

local environment agency plan

NORTH DEVON STREAMS

CONSULTATION REPORT

OCTOBER 1996



**ENVIRONMENT
AGENCY**

FOREWORD

The integrated management of the environment is a fundamental philosophy for the Environment Agency with Local Environment Agency Plans (LEAPs) taking a key role in this approach.

This plan embodies the Agency's commitment to realise improvements to the environment of North Devon.

An important stage in the production of the plans is a period of public consultation. This Consultation Report for the North Devon Streams Catchment covers an important recreational and tourist area of Devon. The Environment Agency is keen to draw on the expertise and interests of the local communities involved.

Please comment - your views are important, even if it is to say that you think particular issues are necessary or that you support the plan and its objectives.

Following on from the Consultation Report an Action Plan will be produced with an agreed programme for the 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 that good progress is made towards the vision.

G. R. Bateman

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ENVIRONMENT AGENCY



127207

ACKNOWLEDGEMENTS

We would like to thank the North Devon Streams Catchment Steering Group (see Section 1.2) for their valuable contribution to this report. They are:

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Shellfishing & North Devon District Council

Regional Flood Defence Committee

National Trust

Fishing Associations & Lynton/Lynmouth Town Council

Recreation/Leisure

Conservation (English Nature)

Local Farmers

Your Views

We hope that this report will be read by everyone who has an interest in the environment. Your views will help us finalise the Action Plan.

Have we identified all the problems in the catchment?

If not, we would like to know.

Are there any issues which you would like to highlight?

Please fill in the questionnaire provided and send your comments by 31st January 1997 to:

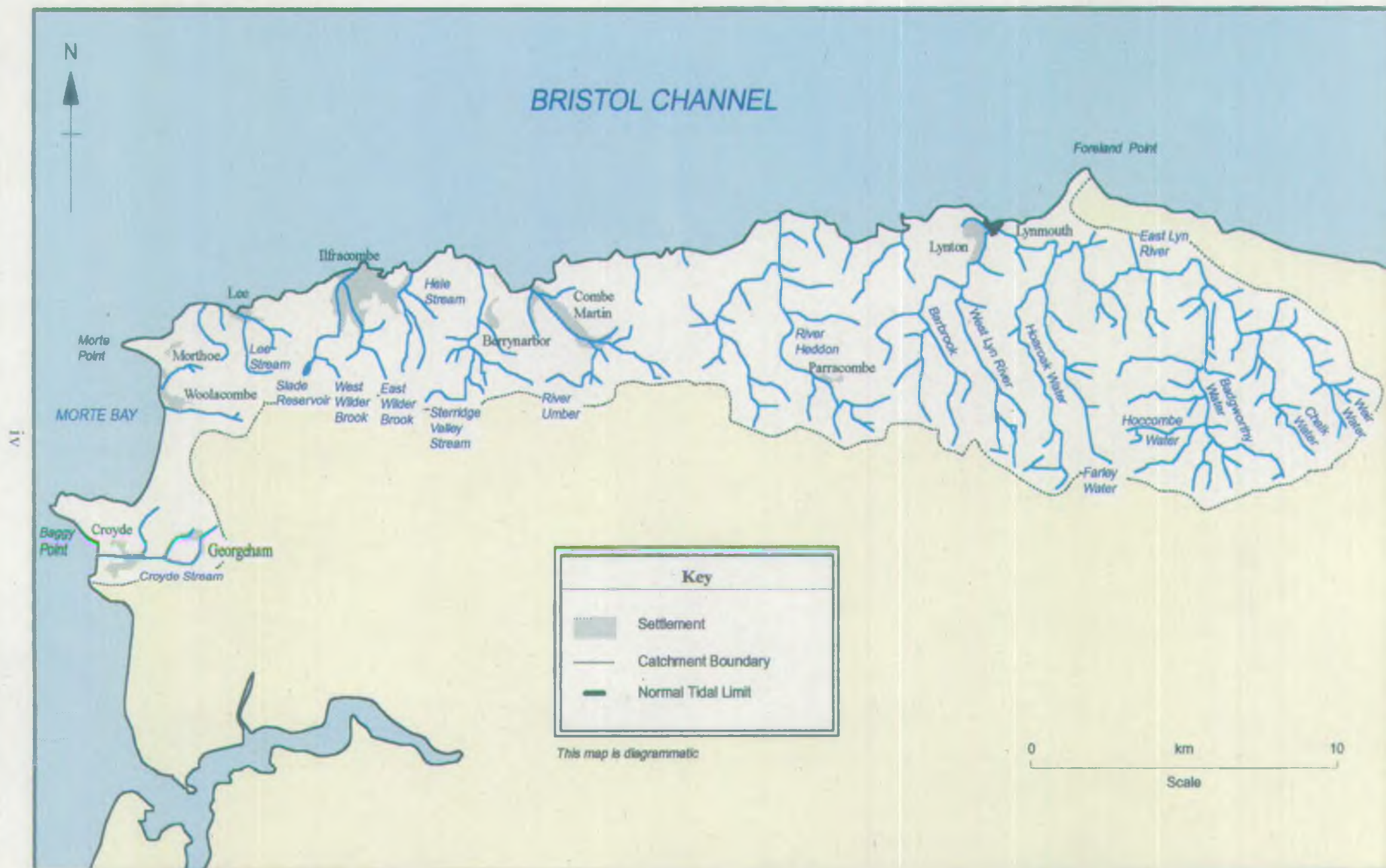
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Map 1 - The North Devon Streams Catchment



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North Devon Streams Local Environment Agency Plan

Environment Agency

DRAFT CATCHMENT VISION

Our vision of the North Devon Streams Catchment is of a healthy and diverse environment, managed in an environmentally sustainable way, balancing the needs of all those who live, work and visit the area.

In an area of such high amenity and ecological value, our Plans will help to ensure that:

- discharges to the air, land and water do not harm the environment
- the abundance and diversity of wildlife and habitats in the catchment is maintained and where appropriate restored or enhanced
- there is maintenance of the natural hydrological cycle, including natural river and wetland functions and processes
- water is a valued resource and is used accordingly
- there is minimal risk to people and property from flooding
- waste generation is minimised and the quantity of waste requiring disposal is reduced through the principles of reuse and recovery
- features of archaeological and historic interest are conserved
- people's enjoyment and appreciation of the environment continues to grow.

The achievement of this vision will require close co-operation between many organisations and individuals. We recognise the importance of establishing links with local communities and representatives, and in particular in working with the local authorities.

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1. INTRODUCTION

1.1 The Environment Agency

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

Our Principal Aim

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

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

Our Objectives

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

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

Our Role

Our work is divided into seven main functions:

- Flood Defence
- Water Resources
- Pollution Control
- Fisheries
- Navigation
- Recreation
- Conservation.

These roles are explained in further detail in Appendix 1.

1.2 The Environment Planning Process

Local Environment Agency Plans are published by us to draw together aspects of environmental management and planning; the plans that we publish are part of an ongoing dialogue between ourselves and the various organisations involved in the protection and management of the environment. This consultation report has already been the focus for discussions between ourselves, the catchment steering group and a range of organisations and individuals involved with the environment. We will encourage this dialogue to continue. The Action Plan that we will publish following the consultation period will contain details of the main actions that we and other organisations will be carrying out over the next few years.

The Consultation Report

This Local Environment Agency Plan (LEAP) Consultation Report gives you the opportunity to comment on environmental problems or our work, it:

- describes the environmental resources of the area;
- explains how these resources are affected by human uses or pressures;
- outlines issues where we, or others, need to take action to address problems in the environment.

The following sections are included:

Catchment Characteristics: This chapter provides a brief and general introduction to the area describing its key environmental resources.

Human Activities and Pressures on the Environment: We all place increasing demands on the environment but expect it to be protected from harm. This section looks at the main pressures that are put on the environment.

State of the Environment: In this section we look at different aspects of environmental media such as air, water and land and consider what standards are available to allow us to assess the state of the environment within and between these media.

Summary of Issues and Actions: Throughout this report we raise issues. These issues and options for action are summarised in this section.

The Action Plan and Annual Reviews

We will collate responses to this Report and publish an Action Plan in June 1997. Each year we will review the progress that has been made with the actions identified in the Action Plan and publish a brief review. We will also report on any major new issues which may affect the way we manage the environment in this area. Within five years of publishing the Action Plan we will undertake a major review of the progress we have made.

Local Environment Agency Plans and 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 advise and guide local planning authorities to encourage them to adopt policies which protect the environment from harmful development. We will reinforce these policies, where we can, when commenting on planning matters or making our own decisions. See Section 3.1 for more information.

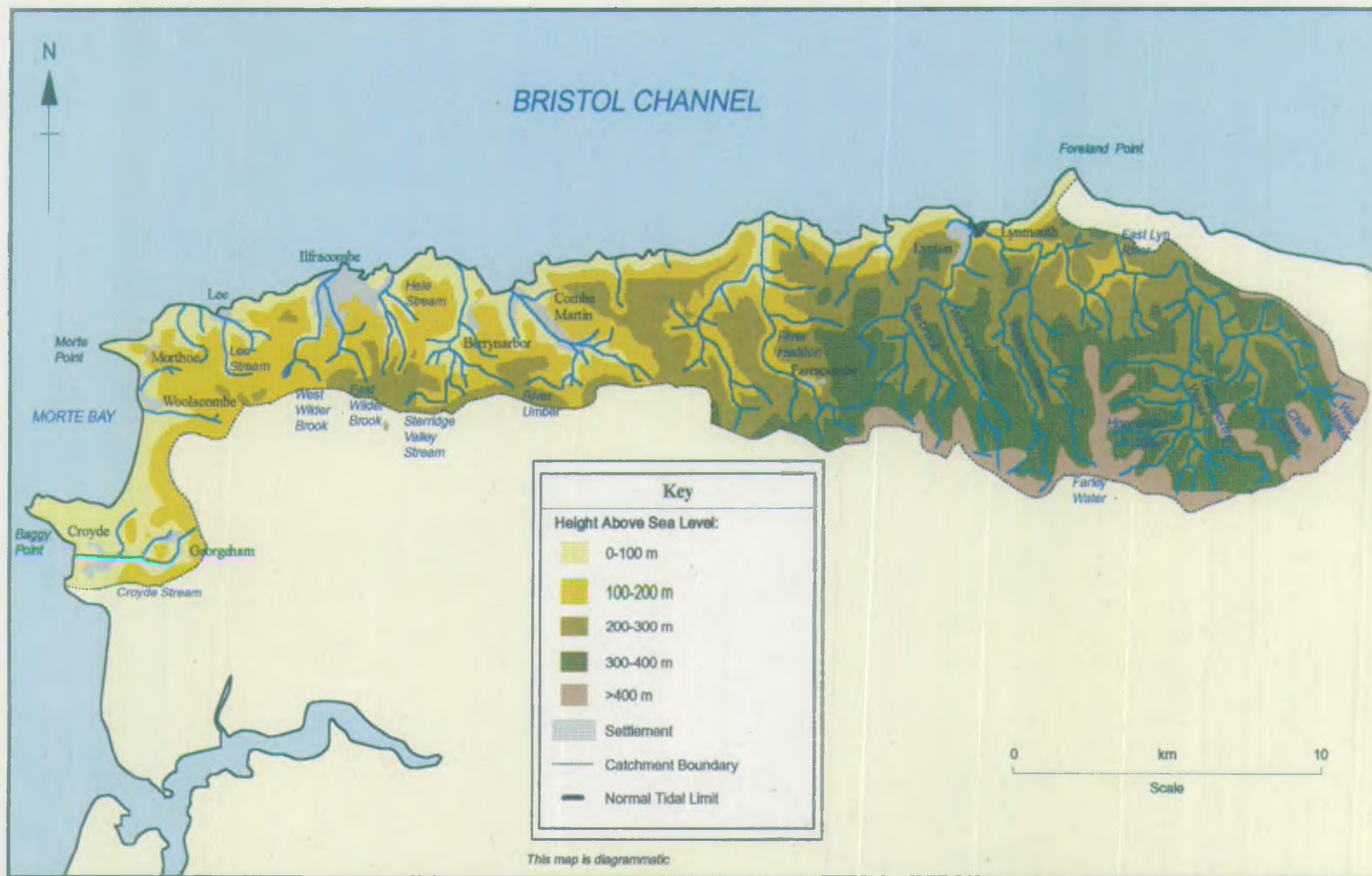
Local Environment Agency Plans and Catchment Management Plans

This LEAP slots into a sequence of plans which were being prepared by the former National Rivers Authority (NRA) to cover all river catchments in England and Wales by the end of 1998. LEAPs will be used by us to cover the same topics as Catchment Management Plans but they will also deal with new topics to cover the full range of our responsibilities.

Local Environment Agency Plans and the Catchment Steering Group

This Steering Group represents a range of commercial, local authority and environmental interests who endorse the Consultation Report and Action Plan prior to public release (see Acknowledgements for list of members). They will monitor the implementation of the Action Plan and provide the Agency with specific advice on the importance of issues within the catchment. They act as a communication link between the local community, the Agency and its committees and will help to promote and develop initiatives of benefit to the environment within the catchment.

Map 2 - Topography



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2. CATCHMENT CHARACTERISTICS

2.1 General Description

The North Devon Streams Catchment drains an area of 225 km². It lies predominantly within the County of Devon with a small area crossing the border to Somerset, and consists of all those streams which discharge to a 56 km stretch of North Devon coast between Saunton Down and Foreland Point (see Map 1). For the purposes of this report the West and East Lyn Rivers are referred to jointly as 'the River Lyn', where appropriate. The lengths of the watercourses are shown in Table 2.1.

Table 2.1 Length of Watercourses in the Catchment

Main watercourse	Length (km)	Secondary tributaries	Length (km)
East Lyn River	15.9	Farley Water	7.6
		Badgworthy Water	7.6
West Lyn River	8.2	Barbrook	7.0
River Heddon	8.3		
Sterridge Valley Stream	6.7		
River Uمبر	5.1		
Croyde Stream	4.4		
West Wilder Brook	4.3		
Hele Stream	3.6		
Lee Stream	3.2		
Woolacombe Stream	3.0		

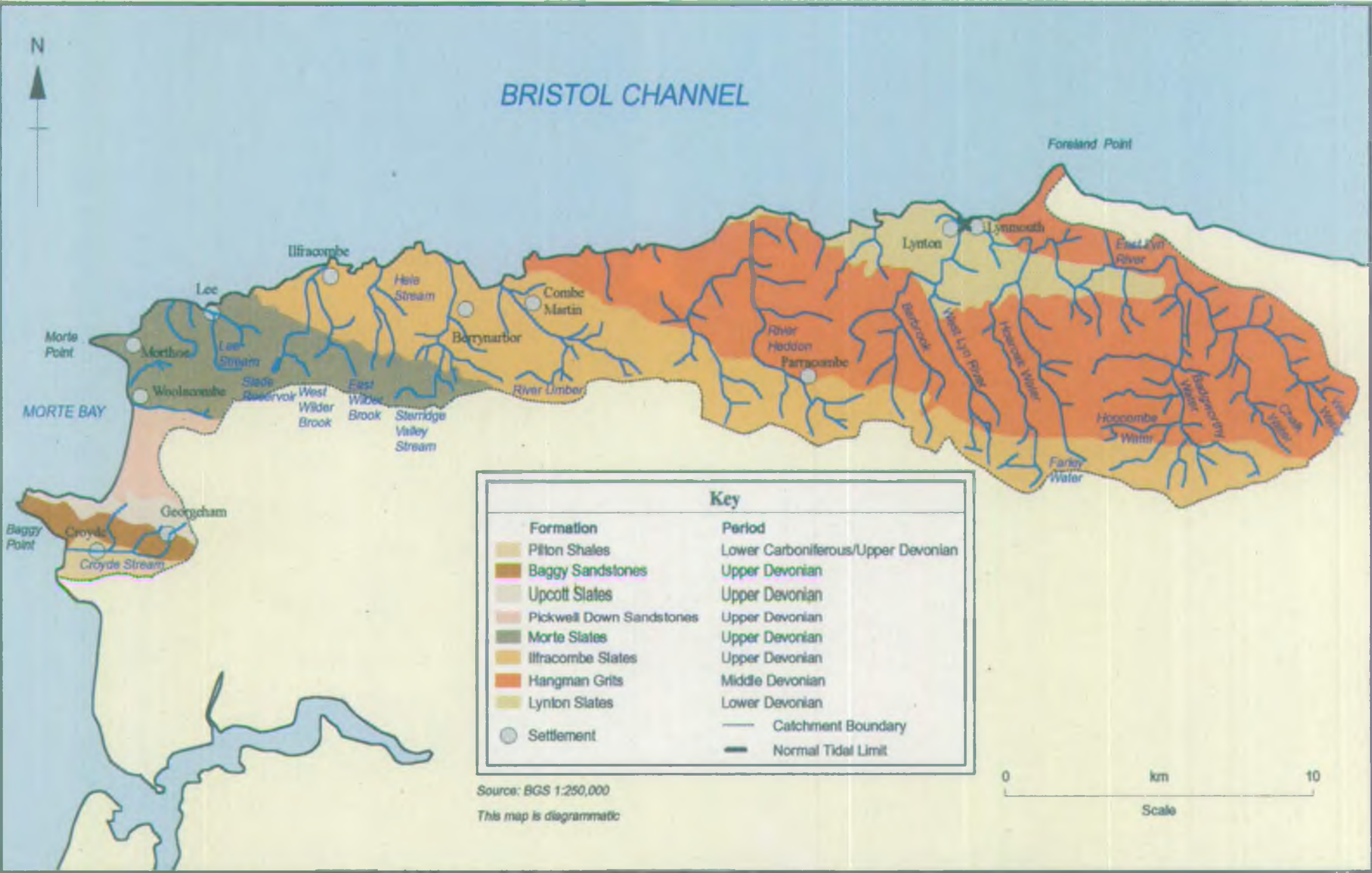
To the east of Combe Martin the streams drain directly off the northern slope of Exmoor. Here, maximum elevations reach 480 m above sea level and the distance from the southern catchment boundary to the north coast is about 8 km (see Map 2). These subcatchments are steep, rocky with fast flowing watercourses; water levels rise and fall quickly in response to rainfall. The area to the west of Combe Martin is generally lower with less severe gradients.

The Slade Reservoir, found on the West Wilder Brook, provides water for Ilfracombe and is a valuable local amenity for fishing and walking.

Less than 2% of the catchment is classified as urban. The principal settlements are all situated on or near the coast, generally in the confined river valleys. Ilfracombe is the largest town, with a population of nearly 11,000 (1991 census). Other settlements include Combe Martin, Lynton, Lynmouth, Woolacombe, Croyde and Berrynarbor. The total population for the catchment is estimated to be around 22,000 (1991 census).

The principal industries are tourism and farming. All the major settlements within the area, particularly the popular coastal resorts of Ilfracombe and Combe Martin, cater for many visitors during the summer months. Grassland in one form or another is by far the greatest land use in the area (see Section 3.5).

Map 3 - Geology



2.2 Geology and Soils

Geology

All the rocks within the catchment are approximately 360 to 400 million years old, dating from the Devonian Period (see Map 3). The oldest exposed strata are the thinly bedded sandstones, siltstones and grey mudstones of the Lynton Beds, seen outcropping between Woody Bay and Lynmouth Bay. Bordering the Lynton Beds, both to the southeast and northeast, are the Hangmans Grits which comprises alternating beds of variously coloured sandstone and shale or slate. Slightly younger than the Lynton Beds are the Ilfracombe Slates comprising mainly the grey Combe Martin Slates and the overlying sandstones and siltstones of the Kentisbury Slates. Pickwell Down Sandstones can be found outcropping in Morte Bay; these consist of red and brown sandstones with subordinate shale. To the south is a narrow west-north-west/east-south-east trending strip of yellow, green and purple slates - the Upcott Slates, which outcrop on the southern side of Morte Bay. Bordering these slates are the youngest of the Devonian rocks within the catchment. These are the Baggy Sandstones, made up of sandstones, siltstones and shales, and the Pilton Shales. The Pilton Shales are shales with siltstones, sandstones and thin limestones.

Soils

The western part of the catchment is mainly described as having well drained, loamy and silty soils over rock, shallow in places. The soils of Exmoor, in the eastern part of the catchment are variable in nature. In the valleys and on the coast at Foreland Point and Heddon's Mouth they are described as well drained loamy soils over rock, some with slowly permeable layers sometimes prone to seasonal water logging. The upper ground of Exmoor region has permeable upland soils over sandstone with a wet peaty surface layer (Ref. 1).

2.3 Hydrogeology

The geology of the catchment is unsuitable for the formation of a major aquifer. The entire catchment has been classified as a 'minor aquifer' which, although not capable of supporting large groundwater abstractions for public water supply, will supply modest requirements. The catchment to the east of Combe Martin Bay is generally exempt from any groundwater licensing requirements (see Section 3.8).

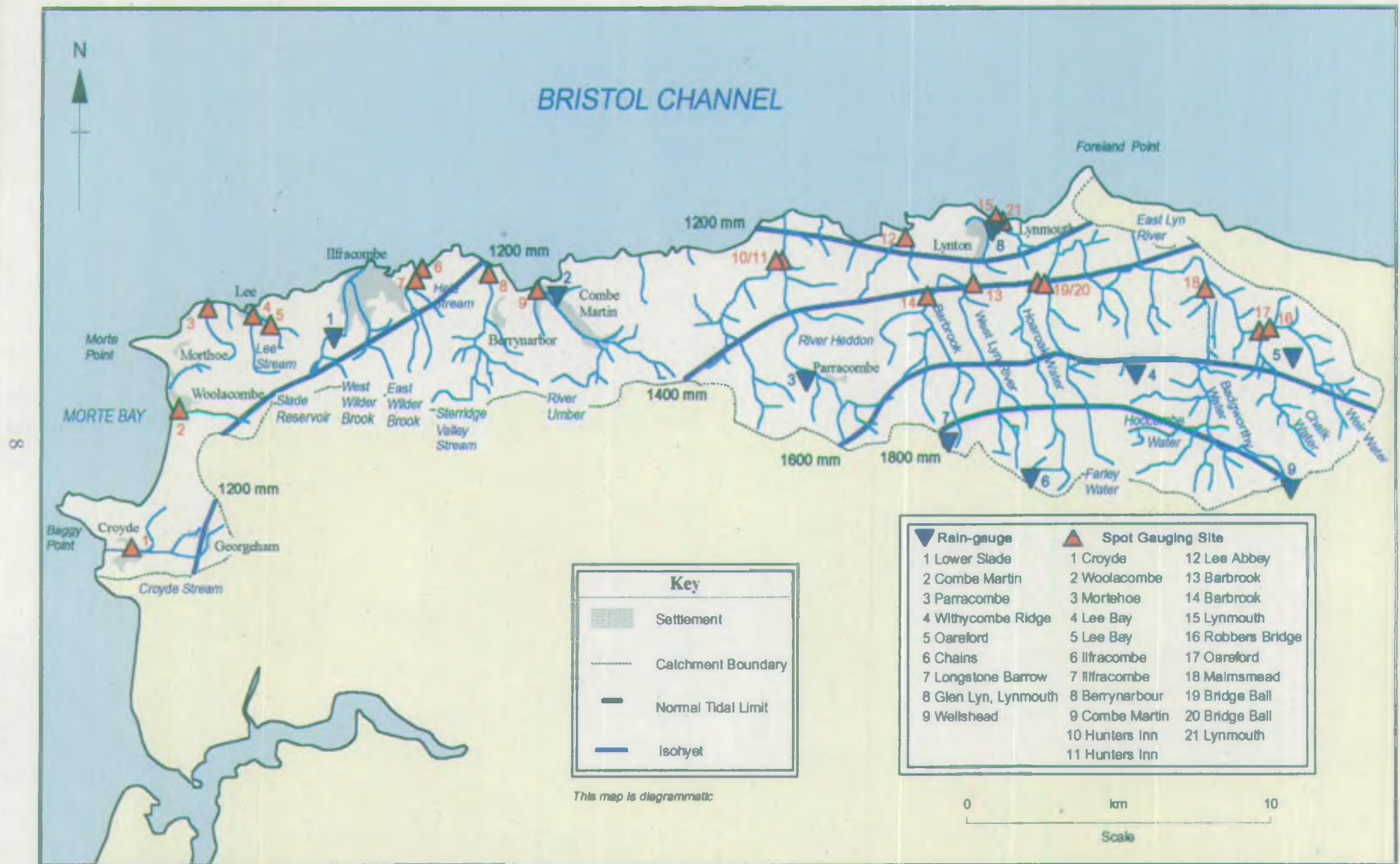
The streams in the catchment are dependent upon groundwater for their baseflows throughout the year, especially during dry periods.

2.4 Hydrology

Rainfall

There is considerable contrast in rainfall between the wet, high grounds of Exmoor, and the more sheltered lowland areas to the west of the catchment. Long term average annual rainfall varies with altitude from 1118 mm on the coast at Lynmouth to over 1950 mm on the high ground of Exmoor (see Maps 2 and 4). Rainfall is currently monitored each day at nine Meteorological Office approved gauges within the catchment (see Map 4). The long-term average for these sites can be seen in Table 2.2.

