to wildlife, support introduction of fisheries zoning and other appropriate management of fisheries. 	MAFF, DSFC, EN, Agency		3k	●	●	●	●	●
			2k	●	●	●	●	●

17l Woodland pasture and parkland (linked species Goldenhair lichen, lungworts *Lobaria* sp.) - Wood pasture and parkland are historic habitat systems derived from glade browsing. The South West has some particularly fine examples of wood pasture, especially medieval deer parks. These are of great importance for the conservation of lichens and mosses, as well as fungi and insects that depend on dead wood.

Table 31 Proposed Action for Woodland Pasture and Parkland

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
Implement actions from Biodiversity Action Plans for Devon and/or North Devon for:							
<ul style="list-style-type: none"> Wood pasture and parkland - encourage the safeguarding and managing of sites, and research and monitoring 	EN, DWT, LAs, MAFF, Site owners	1k p.a.	●	●	●	●	●

17m Sand martin and kingfisher populations - Whilst not identified species in Biodiversity Action Plans both these species have high public appeal. They are typical birds of lower reaches of rivers, where erosion creates high, vertical banks in which they can excavate nesting tunnels. Erosion control and other river management practices not only may directly destroy nest sites but can stabilize eroding faces, leading to subsequent abandonment. We need to have a better understanding of the numbers and distribution of these birds, which are also vulnerable to population fluctuations as a result of hard winters (kingfisher) or drought in wintering areas (sand martin). Quarries are also a potential nest site for sand martins.

Table 32 Proposed Action for Sand Martin and Kingfisher Populations

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
Implement actions from Biodiversity Action Plans for Devon and/or North Devon for:							
<ul style="list-style-type: none"> Support county-wide survey of sand martin and kingfisher nest sites. 	DBWPS, RSPB, Agency, NT	unknown	●				
<ul style="list-style-type: none"> Retain all known sand martin and kingfisher sites and seek to create suitable conditions for colonization elsewhere. 	Agency, NT	< 1k p.a.	●	●	●	●	●

17n Earth science sites and features - There are concerns over the impact of quarrying on landscape and earth science features. Regionally important geological sites (RIGS) will be identified to aid their protection. RIGS are places in Devon that are considered to be especially important for the geology they show. The Devon RIGS Group is responsible, with the help of geologists in the County, for the identification of sites of geological importance and seeks to promote geological conservation by working with local authorities, landowners and others.

The following sites in the catchment have been identified as RIGS by the Devon RIGS Group and are now awaiting recognition by the Torridge and West Devon District Councils. We are keen to see this designation formalized as it will give extra protection to these valuable sites: Colpit Quarry, Hartland; Rosemoor Quarry; Barley Grove, Torrington; Bradworthy Mill Quarry; Devil's Stone, Shebbear; Beam Quarry, Monkleigh; Friars Hele Cross; River Okement, Exbourne; Solland Quarry. Dartmoor National Park Authority is currently identifying RIGS within its area.

Coastal landforms such as those at Hartland Quay, Westward Ho! and the shingle ridge at Northam Burrows also deserve recognition and protection from threats such as recreation, rising sea level, sea defence and cliff stabilization projects.

Table 33 Proposed Action for Earth Science Sites and Features

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
Implement actions from Biodiversity Action Plans for Devon and/or North Devon for:							
• Promote measures to prevent loss of earth science sites and features in rivers and floodplains.	Agency, NT, LAs	unknown	●	●	●	●	●
• Identify and document County Geological Sites.	Devon RIGS Group, Agency, LAs, EN	< 1k p.a.	●	●	●	●	●
• Encourage greater appreciation and understanding of County Geological Sites.	Agency, DCC	< 1k p.a.	●	●	●	●	●

Issue 18 Integrated Coastal Zone Management

Associated Plans: Taw Torridge Estuaries Action Plan²⁸; Bridgwater Bay to Bideford Bay Shoreline Management Plan²⁹

Devon and Cornwall have one of Europe's finest natural and historic coastlines. There are numerous bodies in this area which have formed partnerships and developed 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 Councils, English Nature and ourselves.

The Agency, in partnership with the North Devon and Somerset Coastal Group have prepared a draft Bridgwater Bay to Bideford Bay SMP, which is now in the third phase of its development. After consultation, the coastal operating authorities will formally adopt the final draft plans following the agreement of amendments; and after external consultation the final version of the SMP will be produced at the end of 1998.

