RIVER TORRIDGE
CATCHMENT MANAGEMENT PLAN
CONSULTATION REPORT

NRA

National Rivers Authority
South West Region

ENVIRONMENT AGENCY

RIVER TORRIDGE

CATCHMENT MANAGEMENT PLAN

CONSULTATION REPORT

MAY 1993

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RIVER TORRIDGE CATCHMENT MANAGEMENT PLAN

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FOREWORD

The National Rivers Authority has, since its formation in 1989, been developing the process of catchment management.

A major initiative is the commitment to produce Catchment Management Plans setting out the Authority's vision for realising the potential of each local water environment.

An important stage in the production of the plans is a period of public consultation. The NRA is keen to draw on the expertise and interest of the communities involved.

The first plan for consultation in the South West is for the freshwater River Torridge Catchment. The NRA looks forward to receiving comments on the attached draft.

A final plan will then be produced with an agreed action programme for the future protection and enhancement of this important catchment.

MRS KATHARINE BRYAN
REGIONAL GENERAL MANAGER

RIVER TORRIDGE CATCHMENT MANAGEMENT PLAN
CONSULTATION REPORT

CONTENTS

INTRODUCTION

1.1 Catchment Management Planning - Concept and Process

The National Rivers Authority

The National Rivers Authority (NRA) is responsible for protecting and improving the water environment in England and Wales. It has a wide range of responsibilities which include :

- Flood Defence, including the protection of people and property
- Flood Warning
- Effective management of water resources
- Control of pollution and improving the quality of rivers, groundwaters and coastal waters
- Maintenance and improvement of fisheries
- Promotion of water-based recreation
- Conservation of the natural water environment

To achieve its aims, the NRA must work with or seek to influence central government, local government, industry, commerce, farming, environmental organisations, riparian owners and the general public. Successful management of the water environment requires consideration of a wide range of interests and requirements which may sometimes be in conflict.

To assist in its work, the NRA is producing **Catchment Management Plans (CMP's)**. These allow the full range of water management issues to be identified and considered within a geographical area which is relevant and meaningful.

Scope and Process of Catchment Management Planning

The production of Catchment Management Plans within the NRA is in two stages :

- Catchment Management Consultation Report and
- Catchment Management Final Plan

The **Consultation Report** includes the following sections :

- Uses

  The uses of the catchment are identified and discussed. Information is presented in the form of a map with one or more pages of supporting text. Uses may have impacts on the water environment and/or impose requirements on the water environment. Wherever possible or appropriate, objectives and targets are identified in terms of the requirements for water quality, water quantity and physical features.

- Objectives

  By taking the objectives and targets relevant to the area in which each use takes place, overall objectives and targets for the catchment can be derived. At any location it is the most stringent use related target which must be achieved. In some areas targets have yet to be developed.

- State of the Catchment

  The state of the catchment is assessed against the objectives and targets which apply. Areas where objectives are not met and issues which need to be addressed in order to meet objectives are identified.

- Issues and Options

  The identified issues are discussed and where possible some options for their resolution are proposed. A tabulated summary of issues and options concludes this section. The organisation responsible and also some advantages and disadvantages of the suggested options are proposed.

The Catchment Management Consultation Report is intended to be a focus for consultation between the NRA and all those with interests in the catchment. Consultees may wish to :

- raise additional issues not identified in the plan
- comment on the issues and options identified in the plan
- suggest alternative options for resolving identified issues

The NRA recognises that many of the options for action identified by the Consultation Report will involve organisations or individuals other than the NRA and their views will be crucial to the preparation of the Final Plan.

The **Final Plan** will be produced following consultation and will have regard to the comments received and the level of resourcing available. The Final Plan will form a basis for the NRA's actions within the catchment and also provide a public document which will form a framework for the NRA's interaction with other organisations. The NRA will be seeking commitment to planned actions by others wherever possible.

Limitations of Catchment Management Plans

The finished CMP will inevitably be subject to some limitations, the major examples of which are as follows.