Map 4 - Hydrometric Network



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Table 2.2: Average Annual Rainfall (1961 - 1990) at Specific Sites in the Catchment

Site Name	Record Period	Av. Annual Rainfall (mm)
Lower Slade	1.01.1987 - date	1163
Combe Martin	1.03.1987 - date	1300
Parracombe	1.10.1965 - date	1436
Withycombe Ridge	1.11.1973 - date	1640
Oareford	1.06.1977 - date	1511
Chains	1.10.1952 - date	1955
Longstone Barrow	1.01.1952 - date	1873
Glen Lyn, Lynmouth	1.08.1987 - date	1118
Wellshead	1.10.1968 - date	1785

River Flow

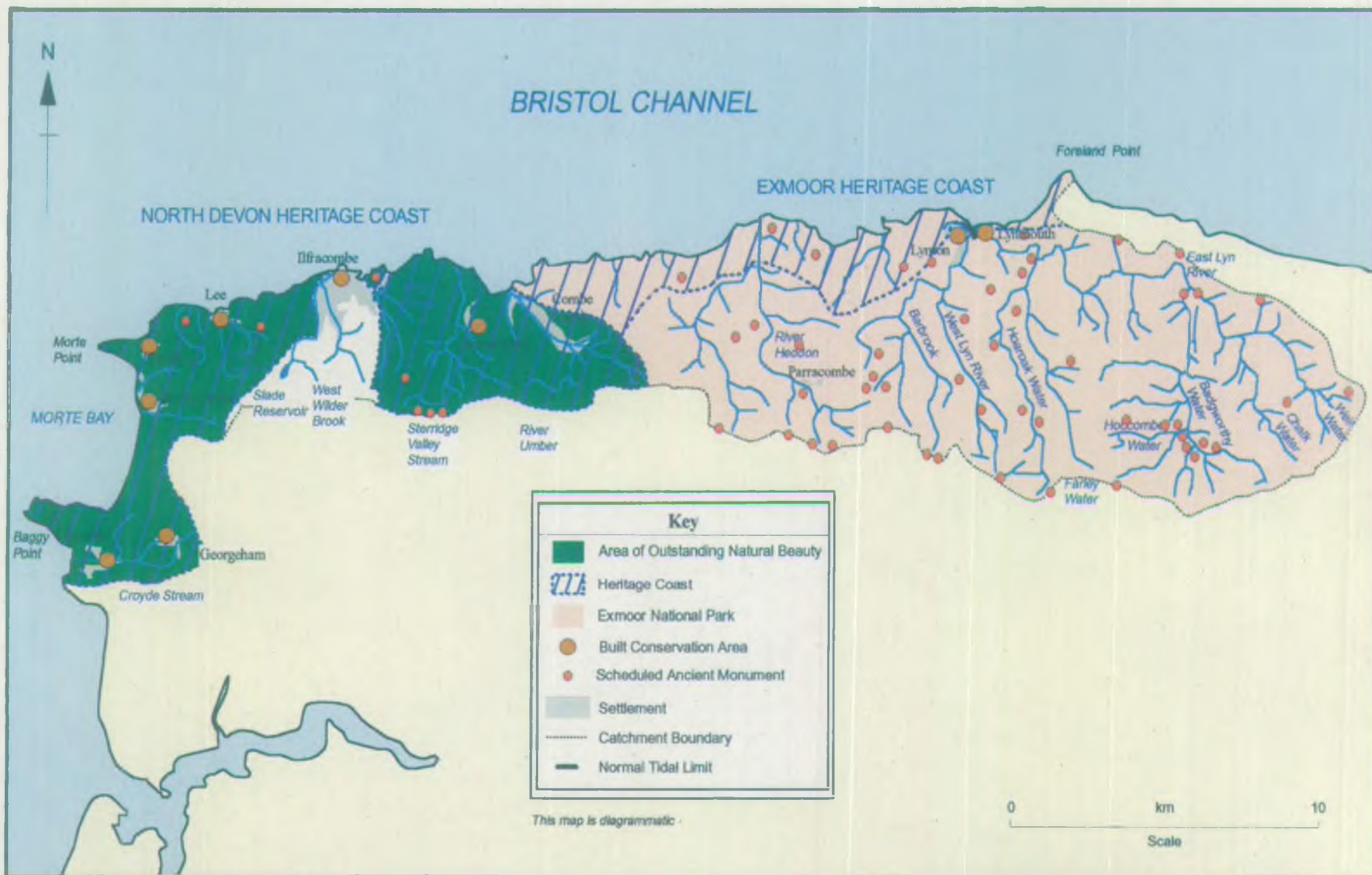
As there are no fixed river gauging stations in the catchment, we do not have any continuous flow information for any of the catchment streams. However, theoretical flow information based on catchment characteristics, such as geology and climate, and instantaneous spot gauging data suggest that the River Lyn is the largest watercourse in the catchment. Spot gauging sites used for recent summer droughts, when stream flow declines rapidly, are shown on Map 4. The theoretical mean flows and Q95s for the ungauged sites have been calculated using a computer model, the results are summarised in Table 2.3.

The Q95 is the flow that is equalled or exceeded, on average, 95% of the time or 347 days in an 'average' year. It can be compared with the mean daily flow to indicate how significant the groundwater contribution is to the river flow. For example, for the Sterridge Valley Stream, the Q95 represents only 10% of the mean daily flow, indicating that groundwater contributes very little to the stream, highlighting the 'flashy' nature of this watercourse. For the River Lyn, however, the corresponding figure is 18.4%, indicating that it has a more significant groundwater component in comparison to other streams in the catchment. This trend coincides with the location of the minor aquifer described in Section 2.3.

Table 2.3: Theoretical Flow Data for Specific Watercourses in the Catchment

Watercourse	Mean daily flow (m ³ /s)	Q95 (m ³ /s)
Wilder Brook	0.207	0.026
Sterridge Valley Stream	0.221	0.022
River Umber	0.359	0.036
River Heddon	0.877	0.115
West Lyn River	0.884	0.136
East Lyn River	2.790	0.514
River Lyn (East & West) - combined flow	3.646	0.650

Map 5 - Landscape Designations and Archaeology



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2.5 Landscape and Archaeology

Landscape

Most of the catchment bears some designation for its landscape value. The Rivers Lyn and Heddon and their tributaries are all included in the Exmoor National Park, while to the west, virtually all the rural area is included in the North Devon Area of Outstanding Natural Beauty (AONB). Both designations indicate landscapes of national importance (see Map 5).

Additionally, the North Devon and Exmoor Heritage Coasts include all the undeveloped coastline, in recognition of their national value. At a county level, the Devon County Structure Plan (Ref. 2) designation of Coastal Preservation Area also applies to all this area.

No landscape assessment has as yet been carried out for the North Devon AONB, unlike most other similar areas, but the Countryside Commission's report 'The New Map of England' (Ref. 3) provides a basic summary.

In the east, the upper reaches of the River Lyn subcatchment run off Exmoor. From the moors the watercourses drop sharply through steep sided, largely treeless valleys. Once away from the open moorland the valleys become incised features with heavily wooded slopes with occasional small fields alongside. These enclosed valleys run right to the sea, with little or no floodplain; even at its downstream end, the River Lyn is a steep, flashy river with huge boulders strewn around the channel. Villages sit isolated in the valleys, linked by narrow, winding roads.

Originally, these rivers were less deeply incised into the landscape. The River Lyn flowed parallel to the coast for some distance, entering the sea to the west of Lynmouth. However, coastal erosion broke through into the valley around Lynmouth and the river was able to flow directly to the sea. As a result, the old lower valley floor is what is now known as the Valley of Rocks, while the rivers have cut down steeply to meet the sea, a process which is still continuing.

At first glance Exmoor may seem wild and unmanaged, it is, however, more modified than Dartmoor. The underlying geology has not encouraged the formation of extensive peat bogs, as found on Dartmoor, making it slightly easier to farm, especially on the fringes. Following the break up of the Royal Forest in the early 19th Century, new farms were created and considerable effort made to drain and improve moorland. This task was, however, only partially successful.

Most of the coast is dominated by high cliffs, which plunge from the maritime heaths at the edge of the rolling plateau to a rocky and wave lashed shore.

Moving westwards the landscape becomes gradually softer and the land use more influenced by human activity. Combe Martin follows the River UMBER down much of the length of its valley, and traces of the mediaeval settlement pattern can still be seen.

The west facing section of coast includes the only extensive area of soft shoreline; sand dune systems rise from wide sandy beaches merging to rolling pastures behind. Harder rocks have resulted in the headlands at Baggy Point and Morte Point, where there are good examples of raised beaches, as well as boulders originating from distant sources, probably left behind by glacial processes.

Archaeology

The landscape of the catchment area includes a wide range of features ranging in date from prehistory to the present century. This is a historic landscape, which contains the history of human occupation and land use over thousands of years; it is particularly well-preserved on Exmoor.

Prehistoric field systems and dwellings, burial monuments, enclosures and stone settings demonstrate the richness of the early archaeological resource. Roman fortlets exist on the coast at Old Burrow, near Countisbury and at Martinhoe. Deserted farmsteads and settlements, as at Badgworthy Water, and a wealth of historic buildings demonstrate the continuation of a farming economy through the mediaeval and post-mediaeval periods. The patterns of field banks, hedges and stone walls form an important part of the man made landscape. The small fields around Combe Martin are excellent examples of burgage plots indicating tenure in this former mediaeval borough. Parts of Exmoor were less civilised; Hoccombe Combe was apparently the location for the Doone family whose exploits inspired the novelist RD Blackmore.

The high moorland at the centre of Exmoor was a Royal Forest from the Saxon period until the early 19th Century, in which special laws allowed grazing of sheep, cattle and ponies, but very little building. In the 19th Century parts of the high moorland were improved for agriculture and new farms established. In the 20th Century military training, particularly during World War II left a wide variety of structures on the moorland.

Although Ilfracombe has buildings dating back to the 14th Century (St Nicholas's Chapel and Holy Trinity, Hillsborough), this resort, like Lynton, is mainly Victorian; Lynton and Lynmouth were one of the first tourist destinations in the early 1800s. They developed as a result of a new romanticism and interest in the natural landscape, as well as improved communications resulting from the construction of a new railway link from Barnstaple.

The major floods of 1952 caused devastation along the courses of rivers rising in the moorland, particularly at Lynmouth, but also in riverside settlements elsewhere.

Nationally important sites are designated as Scheduled Ancient Monuments (SAMs); there are 57 of these, with clusters of sites around the upper reaches of the Exmoor streams. Buildings and structures of county importance are protected under the Planning (Listed Buildings and Conservation Areas) Act 1990. Individual buildings are listed, while groups of buildings or whole areas of towns or villages are notified as Built Conservation Areas. Planning restrictions usually apply to both designations. Nine Conservation Areas have been declared in the catchment. See Map 5 for location of SAMs and Built Conservation Areas in the catchment.

3. HUMAN ACTIVITIES AND PRESSURES ON THE ENVIRONMENT

3.1 Growth and Development

Here we consider the built environment and the process of planning and regulating the construction of new development including roads, housing and industry.

County and District Planning Authorities plan and control development; although they must consult us, they do not have to follow our advice.

Our objectives are to protect the environment from the harmful effects of development and to minimise flood risk.

There are two main ways we can influence development:

- through the planning system we can assist local authorities to allocate land for development by commenting on local plans, identifying constraints and highlighting where the environment can be enhanced by sympathetic development. We will continue to advise on water, waste and certain air quality related issues in our comments on structure and district wide local plans;
- we can advise planning authorities on the control of development by offering formal and informal comments to planning authorities on planning applications and development guides. We can also control some developments using our own powers, for example Land Drainage Consents and IPC authorisations.

We are also active at a higher level informing strategic planners of our environmental concerns, for example rivers affected by over abstraction or water supplies threatened by major pollution hazards.

Local authorities prepare statutory development plans. In January 1994 the former National Rivers Authority published guidance notes for local planning authorities on ways of protecting the water environment through development plans; these notes are being updated to cover all our new areas of responsibility. The notes highlight some of the topics which concern us and offer guidance on model policies. For example, the Government view is that development should be guided away from areas that may be affected by flooding and restricted where it would increase the risk of flooding. To achieve this it expects local authorities to use their planning powers and the Agency to assist by providing advice on development and flood risk. The work that is underway now on preparing flood plans is an example of this advice (see Section 3.7).

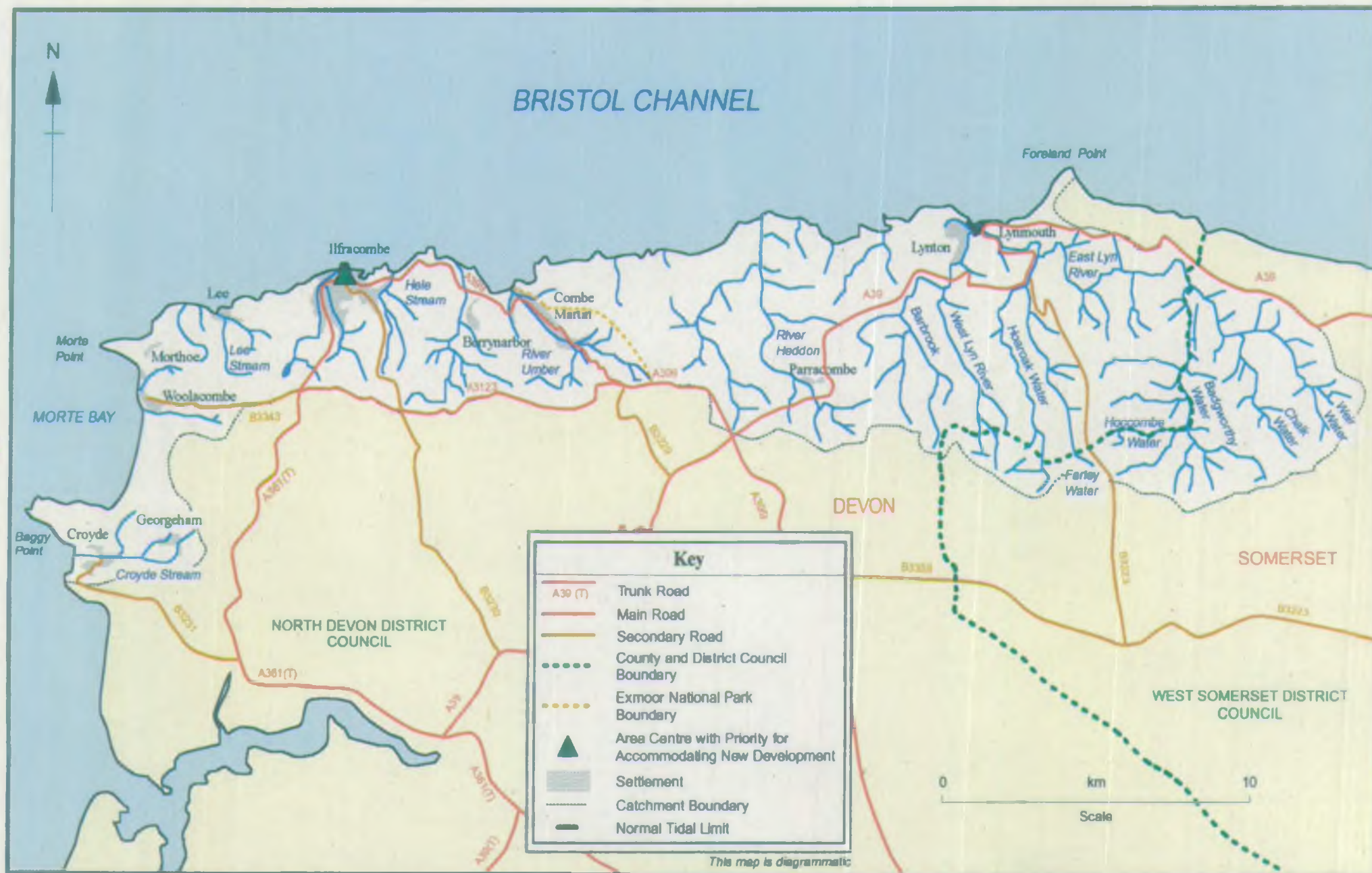
Local Perspective

Development Plans

The Regional Planning Guidance for the South West was published in July 1994. This guidance recognises the need to achieve sustainable development and aims to influence the policies in Structure and Local Plans to secure the best development strategy for the region, including advice on a variety of environmental issues.

There are two approved Structure Plans relevant to the catchment: The Devon County Structure Plan, Third Alteration (Ref. 2), and the Somerset Structure Plan, Second Alteration (Ref. 4). The Structure Plans provide a framework for development and land use within each county. Each Structure Plan contains policies and advice to ensure the protection and conservation of the environment.

Map 6 - Growth and Development



Both counties have produced a draft review of the Structure Plan which takes the plan period forward to 2011 and embodies the principle of sustainable development. These consultation draft plans are the Somerset Structure Plan Review (Ref. 5) and the Devon County Structure Plan 2011 (Ref. 6). We have commented on both of these plans.

The greater part of the North Devon Streams Catchment lies within North Devon District Council, with much of the catchment within Exmoor National Park (a local planning authority), the rest is administered by West Somerset District Council (see Map 6).

The development of County Structure Plans influences the contents of Local Plans, produced by district councils. The North Devon Local Plan Deposit Plan (Ref. 7) was published in November 1995 and the Exmoor National Park Local Plan Deposit Plan (Ref. 8) was published in August 1994. These set out formal planning policies and proposals for the period up to 2001.

The regeneration of Ilfracombe, the major service centre for the North Devon coastal area, is a priority for the Devon Structure Plan. The basis of the development strategy is for an additional housing provision of 280 dwellings, above existing commitments, between 1991 and 2001, to allow population growth to keep pace with employment opportunities. A fifteen acre employment land extension to the Mullacott Cross Industrial Estate in Ilfracombe has been laid out for development.

There is a policy of constraint towards development in much of the catchment. However, the towns of Combe Martin and Woolacombe have been identified as Selected Local Centres, which give priority for development of facilities and local employment opportunities. We have raised objections to development which may increase surface water runoff in both Ilfracombe and Combe Martin until suitable flood alleviation schemes have been implemented (see Section 3.7).

The large community of Lynton and Lynmouth in Exmoor National Park, has been placed in a further category of settlement derived from Selected Local Centres, called Local Rural Centres which aim to provide sufficient housing for local needs. In Lynton and Lynmouth, no acceptable sites for development are available due to environmental and access constraints. Additional housing may be achieved by infilling on vacant plots and change of use and alteration to existing buildings.

Town and Country Planning policies contained in the local plans for the area include positive steps to balance development proposals with the maintenance and improvement of environmental qualities. Some of the plans also include policies to prevent the pollution of water and for the protection of water resources.

Roads

We are a statutory consultee to the Department of Transport for the development of new trunk roads, and have an input into road schemes proposed by County and District Councils. We are involved throughout, from route choice and design through to construction. Through consultation we seek to protect the environment from adverse impacts and secure enhancement where possible.

We have powers to control highway drainage through prohibition notices and discharge consents. These also allow us to insist upon measures to alleviate pollution, for example, the use of interceptors to contain accidental fuel spillage. During the planning of all new roads we also seek to minimise habitat destruction and safeguard important water resources or flood defence assets.

The road network in this region is under increasing pressure from traffic, particularly during the holiday season. Many of the more remote towns and villages are approached by narrow roads, resulting in severe congestion during peak holiday periods, which can have adverse environmental effects. To help alleviate this problem it is proposed that the A361 Barnstaple to Ilfracombe road, via Braunton should be a National Route by 2001; the North Devon Link Road presently stops at Barnstaple. Improvement of the Primary County Route serving the North Devon coast is also a priority. No major road improvement schemes or new roads are proposed within the Exmoor National Park in the period to 2001.

3.2 Mineral Extraction

The extraction of minerals from quarries, mines and pits for sand, gravel or clay can damage both underground and surface water resources. The damaging effects of mineral extraction are often long term, sometimes permanent. The influence of a deep quarry which removes material from below the natural water table may extend many kilometres. Public water supplies and flows from springs that feed streams and rivers can be threatened when aquifers are either removed or disturbed.

Water is purified as it percolates through aquifers and surface layers of soil and rock. Removing these materials can degrade the quality of water in the aquifer and provide an easy route for pollution to reach groundwater.

Local Perspective

Mining

The catchment is underlain by folded slates and sandstones of Devonian age (see Section 2.2). The mineralisation which occurs within these rocks is sparse and isolated. Mineral lodes are mainly found within the bedding planes in the host rock rather than in high angle fissures as in West Devon and Cornwall. Individual deposits are localised, rather than laterally extensive.

There are currently no active mining sites in the North Devon Streams Catchment. There are, however, 20 disused mines found in the catchment. The majority of the historical mining activity is concentrated on deposits in the Combe Martin valley. Mines in this area were worked for lead, silver, iron and zinc. There is a single iron mine on Woolacombe Down. There are also three disused iron mines in the River Lyn subcatchment. The iron ore mineral was siderite; a low grade ore which would not be regarded as an economic source of iron today. The exact locations are unknown and there are no records of mineral output. There are three iron-lead-silver mines to the east of the River Heddon and two iron-manganese mines on the coast, east of Combe Martin.

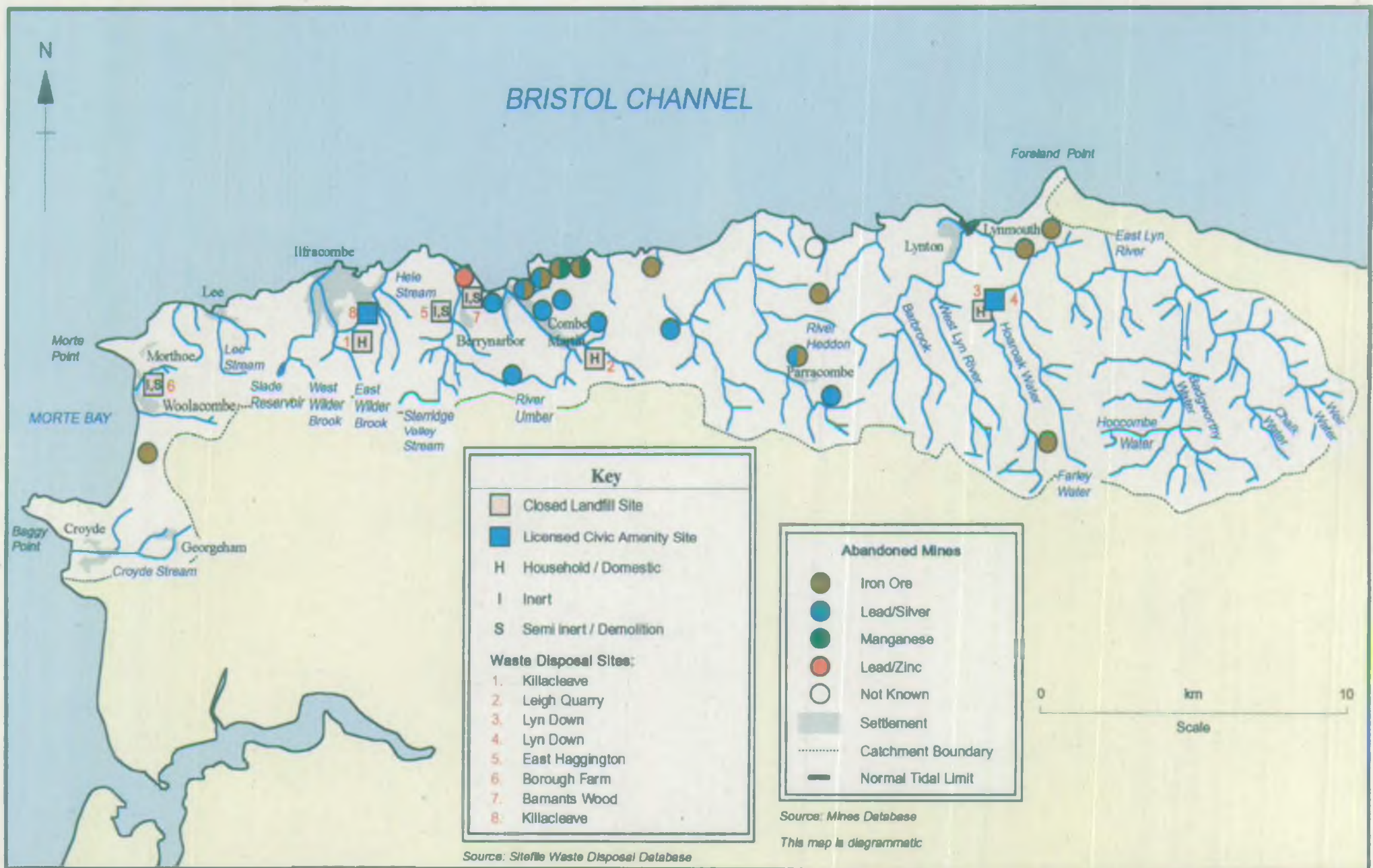
For location of abandoned mines in the catchment see Map 7.

An assessment of water quality monitoring data and mining activity identified no areas where mining was having a demonstrable impact on water quality.

Quarrying

No authorised quarrying operations are undertaken in this catchment (Ref. 9).

Map 7 - Mineral Extraction and Waste Disposal



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3.3 Waste Management

We regulate the transport, disposal and, in some cases, the treatment and storage, of a range of wastes. These include sewage sludge, controlled and radioactive wastes; controlled wastes consist of industrial, household, and commercial waste.

The UK uses a waste management hierarchy of waste reduction, reuse, recovery (i.e. recycling, composting or converting into energy) or if these options are not viable, disposal. Over the UK as a whole it is estimated that around 21% of controlled waste is reused or recycled; the government has set targets of 25% by the year 2000. We will carry out a national waste survey to develop further the DoE's initial waste management strategy. Additionally the Government in the white paper "Making Waste Work" encourages waste to be managed locally and not transported over unreasonably long distances.

By far the greatest proportion of controlled waste is currently sent to landfill as it is regarded as the only option for some inert wastes and for wastes that are difficult to burn or recycle. But regardless of how well they are located or engineered, landfills have the potential to release chemicals to surface waters, groundwaters, and soil, and to generate significant quantities of methane. During the operation of landfill sites, noise, odour, unsightliness and vehicle movements may cause a local nuisance. After landfilling the land may contain contaminants and be unsuitable for certain uses.