Oil Pollution - In the event of a major coastal oil pollution incident draft plans are in place, for both the Taw and Torridge estuaries, that identify: sensitive areas; options for estuary protection (including possible booming positions); an agreed coastal clean-up plan; and temporary holding sites for oiled waste.

Booming of the Taw/Torridge estuary would be difficult and will not be 100% successful, but will significantly reduce oil pollution upstream of the boom and therefore reduce clean-up requirements. An exercise to train people and test boom deployment methods will be conducted once plans have been tested and finalized.

Taw Torridge Estuaries Action Plan - The Taw/Torridge Estuary is a complex and diverse area which experiences many of the problems typical of estuarine areas in the UK.

W S Atkins were commissioned in August 1992³⁰ to prepare a management plan for the Taw/Torridge Estuary. In 1995 an Estuary Manager was appointed to review the plan and implement that revised plan. The majority of the actions were implemented after various modifications. The complete revision of the plan was included as one of the conditions of the European Fund that supported the implementation process.

We are members of the partnership which funds and guides the Taw Torridge Estuaries Action Plan. This includes specific projects which help us to meet our objectives.

Shellfisheries in the Taw/Torridge Estuary - Public consumption of shellfish commercially collected from the Taw/Torridge Estuary is protected by the EC Shellfish Hygiene Directive. Commercial collection of shellfish from some beds in the estuary is prohibited due to bacterial contamination of the shellfish flesh. At other beds, shellfish must be relayed to clean waters before sale to ensure that the quality of shellfish flesh is suitable for public consumption. Water quality improvements to the estuary which will result from SWWSL's Clean Sweep scheme will lead to improvements in shellfish quality and may lead to further harvesting potential (see also Issue 2).

If the fishery operates again, it would provide a valuable source of income for local fishermen. It will be necessary to ensure that the Agency as Sea Fisheries Committee for the estuary regulates the shellfishery effectively, and if stocks appear under threat, introduces legislation to allow increased control. Any relevant actions will appear in future plans for this catchment.

The DETR is currently consulting on whether waters, including the Taw/Torridge, should be designated under the EC Shellfish Waters directive. This directive aims to protect shellfish populations from pollution and designations would allow discharges causing an impact on shellfish to be controlled.

Table 34 Proposed Actions for Integrated Coastal Zone Management

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Continue to support the Taw Torridge Estuaries Action Plan.	Agency	5k p.a.	●	●	●	●	●
b. Continue to support Atlantic Living Coastline Project.	DCC, CCC	< 1k p.a.	●	●	●	●	●
c. Finalize oil pollution contingency plans for the Estuary and implement training and testing.	Agency, LAs, Emergency services	t.b.c.	●	●			
d. Complete Bridgwater Bay to Bideford Bay Shoreline Management Plan.	Agency, North Devon and Somerset Coastal Group	50k	●	●			
e. Consider designation of the estuary under Shellfish Waters Directive.	DETR, Agency	unknown	Timetable unknown				
f. If water quality improves consider introduction of regulatory order to allow better management of shellfishery.	Agency, MAFF	unknown	Dependent upon water quality improvement				

Issue 19 Impact of Recreational Use of the Catchment

Associated Plans: Taw Torridge Estuaries Action Plan

Background

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.

Effects/Examples

Canoeing - The British Canoe Union have an access agreement which permits the use of the Torridge for canoeing activities covering the section of river from Sheepwash Bridge to Bideford. We have a duty when furthering recreation to ensure safe access whilst having regard for any conservation concerns. Poor access raises safety concerns and we need to ensure that provisions are made for the less able when improving access. Erosion of existing access points is also a major concern along with the potential disturbance or re-routing of wildlife using the river corridor. Three sites within this section have been identified as having poor access and are in need of improvements.

At Little America, a floating pontoon structure is being considered to alleviate the pressure on the current access point, which is heavily used and subject to erosion. This site access is particularly poor for the less able. A proper access point is required at Weare Giffard. The part of the bank currently used is suffering from erosion due to heavy use. The Taw Torridge Estuary Project have put forward a design which will involve incorporating an access point into the existing headwall structure. At Beaford Bridge there is also no access point and wooden steps are proposed. We have established the partnerships for these projects but will need to attract additional funds.