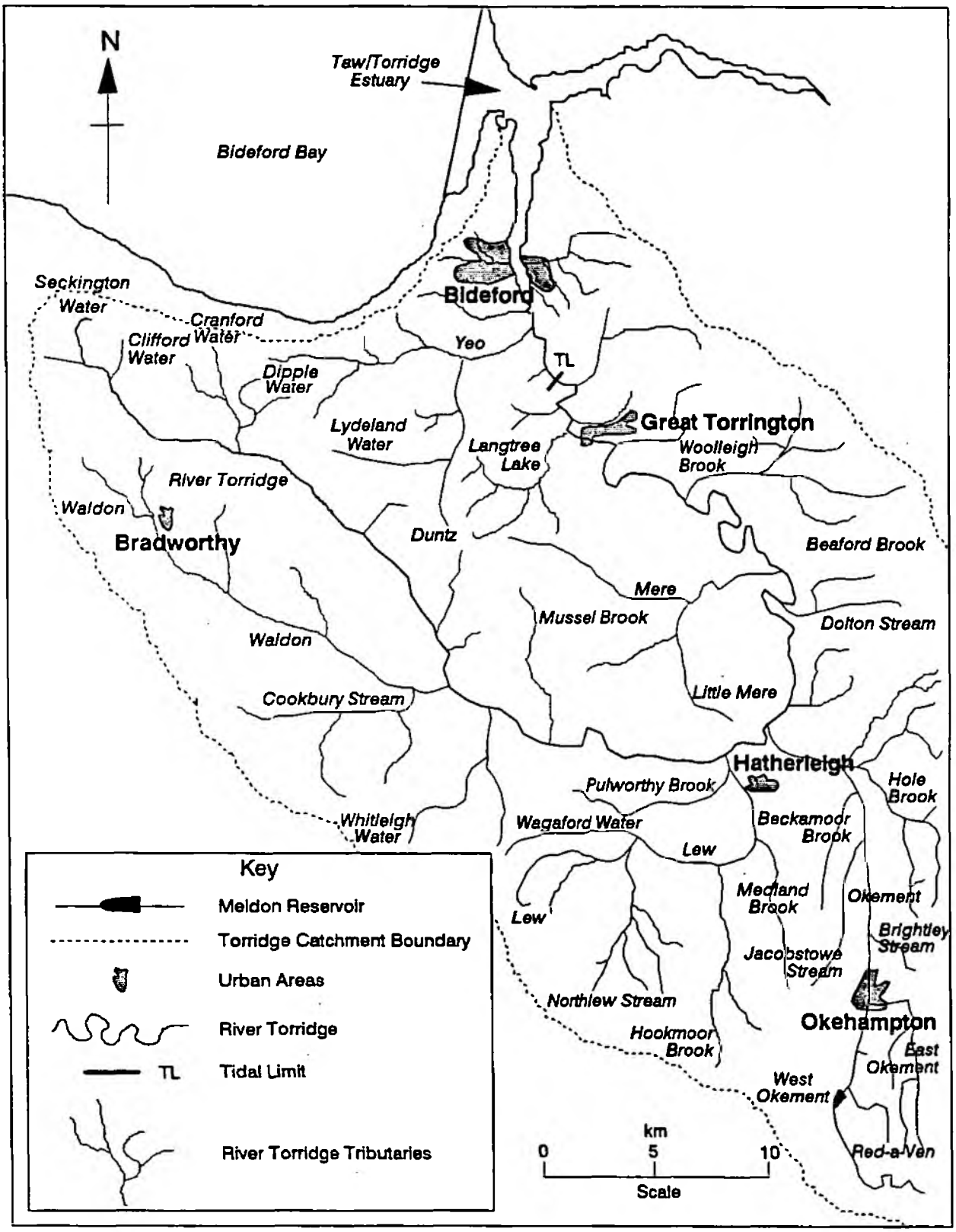
Where improvement works are required to overcome catchment problems, these works will in many cases be the responsibility of other organisations or individuals. The NRA may have no powers to carry out or control the necessary actions. This could involve a Company who may see little or no financial benefit in carrying out the actions, or a Local Authority with restricted expenditure.