Local Perspective

Waste Disposal Sites

There are general concerns across Devon that waste disposal facilities are not sufficient for current demand and we are faced with a crisis for household waste disposal as there are only seven years of landfill capacity left in the County and the Exeter Incinerator closes this year with no firm plans made for new facilities. A draft waste strategy for Devon's household waste has been drawn up by a working group consisting of representatives from district councils, the County Council and ourselves. The location of waste management facilities in the catchment, their licence status and the waste types accepted at them are presented in Table 3.1 and Map 7. Records of sites operating before 1974, when the Control of Pollution Act (Ref. 24) was introduced, are poor, although we are currently carrying out a survey of closed sites in the County.

Table 3.1: Waste Disposal Sites in the Catchment

Site Name	Status	Closure date	Area (ha)	NGR	Waste Type
Killacleave, Ilfracombe	licensed	-	-	SS 531 467	Civic Amenity site
Killacleave, Ilfracombe	closed	Pre 1974	2.49	SS 528 458	Household/domestic
Lyn Down, Near Lynton	licensed	-	-	SS 727 470	Civic Amenity site
Lyn Down, Near Lynton	closed	1995	1.45	SS 727 470	Household/domestic
Leigh Quarry, Combe Martin	closed	1992	1.21	SS 600 454	Household/domestic
East Haggington, Berrynarbor	closed	No record	0.30	SS 554 470	Inert/demolition
Borough Farm, Morteohoe	closed	1990	0.25	SS 458 441	Inert/demolition
Bamants Wood, Berrynarbor	closed	1991	0.23	SS 560 476	Inert/demolition

There are currently just two licensed sites within the catchment. These are the Civic Amenity sites at Ilfracombe and Lynton which accept a range of wastes from householders for recycling and disposal. Household waste and some commercial waste is collected by the District Council from individual homes and businesses. Civic Amenity sites are then available to householders for bulky items, garden waste or other household wastes which are not collected. All of this waste is currently taken to the landfill site at Deepmoor near Torrington for disposal.

There are six closed landfill sites within the catchment. Unlike modern landfills these sites were not contained within a liner and consequently the risk of water pollution is higher. There has been some pollution of a watercourse caused by the site at Killacleave, Ilfracombe; the drainage from Killacleave landfill was found to be acidic, containing elevated levels of metals (mainly iron). Remedial measures utilising limestone blocks in the discharge drain have reduced the pollution. Watercourses near the sites are now regularly monitored by Devon County Council, the Waste Disposal Authority (WDA) responsible for this site, so that further remedial action can be taken quickly should any pollution occur.

We hold very little information on the impact of the former domestic landfill at Lyn Down on the aquatic environment. We have not detected any current pollution occurring from the closed landfill at Leigh Quarry, but the potential does exist; again it is a site monitored by the WDA.

Issue 1: Pollution potential of disused landfill sites at: Killacleave; Lyn Down; and Leigh Quarry.

Leigh Quarry is also occasionally monitored by the WDA for methane, but only low levels have been detected. Lyndown and Killacleave are not monitored for methane but there appear to be no problems associated with landfill gas being generated from these sites.

Fly tipping

Fly tipping can pose hazards to wildlife, may attract vermin, cause pollution and ruin the appearance of an area. A possible cause of this problem may be the scarcity of waste management facilities in the area. Fly-tipping may also increase following the introduction of the Landfill Tax on 1 October 1996. We will take all reasonable measures to minimise the incidence of fly tipping and will actively seek the support and help of local businesses, the public and local authorities in doing so.

Issue 2: Fly tipping.

Land spreading

Land spreading involves the direct deposit of controlled waste on agricultural land to fertilize or condition the soil by either directly injecting the waste into the soil or spraying it over the surface. A large area of the catchment is agricultural and so land spreading of waste is frequently used as a way of fertilizing the land as well as providing a waste disposal route. Wastes commonly land spread in Devon include sewage sludge from South West Water Services Limited (SWWSL) sewage treatment works, private septic tanks and industrial wastes such as whey, milk washings and cider making waste. The continuing improvements to sewage treatment works will result in additional sludge being generated. Land spreading operations need to be carefully monitored by ourselves as they have the potential to cause pollution and damage to wildlife habitats if they are not carried out correctly. We hold maps identifying the locations where this disposal is carried out.

Issue 3: Risk of pollution and damage to land of conservation value associated with increasing use of land spreading as a waste disposal option.

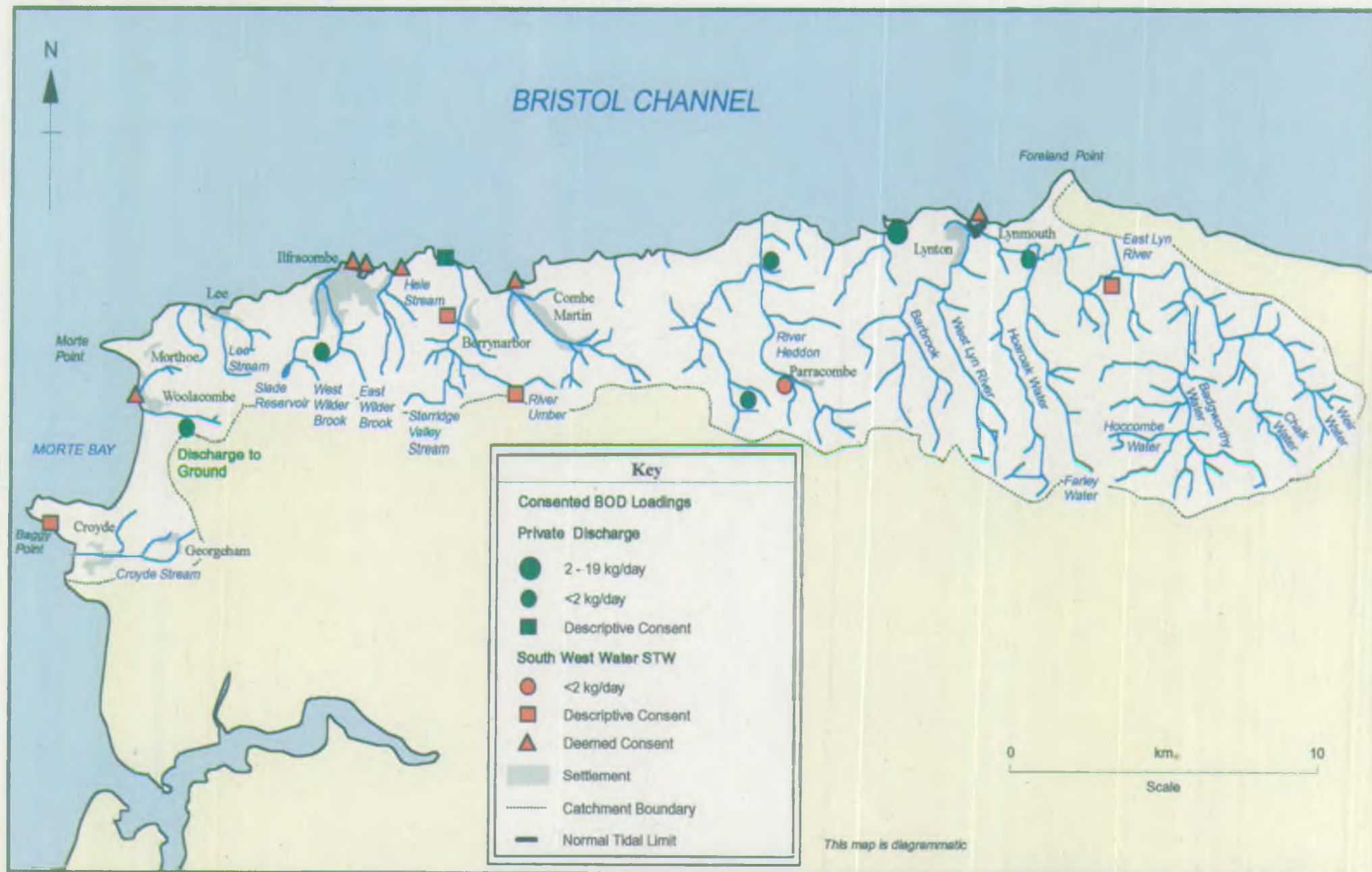
Legislation

On 1 May 1994 the Waste Management Licensing System established by the Environmental Protection Act 1990 (Ref. 10) was implemented. This introduced a range of new duties which the Environment Agency is now responsible for, in particular Waste Disposal Licences became Waste Management Licences. The new system brought in improved environmental standards and licence holders now have to prove their financial capability and their technical competence. These licences can only be surrendered when we are satisfied that the site no longer represents a risk to the environment and a completion certificate has been issued.

Certain waste management operations are exempt from the requirement for a Waste Management Licence. This includes a range of activities such as shredding or baling materials for recycling and spreading waste on land for agricultural benefit. However, each exempt operation must be registered with us and must comply with the criteria given in the Waste Management Licensing Regulations. There are currently a number of activities within the catchment which are registered as exempt, including certain scrapyards, operations, storage of construction and demolition waste and storage of certain wastes such as plastics, glass, paper and cans awaiting recovery.

Map 8 - Effluent Discharges Greater Than 5m³/day

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3.4 Discharges to the Aquatic Environment

We regulate the disposal of effluent by issuing consents to control discharges, including treated sewage, industrial and farm wastes. We also take action if a river is affected by a pollution incident. 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.

Improvements to SWWSL's discharges over the next 10 to 15 years are subject to available funding approved by OFWAT, the water industry's economic regulator. A Strategic Business Plan, (Asset Management Plan 2 (AMP2)) (Ref. 11), for these schemes was developed based on guidelines agreed between the former NRA, Department of the Environment (DoE), Water Services Companies and OFWAT. The plan was submitted to OFWAT early in 1994.

In order of priority, schemes included are:

- those required to meet and maintain current EC and domestic statutory obligations;
- those required to meet and maintain new EC and domestic statutory obligations;
- those which have already been justified separately, required to maintain river quality relative to the 1990 NRA survey of water quality or to achieve river or marine improvements.

OFWAT declared the associated customer charging base in July 1994. At the end of July 1995 the Monopolies and Mergers Commission published their review of SWWSL's AMP2 programme.

Local Perspective

Map 8 shows effluent discharges in the catchment greater than 5 m³/day. The most significant discharges within the catchment are coastal sewage discharges, the main ones being Lynton/Lynmouth, Combe Martin, Ilfracombe, Woolacombe and Croyde. Due to the proximity to EC designated bathing waters (see Section 4.1), 'Clean Sweep' schemes by SWWSL are being or have been constructed at Combe Martin, Ilfracombe and Lynmouth/Lynton. The completion of these schemes should dramatically improve bathing water quality in the area. Woolacombe is served by an existing biological sewage treatment works (STW). It is intended that Croyde will receive secondary treatment by 2005; this will be done under the 'appropriate treatment' provision of the EC Urban Waste Water Treatment Directive (Ref. 12). This Directive specifies minimum standards for sewage treatment and collection systems. A requirement under this Directive is for secondary treatment for all discharges with population equivalents greater than 2,000 to inland waters and estuaries, and greater than 10,000 to coastal waters. Discharges below these population equivalents receive treatment which is 'appropriate' to the size of the discharge and the receiving water. We are responsible for making sure that discharges receive the level of treatment specified in this Directive.

The largest inland sewage treatment works is at Parracombe, which discharges to the River Heddon with a consented Biochemical Oxygen Demand (BOD) load of 1.5 kg/day. This works has been improved by SWWSL.

There are a significant number of small private discharges in the catchment. Private crude sewage discharges at Brendon have historically been a problem in the area. However, SWWSL completed improvements in Spring 1996 to the septic tank by installing a soakaway.

A new biological STW is due to be constructed shortly by SWWSL at Henstridge (River UMBER) to improve an unsatisfactory discharge.

Pollution Events

Table 3.2 is a summary of confirmed pollution incidents, the majority of which were recorded as minor.

Table 3.2: Summary of Confirmed Pollution Incidents in the Catchment

Origin of Pollution	No. of Incidents			
	1992	1993	1994	1995
Farms	8	5	6	5
Trades	3	2	2	1
Sewage - Storm Overflow	5	4	8	5
Vehicle	-	2	-	2
Misc./Other	14	9	14	9
Not Found	9	6	2	2
Total	39	28	32	24

Pollution control with respect to farms is covered in the following section (Section 3.5).

3.5 Rural Land Use

Over 80% of the land in England and Wales is farmland. The way this land is used affects the quality of the environment. We are concerned about the potential pollution of surface and groundwaters from animal wastes, fertilizers and pesticides. Soil erosion, land drainage and stock damage to riverbanks can also lead to problems. A sustainable farming system that conserves the soil and minimises and recycles wastes will reduce the risk of damage to the environment.

There are a limited number of ways we can influence how farmers use land. However, we can control and prevent pollution in the same way as we do with any other industry. Other agencies such as Ministry of Agriculture, Fisheries and Food (MAFF) also encourage sensitive farming practices using financial incentives.

Well-managed woodland in the right places does not harm the water environment and will often bring benefits. However, in some circumstances, woodland planting and management can cause problems. Acidification, soil erosion, pollution, water yield, increased flood risk and damage to wildlife habitats concern us in some parts of England and Wales. In the South West Region the planting and management of new woodland does not usually cause problems for the water environment.

The Forestry Authority regulates forestry in the UK by licensing some operations such as felling and providing grant aid through the Woodland Grant Scheme. They have published a series of guidelines on forests and; water, nature conservation, landscape design, archaeology and recreation. The Guidelines encourage environmentally sympathetic planting, management and harvesting. The Farm Woodland Premium Scheme operated by MAFF also provides grant aid for new woodlands on farms.

Local Perspective

Agricultural Land Use

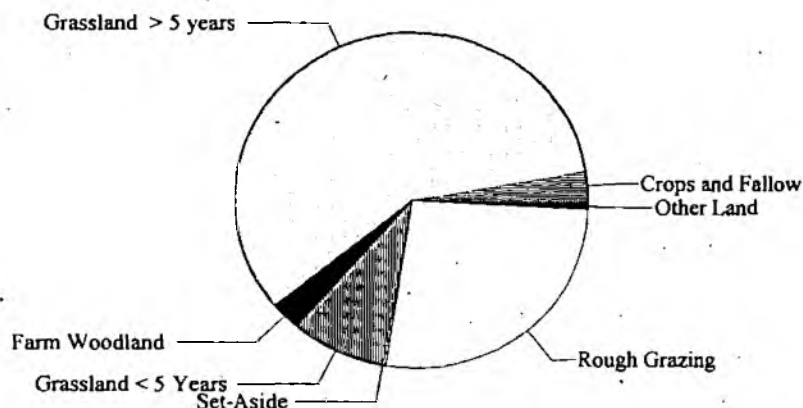
Figure 1 and Table 3.3 summarise the changes in agricultural land use from 1984 to 1994.

Table 3.3: Agricultural Land Use in the Catchment

Land Use	1984 (ha)	1994 (ha)	% of Total Farmed Area	% Change (1984 - 1994)
Grassland < 5 years	3,083	2,868	8.6	- 7.0
Grassland > 5 years	18,569	19,323	58.1	4.1
Rough Grazing	7,434	8,864	26.6	19.2
Crops and Fallow	1,561	1,010	3.0	-35.5
Farm Woodland	451	856	2.6	89.6
Other Land	201	236	0.7	17.2
Set-Aside	-	119	0.4	-
Total Agricultural Area	31,299	33,276	100	6.3

Source: MAFF

Figure 1
Agricultural Land Use - 1994



Source: MAFF

Notes: Grassland in one form or another is by far the greatest agricultural land use in the catchment, most of which is long term grassland (> 5 years).

Farm woodland has increased considerably from 1984 to 1994 assisted by incentives such as grant schemes. However, woodland still forms only 2.6% of the total farmed area.

Set-Aside, an EC scheme introduced as part of the Common Agricultural Policy (CAP) reform to allow farmers to remove cereal growing land from production by receiving compensation, was introduced during this decade (1984 to 1994); 119 ha of arable land has been set-aside in the catchment, only 0.4% of the area. This scheme only applies to individual farmers who grow in excess of approximately 39 acres and there is currently a compulsory minimum rate of set-aside of 10% reducing to 5% in 1997.

Farming Types

Livestock farming based on grassland is the dominant activity in the area. Cattle and sheep rearing is particularly predominant on and around Exmoor. Further west, away from the slopes of Exmoor, the sheep and beef cattle production is diversified with some dairy farming and arable production. Livestock numbers in the catchment are shown in Table 3.4.

Table 3.4: Livestock Numbers in the Catchment

	1984	1994	% Change 1984 - 1994
Total cattle	22,477	20,935	-6.9
Total sheep	192,894	207,581	7.6
Total Pigs	1,280	592	-53.8
Total Fowls	2,197	13,992	536.9

Source: MAFF

In the far west of the catchment, in areas of lower rainfall, farming is more varied again with more arable crops grown in some of the more sheltered areas. Spring barley is the largest hectareage of cereals grown in the catchment. Table 3.5 below summarises the farming types found in the catchment.

Table 3.5: Farm Types found in the Catchment

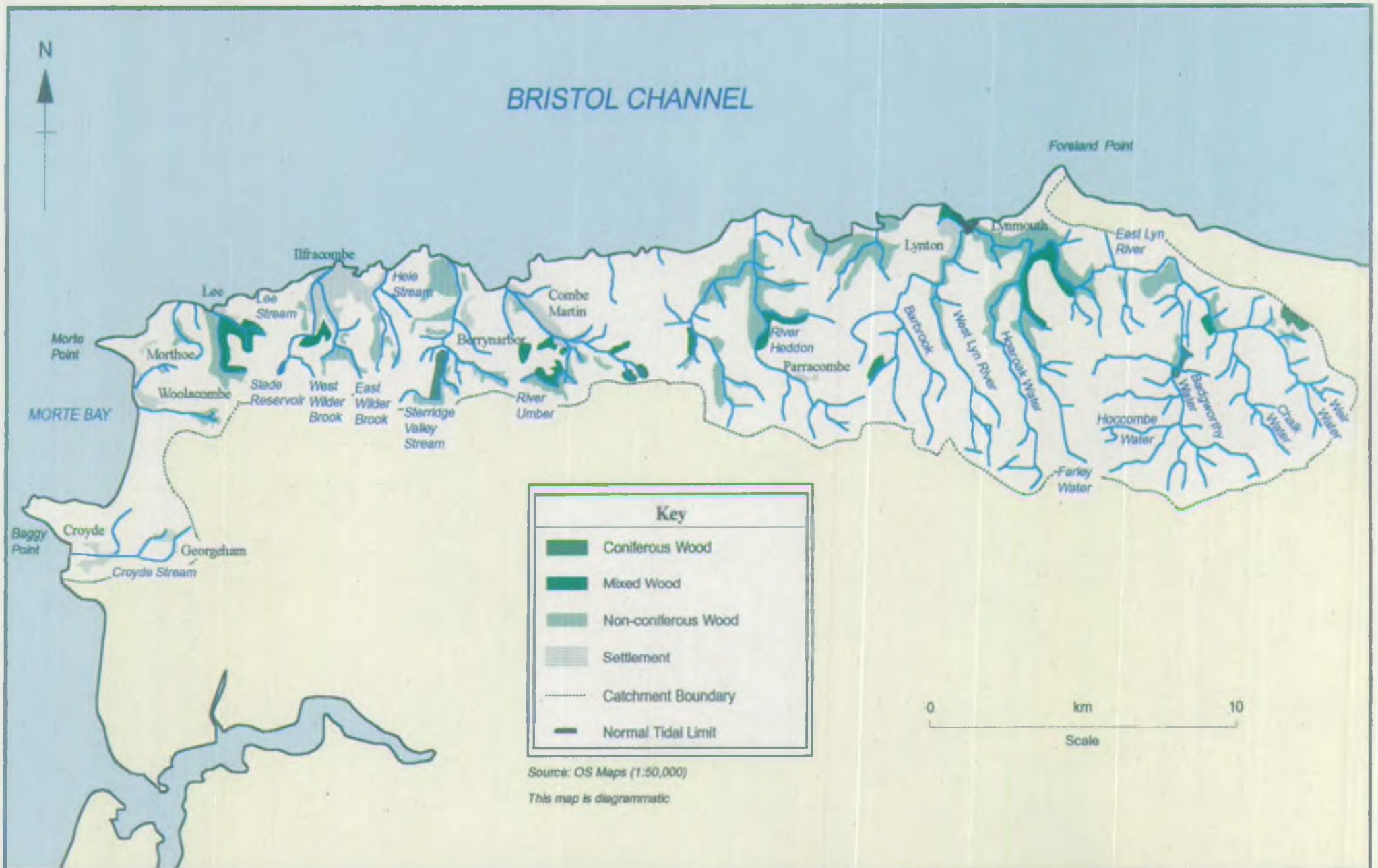
Farm Type	% of Total No. of Holdings (1994)	% of Change in No. of Holdings (1984 - 1994)	Notes
Dairy	9.3	-25.0	Quotas and more stringent hygiene and pollution standards have tended to favour larger farms.
Cattle and Sheep	32.0	14.0	Some dairy farms have switched to cattle and sheep.
Cropping	2.1	100.0	The total area of crops and fallow has fallen substantially by 35.5%, mainly due to set-aside at the expense of spring barley, the least profitable crop in a cereal rotation.
Horticulture	1.0	-37.5	The area covered by horticultural crops, mostly vegetables, has, however, risen substantially.
Mixed	0.0	-100.0	
Part-Time	55.6	20.0	

Source: MAFF

Farm Pollution Control

The farm inspection campaign was launched in 1984 by the former South West Water Authority, the National Farmers Union and the Country Landowners Association. This campaign aimed to tackle the pollution problems which had arisen as a result of changing farm practices such as increased use of fertilizers and a switch from hay to silage production which has led to a more intensive use of grassland and hence more cattle in the catchment. As a result, the production of wastes associated with dairy and beef farming has increased and caused pollution of watercourses.

Map 9 - Forestry



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The farm inspection work looked at all areas of the catchment and this work is now continued within the framework of the 'Task Force' Inspections.

'Task Forcing' has been carried out in this catchment with the targeting of particular river stretches to identify all actual and potential pollution sources. Where pollution problems were identified the sites were revisited and remedial action was taken where appropriate. Both the River Usher and the Croyde Stream have been inspected.

The farm visit and pollution prevention work has controlled point source pollution from farms and led to an overall improvement in water quality in the catchment. However, further work is needed, particularly to tackle diffuse pollution; for example runoff to nearby watercourses from waste spread to land during wet weather. Pollution risk assessment work will endeavour to solve this problem.

The potential for pollution from dead livestock in or near watercourses is a public concern in the catchment, particularly on Exmoor. Concern has also been raised over the quantity of farm waste on the East Lyn River system, upstream of Brendon.

Issue 4: Risk of pollution from farm waste and dead livestock in moorland watercourses.

Where a carcass is found in a watercourse the first responsibility is with the owner of the carcass to remove and dispose of it. We have no legal duty to remove or dispose of animal carcasses found in watercourses. However, we do have the power to remove carcasses which are causing pollution. The local Environmental Health Department should be informed as the carcass may be classed as a 'Statutory Nuisance', in which case that authority has duty to remove and dispose of it.

Future Trends

The agricultural use of the catchment is likely to remain much as it is at present, but perhaps with fewer, but larger units. With the agreements through the Common Agricultural Policy (CAP) and General Agreement on Trade and Tariffs (GATT) there may be increased set-aside of land, reduced management and increased opportunities for conservation and recreation within the countryside.

The existence of the Environmentally Sensitive Areas (ESAs) on Exmoor should result in a reduction in further intensification of farming practices within the River Lyn subcatchment. The ESA Scheme was designed and funded by MAFF to encourage farmers to adopt agricultural practices, using traditional methods, for the benefit of wildlife, archaeology and landscape. Payments are made which may compensate for reduced income.

Other MAFF Schemes designed to encourage environmental improvements include the Habitat Scheme, Countryside Access, Farm Woodland Premium, Moorland and Organic Aid. In addition there is the Countryside Stewardship Scheme (now operated by MAFF), Wildlife Enhancement Scheme (English Nature) and Woodland Grant Scheme (Forestry Authority). The uptake of these schemes will be dependent on the level of financial inducement. Conservation activities in the past have mainly been financed by individuals, but unfortunately the financial returns through such projects (for example as in public access) have been modest.

Exmoor National Park Authority has management agreements and a Farm Conservation Scheme designed to encourage environmentally sensitive farming.

Farm Diversification

Farmers increasingly look to diversify into activities other than agriculture in order to supplement their incomes. North Devon is a tourist destination, and many farmers have added to their income (albeit in a small way) by providing accommodation, produce and services to visitors. Much farm-based work is now concerned with activities such as woodland management, running farm shops and equestrian businesses, and the provision of sporting facilities, nature trails, holiday cottages and various agricultural services (Ref. 13).

'Rural England: A Nation committed to a Living Countryside' (Ref. 13), published in October 1995, provides for the first time ever a comprehensive review of Rural Policy, describing how sustainable development can be put into practice in rural areas, building on the current strengths of the countryside and those who live and work there.

Fish Farms

The use of riverside beds or ponds to rear fish is considered here. Our objective is to protect rivers from the effects of fish farms, for example the escape of non-native fish into rivers and low flows in certain river stretches caused by water abstraction. Fish farming does not generally cause any problems in this catchment.