We have recently launched Rivercall, which provides information over the telephone about current river levels. This will help canoeists and anglers decide whether conditions on the river are suitable for the activity. The information is updated daily and can be obtained by ringing 0930 107705. Calls are charged at 50 pence per minute.

Concerns over impacts of recreation on Estuary - Some areas, for example both Braunton Burrows and Northam Burrows, are already suffering from the adverse effects of intensive use and public pressure. Problems include the effects of trampling and subsequent vegetation erosion and disturbance to wildlife. Disturbance by many recreational activities throughout the estuary has been cited as a problem, primarily for birds and also to other wildlife including in particular otters and fish. This issue will be addressed through the Taw Torridge Estuaries Action Plan (see also Issue 18).

Table 35 Proposed Actions for Recreation

Actions	Action By		Cost to Agency (£)	Financial Year				
	Lead	Other		98	99	00	01	02
a. Implement access improvements at Little America, Beaford Bridge and Weare Giffard.	BCU, TTEP, Agency, TDC		2k	●	●	●	●	●
b. Work with others to develop sustainable recreation in the catchment which does not conflict with wildlife interests.	Agency, TTEP, TDC, NDJCCS		1k	●	●	●	●	●

Issue 20 Lack of Information on Catchment Resources

Background

Some gaps have been identified in information, which is required to make informed management decisions in the catchment. The required data will be useful to the many organizations working in the catchment.

Examples

Aquatic invertebrate populations - An aquatic invertebrate survey was undertaken in 1997; however analysis was not completed in time for this plan. Initial examination of the data shows encouraging results. In general terms samples obtained from sites on the main river Torridge contained a diverse fauna, with pollution sensitive groups present. Data from some tributaries such as the West Okement suggest some potential problems. Once analysis is complete the appropriate issues and actions will be added to this plan.

Need for a Wildlife Inventory for the Torridge District - No full wildlife survey has ever been carried out for the Torridge District and hence there are no recognized County Wildlife Sites, as there are in most other districts in Devon. There are many areas in the catchment which would benefit from this recognition, in particular sites of Culm grassland.

Coarse fish - Routine fisheries surveys have tended to concentrate on juvenile salmonid fish and data collected to date on other species is limited. It is particularly important to improve our knowledge of the distribution of bullheads and the three species of lamprey (brook, river and sea lampreys) as these species are all listed under Annex IIa of the Habitats Directive.³¹

Table 36 Proposed Actions for Lack of Information on Catchment Resources

Actions	Action By Lead Other	Cost to Agency (£)	Financial Year				
			98	99	00	01	02
a. Complete analysis of invertebrate data and add appropriate issues and actions.	Agency	2k	●				
b. Encourage Torridge District Council to implement survey for the production of a wildlife inventory.	Agency, TDC, DWT	1k	●	●			
c. Encourage involvement in surveying for otters in the catchment.	DWT, Agency	1k p.a.	●	●	●	●	●
d. Improve knowledge of distribution and abundance of bullhead and lamprey species, identifying lampreys to species level in surveys, and improve awareness of conservation importance of these species amongst field staff.	Agency	5k	●			●	
e. Improve knowledge of archaeological/historic value of the catchment through collaboration with other interested parties. Pilot project to be carried out in another catchment.	DCC, Agency, English Heritage, Local archaeology groups, Universities	unknown					

5. A Better Environment Through Partnership

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

5.1 The LEAP Steering Group

This group represent 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 ourselves and the local community, they will help to promote and develop initiatives of benefit to the environment within the catchment. The steering group members are:

Representing

Mr A Bell	Taw Torridge Estuary Project
Mr P Hickman	Torridge District Council
Mr B Butler	National Farmers' Union
Mr R J Chappell	Torridge Environmental Forum
Mr R G Copp	Industry/Watts Blake Bearne North Devon Clay Works
Mr J Daniel	Net Fishing Interests
Mrs R Day	Taw Torridge Estuary Forum
Mr I Edmonds	Bideford Canoe Club - BCU
Mr T Hynes	Northern Devon Joint Coast and Countryside Service
Mr C Inniss	Devon Fisheries Forum/The River Torridge Fishery Association
Ms M R Lane	Devon Wildlife Trust
Mr R Lascelles	Riparian Owners Association
Mr G Mountjoy	Bideford Angling Association
Mrs T Norton-Smith	The River Torridge Fishery Association
Mr L J Walter	Hartland Parish Council
Mr M Williams	South West Water Services Ltd

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 2011 First Review - Deposit Version November 1996 provides a framework for development and land use within Devon for the period up to 2011. The plan contains policies and advice to ensure protection and conservation of the environment in a sustainable way.