It will inevitably be the case that the achievement of some objectives will depend upon the Development Planning Policy of the County or District Council. The NRA is a consultee in the development of such policy, but it is recognised that the Councils are subject to many other constraints in meeting their obligations and will not always be able to put the needs of the river catchment first.

The land-use within a catchment is a major contributor to the state of that catchment, as is apparent from this report. In area terms, the largest land use is agriculture, over which, apart from restricted areas, such as Sites of Special Scientific Interest (SSSI) and Environmentally Sensitive Areas (ESA), there are few relevant controls. In cases where changing farming practice is needed to achieve catchment improvements, it will be necessary to obtain the support of the landowners concerned.

Whilst these limitations will inevitably hamper the achievement of some of the plan objectives, it is essential that these objectives be set and pursued. Alternative means of achieving them might be identified, or the very fact of their identification and promotion might bring the necessary incentive to those involved to work towards their achievement.

Torridge Catchment



CATCHMENT DESCRIPTION

2.1 Introduction

The purpose of this section is to provide a broad introduction to the freshwater Torridge Catchment and to describe its natural features.

The River Torridge drains a large part of north-west Devon. The main river rises near the coast at Baxworthy Cross (SS 290 224) at a level of 200 m AOD (at ordnance datum). From this point it flows south-east where it is joined by the River Waldon north-east of Bradford (SS 426 079) and further downstream by the River Lew north of Hatherleigh (SS 534 050). It then turns north and begins to flow towards the estuary at Bideford. In this stretch, it is joined by the River Okement (SS 551 072), which rises on Dartmoor, by the River Mere south of Beaford (SS 551 130) and by the River Yeo 2 km south of Bideford (SS 462 245) below the freshwater limit.

The total area drained by the Torridge freshwater catchment is equivalent to 857 km². Major sub-catchments within the Torridge include:

Catchment	Area km²	Percentage of Total Catchment %
Waldon	78	9
Lew	117	14
Okement	141	16

Key Statistics

Catchment Area	857 km² (380 sq miles)
Population (1991)	33,288
Major Towns	Great Torrington, Okehampton, Hatherleigh
Average Annual Rainfall	900mm (near Bideford) 2000mm (high Dartmoor)
Main River Length (Maintained by NRA for flood defence purposes)	100.71 km
Controlled Water Length (Monitored by NRA for water quality purposes)	322.7 km

2.2 General Features

The Torridge Catchment was immortalised in Henry Williamson's 'Tarka the Otter'. In recent years concern has been expressed about the apparent decline in the environmental quality of the River Torridge. In the late 1970s and early 1980s proposals were made by the statutory bodies including South West Water Authority to reverse the decline in salmon and trout stocks; to dispose of sewage to the estuary and to combat problems of the 1984 drought. Changes in water quantity and quality and their subsequent impact on aquatic biota were debated at length during public inquiries.

In 1985 a review was carried out of all the available evidence of environmental change on a catchment basis, to investigate the possible causes of change and to take some immediate action. A public meeting was held in July 1985 where the exchange of ideas proved very constructive. This resulted in a report entitled 'Environmental Investigation of the River Torridge' in October 1986 (Ref 1). This report was the forerunner of catchment management, and the remedial action taken prior to and following its production has significantly improved environmental quality.