There is one operational fish farm present in the catchment; the Lyn Valley Trout Farm on the Wendle Water (NGR SS 686 461). This farm produces a small quantity of rainbow trout for the table and for a small put and take fishery. There is another fish farm also owned by the Lyn Valley Trout Farm on the West Lyn River (NGR SS 712 470), but this is no longer in use.

Forestry

Forests and woodland are widely scattered across the catchment, although there is no Forest Enterprise or Forestry Commission owned land (see Map 9). Semi-natural broadleaved woodland in the South West Region is composed mainly of native species such as hazel, alder, ash, rowan and the pedunculate and sessile oaks. However, other non-indigenous species such as sycamore and beech also contribute significantly to the catchment's canopy. Much of the semi-natural woodland in the catchment is of national importance due to the presence of the western sessile oaks, and are therefore largely designated as SSSIs. The National Trust owns and manages the majority of woodland in the Rivers Lyn and Heddon valley and Woody Bay. See Section 4.5 for further information on woodland in the catchment.

The catchment lies within a critical load area. This is an area designated by the DoE, where sulphur levels, causing acidification (low pH), are considered to be impacting on the ecosystem. Section 4.3 on Air Quality explains this in further detail. Any proposals for new coniferous plantings within this critical load area may require an Environmental Assessment to assess whether the forestry proposal would exacerbate the problem of low pH. In addition to new planting, forestry activities on existing sites (particularly harvesting) may cause a short term reduction of pH. We would be reluctant to see further development of coniferous forestry in this area, as it could lead to further acidification.

3.6 Recreation and Amenity

Many people spend their spare time enjoying our rivers and coasts. Where we can we try to improve facilities for these people, particularly if land is in our control, but we must always safeguard the environment from the damage they might cause. We also have a general duty to promote the recreational use of water throughout England and Wales.

Local Perspective

This area is a major tourist destination, with many hotels and camping or caravan sites.

Freshwater based recreation in the catchment is rather limited, however, the River Lyn provides some of the most challenging canoeing in the area, though on a strictly controlled basis. The season runs from 1

Issue 5: Need to review arrangements for canoeing on the River Lyn.

November to 28 February, avoiding conflict with fishery interests. Numbers of canoeists are limited and prior permission must be obtained from the British Canoe Union (BCU) Local Access Officer. Some concern has been expressed over the number of breaches of access agreements. We also operate a canoeing information line for this river.

Coastal waters provide more recreational opportunities. Surf canoeing takes place at Woolacombe, Croyde and Lynmouth, and the first two sites, together with Putsborough, are probably the most popular North Devon surfing beaches, attracting both novices and the more experienced in large numbers. There are a number of bathing beaches within the catchment which are extensively used (see Map 10). We discuss the water quality of bathing beaches in Section 4.1. Windsurfing also takes place at a number of locations, especially off some of the more popular beaches. The harbour at Ilfracombe provides sea fishing and other boat trips, including services to Lundy Island. Yacht clubs operate from Watermouth and Ilfracombe. The variety of marine life off the rocky shores attracts snorkelling and sub-aqua enthusiasts both individually and through clubs at Combe Martin and Ilfracombe.

The South West Coast Path, a National Trail, runs along the whole of the coast, drawing both short and long distance walkers. Over much of its length the Tarka Trail follows the same route, before turning inland at Lynmouth to follow the Two Moors Way, another long distance path which links Exmoor and Dartmoor. The Exmoor rivers offer several riverside footpaths, a number of which are in National Trust owned areas; some are managed as nature trails. The footpaths along the River Lyn and the River Heddon are of particular note for their extent and beauty. They annually receive an estimated 100,000 and 70,000 visitors respectively. Several pony trekking centres operate in the catchment, and there is a riverside bridlepath in the Badgworthy Valley.

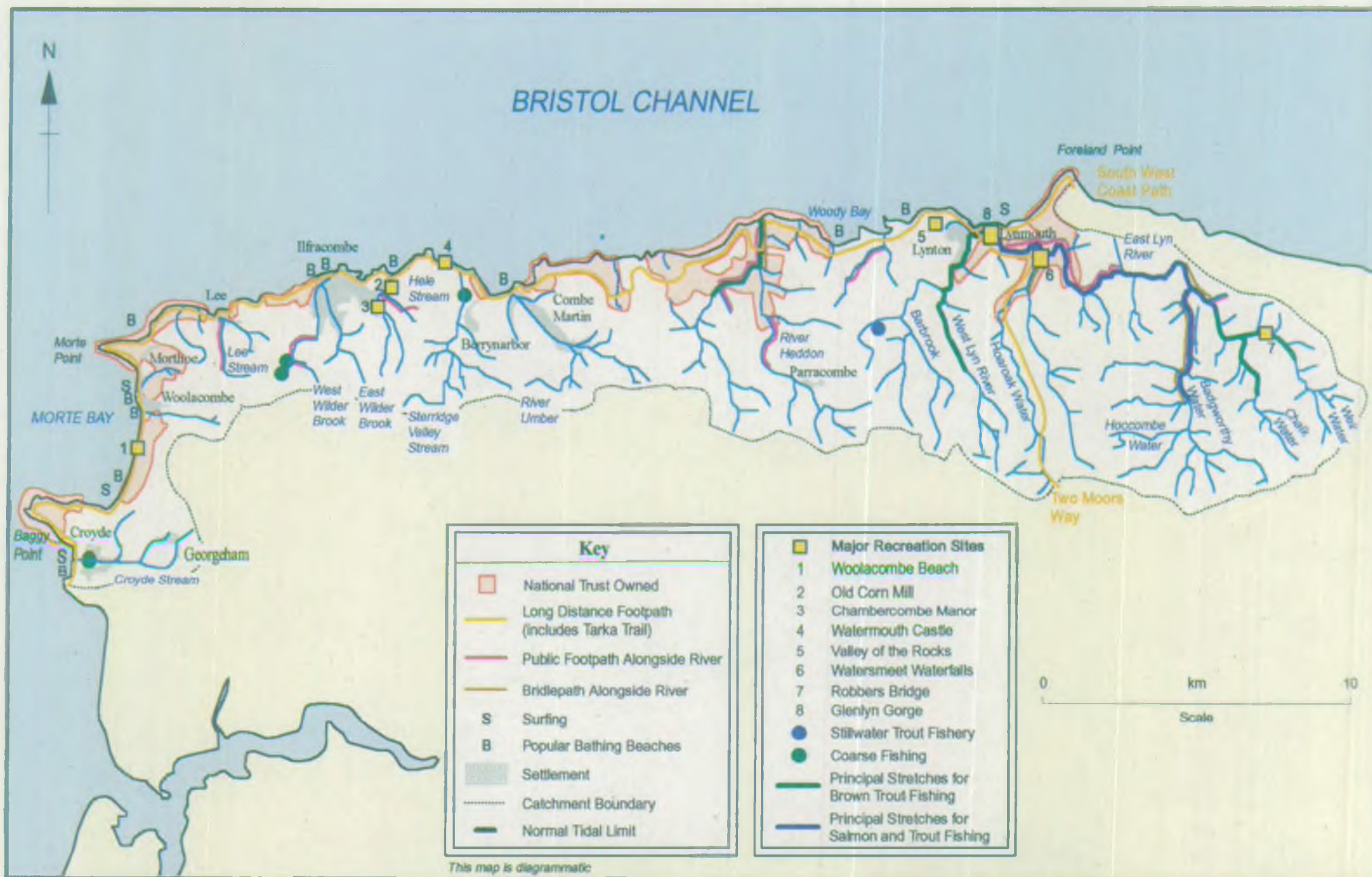
The use of four-wheeled drive vehicles and mountain bikes for recreational purposes is becoming increasingly popular in the area, particularly on Exmoor.

The sea cliffs at Baggy Point offer some of the most popular rock-climbing in Devon. However, access to parts of the cliffs is restricted from 15 March to 30 June to protect cliff nesting birds.

The River Lyn is a major game fishery; there are also several small stillwater fisheries for both trout and coarse.

Various other water related recreational sites are indicated on Map 10.

Map 10 - Recreation, Amenity and Angling



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3.7 Risks of Flooding

River flows vary widely and are affected by climate, geology and land use. We manage flood risk from rivers and the sea using Flood Defence and Land Drainage powers.

Flood risk and land drainage have always affected the way we use land. By improving our control of water we have been able to increase our use of river and coastal floodplains for farming or urban development. This control can take many forms, from simple channel alterations to major floodbanks and artificial washlands. Works constructed for other purposes, such as weirs, mills and bridges, have also altered the natural river system.

Better protection from floods and improved land drainage has brought certain economic and social benefits. However, unless properly managed, flood defence and land drainage schemes may result in other problems such as increased downstream flows and a legacy of expensive works for future generations to maintain. Changes in land use, made possible through drainage and flood defence, may also cause significant environmental damage, particularly to wetlands. Today we manage flood defences and land drainage to balance the needs of all river users with the needs of the environment.

All rivers are classified as either 'main river' or 'ordinary watercourse' (sometimes referred to as 'non-main river'). We supervise all flood defence matters but have special powers to carry out or control work on main rivers and sea defences. Local authorities, and in some areas (though not in this catchment) internal drainage boards, are responsible for flood defence on ordinary watercourses. Local authorities are responsible for protecting the coast from erosion by the sea.

Our statutory flood defence committees make decisions on flood defence.

Local Perspective

The catchment is relatively unaffected by land drainage. 'Main River' covers 6.16 km of the River Usher and tributary, 7.25 km of the River Heddon and 37.65 km of the River Lyn subcatchment (see Map 11).

Regulation

We advise planning authorities on flood defence matters. We also issue consents and byelaw approvals for certain works which are likely to affect the flow of water or impede any drainage work. Our target is to provide planning authorities with sufficient information to ensure that the effects of development on flood risk are properly considered in accordance with the Department of Environment Circular 30/92.

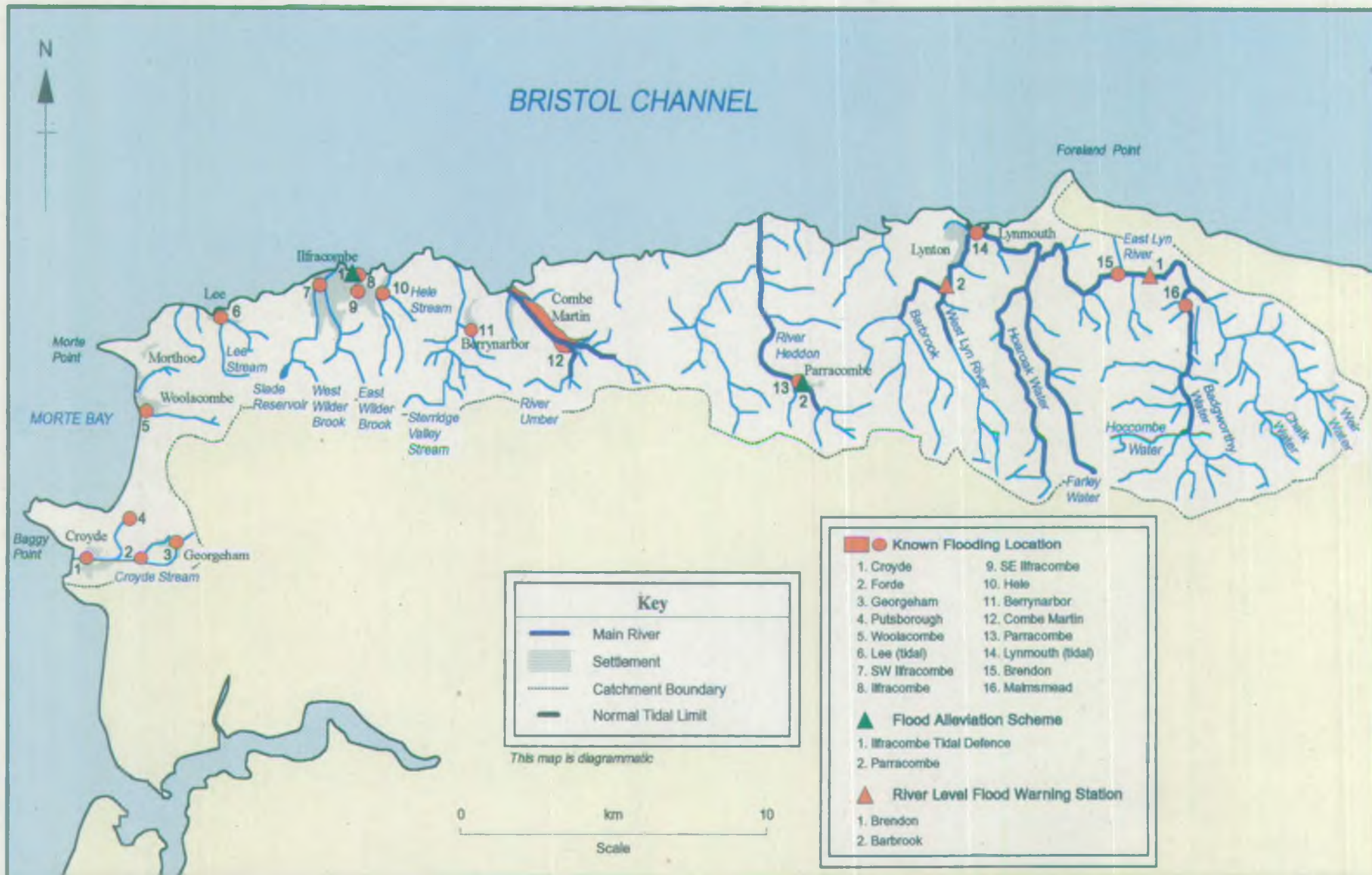
Information is currently provided on the basis of historic flood records and survey data. We have agreed with Planning Authorities how we can improve this information.

Significant development in the catchment is generally restricted to the existing urban areas of Ilfracombe and Combe Martin. Development at Croyde, Woolacombe, Lynton and Lynmouth is limited to individual properties and conversions.

Issue 6: We need to identify flood risk for planning authorities, taking account of the timetable for preparing district wide Local Plan(s).

Map 11 - Flood Defence

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Flood Defence Schemes

Serious floods occur less often than minor floods. The term 'return period' describes how often on average a flood might occur. For example a 10 year return period flood might be equalled or exceeded once every 10 years on average. A more serious flood may occur once every 100 years and therefore have a 100 year return period.

The standard of service of flood protection at a location is the worst flood (expressed as a return period) which can be withstood without significant damage. Flood defence schemes alleviate flooding up to the design standard, however a more serious flood may still occur.

There is only one major flood defence scheme in the catchment, this is on the River Lyn at Lynmouth. There is a small scheme on the River Heddon at Parracombe and a sea defence scheme at Ilfracombe (see Map 11).

We can build new flood defences if flooding is a serious problem in a particular area. Nowadays we usually only build new defences to protect built up areas from flooding. All schemes must be technically, economically and environmentally sound. We keep a list of schemes called a Programme of Capital Works which helps us to plan for the future.

Different types of land and property need different levels of protection. Table 3.6 shows the indicative standards (return period in years) used to design schemes. Map 12 shows the land use bands for 'main river' within the catchment.

Table 3.6: Indicative Flood Defence Standards for Different Land Use

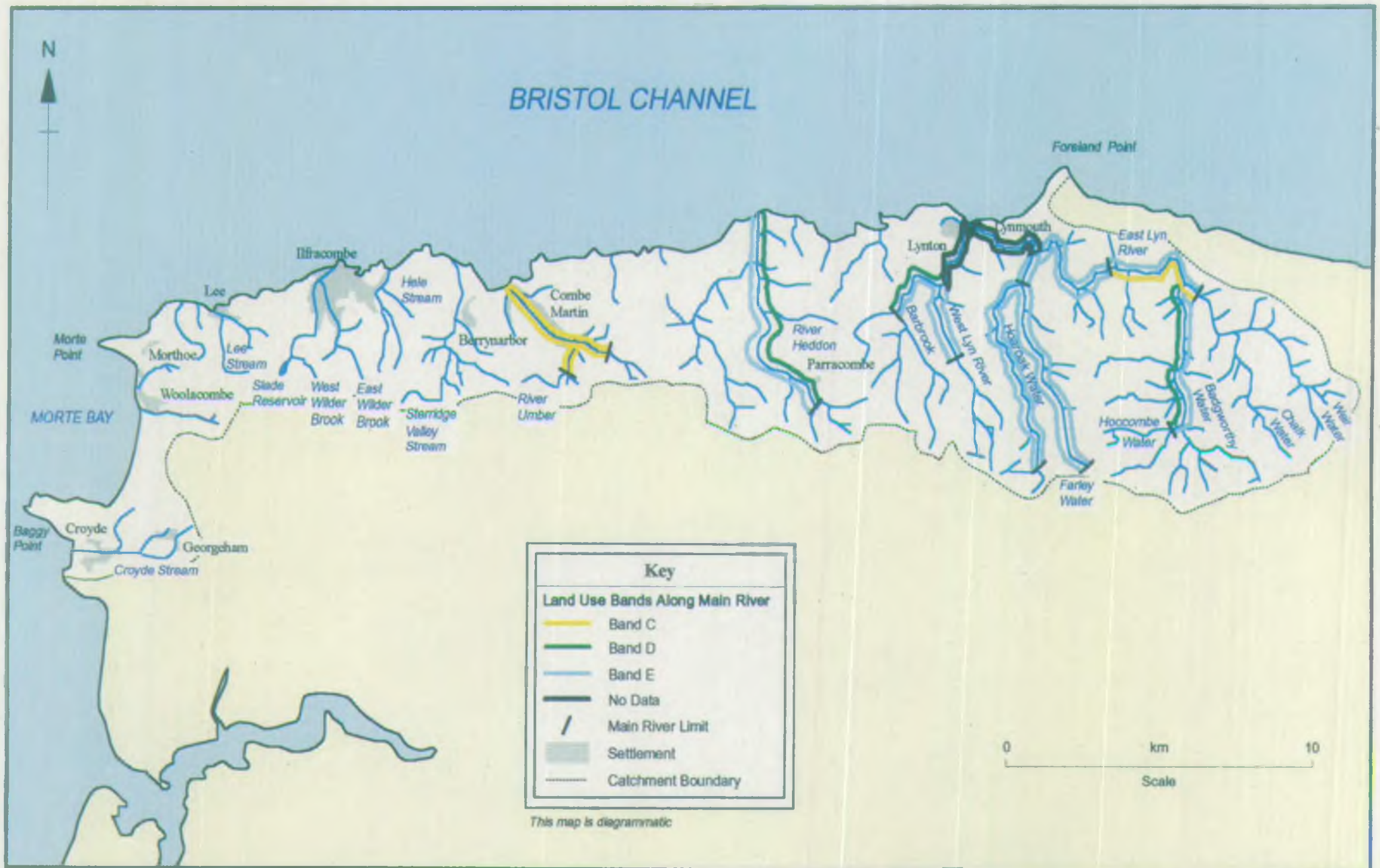
Current land use	Land Use Band	Sea (Return Period - Years)	River (Return Period - Years)
High density urban, containing significant residential and non-residential property.	A	100 - 200	50 - 100
Medium density urban.	B	50 - 200	25 - 100
Low density or rural communities. Highly productive agricultural land.	C	10 - 100	5 - 50
Generally arable farming with isolated properties.	D	2.5 - 20	1.25 - 10
Low productivity land with few properties at risk.	E	< 5	< 2.5

Note: Indicative standards are only a guide: they may not always be appropriate.

We maintain a register of flood problems and we are developing a Long Term Plan of Needs where work needs to be carried out.

A programme to review flood problems is being undertaken as part of the Development and Flood Risk Surveys (Section 105 Surveys), using floodplain mapping information. The introduction of a new scheme this year, the Flood Defence Management Framework, will assist in the identification of the relative priorities of schemes to alleviate flooding problems.

Map 12 - Flood Defence Land Use Bands



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Flooding Problems

A list of known flooding locations is shown on Map 11. There are major flooding problems on the West and East Wilder Brooks and the Hele Stream at Ilfracombe and the River Umber at Combe Martin. We are therefore recommending (in accordance with the DoE Circular 30/92) that development should not be permitted within the catchments of these rivers. This recommendation is being maintained until such time as a flood alleviation scheme for the area at risk has been carried out to our satisfaction. The current status in development control terms for each of these rivers is as follows.

Issue 7: Flood problems have been identified at Ilfracombe and Combe Martin.

West and East Wilder Brooks, Ilfracombe

Consulting Engineers have carried out a feasibility study into a flood alleviation scheme at the above location and have produced three alternative schemes:

1. Piecemeal improvements along the watercourses;
2. A tunnel to discharge floodwater direct to the sea;
3. A flood retention reservoir on the East Wilder Brook.

Only option two would allow the potential for future development in the catchment.

Hele Stream, Ilfracombe

A major retail and residential development has been proposed at Killacleave. The developer has formally agreed to carry out the following works to control the rate of surface water runoff and to alleviate the flood risk;

1. An on-site surface water storage lagoon and outlet control will be provided as part of Phase 1 (Retail) of the development. This will limit the discharge rate to the receiving watercourse to be commensurate with the rate of runoff from the undeveloped site;
2. Increased channel capacity and a by-pass pipeline will be provided as part of Phase 2 (Residential) of the development. This will enable the watercourse to discharge the additional runoff and provide a flood defence benefit.

River Umber, Combe Martin

A flood defence scheme at Combe Martin has been designed but is not included in the current capital programme because of its poor viability in terms of benefits compared with costs. We will continue to recommend that no further development should take place in the catchment until such time as a flood defence scheme has been carried out.

River Lyn, Lynmouth

Since the Lynmouth Disaster of August 1952 and the subsequent flood defence scheme, there have been no areas identified as being at risk from flooding. Accordingly there are very few restrictions with respect to development control in this area apart from our normal requirements in respect of main river clearance margins.

Maintenance

We maintain rivers and flood defence structures to minimise the risk of flooding.

We try to focus our work where it is needed most. We work out how best to concentrate our efforts using a method called Standards of Service. We have only just started to use this technique and are busy collecting the information we need to make it work.

Issue 8: We need to improve the efficiency and effectiveness of our flood defence work.

Some clearance of vegetation from the channel is regularly carried out at Combe Martin (River UMBER), Lynmouth (East and West Lyn) and Barbrook (West Lyn). Other maintenance work mainly consists of the removal of fallen trees and other debris to ensure that river channels remain clear to discharge flood flows. During this work consideration is given to the conservation value of the watercourses.

Shoreline Management Plan

Included within this plan area is the coast between Saunton Down in the west and Foreland Point in the east. We, in partnership with local authorities, county councils, English Nature and other land owners are preparing the Bridgwater and Bideford Bay Shoreline Management Plan (SMP) which includes this length of coast.

The aims in producing these plans are to improve the understanding of coastal processes, predict the likely future evolution of the coast, identify assets at risk and improve consultation between organisations with an interest in the shoreline. The plans will consider options and detail preferred approaches, recommend monitoring programmes and identify environmental enhancements. The plan is entering Stage 2 of the process and is being led by Sedgemoor District Council. It is planned to have the SMP in place by the end of 1998.

Issue 9: We need to understand how the coastline is changing.

Flood Warning

Flood warnings are issued from our Regional Office at Exeter. These are based on weather radar and forecasts, and on rainfall and measured river levels. Flood warnings are colour coded Yellow, Amber or Red to indicate their severity.

Within the catchment area there are river level gauges at Barbrook on the West Lyn and at Brendon on the East Lyn (see Map 11). Warnings are issued for these rivers on the stretches down to Lynmouth. In addition, a local system is in operation where alerts for high river levels are issued by the National Trust at Watersmeet. Tidal warnings are issued for the North Devon Coast from Hartland to Lynmouth based on predictions at Ilfracombe.

We have a commitment to improve the level of service so that where possible a warning is issued at least 2 hours in advance of flooding. A study is currently being undertaken to identify where existing flood warning arrangements meet this standard and where it is possible to improve the network.

A leaflet is available which sets out the current flood warning service in North Devon and which gives details of the dissemination methods and recorded information service 'Floodcall'.

3.8 Water Abstraction and Supply

Catchment Perspective

Here we consider the abstraction of water from surface and groundwater for public and private uses in the catchment.

Current Licensed Abstractions

Water is abstracted from the catchment for public water supply and private use. Private use includes the supply of water for holiday accommodation, agricultural purposes, hydropower, fishfarming, industrial uses and amenity purposes.

In the catchment there are currently 19 licences for abstractions from surface water and 65 from groundwater (those above 20 m³/d are shown on Map 13). The total licensed quantity of water which can be abstracted from these sources is 25,788 MI/year; 25,653 MI/year is surface water abstraction, 135 MI/year is groundwater abstraction. This indicates the relative importance of surface water sources within the catchment (see Figure 2).

Consumptive and Non-Consumptive Abstractions

Abstractions can be categorised according to their consumptive or non-consumptive nature of water use. Consumptive abstractions generally involves a loss of a proportion of the water abstracted, for example public water supply or industrial processing. Non-consumptive abstractions involves the majority of the abstracted water returned to the catchment, usually within the vicinity of the abstraction point, for example fishfarms and water power schemes.

Of the total annual licensed quantity of water for abstraction in the catchment, 96% is for non-consumptive uses and 4% is for consumptive uses. The majority of abstraction within the catchment is for purposes other than public water supply.

Public Water Supply

Licensed abstraction within the catchment for public water supply is restricted to surface water sources as there are no significant aquifers in the area and a significant proportion of the area falls within the parishes covered by the Devon River Authority (Exemptions from Control) Order 1970 (Ref. 26). This Order was obtained because yields from groundwater abstraction on water resources was considered to be insignificant. Therefore, all groundwater abstraction in this area, irrespective of volume or use can take place without a license to abstract.