The Torridge and Hartland Streams catchment area falls within the jurisdiction of three local authorities: Torridge District Council, North Devon District Council and West Devon Borough Council; and a small part of Dartmoor National Park, all of whom are required to prepare 'Local Plans' for their area, which give more detail and 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.

The Devon County Structure Plan Devon 2011, First Review - Deposit Version November 1996, proposes the development of about 74,500 dwellings in Devon and provides for about 775 hectares of employment land, between 1995 and 2011 (see Table 37 below).

Table 37 Future Land Use Proposals in the Catchment

Local Authority (approx % in catchment)	Housing Provision 1995 - 2011 (Dwellings) as per Devon County Structure Plan	Employment Land Provision 1995 - 2011 (ha) as per Devon County Structure Plan	Plan Status	Existing Environment Protection Policies
West Devon Borough Council (25%)	4,100	35	West Devon Borough Local Plan adopted January 1997	A wide range of protection policies
Torridge District Council (70%)	7,100 (of which 4,000 within Barnstaple/Bideford Area of Economic Activity)	75 (of which 40 ha within Barnstaple/Bideford Area of Economic Activity)	Torridge District Local Plan Topic Reports 1 - 13, published 1996 collecting information to move towards preparation of Draft Local Plan	Protection policies being developed for Draft Local Plan
North Devon District Council (1%)	6,800 (of which 3,800 within Barnstaple/Bideford Area of Economic Activity)	70 (of which 40 ha within Barnstaple/Bideford Area of Economic Activity)	North Devon Local Plan - Public Inquiry March - September 1997. Inspector's Report awaited.	A wide range of protection policies.
Dartmoor National Park (4%)	800 (but none in the catchment)	None	Dartmoor National Park Local Plan (Revised) including Minerals & Waste Policies: Adopted Version February 1996	A wide range of protection policies

5.3 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:

- Devon Biodiversity and Earth Science Action Plan
- The Nature of Dartmoor: A Biodiversity Profile
- Devon's Local Agenda 21 Network Issues Report
- Bridgwater Bay to Bideford Bay Shoreline Management Plan (in preparation)
- Bideford Bay to Land's End Shoreline Management Plan (scoping information collection)
- Taw/Torridge Estuary Management Plan, W S Atkins (currently being revised)
- Heritage Coast Management Plan
- North Devon AONB (no management plan at present)

5.4 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.

National Rivers Authority Catchment Management Plans in the Torridge and Hartland Streams Catchment:

River Torridge Catchment Management Plan:

Consultation Report May 1993, Final Report September 1994, First Annual Review September 1995, Second Annual Review October 1996, Third Annual Review January 1998.

Taw/Torridge Estuary Catchment Management Plan:

Consultation Report August 1993, Action Plan March 1995, First Annual Review April 1996, Second Annual Review April 1997.

Hartland Streams Catchment Management Plan:

Consultation Report June 1995, Action Plan March 1996, First Annual Review combined with Torridge Third Annual Review January 1998.

5.5 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. 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 West Devon the Agenda 21 process is led by the West Devon Environmental Network, a community-based network created in 1992 which is now a charity. Extensive public consultation led to the formation of 16 principles which are the basis for Agenda 21 in West Devon.

In Torridge District Torridge Agenda 21 Environmental Forum, (Tag 21), also a community-based network, created in 1998, lead Agenda 21.

Dartmoor National Park Authority endorse 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.

5.6 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 a guide to information 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 Consultation Draft, please contact the Team Leader LEAPs at our Exminster office.