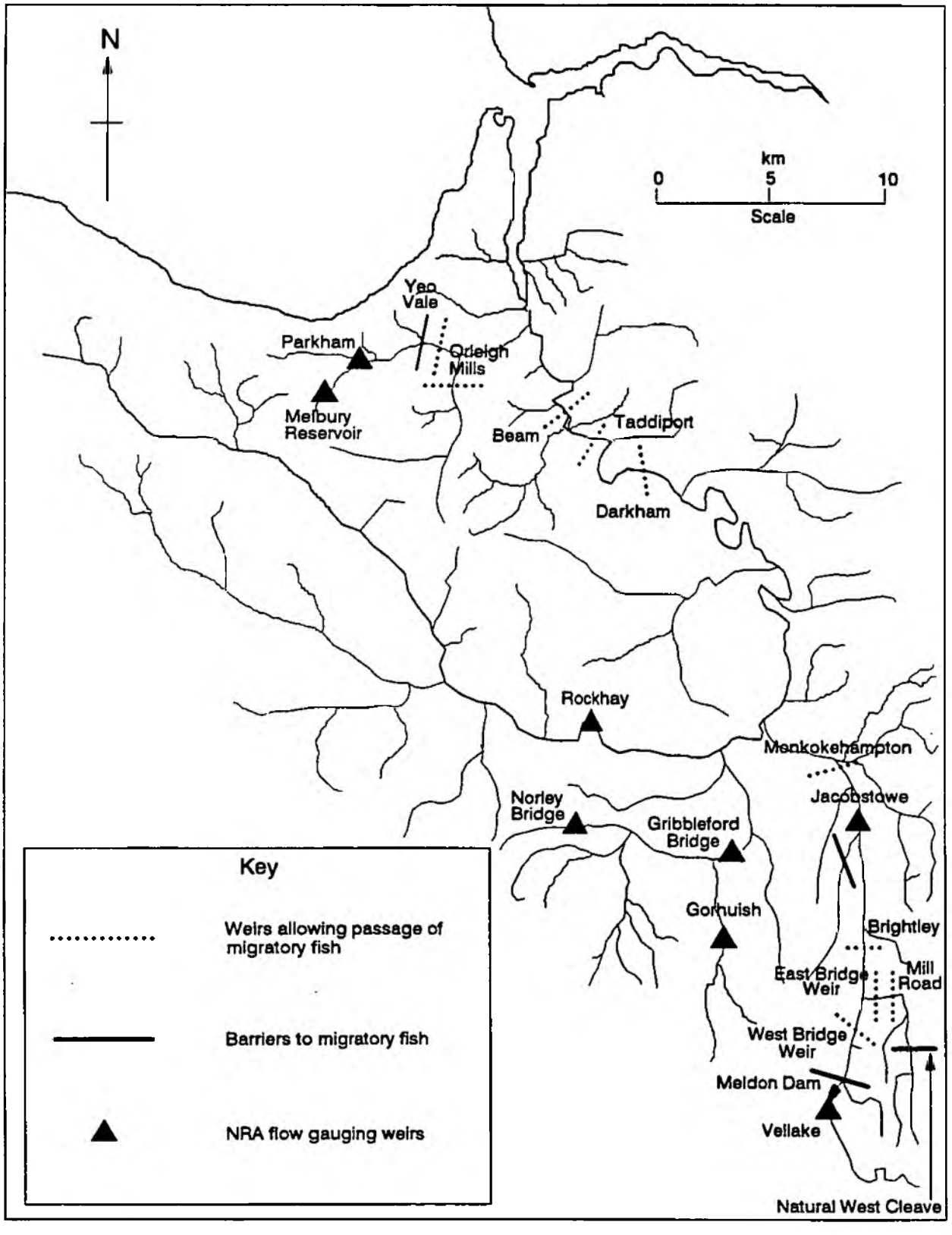
There are few urban areas in the catchment. The greatest concentrations in the freshwater catchment are at Great Torrington, Hatherleigh and Okehampton. Other urban areas are small and for the most part remote from the floodplain.

The most important industry is agriculture with dairy farming, sheep and beef rearing being the principal activities. Other important industries in the catchment are agriculturally associated e.g. abattoirs; and tourism. There is some quarrying for stone and ball clay, and a little light industry.