There are only two small public water supply abstractions within the catchment; Slade Reservoir, on the West Wilder Brook, is licensed for over 2.7 MI/d and an abstraction from the Barbrook is licensed for almost 1.4 MI/d. Due to physical constraints the combined reliable yield for these sources is 2.7 MI/d.

The sole provider of supplies to this catchment is South West Water Services Limited (SWWSL). The company's total supply area is split into three zones, each dependant on a large strategic reservoir which augment smaller, local sources. The catchment forms part of the Roadford Supply Zone which provides water supplies to Plymouth, South Hams and Torbay as well as North Devon and parts of North East Cornwall.

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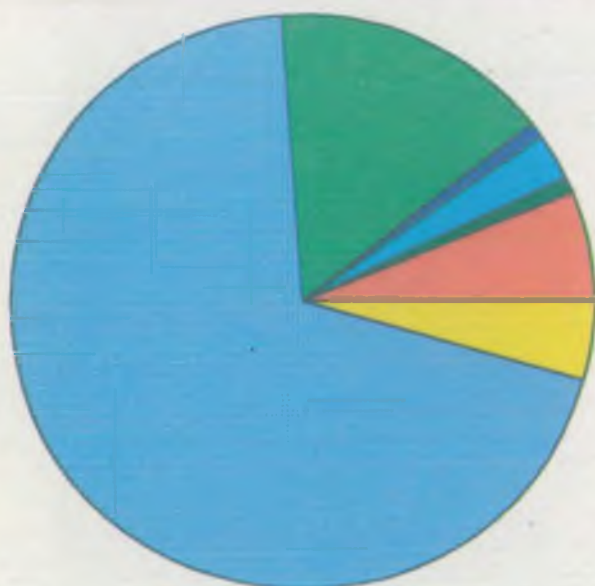
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Figure 2 - Abstraction Statistics



**Total Licensed
Abstraction by Volume**

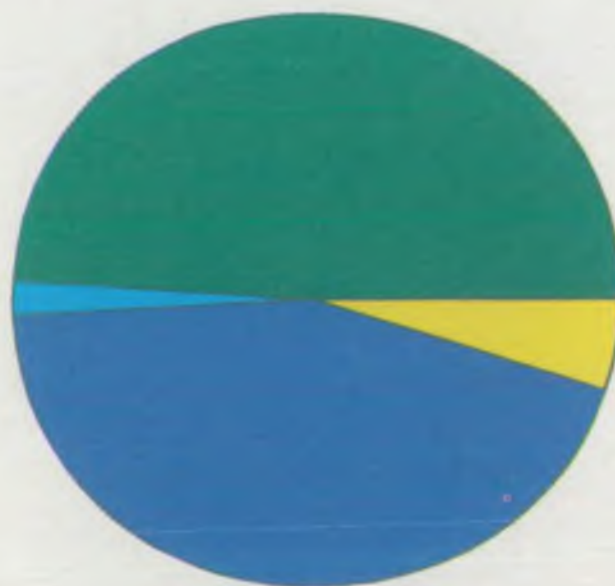
Surface Water	99.5%
Groundwater	0.5%



**% Abstraction
of Surface Water by Volume**

Authorised Total 25,653 MI/year

Consumptive Use	Non-Consumptive Use
South West Water 3.69%	Fish Farms 17.43%
Agriculture 0.01%	Water Power 78.15%
Spray Irrigation 0.05%	Private Amenity 0.66%
Private Water Supply 0.01%	



**% Abstraction
of Groundwater by Volume**

Authorised Total 135 MI/year

Consumptive Use	Non-Consumptive Use
Agriculture 49.12%	Private Amenity 5.2%
Spray Irrigation 1.42%	
Private Water Supply 44.26%	

The Demand For Public Water Supply

The current water supply demand across the Roadford Supply Zone represents 246 MI/d on average (Ref 14) of which no more than 10 MI/d, a tiny portion, can be attributed to this catchment. However, demand can rise significantly during prolonged dry weather, for example the drought year of 1995 when annual average demand for the whole Roadford Supply Zone rose to 279 MI/d. The influx of people to this sparsely populated area during the summer results in relatively high peak demands during this period. The largest centres of demand are situated along the coast at Ilfracombe, Combe Martin, Lynton and Lynmouth.

Supplying the Public Water Supply Demand

The demand within the catchment is met by a combination of supplies from local catchment sources and sources within the Roadford Supply Zone. The reliable yield from the local sources is less than 3 MI/d, therefore large parts of this area are supplied with imported water from sources within other catchments. The total reliable resources for the whole of the Roadford Supply Zone total some 326 MI/d, a small proportion of this makes up the potential deficit in supply to the North Devon coastal towns.

Imported sources of water include the Rivers Yeo (Barnstaple) and Taw via Barnstaple, transferred to Ilfracombe, Combe Martin and Croyde. These abstractions can be supplemented by additional imports from Wistlandpound Reservoir on a tributary of the River Yeo (Barnstaple) and from the River Bray at Leehamford.

The Lynton/Lynmouth area relies on a local source of supply from the Barbrook. The Parracombe community used to be supplied from a local, unlicensed spring source, it is due to be connected to SWWSL's mains supply by Autumn 1996.

Public Water Supply Conservation And Management

All new houses within the SWWSL supply area must now be metered. SWWSL also have a company wide leakage control policy and associated monitoring which endeavours to attain economic levels of leakage for all supply zones. Before the development of new resources is approved, the water company must demonstrate that adequate measures have been taken to conserve and manage existing licensed resources. Future demand and supply options are discussed in Section 4.7.

Private Abstractions

The maximum licensed quantity of water which can be abstracted for private use is approximately 24,842 MI/year. Of this, approximately 135 MI/year is from groundwater sources and 24,707 MI/year from surface water sources.

There are 82 private use abstraction licences within the catchment; 65 are groundwater and 17 are surface water licences. Hydropower is by far the largest use with over 20,047 MI/year from surface water. The largest use of groundwater is 66 MI/year for agricultural purposes (excluding spray irrigation). Of the total authorised quantities for private use, almost 100% is non-consumptive.

Future demand for private supplies is presented and discussed in Section 4.7.

4. STATE OF THE ENVIRONMENT

4.1 The Quality of the Aquatic Environment

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

- River Quality Objectives to protect recognised uses;
- standards laid down in EC Directives;
- international commitments to reduce the amount of Annex 1A substances entering tidal waters.

In this chapter, we report on the state of the catchment by comparing existing water quality with relevant water quality targets. We have identified issues where targets are not being achieved and action is needed to improve water quality. Other water quality issues in the catchment have also been identified.

River Quality Objectives

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 which is made up of five water quality classes (RE1 to RE5) (see Appendix 2). These classes reflect the chemical quality needed by different types of river ecosystem, including the types of fishery they can support. The RE classification scheme replaces the National Water Council (NWC) system that was used by the former NRA until the end of 1993 (see Table 4.1).

Table 4.1: Translation of River Quality Objectives based on the NWC system to River Ecosystem Classes

RQO (NWC Scheme)	RQO (RE Class)
1A	RE1
1B	RE2
2	RE3/RE4
3	RE5
4	RE5

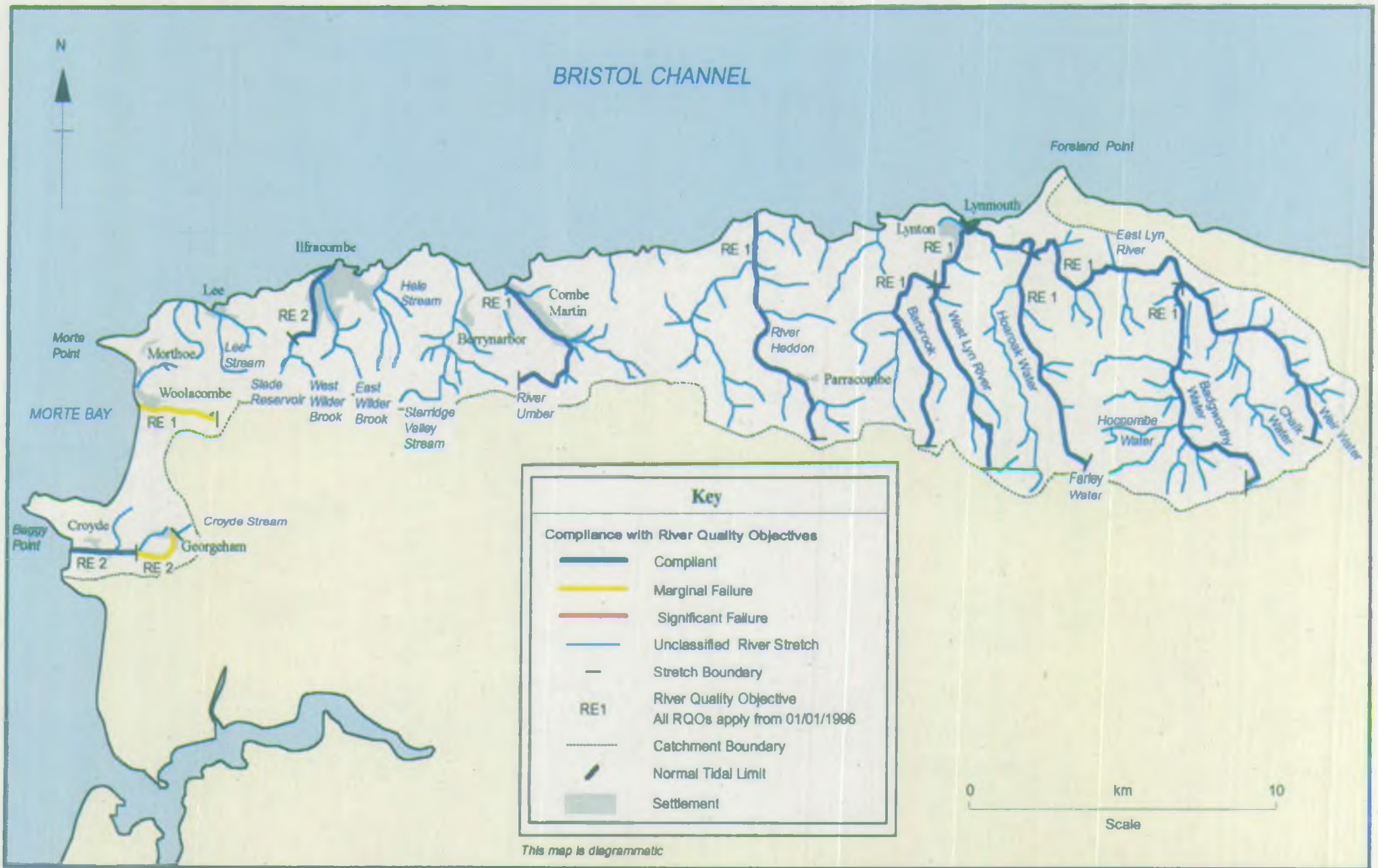
How RQOs are set

Wherever possible we set new RQOs that reflect historical RQOs based on the NWC system (see Table 4.1). All RQOs must be achievable and sustainable. This means that before we can set an RQO we must be able to identify what needs to be done to meet it. We must also be able to ensure, as far as is practicable to do so, that water quality can be maintained at this level in the future.

We set RQOs based on the need to protect current water quality and future use. The available investment to improve water quality, including, for example South West Water's AMP2 investment programme agreed with Government (see Section 3.4), has to be taken into consideration when setting RQOs.

Unlike the historical RQOs based on the NWC system which had no date for achievement, the new RQOs must be achieved by a certain date within the next 5 to 10 years.

Map 14 - Compliance with Proposed River Quality Objectives



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Proposals for RQOs for the North Devon Streams Catchment

The RQOs based on the RE classification that we are proposing for the catchment are shown on Map 14. These proposed RQOs must be complied with from 1996. The proposed RQOs are equivalent to the historical RQOs based on the NWC system unless stated below. RQOs for the Croyde and Woolacombe Streams were first presented in the River Taw Catchment Management Plan (Ref. 15).

There are two stretches in the catchment where we are proposing RQOs which are higher than the historical RQO which are shown in Table 4.2, below:

Table 4.2: RQOs which are better than historical RQOs based on the NWC system

River	Stretch	RQO (NWC)	RQO (RE)
Umber	Source to prior to beach	1B	RE1
Heddon	Source to mean high water	1B	RE1

There are no stretches in the catchment where we are proposing RQOs which are lower than the historical RQO.

Catchment Compliance with RQOs

Map 14 also shows where current water quality fails to meet its RQO. This assessment is based on three years of routine monitoring data from the Public Register collected between 1993 and 1995 (inclusive). We have shown failures to meet RQO as *significant* and *marginal* failures. Significant failures are those where we are 95% certain that the river stretch has failed to meet its RQO. Marginal failures are those where we are between 50% and 95% certain that the stretch has failed to meet its RQO.

Of the eleven monitored river stretches (64.6 km) in the catchment there are no stretches which significantly fail to meet their RQO, and two stretches (4.5 km) which marginally fail to meet their RQO. The reasons for these failures are explained below.

Marginal Failures

1. *Croyde Stream (Crowborough to Forda)*

River water quality in this stretch did not meet the proposed RQO RE2 in 1994 and 1995 because of elevated Biochemical Oxygen Demand (BOD) concentrations. The cause of non-compliance is unknown and we will carry out field investigation work to determine specific sources contributing to BOD concentrations.

Issue 10: Need for improvement of water quality in Croyde Stream and Woolacombe Stream.

2. *Woolacombe Stream (Source to prior to beach)*

River water quality in this stretch did not meet the proposed target RE1 in 1995 due to a single high BOD result. Investigation work found no specific chemical water quality problems, therefore further investigation work will be required.

EC Directives

There are six EC Directives that currently apply to the catchment, including the Urban Waste Water Treatment Directive mentioned in Section 3.4. The designated stretches and sites are shown on Map 15.

Our responsibilities for the following EC Directives are:

- **Bathing Waters Directive** - for monitoring the quality of identified popular bathing waters;
- **Dangerous Substances Directive** - for authorising, limiting and monitoring Dangerous Substances in discharges; and monitoring the quality of waters which receive discharges containing Dangerous Substances;
- **Freshwater Fish Directive** - for monitoring the quality of identified fisheries;
- **Surface Water Abstraction Directive** - for monitoring the quality of designated surface water abstractions.

For the above Directives we report our results to the DoE who decide whether the standards in the Directive have been met. Where the requirements are not met, we are responsible for identifying sources of pollution that are causing failures, and making sure that improvements are made.

- **Shellfish Directive** - The Ministry of Agriculture, Fisheries and Food (MAFF) and the Department of Health (DoH) share responsibility for this Directive in England and Wales. We have only a minor role in implementing this Directive. Although we provide information on the location of discharges that may affect harvesting areas, we cannot require that improvements are made to polluting discharges under this Directive. However, we can use our powers to ensure that water quality does not deteriorate in harvesting areas.

These Directives, together with the catchment status, are detailed below.

EC Bathing Waters Directive

The Bathing Waters Directive (Ref. 16) protects the environment and the public health of bathers using identified bathing waters by reducing pollution entering these. The Directive contains standards for nineteen microbiological, physical and chemical parameters to assess bathing water quality (see Appendix 3). Compliance is assessed mainly by standards for bacteria (total and faecal coliforms) found in sewage.

Catchment Status

There are eight EC Bathing Waters in the catchment which are monitored under the Directive. Table 4.3 shows when failures have been recorded.

Table 4.3: Bathing Water Failures for the Catchment

Bathing Water	Year
Croyde	no failures
Woolacombe (Putsborough)	1995
Woolacombe (Village)	no failures
Ilfracombe (Tunnels)	no failures
Ilfracombe (Hele)	1987, 1991, 1992, 1994, 1995
Ilfracombe (Capstone)	1986, 1987, 1990, 1992, 1993, 1995
Combe Martin	1986, 1987, 1988, 1989, 1991, 1992, 1994
Lynmouth	1986, 1987, 1989, 1990, 1991, 1993, 1994, 1995

During 1995 the bathing waters at Woolacombe (Putsborough) failed to comply with the Directive. The quality of the bathing waters at this site has historically been very good, meeting the more stringent guideline standards of the Directive in the years 1986 to 1994, inclusive. We have investigated the failure in 1995 but were unable to identify any cause. Further investigations during 1996 indicated that the Woolacombe outfall was not the source of contamination. No further work is planned.

The main causes of non-compliance at Ilfracombe Capstone and Hele bathing waters were bacterial contamination from the Wilder Brook, Hele Stream and crude sewage discharges. A SWWSL scheme should improve bathing water quality for the 1997 bathing season. We will continue to investigate the sources of bacterial contamination of the Wilder Brook and Hele Stream.

The Bathing Waters at Combe Martin failed to comply with this Directive due to two main causes. These were the discharge of crude sewage off Lester Point and bacterial contamination of the River Umber thought to be caused by a leaking sewer. SWWSL have recently completed a scheme which provides secondary treatment and has improved the sewer. We will be carrying out investigation work to establish whether there are any other sources of bacteria to the River Umber which require control. Routine bathing season monitoring of the River Umber should indicate whether a problem is present and investigation work may be necessary to identify any sources.

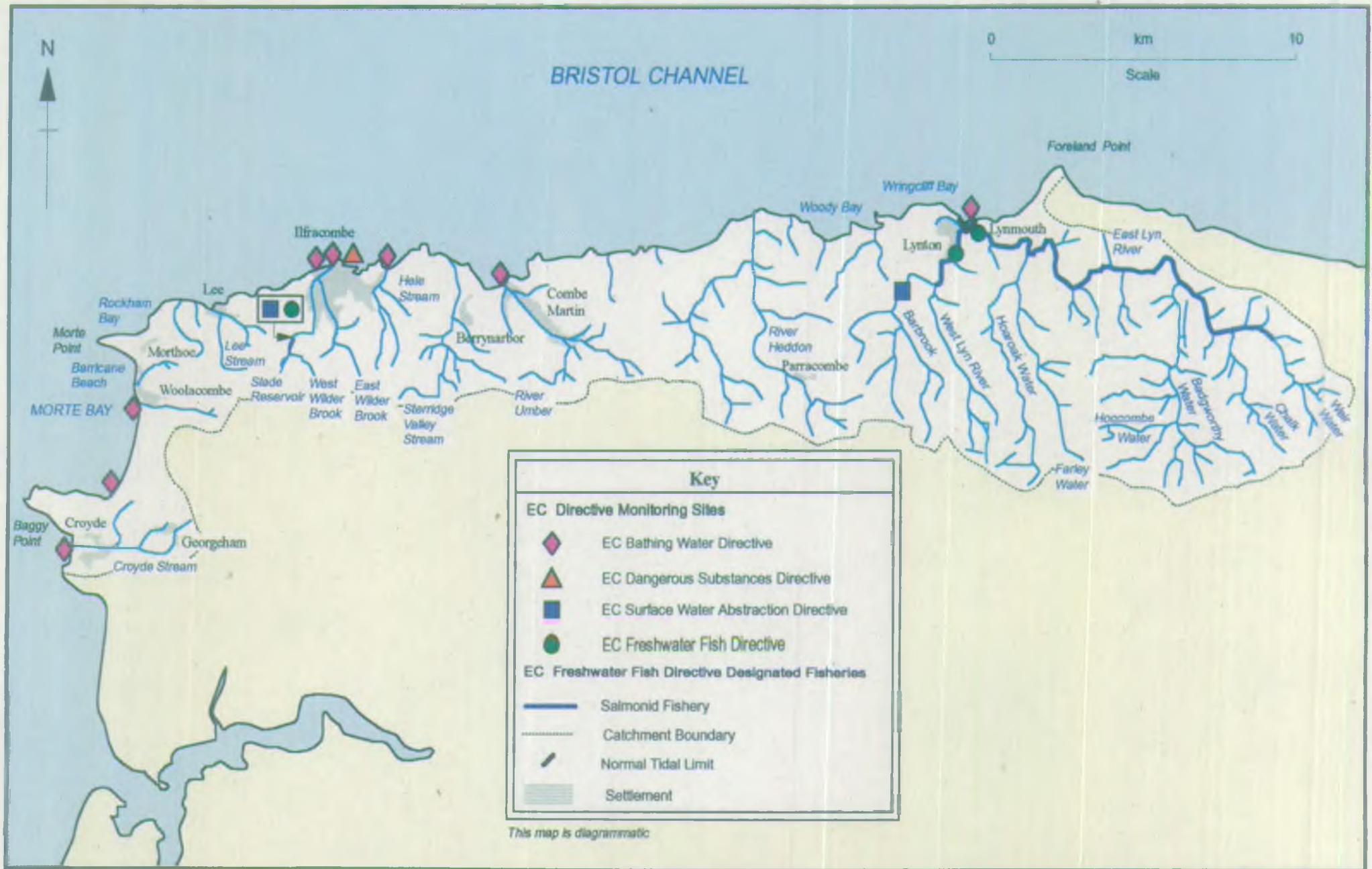
The Bathing Waters at Lynmouth fail to comply with the Directive due to a crude sewage discharge. SWWSL will be carrying out an improvement scheme at Lynmouth.

Issue 11: Bathing water non-compliance.

EC Dangerous Substances Directive

The Dangerous Substances Directive (Ref. 17) protects the water environment by controlling discharges that contain harmful substances to rivers, estuaries and coastal waters. It describes two lists of compounds. List I contains substances regarded as particularly dangerous because they are toxic, persist in the environment and bioaccumulate. Discharges containing List I substances must be controlled by Environmental Quality Standards (EQSs) issued through Daughter Directives (see Appendix 4). List II contains substances which are considered to be less dangerous but can still have a harmful effect on the water environment. Discharges of List II substances are controlled by EQSs set by the individual Member States (see Appendix 5).

Map 15 - EC Directive Monitoring



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Catchment Status

There is a single designated Dangerous Substance site in the catchment; Ilfracombe crude sewage outfall is designated for the List 2 substances copper, zinc, lead, chromium, nickel and iron. There have been no EQS exceedances at this site since monitoring of the receiving waters began in 1990.

EC Freshwater Fish Directive

The Freshwater Fish Directive (Ref. 18) ensures that water quality in designated stretches of water is suitable for supporting certain types of fish. It contains two sets of quality standards. One set of standards protects cyprinid or coarse fish populations. The other set of standards is stricter, protecting salmonid or game fish populations for example, salmon and trout.

There are two sets of standards for each fishery type; imperative standards, which must be achieved and guideline standards that Member States should aim to achieve.

Catchment Status

The Lower Slade reservoir, East Lyn River from Weirwood to the Normal Tidal Limit (NTL) and the West Lyn River from its confluence with the Barbrook to the NTL are designated salmonid fisheries. There are no designated cyprinid stretches. All designated stretches met the imperative standards of the Directive in the period 1990 to 1995.

EC Surface Water Abstraction Directive

The Directive (Ref. 19) protects the quality of surface water used for public supply. This Directive ensures that water abstracted for public supply meets certain quality standards and is given adequate treatment before entering public water supplies.

The Directive sets out imperative standards that must be achieved, and guideline standards that Member States should aim to achieve, for water for public supply which is to be given different levels of treatment.

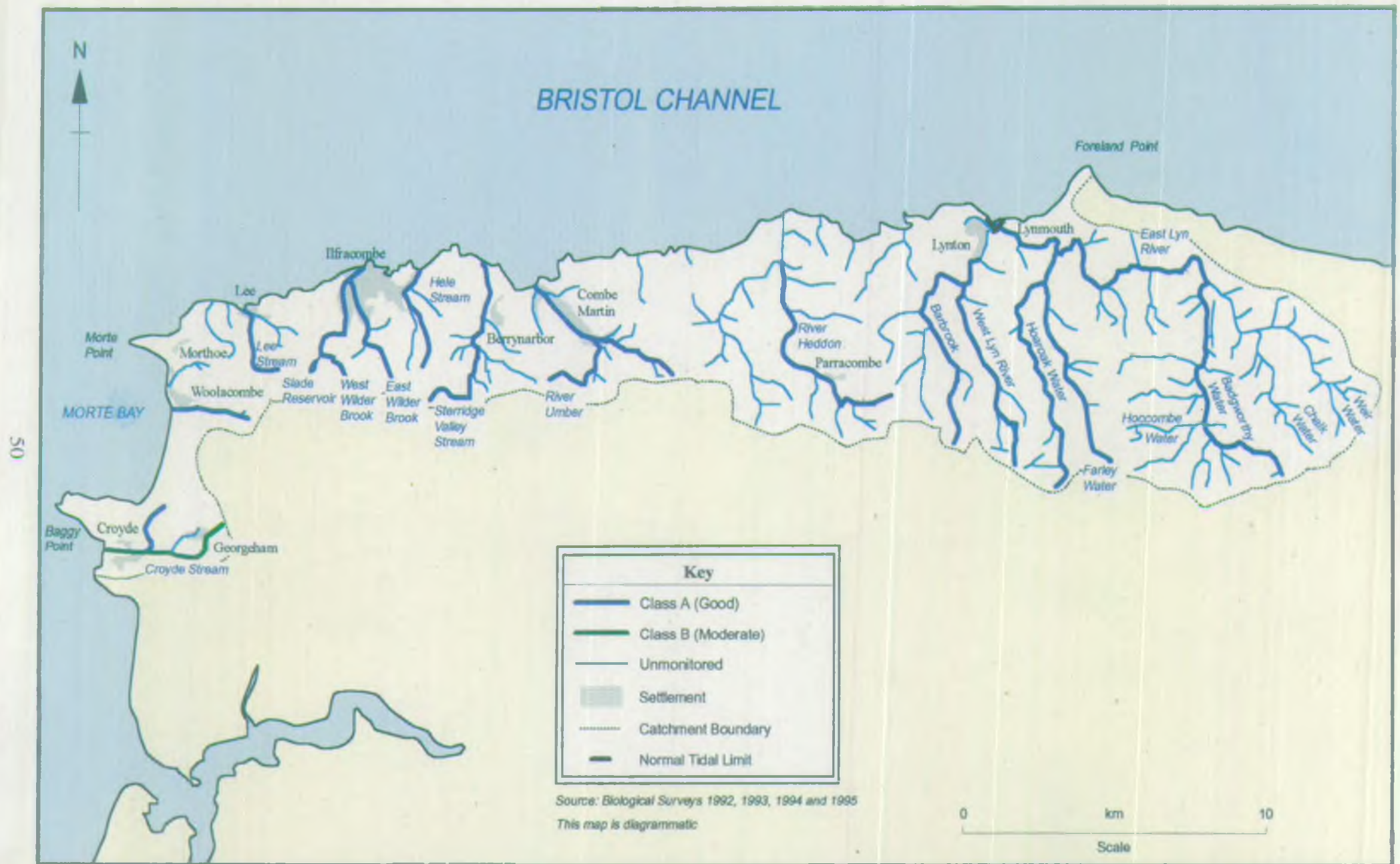
Catchment Status

There are two designated Surface Water Abstraction points in the catchment. Both sites have exceeded the imperative standards of the Directive. During 1993 and 1994, the Lower Slade Reservoir site exceeded the dissolved and emulsified hydrocarbon imperative standards of the Directive.