6. Appendix One

The Role of the Environment Agency

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

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

The **Pollution Control** function includes:

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

The Environment Agency is responsible for maintaining, improving and developing **Fisheries**. This is carried out by licensing, regulation and enforcement schemes which cover salmon, sea trout, non-migratory trout, coarse and eel fisheries. The Agency also carries out improvements to fisheries habitat and fish stocks and provides advice to fishery owners. The Agency also has the powers of a Sea Fisheries Committee for some tidal waters. We control commercial fishing for sea fish and shellfish in these waters.

The Agency has statutory duties under the Environment Act 1995 to promote the **Conservation** of wildlife and landscape of inland and coastal waters and associated land, and to further the conservation of wildlife, landscape and heritage features when carrying out its operational or regulatory actions. We have a role to play in the conservation of any species, habitat or feature that may be affected by our activities. We will seek to protect not only those interests which have official protection, but also others which are nevertheless considered important for nature conservation.

The Agency's **Recreation** responsibilities extend to all inland and coastal waters and associated land. Our statutory duties include the promotion of the use of water and associated land for recreational purposes and a duty to consider the need to maintain public access at sites of conservation or historic interest. We must also have regard to preserving access to places of natural beauty and take account in all aspects of our work of the needs of the sick or disabled.

We have no **Navigation** responsibilities in the South West Region.

The Environment Agency will **not** be dealing with:

- Waste collection and litter - responsibility remains with local authorities.
- Noise and odour pollution - responsibility remains with local authorities Environmental Health Departments.
- Drinking water quality - responsibility remains with private water companies and local authorities.
- Public health.
- Most aspects of air pollution - responsibilities for local air quality management plans, local traffic and development planning and control and the regulation of some industrial processes remain with the local authorities.
- Planning permission - responsibility remains with local authorities, who are legally obliged to seek our opinion on any developments which affect our interests.

7. Appendix Two

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. We eventually plan to introduce Statutory Water Quality Objectives to supersede these River Quality Objectives.

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 ₃	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.

7. Appendix Three

Proposed River Quality Objectives

Table 38 Proposed River Quality Objectives for the Catchment

River	Stretch name	RQO	Long term RQO	Set aside used 1997
Torridge	Source - Fordmill Farm	1		
	Fordmill Farm - Putford Bridge	2	1	
	Putford Bridge - Gidcott	2	1	
	Gidcott - Kingsley Mill	2		
	Kingsley Mill - Rockhay Bridge	2		
	Rockhay Bridge - Hele Bridge	2		
	Hele Bridge - Newbridge	2		
	Newbridge - Beaford Bridge	2		
	Beaford Bridge - Undercleave	2		
	Undercleave - Town Mills Torrington	2		
	Town Mills Torrington - Rothern Bridge	2		
	Rothern Bridge - Normal Tidal Limit	2		
Yeo (Bideford)	Foxdown - Tuckingmill	2		
	Tuckingmill - Hoopers	2		
	Hoopers - Normal Tidal Limit	2		
Duntz	Source - Yeo (Bideford) confluence	2		
Lydeland Water	Source - Duntz confluence	2		
Langtree Lake	Source - Torridge confluence	2		
Peagham Stream	Source - B3227 Road Bridge	2		
	B3227 Road Bridge - Torridge confluence	2		
Woolleigh Brook	Source - Torridge confluence	2		
	Coleford Bridge - A386 Bridge at Merton	2		
	A386 Bridge at Merton - Torridge confluence	2		
Little Mere	Woolladon Moor - downstream Stockleigh Quarry	2		
	downstream Stockleigh Quarry - Mere confluence	2		
East Okement	Source - Okement confluence	1		
West Okement	Source - Meldon Reservoir inflow	1		pH
	Meldon Reservoir - downstream Meldon Dam	1		
	downstream Meldon Dam - Meldon Viaduct	1		
	Meldon Viaduct - downstream Meldon Quarry Bridge	1		
	d/s Meldon Quarry Bridge - Okehampton Hospital	1		
Okement	Okehampton Hospital - Knowle Bridge	1		
	Knowle Bridge - Brightley Bridge	1		
	Brightley Bridge - South Dornafor	2	1	
	South Dornafor - Woodhall Bridge	1		
Hole Brook	Woodhall Bridge - Torridge confluence	1		
	Source - Okement confluence	2		
Lew (Torridge)	Source - Hole Stock Bridge	1		
	Hole Stock Bridge - Great Rutleigh	2	1	
	Great Rutleigh - Hatherleigh Bridge	2	1	
	Hatherleigh Bridge - Torridge confluence	2	1	
Pulworthy Brook	Source - Lewmoor Bridge	3	2	
	Lewmoor Bridge - Lew confluence	4	3	
Hookmoor Brook	Source - Lew confluence	1		
Wagaford Water	Source - Lew confluence	2		
Northlew Stream	Source - Lew confluence	1		
Whiteleigh Water	Source - Torridge confluence	2		
Waldon	Source - Sutcombe	2		
	Sutcombe - Waldon Bridge	2		
	Waldon Bridge - Torridge confluence	2		
Cookbury Stream	Bason Cross - Waldon confluence	2		
Dipple Water	Source - Torridge confluence	1		
Clifford Water	Source - Torridge confluence	2	1	