In recent years the rail infrastructure has declined to one branch-line from Exeter to Barnstaple, but the development of the Tarka Trail and the reopening of the old railway routes to pedestrian and cycle traffic, has added a new opportunity for access to the countryside.

Road links to the north by the North Devon Link Road (A39) and to the south (A30) have improved access, but north to south links are relatively poor. This undoubtedly preserves the special character of the catchment. Opportunities for further exploitation will depend, in part, on the infrastructure provisions and will benefit from the improvements now being seen in the aquatic and associated terrestrial environments.

Torridge Catchment
Weirs and Obstacles to Migratory Fish



2.3 River Topography

The Torridge rises at a level of 200 m AOD in North Devon, and descends 16 m in the first kilometre. The gradient then declines to 2.95 m/km until the river is joined by the River Waldon. Downstream of this point, the gradient decreases to 1.2 m/km down to the tidal limit at Weare Giffard. The average gradient for the River Torridge is 2 m/km, from the source to the tidal limit.

In contrast, the River Okement has a steeper profile, falling 34 m/km over the first 3.2 km from the source on Dartmoor at a height of 560 m AOD. The West Okement becomes even steeper prior to Meldon Reservoir with a gradient of 80 m/km. The overall gradient of the Okement is 14.5 m/km from the source to the confluence with the River Torridge.

There are twenty-one weirs and obstacles on the River Torridge and its tributaries (see map), only four of which are complete barriers to the upstream migration of salmon and sea trout. Eleven of these have been associated with leats supplying water for a variety of uses, and the majority have fallen into disuse. The seven NRA gauging weirs present no obstacle to upstream migration.

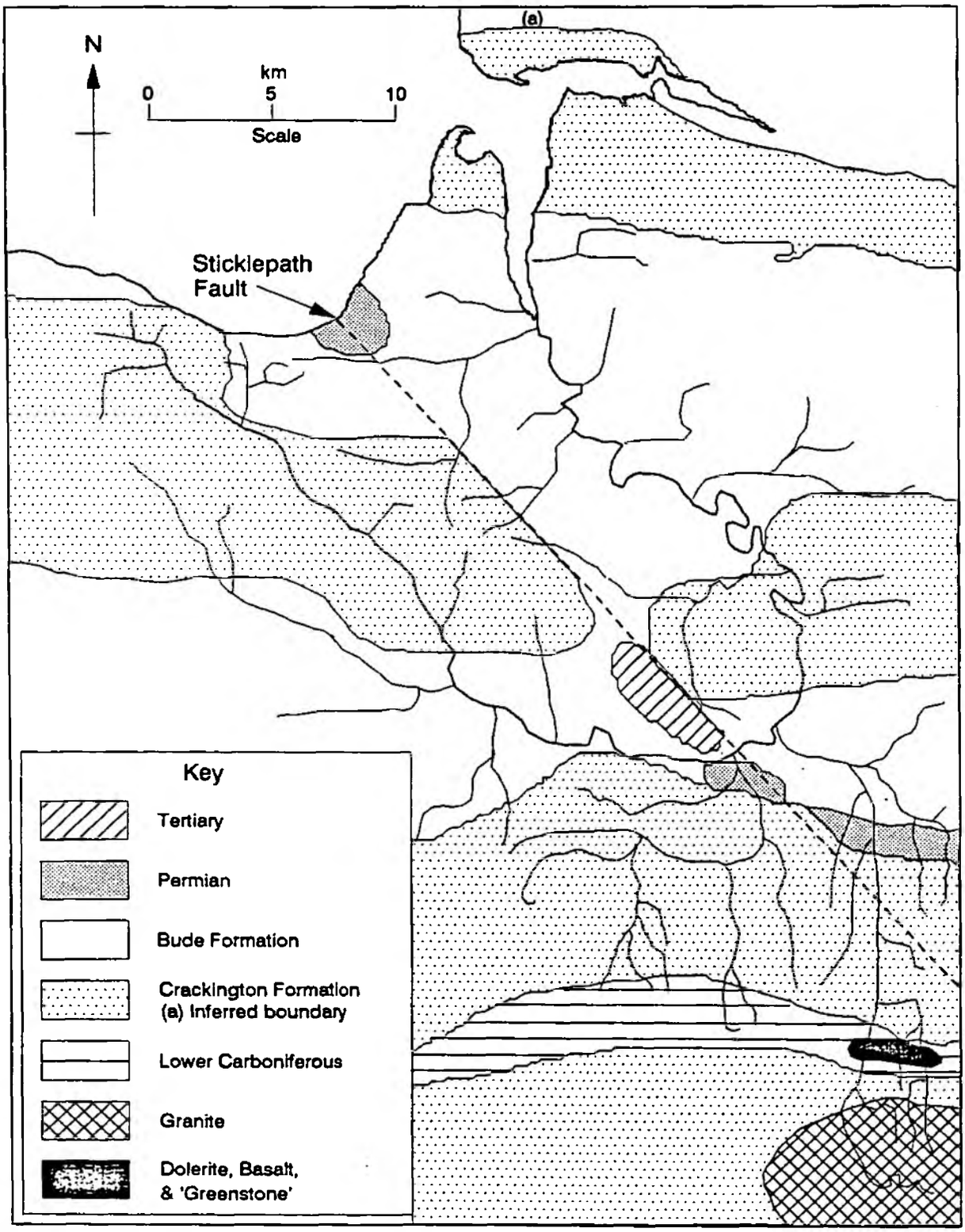
In 1978 the opening of the Monkokehampton fish pass extended the range of migratory fish.