During 1993 the West Lyn River site exceeded the dissolved and emulsified hydrocarbon imperative standards of the Directive, though no further exceedances have occurred.

We are concerned about the suitability of the methods for analysis for dissolved and emulsified hydrocarbons as specified in the EC Surface Water Abstraction Directive. Exceedances of the Directives standards cannot always be attributed to polluting discharges, and we suspect that some exceedances may be due to natural compounds resulting from the breakdown of natural vegetation. We are involved in discussions with the DoE, with a view to reviewing the analytical methods used. We will continue to report exceedances of the EC Surface Water Abstraction Directive standards. However, as there are no obvious sources of these compounds in the catchment we are not planning to undertake any further studies until we receive direction from the DoE.

Map 16 - Biological Classification



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EC Shellfish Hygiene Directive

The Shellfish Hygiene Directive (Ref. 21) protects the public health of consumers of live bivalve mollusc shellfish such as mussels and oysters. It also classifies bivalve mollusc harvesting areas into categories according to the degree of microbiological contamination in live shellfish harvested from them; with Category 'A' being the cleanest shellfish which can be sold immediately to the public.

Catchment Status

In 1995 an area approximately 2 km off Lynton and Lynmouth was classified as Class A under this Directive.

Other International Commitments

Annex 1A Reduction Programme

At the second and third North Sea Conferences in 1987 and 1990, the UK Government made a commitment to reduce the load (load = concentration x flow) of certain substances known as 'Annex 1A' substances (see Appendix 6) entering tidal waters from rivers and direct discharges. Loads of most Annex 1A substances are to be reduced by 50%, but loads of mercury, cadmium and lead are to be reduced by 70%. Reductions were to be achieved by 1995 compared to a 1985 baseline or a 1991/1992 baseline where data for 1985 is unavailable. Nationally the UK achieved reductions of most of the Annex 1A substances. One of the few substances that the UK has not met its reduction targets included gamma HCH (commonly known as lindane), which is used as an organochlorine pesticide and wood preservative.

We are responsible for carrying out monitoring and identifying significant sources of these substances. We identify significant sources by ranking the loads of Annex 1A substances in rivers and direct discharges according to their size. A discharge is significant if it belongs to the group of discharges that contribute the first 95% of the total load entering tidal waters. In accordance with DoE guidelines we identify where reductions can be made.

Catchment Status

We monitor the Ilfracombe Cheyne outfall for Annex 1A purposes. During the period 1990 to 1995 we recorded a significant load of gamma HCH during 1990 only. We monitored the sea off this outfall between 1992 and 1994 for gamma HCH and found that concentrations were well below the EQS for this substance. We are not planning any further action under this initiative though we may exercise our powers to ensure loads of gamma HCH do not increase in the future from this discharge.

Additional Monitoring

As well as the work we carry out to meet the requirements of RQOs, EC Directives and other international commitments, we carry out additional monitoring. This additional monitoring helps us to determine the state of water quality in the catchment.

Freshwater Biology

We monitor the ecological quality of rivers by sampling benthic macroinvertebrates. These are small animals that live in river sediments. They are unable to move far and so are affected by long term

conditions in the river. We collect samples from the river during spring, summer and autumn and list the different families (taxa) of macroinvertebrates present. A scoring system (Biological Monitoring Working Party - BMWP) is used to assign scores to the different families recorded in a sample depending on their tolerance to pollution. Following this a computer model, RIVPACS - River Invertebrate Prediction and Classification System is used to predict families expected for a particular site under natural, unpolluted conditions, based on its physical and geographical characteristics. These predicted values are compared with the values obtained. From this comparison a biology classification is assigned to the watercourse as shown in Table 4.4.

Table 4.4: Biological Classification System

Biological Class	Description
A	Good
B	Moderate
C	Poor
D	Very Poor

Catchment Status

Recent data for the catchment shows biological quality remains at a high standard. Two sites on the Croyde Stream show moderate biological quality; one of the sites is located within the town of Croyde. The location of this site may account for the reduced biological quality due to urban discharges, including road runoff, and the fact that the stream is canalised through much of Croyde, creating a poor habitat. There are no known problems associated with the other site but the reduction in quality may be from mild organic enrichment. We will be conducting a field investigation to determine sources of organic enrichment in this stream (see Issue 10: 'Need for improvement of water quality in Croyde Stream and Woolacombe Stream'). See Map 16 for the Biological Classification for the catchment.

Non-identified Bathing Waters

Besides the identified EC Bathing Waters listed previously, we also monitor the quality of four popular, 'non-identified' bathing waters in the catchment.

Catchment Status

Bathing water quality off Barricane Beach, Rockham Bay, Woody Bay and Wringcliff Bay (see Map 15) met the imperative standards for bacterial quality under the EC Bathing Waters Directive.

4.2 Integrated Pollution Control/Radioactive Substances

Our responsibilities include regulation of pollution control for certain prescribed heavy industrial processes and regulation of the storage, use and disposal of radioactive substances.

Heavy Industrial Processes

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

Two lists of processes have been prescribed by regulations for control: Part A processes are controlled under IPC by the Agency; releases to the air from Part B processes are controlled at a local level under a system of Local Authority Air Pollution Control.

Catchment Status

There are no Part A processes found in the North Devon Streams Catchment. However, National Power's proposal for burning of emulsified hydrocarbon fuels at Pembroke Power Station, in South Wales, has raised some public concern in North Devon. One of these fuels has the trade name Orimulsion. There are two areas of concern; the potential for the power station to cause air pollution which could affect North Devon and the potential for an oil spill from the tankers supplying the fuel to the power station.

The Environment Agency in Wales are currently determining the staged application and will apply conditions to the authorisation which will prevent the release of polluting substances or where prevention is not reasonably practicable, to minimise and render harmless the substances released. In determining the application Welsh Region will take advice from public health and conservation bodies (such as Countryside Council for Wales and English Nature), and consider monitoring requirements, air quality guidelines, such as those published by the Expert Panel on Air Quality Standards and the World Health Organisation, and critical load maps (used to determine any effects on acidification, see Section 4.3).

Milford Haven Port Authority have applied to the local planning authority (Pembrokeshire County Council) for planning permission for a jetty for the oil tankers. Our Welsh Region have been consulted on this application and have raised concerns to the proposals on water quality and conservation grounds. The determination of this planning application has been put on hold by the Secretary of State for Wales who will decide whether a public inquiry is needed.

Radioactive Materials

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

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

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

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

Sites have been assessed and permission granted by us on the basis that the use of radioactive materials is justified and that operators are prepared to abide by conditions to safeguard human health and protect the environment. The permissions take the form of:

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

Catchment Status

There are no sites in this area licensed under the Radioactive Substances Act.

Radon

Radon is a natural radioactive gas which forms from the decay of uranium and thorium in rocks and soils. In 1990 Devon and Cornwall were designated by the DoE as affected areas. These were areas where more than 1 in 100 homes were likely to have radon concentrations above the level recommended by the National Radiological Protection Board.

North Devon District Council and West Somerset District Council conduct monitoring of radon concentrations in homes in the catchment. They also provide advice and in some cases home improvement grants, in order to reduce exposure to radon.

4.3 Air Quality

Air pollution can have adverse affects on public health, buildings, wildlife and habitats. Ambient concentrations of smoke and sulphur dioxide have generally declined in the UK as a whole over the last 20 years. Similarly, both the quantity released and the concentration of lead in the atmosphere has declined since the mid 1980s following the introduction of lead free petrol. However, the release of some pollutants such as nitrogen oxides, carbon monoxide and volatile organic compounds have remained relatively stable during this period, although there may have been changes in their source. For example, releases of oxides of nitrogen from industrial sources have generally declined whilst emissions from road traffic have increased.

With the exception of ground level ozone, ambient levels of these pollutants are generally lower in the South West of England than in many other parts of England and Wales.

The Agency has published 'The Environment of England and Wales - A Snapshot' (Ref. 20) which describes the state of the environment, including air, in the UK.

National Air Quality Strategy

Under Part 4 of the Environment Act 1995 the Government is required to publish a national strategy for air quality including:

- a framework of standards and objectives for the pollutants of most concern;
- a timetable for achieving objectives;
- the steps the Government is taking and the measures it expects others to take to see that objectives are met.

The strategy has been published for consultation in August 1996. We will be working closely with local authorities to help achieve the objectives of the National Air Quality Strategy.

Catchment Status

Once the full implications of the National Strategy are known, North Devon District Council and West Somerset District Council will be conducting a review of air quality in their areas. They will then be required to produce Air Quality Management Plans in areas where air quality exceeds certain standards and guidelines.

Acid Rain

The term 'Acid Rain' is loosely used to describe wet or dry deposition of acidic compounds from the atmosphere. More precisely, it is used to mean rain, mist or snow which contains acid compounds predominantly of sulphur and nitrogen. The main sources of these acid gases are power stations and other large industrial combustion plant which burn fossil fuels (coal, oil and gas) and (particularly in the case of oxides of nitrogen) motor vehicles. Ammonia which arises from agriculture may under some soil conditions also lead to acidification. Natural sources of sulphur dioxide such as volcanoes and marine algae account for only a few per cent (less than 5%) of the acid deposition received in the UK.

Catchment Status

As mentioned in Section 3.5, this catchment lies within a critical load area. In parts of the UK, natural ecosystems have a significant capacity to neutralise acidity and acid deposition has little impact on them. However, in acid sensitive areas, such as this catchment, acid rain causes damage to plants and soils in which they grow. In these areas, substances, mainly metals, can be released from soils which runoff into water bodies and are toxic to water life. Acid deposition can also alter the acid balance in water bodies, affecting the life they support and corrode buildings. However, the causes of acidity in these watercourses are thought to be due to the natural geology and soil of the area, rather than inputs from acid rain.

Particular concerns have been raised in the catchment about the possible impact of air pollution on sensitive habitats and species, in particular those on Exmoor; see Section 4.5 for an overview of species and habitats found in

Issue 12: Need for a better understanding of air quality and its affect in the catchment.

the catchment. Many upland habitats, for example blanket bogs, have a very low nutrient status. Acid rain components which contain nitrogen have the effect of acting as a fertilizer and there is some concern nationally that the nutrient status of these habitats is increasing to a level that is damaging, thus changing the make up of communities of land and water plants, and animals that live off them. It is not known whether this is occurring in the catchment.

Lichens are particularly sensitive to air pollution and there is some evidence to suggest that pollution intolerant species have declined on Exmoor. The reason for this decline is unknown.

Ground Level Ozone

Ozone in the upper atmosphere shields the earth from harmful Ultra-Violet radiation. However, at ground level, ozone can be a harmful pollutant damaging crops and building materials and causing respiratory difficulties amongst sensitive people. Ground level ozone is formed by a chemical reaction between the mixed emissions of nitrogen oxides and hydrocarbons, derived mainly from vehicle exhausts, in the presence of sunlight. These chemical reactions do not take place instantaneously, but over several hours or even days, and once ozone is produced it may persist for several days. In consequence, ozone produced at one site may be carried for considerable distances in the air, and maximum concentrations usually occur away from the source of the primary pollutants. The highest concentrations of ozone generally occur during hot, sunny and relatively windless days in summer.

Catchment Status

In common with other parts of Southern England, ozone levels in the catchment are generally above those at which damage to vegetation may occur (Ref. 20).

4.4 Contaminated Land

The Environment Act (Ref. 25) contains new provisions for dealing with contaminated land. These will be enacted in 1997 and will define contaminated land as any land which appears to a local authority to be in such a condition - because of the substances it contains - that water pollution or significant harm is being, or is likely to be caused. This interpretation is subject to guidance issued by the Secretary of State. Local authorities will be required to carry out a survey to identify contaminated land in its area. When these surveys have been carried out we have a duty to prepare and publish a report on the state of contaminated land from time to time, or if specifically requested to do so by the Secretary of State. Some sites may be designated as 'special sites'; these will become our responsibility. Until these new powers come into force, contaminated sites will continue to be addressed through planning conditions and existing pollution legislation.

Catchment Status

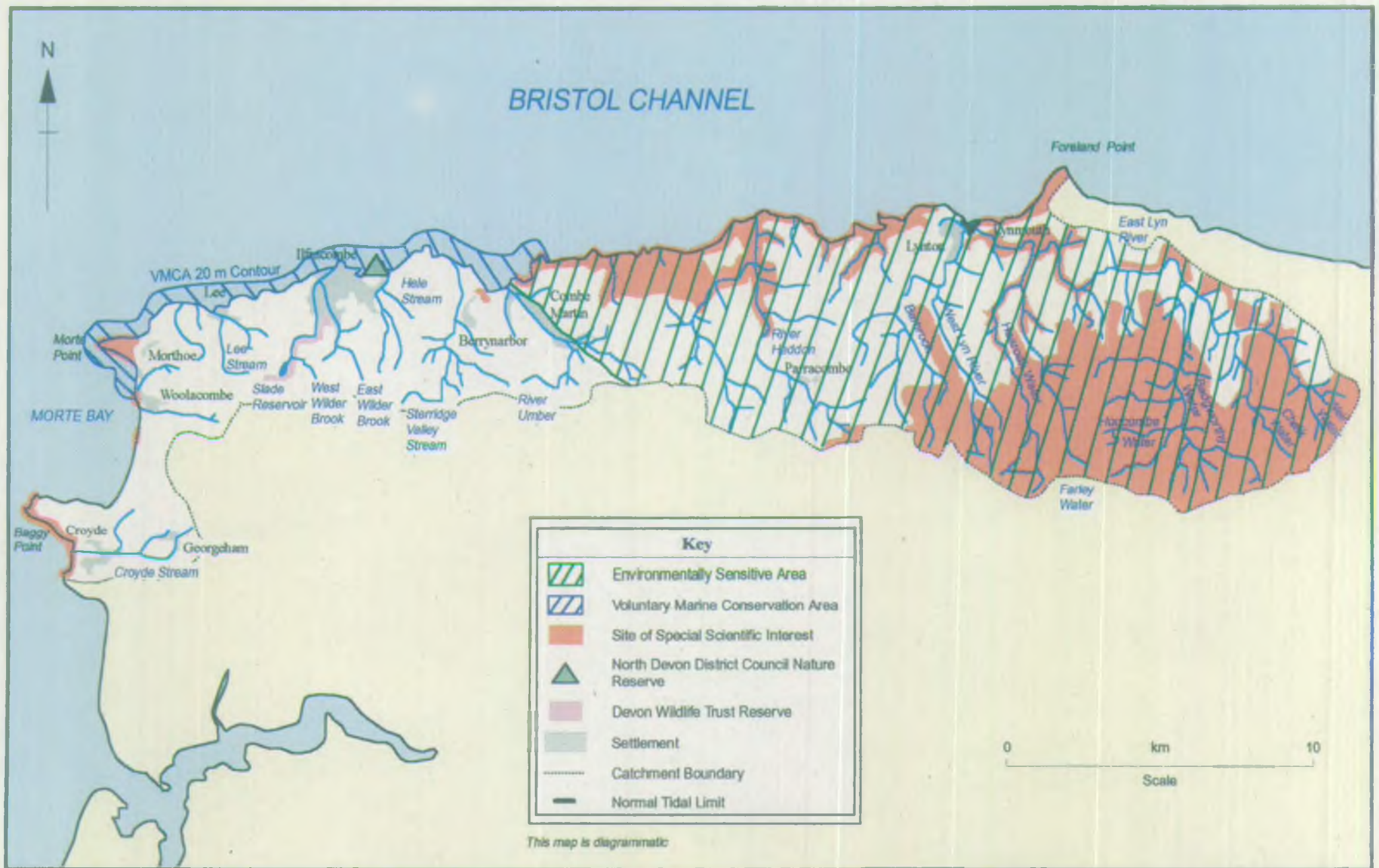
The precise nature and full extent of contaminated land within this catchment is not known, since the contamination of many sites is only realised when they are redeveloped or when pollution actually occurs.

All open and closed non-inert landfill sites are by definition contaminated sites, but other waste management activities may have the potential to cause contamination. Current landfill management is addressed in Section 3.3.

One former gas works site has been identified in the catchment at Ilfracombe (NGR SS 533 473). This site has been partially redeveloped since closure, however, the extent of clean up undertaken at the time of redevelopment is considered to be minimal. Gas works sites often contain toxic metals, ammoniacal liquors, coal tars, naphthalenes and phenols arising from the former production of town gas at the sites. These contaminants can move easily into rivers and groundwater, and may be present beneath the former gas works sites. There are no known water quality problems associated with this site.

The other main potential cause of contamination within the catchment is industry, which, due to the rural nature of much of the catchment, is largely concentrated in current and former industrial estates in Ilfracombe and Lynton. A large number of other activities also have the potential to cause contamination; for example agriculture, petrol filling stations or even domestic heating tanks.

Map 17 - Conservation



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4.5 Conservation of the Natural Environment

Nature Conservation Areas

There are eleven designated SSSIs in this catchment (see Map 17), however, no sites have as yet been designated under the EC Habitats Directive (Ref. 22). A full list of SSSI's and their major features of interest is contained in Appendix 7.

A large part of the catchment falls within Exmoor National Park; this area is also designated an Environmentally Sensitive Area (see Section 3.5). However, both in the National Park, ESA and elsewhere, changes in land use and new development have resulted in a steady loss of conservation value. Particular problems are the heavy grazing of grassland or moorland reducing attenuation of runoff, contributing to increased sedimentation, and the loss of unimproved grass and wetland to agricultural improvement. Uncontrolled burning on the wetter moorland heathland is also a concern, as it can cause a loss of bog species, especially *Sphagnum* (moss).

Issue 13: Loss of conservation value of wider catchment.

The shore and coastal waters along the north coast from Baggy Point to Hangman Point have been classified as the North Devon Sensitive Marine Area and the North Devon Voluntary Marine Conservation Area (VMCA). These are not statutory designations but they recognise the value of the marine wildlife in the area and seek to protect it from inappropriate development or exploitation. Further work to achieve continued protection is needed.

Issue 14: Need for protection of marine habitats.

Nature reserves, both statutory and non-statutory, are present; these can provide useful opportunities for people to enjoy and learn about wildlife, even in close proximity to towns. The same is true of the large areas of land under the control of the National Trust (see Map 10), which includes some of the River Lyn and Heddon valleys, large expanses of coastal heath on the Exmoor cliffs and maritime grassland between Ilfracombe and Croyde, the Woolacombe Dunes and the extensive oak woodland and cliffs of the West Exmoor coast and Watersmeet properties.

Both Devon and Somerset Wildlife Trusts have carried out surveys aimed at identifying sites which, although of conservation value, do not qualify for SSSI status. These County or Local Wildlife Sites are usually protected from development by policies in Local Plans. There

Issue 15: Need for current information on important wildlife and geological sites to inform Agency decisions and actions.

are many of these sites but most are in private ownership and difficult to locate accurately on maps of the scale contained in this document. A similar process to identify sites of earth science value is underway but not yet complete, or available to us; these 'Regionally Important Geological Sites' are also likely to receive some protection through planning policies. The information on both wildlife and geological sites is very helpful to us when commenting on actions, but is only of value if regularly updated.

Biodiversity Action Plans (BAPs)

Conservation of both habitats and species is co-ordinated through the production of Biodiversity Action Plans (BAPs). This concept, which arose from the Earth Summit at Rio in 1992, enables us, together with other bodies, to prioritise where to concentrate our efforts. We will be establishing clear targets and

actions to achieve our objectives. For Devon, many of these targets, actions and objectives will be contained in the BAP for Devon's Rivers and Wetlands, which has been developed by Devon Wildlife Trust with the collaboration of the Environment Agency, English Nature and others. We will include actions, for those species and habitats for which we have a strong involvement, in our Action Plans.

Habitats and Species

English Nature (EN) is the Government's adviser on nature conservation in England. They, in conjunction with the Countryside Commission, have divided up the whole of England into areas based on their natural character. All of the catchment falls within the Exmoor and Quantocks Natural Area, while the coastal waters are part of the Land's End to Minehead Maritime Natural Area. English Nature and Exmoor National Park are in the process of developing a profile for the Exmoor Natural Area.

Habitats of particular importance in these Areas are: the mosaic of moorland types from valley mires to blanket bog and heather moor; sea cliffs and coastal heaths; valley oak woods; dry and marshy grassland; geological exposures; and freshwater habitats. In the marine environment, rocky shores with overhangs, reefs and surge gullies are especially valued. The moorland of Exmoor supports several uncommon species, notably curlew, whinchat, stonechat, wheatear and ring ouzel, as well as remnant populations of red grouse and merlin. These key habitats and associated species are likely to be the focus of attention for BAPs.

Issue 16: Need for conservation of key habitats and associated species.

Exmoor also contains large numbers of red deer which use both open moorland and, more usually, the valley woodland. The area around the Valley of Rocks near Lymouth supports a feral goat population.

Otters are known to use many of the rivers and streams, although they are not as common in this catchment as on some of Devon's rivers. They also use the coast to some extent, although this use is not well understood. Populations are still recovering from the severe decline caused by pesticides. The species is fully protected under the Wildlife and Countryside Act 1981 (Ref. 23), but despite this protection numbers still give cause for concern.

Issue 17: Patchy recovery of otter population.

Mink are also found in this catchment; their presence may be partly responsible for the absence of water voles. However, steep, fast-flowing streams, such as those in this catchment, are not the preferred habitat for water voles, which have suffered a major decline nationally in the last twenty years. Some disturbance to otters may take place as a result of mink hunting.

Issue 18: Control of mink.

Seven species of bat have been recorded in the catchment; all species are fully protected, but of particular note are both greater and lesser horseshoe bat. The former species has suffered a major decline and is now largely restricted to the South West. It appears to use sea caves in this catchment.

Grey seals are present along the coast. Various species of small whales, dolphins and porpoises have also been recorded, although less frequently than further west. There are concerns about disturbance of these animals by recreational boat activity. The area within the North Devon VMCA is also particularly rich in both fauna

Issue 19: Need for conservation of marine mammals.

and flora, including uncommon anemones and sponges.

The steep, rocky cliffs of the coast provide good breeding habitat for a variety of birds; fulmars and gulls, auks, raven and peregrines can all be seen here; oystercatchers breed at or close to the foot of the cliffs where there is little or no disturbance.

Issue 20: Need for conservation of cliff nesting birds.

Oak woodlands are used by redstarts and pied flycatchers, while the streams and rivers have grey wagtails and dippers breeding in good numbers. The catchment does not, however, contain suitable habitat to encourage some of the other species usually associated with the water environment. Waterfowl are not common, and there are no significant estuaries to attract large numbers of waders. Neither kingfishers nor sand martins appear to breed widely, although they may be present locally.

Some 15 species of dragonflies and damselflies (*Odonata*) have been recorded, although the only Devon key species present in the catchment is the keeled skimmer. No key sites have been recognised, but it is acknowledged that areas of North Devon are under-recorded. About 35 species of butterflies have also been observed; these include several species of conservation importance, notably marsh, pearl bordered, high brown and heath fritillaries. These species are all protected by the Wildlife and Conservation Act 1981 (Ref. 23) and other legislation and have had action plans prepared for their conservation.

Issue 21: Need for better understanding of status of *Odonata* in North Devon.

The River Lyn supports an important salmon population (see also Section 4.6). This species is listed in Annex II of the EC Habitats Directive (Ref. 22), as are bullheads and lampreys. We have found bullheads in some of the streams in this catchment during fisheries surveys, but none of the three species of lamprey has been recorded (see Section 4.6). Routine biological sampling shows the rivers and streams in the catchment to have a range of invertebrate species typical of steep, fast-flowing waters.

Devon's rivers are not generally rich in aquatic plants; the North Devon Streams are even less diverse than most, with very few areas supporting more than a few species. In contrast, lower plants such as mosses and liverworts are abundant and important. Wetland plants are also well represented, particularly on Exmoor. Valley woodlands and old deer parks are important for lichens and lower plants. In places, sycamore, beech or rhododendron are invading the typical oak woodland, reducing its wildlife value. This may involve, however, loss of bankside trees of value both for wildlife and for stabilising banks. Towards the end of 1995, sycamore trees above Long Pool, the main salmon holding pool on the East Lyn upstream of Watersmeet (see Map 17), were felled by The National Trust. This resulted in a loss of cover for resting salmon returning to spawn in the river's upper reaches. An agreement has now been reached that the National Trust will not undertake further tree felling without prior consultation with us.