Note: 'Set aside' of data

In certain circumstances we can 'set aside' data, that is we will not take into account some or all of the results of a particular determinand when we assess compliance with an RQO. For the 1997 classification we 'set aside' pH for one stretch due to low pH being caused by the natural geology of the catchment. This allows us to protect good water quality reflected by other parameters in the RE Classification.

9. 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.

abstraction licence - licence issued by the Environment Agency under section 38 of the Water Resources Act 1991 to permit removal of water from a source of supply.

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.

aquatic plants - a term given to plants that grow entirely covered by water, like water-milfoil, or at the surface, such as yellow water-lily. Some plants have both aquatic and emergent forms.

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.

bar - an accumulation of sediment in a river, formed underwater in floods and subsequently exposed at lower flows.

BATNEEC - Best Available Technology Not Entailing Excessive Cost.

biodiversity - variety of life.

buffer zone - strip of land, 10-100m 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.

Countryside Stewardship Scheme - an initiative funded by MAFF to enhance and conserve farming landscapes, wildlife habitats and cultural heritage.

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.

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.

Drought Order - orders made by the Secretary of State upon application by the Environment Agency or a water undertaker to meet deficiencies in the supply of water due to exceptional shortages of rain. Drought Orders are sub-divided into 'ordinary' and 'emergency'. An 'ordinary' Drought Order may, for example, authorize abstraction from an unlicensed source or override the conditions pertaining to an abstraction licence. An emergency Drought Order might prohibit specified uses, such as in car washes.

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.

ephemeral - lasting only a short time; transitory.

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.

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

fyke net - net designed to catch eels, consisting of a tube of netting supported by hoops with three or more internal funnels.

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.

heavy metal - metals such as copper, zinc, cadmium, nickel, lead and mercury that may have deleterious environmental impact.

hydrogeology - branch of geology concerned with water within the earth's crust.

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.

leaching - the washing out of a soluble constituent.

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.

maintenance works - regular river maintenance such as desilting or weed control.

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

metamorphic aureole - the zone of rocks surrounding an intruded mass of igneous rock, e.g. granite, which has been altered and affected by the heat.

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.

Nitrate Vulnerable Zone - an area where nitrate concentrations in sources of public drinking water exceed, or are at risk of exceeding the limit of 50 mg/l laid down in the 1991 EC Nitrate Directive, and where compulsory, uncompensated agricultural measures will be introduced from 1998 as a means of reducing those levels.

outfall - the point where a river or pipe discharges.

organic finds - objects of organic nature from archaeological sites such as leather, wood and crop remains.

PAYBACK - business environment association.

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.

Public Surface Water Sewer - sewers which transmit surface water runoff to a watercourse. The water should be uncontaminated and is the responsibility of the sewerage undertaker to maintain and control.

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

reach - a length of channel.

Red Data Book - a series of reference books which list those species considered to be under threat.

rehabilitation - the partial return to a pristine state.

residual flow - the flow remaining in the watercourse after abstractions have taken place.

restoration - the return to a pristine state.

return period - refers to the return period of a flood. Flood events are described in terms of the frequency at which on average a certain severity of flood is exceeded. This frequency is usually expressed as a return period in years e.g. 1 in 50 years.

revetment - facing built to support a bank.

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).

salmonid fish - game fish, e.g. trout and salmon.

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.

shoal - exposed gravel/pebble-bar deposit.

silage - a winter feed for cattle produced by bacterial action on freshly cut grass.