At the request of the owner, the Authority made repairs to the weir at Beam in 1989. Local opinion holds that this work adversely affected the efficiency of the fish pass and hindered upstream migration of fish. This is contrary to the NRA view and independent advice has been received. It is proposed to modify the fish pass and trap at Beam to accommodate a fish counter in the pass and to improve the efficiency of the trap.

In low flow periods it has been the practice of the abstractor to put boards in the fish pass notch at Taddiport, thereby impeding fish movement. This practice is now discouraged.

A new fish pass was constructed at Mill Road Weir on the East Okement in 1992. This pass now ensures that salmon and sea trout can negotiate the weir at all states of river flow.

Torridge Catchment
Geology



2.4 Geology, Hydrogeology, Hydrology and Pedology

Geology

Sedimentary rocks of Carboniferous age, known locally as the Culm Measures, predominate in the Torridge Catchment; although the headwaters of the East and West Okement have their sources on the northern fringes of the Dartmoor granite. Other minor igneous intrusions of doleritic and basaltic rock lie just to the north of the granite, intruded into the sedimentary sequence. See Ref 2 and map opposite.

The Carboniferous strata are formed of thin alternating layers of shale and turbiditic sandstone. Sandstones predominate in the Bude Formation. Shales predominate in the Crackington Formation and are separated by thinner sandstone beds.

The strata were folded along E-W axes during the Variscan Orogeny; a period of major earth movements in late Carboniferous times. The Dartmoor granite was also intruded during this period.

Uplift and erosion at the end of the Variscan period gave rise to local deposits of breccia and breccio-conglomerate which were deposited in hollows in the carboniferous landscape during Permian times. Now seen near Hatherleigh and east of Clovelly.

The Carboniferous strata were further displaced by a swarm of minor, and some major, NW-SE dextral wrench faults, of which the Sticklepath Fault is the most important example. Much of this NW-SE faulting occurred during Tertiary times.