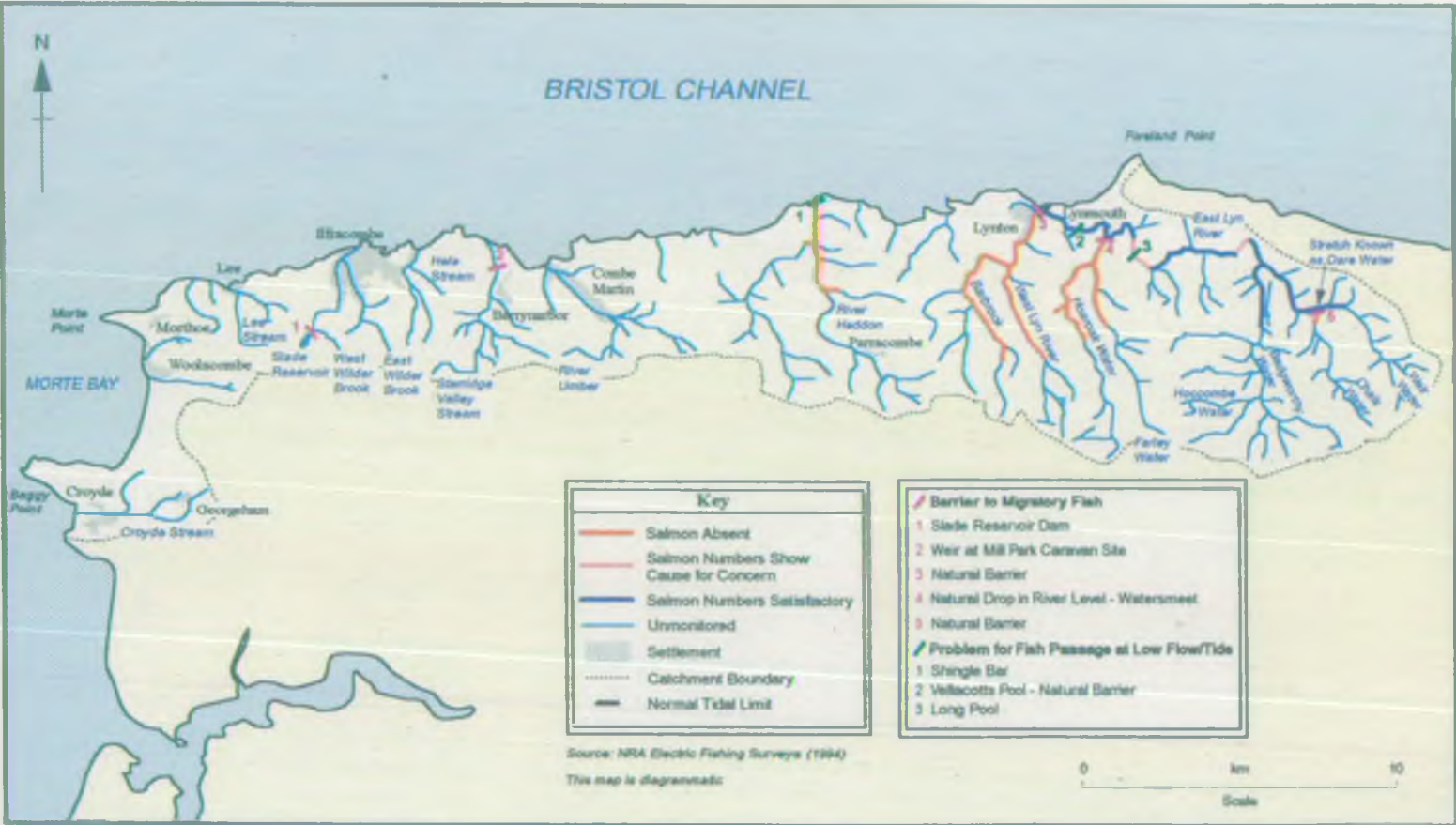
Issue 22: Loss of bankside cover due to removal of sycamore from semi-natural woodlands.

Three non-native invasive bankside plants are found in the catchment; Himalayan balsam, Japanese knotweed and giant hogweed. Himalayan balsam is widely distributed, while Japanese knotweed has become the dominant vegetation in some places, notably the lower reaches of the River Lyn, at the expense of other, native plants. Combe Martin supports giant hogweed in several locations, including a stream side meadow.

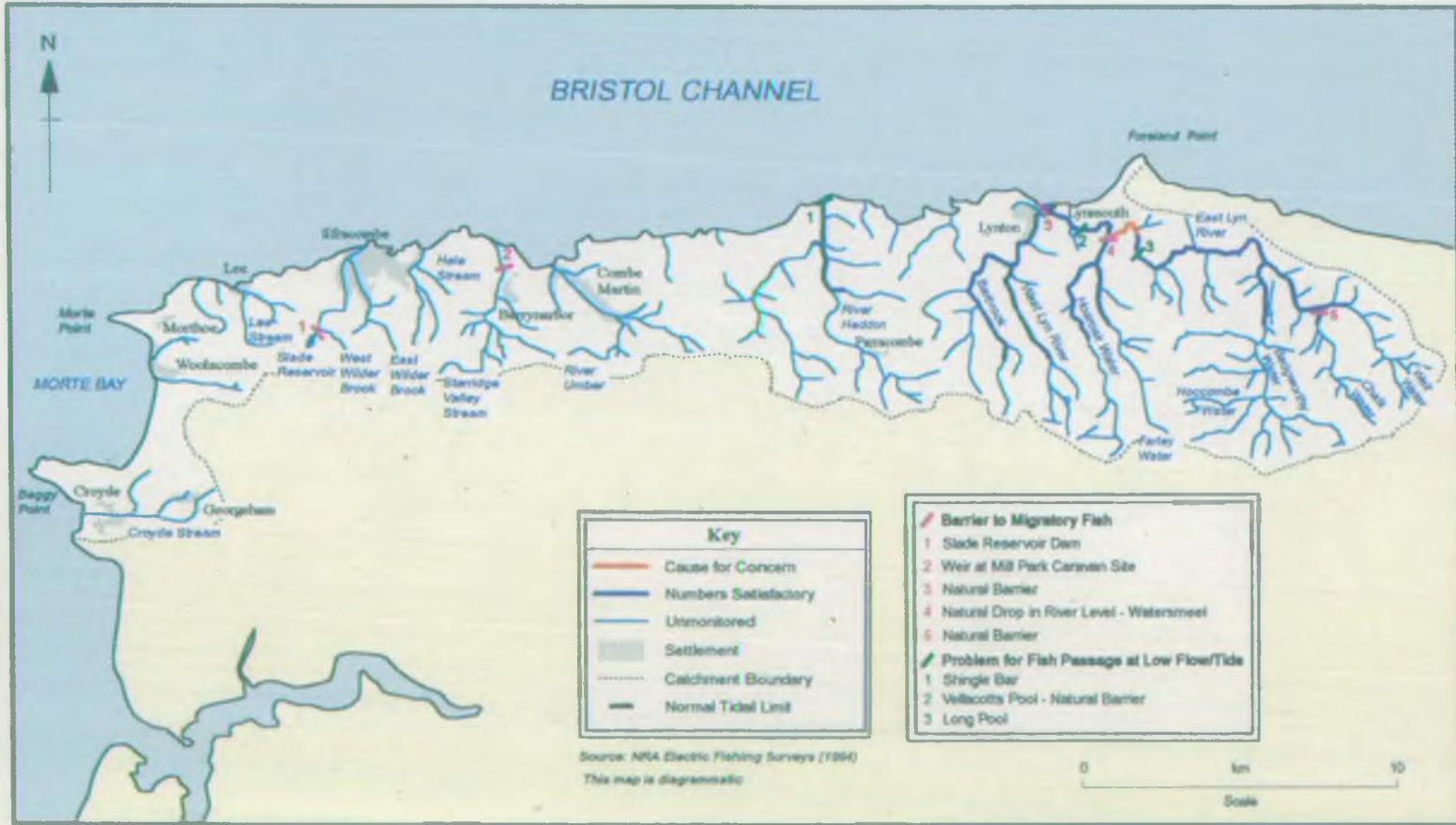
Issue 23: Spread of invasive bankside plants.

Three non-native invasive bankside plants are found in the catchment; Himalayan balsam, Japanese knotweed and giant hogweed. Himalayan balsam is widely distributed, while Japanese knotweed has become the dominant vegetation in some places, notably the lower reaches of the River Lyn, at the expense of other, native plants. Combe Martin supports giant hogweed in several locations, including a stream side meadow.

Map 18 - Juvenile Salmon Fisheries Status



Map 19 - Brown Trout Fisheries Status



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4.6 Fisheries

Salmonid Fisheries

The River Lyn Subcatchment

The River Lyn and its tributaries presently supports a population of predominantly salmonid species which are found in the main river and its tributaries. Brown trout proliferate throughout the subcatchment, and salmon and sea trout found where access permits. Maps 18 and 19 show the fisheries status and distribution of salmon and brown trout in the monitored stretches of the catchment. Fluctuations in the numbers of salmon and sea trout caught in the river and variations in the densities of juvenile fish recorded here reflect the short, steep, flashy characteristics of the subcatchment.

There is an active rod fishery for all salmonid species throughout this subcatchment much of which is managed by us; we lease fishing rights from riparian owners and the National Trust. A licensed fixed engine, in the form of a tidal trap, operates at the mouth of the river on a seasonal basis taking salmon, sea trout, and occasionally, sea fish. The trap which has been in operation for many years is valued by the local community as part of the town's history.

The quality of the fishery is limited to a certain extent by the amount of suitable spawning habitat available. The substrate of much of the river bed is bedrock, and in many areas, spawning gravels are sparsely distributed. Some of the best spawning habitat is found at locations that migratory fish are unable to reach because of natural obstructions in the river (see Map 20).

Production of salmon and sea trout is limited by the amount of spawning gravels available in the system. Given that it is not feasible in most cases to improve conditions for migration to those areas where quality gravels are to be found, productivity can only be increased by either improving existing spawning areas or through the creation of new areas. Gravel rehabilitation work to improve the suitability of the available gravel for spawning was carried out on the River Lyn at two locations in 1995. These gravels were widely used by spawning fish.

Issue 24: Limited potential for migratory fish production in the catchment.

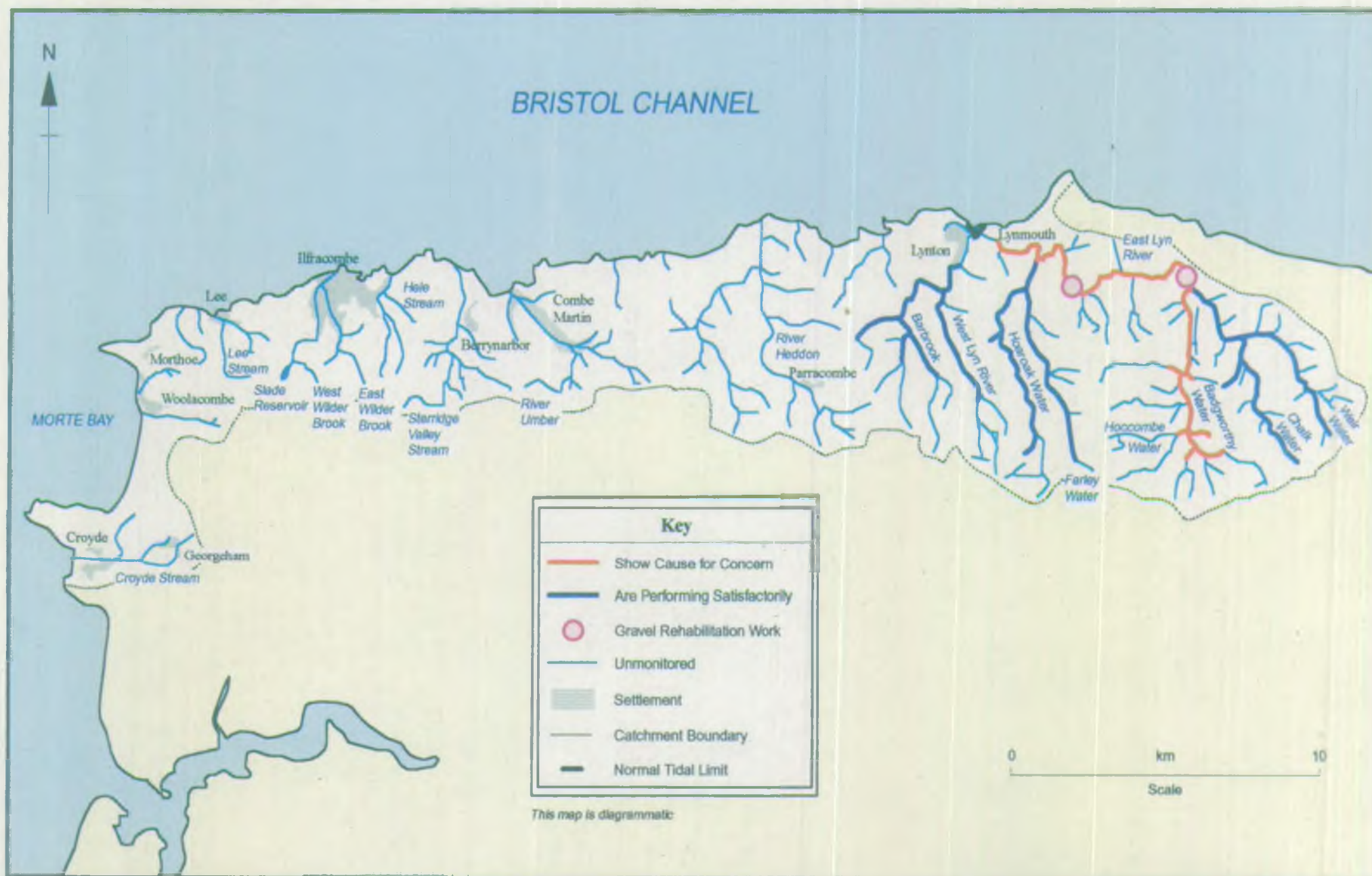
Other North Devon Streams

These streams all support stocks of brown trout which are fished mainly by local anglers. We have limited information relating to these watercourses as they are not included in the routine fisheries survey programme. It is thought that migratory fish are able to gain access to some of these watercourses under certain conditions, in particular, the Rivers Heddon and Umber. The limited survey data we have shows no evidence that salmon or sea trout are found in any numbers in any of these watercourses. Rod returns, collated by the Devon River Authority for the period 1953-72, however, were expressed as a combined figure for the Rivers Lyn and Heddon. This implies that during this period, migratory fish were exploited on the Heddon, albeit to a limited extent. It should be noted that the National Trust has not allowed fishing on the River Heddon where it is the riparian owner for 23 years.

It is apparent that some of these fisheries may be quite significant. To facilitate their future development and management it would be beneficial to improve our knowledge of the fisheries.

Issue 25: Lack of fisheries data for parts of the catchment.

Map 20 - Spawning Gravels



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Barriers

Maps 18 and 19 both depict barriers to migratory fish and problems for fish passage.

Issue 26: Barriers to fish movement in the catchment.

The River Lyn Subcatchment

On the West Lyn River, access for migratory fish is limited to the 100 metres of river below the Glen Rock Hotel. At this location, there is a natural rock formation which denies fish further access at all times. Upstream of this barrier, the river rises steeply and would present extreme difficulty to ascending fish, even under the most favourable flows. There are suitable spawning gravels in the upper reaches of the West Lyn River.

On the East Lyn River, the first barrier to fish movement is at Vellacotts Pool where fish are held up during low flows. Further upstream, Stag Pool presents a slight obstacle in low flows. The most significant barrier is at the upstream end of Long Pool where a natural rock formation creates an obstacle passable only in a very limited range of flows. As many as fifty fish have accumulated in Long Pool waiting for the right conditions to permit further passage. When fish are waiting in the pool they are vulnerable to poaching and a high level of enforcement is necessary to protect them.

The Badgworthy Water contains limited spawning gravels but is frequented by migratory fish because there are no significant obstructions. However, during the summer months, tourists on Exmoor construct dams in the river which create temporary obstructions which increases the depth of water thus making it unsuitable for spawning.

The Oare Water and Weir Water are also subject to these temporary barriers which have to be removed on a regular basis. Natural obstructions deny migratory fish access to the Chalk Water.

Some of the best spawning areas in the system are to be found in the Hoar Oak Water and the Farley Water. Both are totally inaccessible to ascending fish due to natural rock obstructions and steep gradients. A small waterfall is located on the Hoar Oak Water close to the confluence with the East Lyn River at Watersmeet. Improving conditions for migration at this site would be unrealistic.

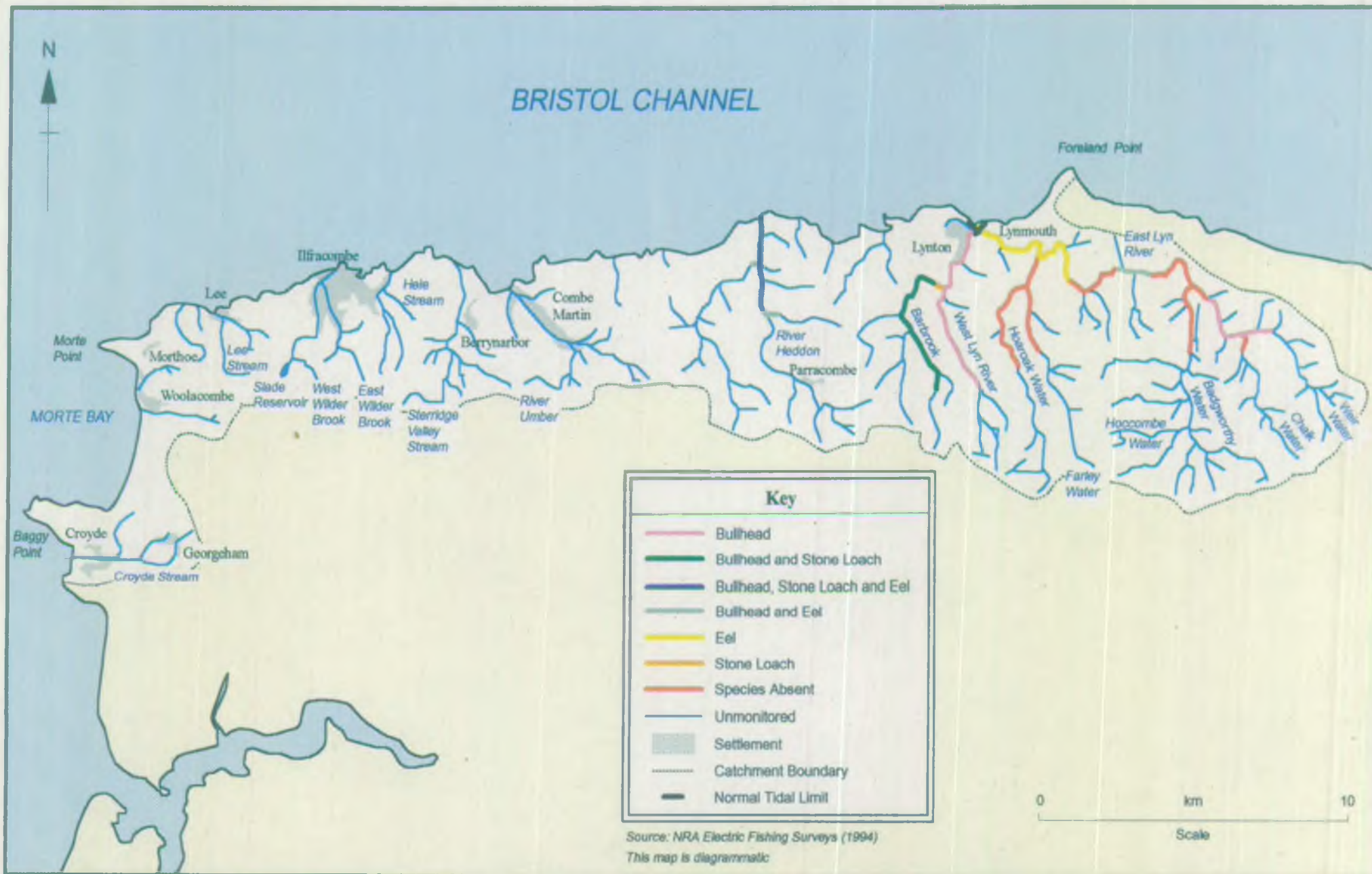
Other North Devon Streams

The River Heddon and most of the other streams to the west have restricted access to the sea, and would normally be passable only when high spring tides coincided with spate conditions.

Sea Trout have been known to run the bottom half mile of the Sterridge Valley Stream, but a weir at Mill Park caravan site creates a complete barrier to fish migration.

We do not intend to improve fish passage at natural barriers which totally exclude migratory fish from parts of the catchment. Such inaccessible sections of watercourses are likely to contain genetically isolated populations of indigenous brown trout. We consider it important that small stocks are maintained in a pristine condition wherever possible.

Map 21 - Coarse Fish and Eel Distribution



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Salmon Action Plans

In February 1996, the former NRA launched its Strategy for the Management of Salmon (Ref. 27), this has now been taken on by the Agency.

Over the next five years, Salmon Action Plans for all salmon rivers in England and Wales with

the following aims; safeguarding salmon stocks, maximising economic/social benefits, and ensuring sustainable long term improvements. Each Plan will describe the fishery and how it is performing, identify the key issues in each river system, set fishery targets and fishing effort controls and outline a programme of improvement. We intend to develop a Salmon Action Plan for the River Lyn in the financial year 1999/2000.

Issue 27: Need for a comprehensive plan for salmon management in the catchment.

Coarse and Eel Fisheries

Natural coarse fish stocks in the catchment are extremely limited as the conditions are generally not well suited to their production. With the exception of minor species, namely bullheads, stone loach and minnows, it is unlikely that any other coarse species occur naturally although some may have been stocked in freshwater stretches through urban areas.

Eels are found throughout the catchment but generally in low numbers. There is no fishery for this species.

See Map 21 for coarse fish and eel distribution.

Fisheries Regulation

We lease much of the fishing in the East Lyn River from the riparian owners; principally The National Trust. Although we are not a profit making organisation, we must seek to recover costs and have some recreation responsibilities to ensure that assets in its ownership such as

this fishery are used to their full potential. We must seek to manage the fishery in a way which meets these requirements without detriment to the river on the whole, taking into account the impact on the overall ecology of the river, including plants and animals other than fish.

Issue 28: Need to ensure appropriate management of Environment Agency fishery during the period of the lease.

It has been felt by some fisheries interests in the River Lyn subcatchment that the number of returning salmon, and more particularly sea trout, has declined in recent years. There is no direct evidence from rod and net returns nor

from juvenile surveys to demonstrate this trend. Unlike many of the other rivers in the South West, the River Lyn has not suffered a marked decline in the run of spring salmon, and although recent returns of sea trout have been poor, they appear to be consistent with past variations. The fish trap has been suggested as a cause of the perceived decline, and we have, in the past, discussed the possibility of buying out the rights to the trap.

Issue 29: Perceived decline in runs of salmon and sea trout.

4.7 The Adequacy of Water Resources

Our target is to ensure that there is enough water available for public and private water supply now and in the foreseeable future.

As discussed in Section 3.8 the North Devon Streams Catchment falls within SWWSL's Roadford Supply Zone. Therefore, demand forecasts are only available at a strategic zone level and do not directly relate to the individual catchment. In the following sections future public and private water supply demands within the strategic supply zone are discussed, together with any potential implications.

Public Water Supply

Demand in the Roadford Supply Zone is expected to increase from 246 MI/d to 347 MI/d by 2021 assuming a 'high' growth rate in domestic, industrial and commercial consumption and using 1992 levels of demand management. However, with a 'lower' growth rate for domestic, industrial and commercial consumption as well as a greater water company reduction in leakage, demand may only increase to 291 MI/d over the same period.

Comparing these forecasts to the current reliable yield of 326 MI/d indicates that in 2021 under the 'high' growth rate scenario there will be a deficit of 21 MI/d but under the 'low' growth rate scenario there will be a surplus of 35 MI/d. By encouraging demand management and leakage control (the 'low' growth rate scenario) there will be no need for any major new strategic sources in the Roadford Supply Zone until after 2021.

The significant dependence on imports of water to the North Devon coastal towns from sources within the River Taw Catchment means that it is important to secure reliable supplies from within this catchment. It is therefore important for us to agree a strategy with SWWSL which will ensure demands can continue to be met whilst causing the minimal impact to the environment and other water users. This will be achieved by implementing the policies described in our Regional Water Resources Strategy. Any changes to the operation of sources within the supply zone will be addressed through the existing abstraction licensing procedure.

Private Water Supply

In Section 3.8 it was indicated that the most significant type of abstraction in the catchment is for non-consumptive surface water use.

We must have regard to the reasonable future need for water for private abstractors. Growth rates for future private abstraction demand are outlined in 'Tomorrow's Water' (Ref. 14). Using the rates specified the current net commitment to private licensed abstractions in the North Devon Streams Catchment would only rise from 0.14 MI/d to 0.16 MI/d by 2021.