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.

spiling - willow twigs woven around winter-cut willow stakes and used to protect steep or vertical banks. Cut twigs and stakes will regrow.

spoil - material and silt removed during dredging or excavation.

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.

10. Abbreviations and Units

ADAS	Agricultural Development Advisory Service
Agency	Environment Agency
AMP	Asset Management Plan
AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
ATU	Allyl Thiourea
BATNEEC	Best Available Technique Not Entailing Excessive Cost
BAP	Biodiversity Action Plan
BC	Butterfly Conservation
BCU	British Canoe Union
BDS	British Dragonfly Society
BPEO	Best Practical Environmental Option
BOD	Biochemical Oxygen Demand
BTO	British Trust for Ornithology
CASI	Compact Airborne Spectrographic Imager
CAP	Common Agricultural Policy
CCC	Cornwall County Council
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CLA	Country Landowners Association
DAS	Devon Archaeological Society
DBAP	Biodiversity and Earth Science Action Plan for Devon
DBWPS	Devon Bird Watching and Preservation Society
DCC	Devon County Council
DETR	Department of Environment, Transport and the Regions
DNPA	Dartmoor National Park Authority
DO	Dissolved Oxygen
DoE	Department of the Environment
DoH	Department of Health
DSFC	Devon Sea Fisheries Committee
DWT	Devon Wildlife Trust
EC	European Council
EH	English Heritage
EN	English Nature
EPAQS	Expert Panel on Air Quality Standards
EQI	Environmental Quality Indices
EQS	Environment Quality Standard
ESA	Environmentally Sensitive Area
EU	European Union
FRCA	Farming and Rural Conservation Agency
FSC	Field Studies Council
GATT	General Agreement on Tariffs and Trade
GQA	General Quality Assessment
HCS	Heritage Coast Service
HCH	Hexachlorocyclohexane
HMIP	Her Majesty's Inspectorate of Pollution
HNDA	High Natural Dispersion Area
IFE	Institute of Freshwater Ecology
IPC	Integrated Pollution Control
ITE	Institute of Terrestrial Ecology
JNCC	Joint Nature Conservation Committee
LA	Local Authority
LEAP	Local Environment Agency Plan
LIDAR	Laser Induced Direct and Ranging system
MAFF	Ministry of Agriculture, Fisheries and Food
MNA	Marine Natural Area
NDDC	North Devon District Council
NDJCCS	Northern Devon Joint Coast and Countryside Service

NERC	National Environmental Research Council
NFFO	Non Fossil Fuel Obligation
NFU	National Farmers Union
NGO	Non-governmental Organization
NII	Nuclear Installations Inspectorate
NRA	National Rivers Authority
NT	National Trust
NVZ	Nitrate Vulnerable Zone
NWC	National Water Classification
OFWAT	The water industry regulator
PPG	Planning Policy Guidance
RCHME	Royal Commission on the Historical Monuments of England
RE	River Ecosystem
RIGS	Regionally Important Geological Site
RQO	River Quality Objective
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SAM	Scheduled Ancient Monument
SMP	Shoreline Management Plan
SSA	Strategic Supply Area
SSSI	Site of Special Scientific Interest
STW	Sewage Treatment Works
SWWSL	South West Water Services Limited
TDC	Torridge District Council
TTEP	Taw Torridge Estuary Project
UK	United Kingdom
UWWTD	Urban Waste Water Treatment Directive
WDA	Waste Disposal Authority
WDBC	West Devon Borough Council
WLMP	Water Level Management Plan
WRA	Waste Regulation Authority
WTW	Water Treatment Works

Units

°C	degrees centigrade
g	grams
ha	hectare
km	kilometres
km ²	square kilometres
l	litre
m	metre
m ³ /day	cubic metres per day
m ³ /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 ³	micrograms per cubic metre
<	less than
≤	less than or equal to
>	greater than
≥	greater than or equal to
%	percentage