5. SUMMARY OF ISSUES AND ACTIONS

Issue	Options/Actions	Action By Lead Other
1. Pollution potential of disused landfill sites at: Killacleave, Lyn Down and Leigh Quarry.	<ul style="list-style-type: none"> ● Negotiate with the licence holder (Waste Disposal Authority - WDA) to establish responsibility for monitoring of the site and to ensure remedial measures continue to be effective. ● Consider implications of the new contaminated land regulations when they come into force. ● Review current data and monitoring programme. 	Agency, WDA Agency Agency
2. Fly tipping.	<ul style="list-style-type: none"> ● Increase effort by Agency Waste Inspectors to locate fly tipping sites and to catch offenders. Particularly following the introduction of the landfill tax on 1 October 1996. ● Improve waste management facilities in the area. ● Publicise the problem to discourage illegal tipping and to encourage the public to report illegal waste tipping. 	Agency WDA <i>NDDC, Agency</i> Agency
3. Risk of pollution and damage to land of conservation value associated with increasing use of land spreading as a waste disposal option.	<ul style="list-style-type: none"> ● Ensure that land spreaders follow guidance available so that pollution risks are minimised. ● Monitor land spreading activities to ensure that fields are not overloaded with waste or spread on during inappropriate weather conditions or in locations where there would be a risk of polluting water or damaging land of conservation value. ● Improve efficiency of consultation between Agency departments to enable prenotifications received at short notice to be dealt with effectively. 	Agency Agency Agency
4. Risk of pollution from farm waste and dead livestock in moorland watercourses.	<ul style="list-style-type: none"> ● Raise awareness of the problem amongst the farming community. ● Continue to remove carcasses causing pollution, where the owner cannot be traced and other agencies have failed to do so. 	Agency <i>NT, ENP, farmers</i> Agency
5. Need to review arrangements for canoeing on the River Lyn.	<ul style="list-style-type: none"> ● Encourage discussions between interested parties to investigate access and control agreements. ● Review success of existing telephone or E-mail information lines. 	Agency, BCU <i>NT, ENP</i> Agency, BCU

Issue	Options/Actions	Action By Lead Other
6. We need to identify flood risk for planning authorities, taking account of the timetable for preparing district wide Local Plans.	<ul style="list-style-type: none"> Specify details of any pilot work, if applicable, otherwise the programme is due for completion by 1999, subject to national approval. 	Agency
7. Flood problems have been identified at Ilfracombe and Combe Martin.	<ul style="list-style-type: none"> Review flood problems at Ilfracombe and Combe Martin. 	Agency
8. We need to improve the efficiency and effectiveness of our flood defence work.	Implement the flood defence management system by: <ul style="list-style-type: none"> Carrying out asset survey. Comparing actual against target Standards of Service and address the differences. 	Agency
9. We need to understand how the coastline is changing.	<ul style="list-style-type: none"> Undertake shoreline management plans. 	SDC, Agency, Maritime and other LAs <i>Other landowners /consultees</i>
10. Need for improvement of water quality in Croyde Stream and Woolacombe Stream.	<ul style="list-style-type: none"> Undertake specific water quality investigations and task force inspections to identify sources of poor water quality. 	Agency <i>Farmers, SWWSL, private dischargers</i>
11. Bathing water non-compliance.	<ul style="list-style-type: none"> Undertake specific water quality investigations to identify sources of poor water quality leading to bathing beach failures at Ilfracombe, Combe Martin. Carry out improvement scheme to STW at Lynmouth. 	Agency <i>Farmers, SWWSL, private dischargers</i> SWWSL Agency
12. Need for a better understanding of air quality and its affect in the catchment.	<ul style="list-style-type: none"> Review air quality in the area. Monitor sensitive communities and share data. 	NDDC EN, DWT <i>NDDC, Agency, Exeter University, NT</i>
13. Loss of conservation value of wider catchment.	<ul style="list-style-type: none"> Promote ESA/Countryside Stewardship/other schemes to encourage less intensive land use. Encourage the restoration of natural vegetation especially heathland on some improved slopes, to improve the attenuation of runoff. 	MAFF/ADAS, EN, CoCo <i>NFU, farmers, NDHCS</i> NT, ENP
14. Need for protection of marine habitats.	<ul style="list-style-type: none"> Continue to support activities of North Devon Heritage Coast Service (NDHCS) relating to the Voluntary Marine Conservation Area (VMCA). 	Agency <i>NDHCS</i>

Issue	Options/Actions	Action By Lead Other
15. Need for current information on important wildlife and geological sites to inform Agency decisions and actions.	<ul style="list-style-type: none"> Support updating and maintenance of databases. Encourage identification of RIGS. 	Agency <i>RIGS, DWT, EN, DBWPSoc, DCC, NDDC, WERG, NT</i> Agency <i>RIGS, LAs, EN</i>
16. Need for conservation of key habitats and moorland species.	<ul style="list-style-type: none"> Develop agreed biodiversity targets and actions. 	Agency, DWT, RSPB, EN, ENP, DCC, NT
17. Patchy recovery of otter population.	<ul style="list-style-type: none"> Refer to Rivers and Wetlands Biodiversity Action Plan for targets and actions (to be developed further for Action Plan). 	DWT, Agency, EN, ENP, NDHCS, DCC, NT
18. Control of mink.	<ul style="list-style-type: none"> Investigate the extent of the population of mink in the catchment. Consider disturbance to other wildlife as a result of mink hunting. 	Agency Agency, DWT, EN
19. Need for conservation of marine mammals.	<ul style="list-style-type: none"> Develop targets and actions for conservation of harbour porpoise in association with other bodies. 	DWT Agency, EN, VMCA, other interested bodies
20. Need for conservation of cliff nesting birds.	<ul style="list-style-type: none"> Develop targets and actions. 	DWT Agency, EN, NT, DBWPSoc, DCC, RSPB.
21. Need for better understanding of status of <i>Odonata</i> in North Devon.	<ul style="list-style-type: none"> Raise awareness among field staff and encourage recording in course of other duties. 	Agency
22. Loss of bankside cover due to removal of sycamore from semi-natural woodlands.	<ul style="list-style-type: none"> Ensure no excessive loss of bankside trees and habitats (e.g. otter) and fish habitat. Encourage removal of sycamore at appropriate locations. Encourage regeneration, or planting, of native species. 	NT Agency, EN NT Agency, EN NT Agency, EN
23. Spread of invasive bankside plants.	<ul style="list-style-type: none"> Identify areas owned or managed by the Agency with invasive species present. Treat worst affected area to prevent further spread, ensuring non-target species are protected. Develop strategy for other areas; work with others to achieve control. 	Agency Riparian owners, NT Agency Riparian owners, NT Agency Riparian owners, NT

Issue	Options/Actions	Action By Lead Other
24. Limited potential for migratory fish production in the catchment.	<ul style="list-style-type: none"> ● Carry out gravel rehabilitation where appropriate, taking into account the river ecology. ● Consider the installation of artificial spawning beds or bed check weirs. 	<i>Agency Riparian owners</i> <i>Agency Riparian owners</i>
25. Lack of fisheries data for parts of the catchment.	<ul style="list-style-type: none"> ● Conduct surveys of the most significant watercourses to determine the extent and nature of their fisheries. 	<i>Agency</i>
26. Barriers to fish movement in the catchment.	<ul style="list-style-type: none"> ● Continue to remove temporary obstructions on moorland streams. Encourage Exmoor National Park to assist and prevent construction. ● Consider means of improving conditions for fish migration at Long Pool on the East Lyn. 	<i>Agency ENP, riparian owners, anglers</i> <i>Agency ENP, riparian owners, anglers</i>
27. Need for a comprehensive plan for salmon management in the catchment.	<ul style="list-style-type: none"> ● Develop Salmon Action Plan. 	<i>Agency</i>
28. Need to ensure appropriate management of Environment Agency fishery during the period of the lease.	<ul style="list-style-type: none"> ● Manage fishery to recover costs with due consideration to the wider impact of angling on the river. 	<i>Agency Anglers.</i>
29. Perceived decline in runs of salmon and sea trout.	<ul style="list-style-type: none"> ● Consider partial buy back of fixed engine licence if stocks appear threatened. 	<i>Agency Licence owner</i>

GLOSSARY

ABSTRACTION

Removal of water from surface or groundwater.

AQUIFER

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

BENTHIC

Bottom dwelling.

BIOACCUMULATE

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

BIOCHEMICAL OXYGEN DEMAND (BOD)

A measure of the amount of dissolved oxygen consumed in water, usually as a result of organic pollution.

BIODIVERSITY

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

BLANKET BOG

Sphagnum (moss) rich vegetation which occurs on thick layers of peat (>0.5 m), where the water table is at or just below the surface and fed by direct precipitation.

BURGAGE

Tenure of land in a town on a yearly rent.

CATCHMENT

The total area from which a single river collects surface runoff.

COLIFORMS

A group of bacteria distinguished by their ability to degrade lactose to produce acid and gas. They are used as indicators of possible contamination of water by sewage. The faecal coliforms, a subgroup of the coliforms, are normally found only in faeces and are therefore a more reliable indicator of contamination by sewage.

CONSENT

A legal document raised by the Environment Agency which specifies the conditions under which a discharge may be made.

CONTROLLED WASTE

Defined by the UK EPA 1990 Section 75 as household, industrial and commercial waste.

COUNTRYSIDE STEWARDSHIP

An initiative of the Countryside Commission in collaboration with English Nature, English Heritage and MAFF to enhance and conserve important English landscapes, wildlife habitats and history.

CYPRINID

Fish like or akin to carp i.e. coarse fish.

DEVONIAN PERIOD

The fourth of the six periods of the Palaeozoic Era. Extending from 395 to 345 million years ago.

ECOSYSTEM

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

FISSURE

An opening, usually long and narrow, made especially by cracking, splitting or separation of parts.

FIXED ENGINE

A general expression indicating a method of trapping fish by means of an immovable structure of some kind.

FLASHY

Watercourse which has a rapid response to rainfall. Typically has long periods of low flows and high flows may be several times the low flow.

GROUNDWATER

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

INCISE

Make a cut into.

LANDFILL

A process whereby areas such as disused quarries are used to dispose of solid wastes in a controlled manner prior to being capped and revegetated.

LODE

Mineral vein or system of veins.

MACROINVERTEBRATE

A large invertebrate, e.g. jellyfish, snail, fly.

MAIN RIVER

Rivers designated as 'Main' on a map held by MAFF; generally defined as a watercourse of strategic nature, carrying flows from an upland catchment of significant size to the sea.

NAPHTHALENE

A byproduct of coal tar manufacture, toxic by inhalation. A polyaromatic hydrocarbon (see below).

pH

A measure of the concentration of hydrogen ions which cause acidity. Acid solutions have a pH of less than 7, alkalis of more than 7 and neutral solutions a pH of 7 (e.g. pure water).

PHENOLS

A class of aromatic organic compounds derived from a benzene ring structure. Toxic by inhalation and skin absorption.

POLYAROMATIC HYDROCARBON (PAH)

Naturally occurring in many products but also arising in the combustion residues of petroleum products. Some PAHs are known to be potent human carcinogens.

POPULATION EQUIVALENT (pe)

The volume and strength of an industrial waste water expressed in terms of an equivalent population.

PUT AND TAKE FISHERY

A fishery which is stocked, often with brown trout, and then fished by the general public and the yield taken home.

Q95

The flow that on average is equalled or exceeded for 95% of the time.

RIPARIAN OWNER

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

RUNOFF

Rainwater which does not soak into the ground but which runs over the surface in a downhill direction.

SALMONID

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

SECTION 105 SURVEYS

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

SEPTIC TANK

A small tank receiving and treating sewage by bacteria where effluent overflows

SET-ASIDE

The EC set-aside scheme was first introduced for the crop year 1991/92 as part of the reform to allow farmers to remove land from production by receiving compensation. Eligible crops are a wide range of arable crops, principally cereals.

SHALE

Fine-grained, sedimentary rock of unspecified mineral composition, with a tendency to split.

SIDERITE

A low grade, iron ore mineral.

SOAKAWAY

An arrangement for disposing of waste water by letting it percolate through the soil.

TRIBUTARY

A stream or river which feeds into a larger one.

VALLEY MIRE

Habitat which occurs along the lower slopes and floors of small valleys, usually around a central watercourse which is fed from springs and seepages on the valley sides. Valley mire is typically dominated by wetland plants, often moss-rich and usually occurs over a thick layer of peat (>0.5 m).

ABBREVIATIONS AND UNITS

ABBREVIATIONS

AMP	Asset Management Plan
AONB	Area of Outstanding Natural Beauty
BAP	Biodiversity Action Plan
BATNEEC	Best Available Technique Not Entailing Excessive Cost
BCU	British Canoe Union
BMWP	Biological Monitoring Working Party
BOD	Biochemical Oxygen Demand
CAP	Common Agricultural Policy
CoCo	Countryside Commission
CS	Countryside Stewardship
DBWPSoc	Devon Bird Watching and Preservation Society
DCC	Devon County Council
DoE	Department of the Environment
DoH	Department of Health
DWT	Devon Wildlife Trust
EC	European Council
EN	English Nature
ENP	Exmoor National Park
EQS	Environmental Quality Standards
ESA	Environmentally Sensitive Area
GATT	General Agreement on Trade and Tariffs
HCH	Hexachlorocyclohexane
HMIP	Her Majesty's Inspectorate of Pollution
IPC	Integrated Pollution Control
LAS	Local Authorities
LEAP	Local Environment Agency Plan
MAFF	Ministry of Agriculture, Fisheries and Food
NDDC	North Devon District Council
NDHCS	North Devon Heritage Coast Service
NFU	National Farmers Union
NGR	National Grid Reference
NII	Nuclear Installations Inspectorate
NRA	National Rivers Authority
NT	National Trust
NTL	Normal Tidal Limit
NWC	National Water Council
OFWAT	Office of Water Services
OS	Ordnance Survey
RE	River Ecosystem
RIGS	Regionally Important Geological Site
RIVPACS	River Invertebrate Prediction and Classification System
RQOs	River Quality Objectives
RSPB	Royal Society for the Protection of Birds
SAM	Scheduled Ancient Monument
SDC	Sedgemoor District Council
SMP	Shoreline Management Plan
SoS	Standards of Service
SSSI	Site of Special Scientific Interest
STW	Sewage Treatment Works
SWWSL	South West Water Services Ltd
VMCA	Voluntary Marine Conservation Area
WDA	Waste Disposal Authority
WRA	Waste Regulation Authority

UNITS

DO%	Dissolved oxygen percentage
km	Kilometres
km ²	Kilometres squared
%	Percentage
mm	Millimetres
m ³ /s	Cumecs; cubic metres per second
m ³ /d	Cubic metres per day
ML/day	Megalitres per day
ML/year	Megalitres per year
mg/l	Milligrams per litre
ug/l	Micrograms per litre
kg	Kilograms
kg/day	Kilograms per day
ha	Hectare
<	Less than
>	Greater than
≤	Less than or equal to

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APPENDIX 1: The Role of the Environment Agency

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

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

The **Pollution Control** function includes :

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

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

The **Navigation** function is responsible for managing and improving over 800 km of inland waterways, the Harbour of Rye and Dee Estuary. Its aim is to make these resources widely available to the public for water or land based recreational use.

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

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

What we do not do

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

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

Environmental Health issues should also be directed to your Local Authority.

APPENDIX 2: Standards for the Five River Ecosystem Use Classes

Use Class	DO % sat 10%ile	BOD (ATU) mg/l 90%ile	Total Ammonia mg N/l 90%ile	Un-ionised Ammonia mg N/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 1000 2000	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 1000 2000	Water of fair quality suitable for coarse fish populations
5	20	15.0	9.0	-	-	-	-	-	Water of poor quality which is likely to limit coarse fish populations

APPENDIX 3: EC Directive Standards Concerning the Quality of Bathing Waters

Microbiological Standards

Parameter	Units	Value (1)		Status	
		I	G	I	G
Total coliforms	no/100ml	10,000	500	95% of samples	80% of samples
Faecal coliforms	no/100ml	2,000	100	95% of samples	80% of samples
Faecal streptococci	no/100ml	-	100	-	80% of samples
Salmonella	no/l	0	-	95% of samples	-
Enterovirus	PFU/10l	0	-	95% of samples	-

PFU = Plaque Forming Units

Notes : 1. I = Imperative or Mandatory standard.
G = Guideline standard.

2. There is currently no imperative standard for faecal streptococci, however, it has been proposed that the Directive should be revised and should include an imperative standard for faecal streptococci of 400/100ml.

Aesthetic Criteria

Parameter	Analysis Method	Description/Standard
Colour	Visual inspection	No abnormal change
Mineral oils	Visual inspection	No visible surface film
	Olfactory inspection	No odour
	mg/l after extraction and weighing dried residue	≤0.3
Surface-active substances (methylene-blue active)	Visual inspection	No lasting foam
	mg/l as lauryl sulphate	≤0.3
Phenols	Olfactory inspection	No specific odour
	mg/l	≤0.05
Transparency	m	1
Tarry residues, solid floating material, effluent sticks	Visual inspection	Absent

APPENDIX 4: EC Dangerous Substances Directive

- EQSs for List I Substances (Inland Waters)

Parameter	Units	Value	Status (1)
Mercury	µg Hg/l	1.0	AA,T
Cadmium (2)	µg Cd/l	5.0 1.0	AA,T AA,T,B (4)
Hexachlorocyclohexane (HCH) (2)	µg/l	0.1 0.05	AA,T AA,T,B (4)
Tetrachloromethane (CTC)	µg/l	12	AA,T
DDT (para-para DDT isomer) (2)	µg/l	0.01	AA,T
Total DDT (2)	µg/l	0.025	AA,T
Pentachlorophenol (PCP) (2)	µg/l	2	AA,T
'The Drins' (from 1 Jan 1989)	µg/l	0.03 (3)	AA,T
Aldrin (from 1 Jan 1994)	µg/l	0.01	AA,T
Dieldrin (from 1 Jan 1994)	µg/l	0.01	AA,T
Endrin (from 1 Jan 1994)	µg/l	0.005	AA,T
Isodrin (from 1 Jan 1994)	µg/l	0.005	AA,T
Hexachlorobenzene (HCB) (2)	µg/l	0.03	AA,T
Hexachlorobutadiene (HCBd) (2)	µg/l	0.1	AA,T
Chloroform	µg/l	12	AA,T
1,2-dichloroethane	µg/l	10	AA,T
Trichloroethylene	µg/l	10	AA,T
Perchloroethylene	µg/l	10	AA,T
Trichlorobenzene (TCB)	µg/l	0.4	AA,T

- EQSs for List I Substances (Tidal Waters)

Parameter	Units	Value	Status (1)
Mercury (2)	µg Hg/l	0.3	AA,D
Cadmium (2)	µg Cd/l	2.5	AA,D
Hexachlorocyclohexane (HCH) (2)	µg/l	0.02	AA,T
Tetrachloromethane (CTC)	µg/l	12	AA
DDT (para-para DDT isomer) (2)	µg/l	0.01	AA
Total DDT (2)	µg/l	0.025	AA
Pentachlorophenol (PCP) (2)	µg/l	2	AA
'The Drins' (from 1 Jan 1989)	µg/l	0.03 (3)	AA,T
Aldrin (from 1 Jan 1994)	µg/l	0.01	AA
Dieldrin (from 1 Jan 1994)	µg/l	0.01	AA
Endrin (from 1 Jan 1994)	µg/l	0.005	AA
Isodrin (from 1 Jan 1994)	µg/l	0.005	AA
Hexachlorobenzene (HCB) (2)	µg/l	0.03	AA
Hexachlorobutadiene (HCBd) (2)	µg/l	0.1	AA
Chloroform	µg/l	12	AA
1,2-dichloroethane	µg/l	10	AA
Trichloroethylene	µg/l	10	AA
Perchloroethylene	µg/l	10	AA
Trichlorobenzene (TCB)	µg/l	0.4	AA

Proposals have been published for the following List I substances but these have not, so far, been adopted:

Trifluralin, endosulphan, simazine, triorganotin compounds (tributyltin oxide, triphenyltin acetate, triphenyltin oxide, triphenyltin hydroxide), atrazine, organophosphorus substances (azinphos-methyl, azinphos-ethyl, fenitrothion, fenthion, malathion, parathion and parathion-methyl, dichlorvos).

- Notes:**
1. AA=Annual Average, T=Total, B=Background Monitoring
 2. A 'standstill' provision exists for concentrations in sediments and/or shellfish and/or fish
 3. Maximum of 0.005 for Endrin
 4. B=Background Monitoring: only applies at designated end of catchment sites.

APPENDIX 5: EC Dangerous Substances Directive - EQSs for List II Substances
- EQSs for List II Substances (Inland Waters) (1)

Parameter	Units	Value (3)		Hardness (mg CaCO ₃ /l)	Status (2)
		A Std	B Std		
Lead	µg Pb/l	4 10 10 20 20 20	50 125 125 250 250 250	0 to 50 50 to 100 100 to 150 150 to 200 200 to 250 >250	AA,D
Chromium	µg Cr/l	5 10 20 20 50 50	150 175 200 200 250 250	0 to 50 50 to 100 100 to 150 150 to 200 200 to 250 >250	AA,D
Zinc	µg Zn/l	8 50 75 75 75 125	75 175 250 250 250 500	0 to 50 50 to 100 100 to 150 150 to 200 200 to 250 >250	AA,T
Copper	µg Cu/l	1 6 10 10 10 28	1 6 10 10 10 28	0 to 50 50 to 100 100 to 150 150 to 200 200 to 250 >250	AA,D
Nickel	µg Ni/l	50 100 150 150 200 200	50 100 150 150 200 200	0 to 50 50 to 100 100 to 150 150 to 200 200 to 250 >250	AA,D
Arsenic	µg As/l	50		All	AA,D
Boron	µg B/l	2000		All	AA,T
Iron	µg Fe/l	1000		All	AA,D
pH	pH values	6 to 9		All	95% of samples
Vanadium	µg V/l	20 60	20 60	0 to 200 200+	AA,T
Tributyltin	µg/l	0.02		All	M,T
Triphenyltin	µg/l	0.02		All	M,T
Polychlorochloromethyl- sulphonamidodiphenyl ether (PCSDs)	µg/l	0.05		All	T, 95% of samples
Sulcofuron	µg/l	25		All	T, 95% of samples
Flucofuron	µg/l	1.0		All	T, 95% of samples
Permethrin	µg/l	0.01		All	T, 95% of samples
Cyfluthrin	µg/l	0.001		All	T, 95% of samples

- EQSs for List II Substances (Tidal Waters)

Parameter	Units	Value (1)	Status
Lead	µg Pb/l	25	AA,D
Chromium	µg Cr/l	15	AA,D
Zinc	µg Zn/l	40	AA,D
Copper	µg Cu/l	5	AA,D
Nickel	µg Ni/l	30	AA,D
Arsenic	µg As/l	25	AA,D
Boron	µg B/l	7000	AA,D
Iron	µg Fe/l	1000	AA,D
pH	pH values	6 to 8.5 (3)	95% of samples
Vanadium	µg V/l	100	AA,T
Tributyltin	µg/l	0.002	M,T
Triphenyltin	µg/l	0.008	M,T
Polychlorochlormethyl- sulphonamidodiphenyl ether (PCSDs)	µg/l	0.05	T, 95% of samples
Sulcofuron	µg/l	25	T, 95% of samples
Flucofuron	µg/l	1.0	T, 95% of samples
Permethrin	µg/l	0.01	T, 95% of samples
Cyfluthrin	µg/l	0.001	T, 95% of samples

- Notes:**
1. National environmental quality standards recommended for the UK.
 2. AA=Annual Average; D=Dissolved; T=Total; M=Maximum Allowable Concentration
 3. A Std denotes standards for the protection of sensitive aquatic life
B Std denotes standards for the protection of other aquatic life

APPENDIX 6:**Third North Sea Conference - Priority Hazardous Substances
(Annex 1A List of Substances)**

Mercury	Simazine
Cadmium	Atrazine
Copper	Triorganotin compounds
Zinc	Azinphos-ethyl
Lead	Azinphos-methyl
Arsenic	Fenitrothion
Chromium	Fenthion
Nickel	Malathion
Aldrin	Parathion
Dieldrin	Parathion-methyl
Endrin	Dichlorvos
Isodrin	Trichloroethylene
HCH	Tetrachloroethylene
DDT	1,1,1-trichloroethane
Pentachlorophenol	Trichlorobenzene
Hexachlorobenzene	1,2-dichloroethane
Hexachlorobutadiene	Polychlorinated biphenyls
Carbon tetrachloride	Dioxins (*)
Chloroform	
Endosulphan	
Trifluralin	

At the Third North Sea Conference, the UK Government undertook to reduce loadings (flow x concentration) of the 'Annex 1A' list of substances except dioxins (*) entering UK tidal waters from rivers and direct discharges by 50% (70% for Hg, Cd, Pb) by 1995, against a 1985 baseline.

APPENDIX 7: List of SSSIs in the Catchment

<i>Name</i>	<i>NGR</i>	<i>Description</i>
Saunton to Baggy Point	SS 447 408, 434 393, 446 376	Geological and biological, maritime heathland, grassland and lichens.
Mill Rock	SS 455 431	Geological (palaeological).
Barricane Beach	SS 453 443	Geological (palaeological).
Morte Point	SS 450 455	Coastal, cliff and foreshore habitats, maritime heaths.
Napps Cave	SS 563 475	Geological and bats.
Exmoor Coastal Heaths	SS 620 480, 750 500, 800 485	Extensive heathland and other Exmoor Coastal Heaths. Many rare species are present.
West Exmoor Coast and Woods	SS 665 495	Ancient sessile oak woodland maritime plant communities and coastal lichens. Also geological.
Dean Steep	SS 745 487	Geological.
Watersmeet	SS 745 487	Ancient semi-natural oak woodland with rare plants and rich bird population. Also geological interest.
North Exmoor	SS 800 430	Nationally important lowland heath. Important transitions from ancient semi-natural woodland through upland heath to blanket mire. Breeding bird communities and heath fritillary butterfly.
River Lyn	SS 702 442, 7235 4920	Geological.

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.

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

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