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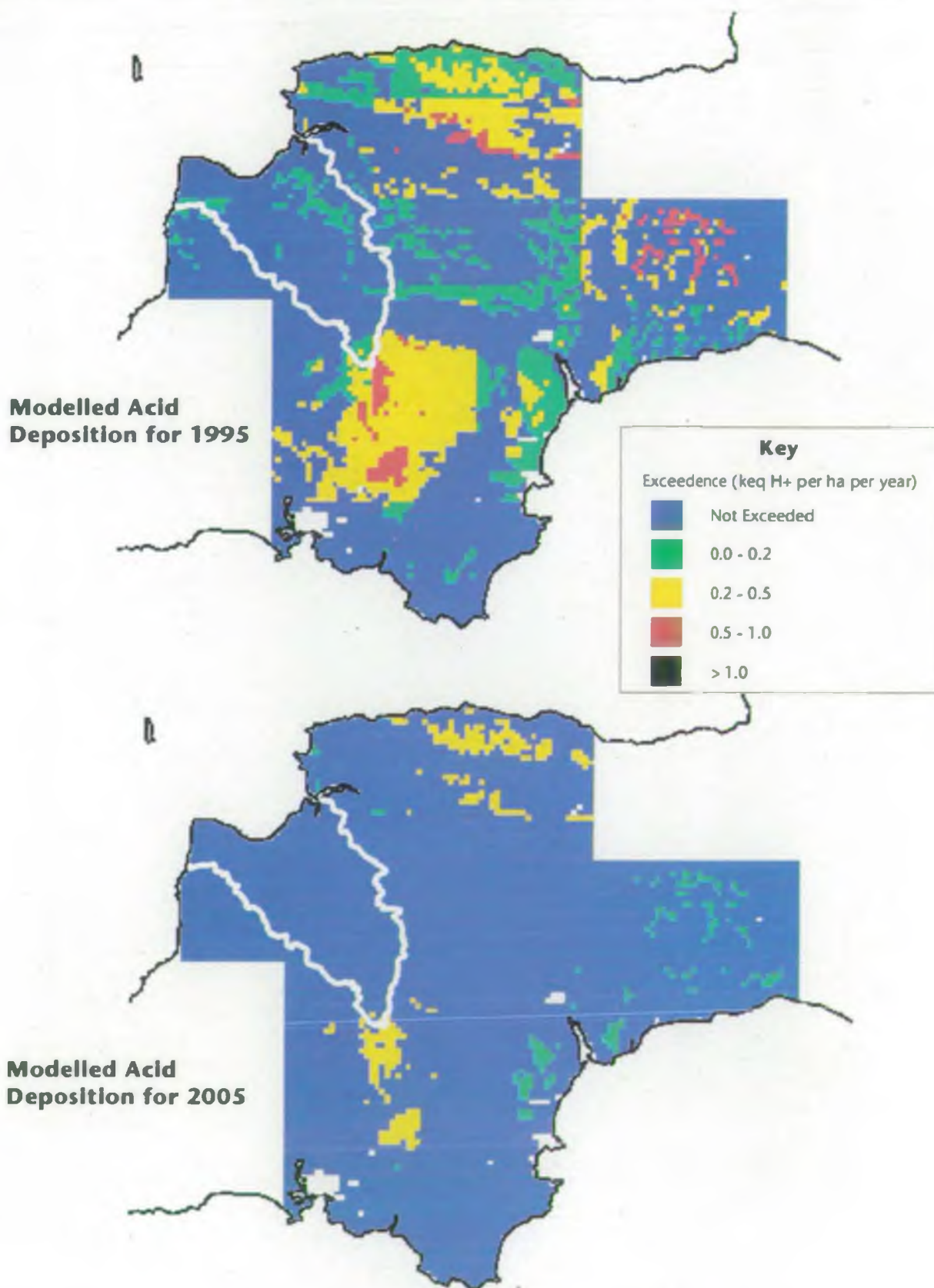
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Map 6 - Exceedences of Critical Loads of Acidity for Soils

Source: Critical Loads Mapping and Data Centre, ITE Monks Wood - Data acknowledgement: CLAG Soils sub-group, Hull University

Map 7 - Torridge and Hartland Streams Parish and District Boundaries



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 BS32 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

SOUTHERN

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

NORTH EAST

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

SOUTH WEST

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

NORTH WEST

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

THAMES

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

MIDLANDS

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

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.

ENVIRONMENT AGENCY GENERAL ENQUIRY LINE

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ENVIRONMENT AGENCY EMERGENCY HOTLINE

0800 80 70 60



**ENVIRONMENT
AGENCY**



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