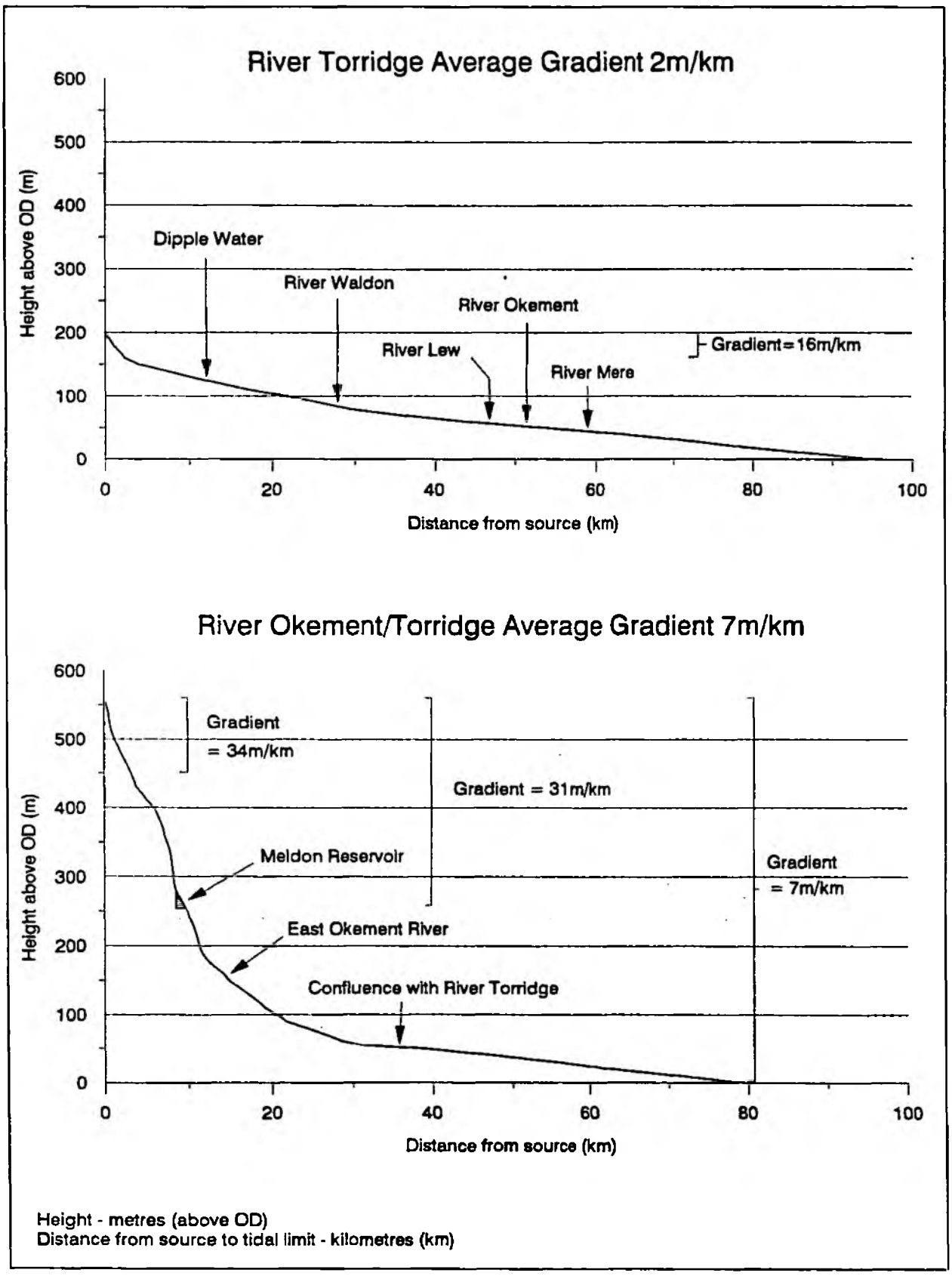
The Alpine Orogeny (tertiary) reactivated the NW-SE faulting and caused local basin subsidence along the line of the Sticklepath Fault. The thick deposits of clay, lignite and sand which form the Petrockstowe basin were accumulated at this time. This deposit is exploited for the extraction of ball clay.

Minor outcrops of boulder clay and related glacial tills are found in the extreme north of the catchment which are peripheral deposits from late stage glaciation in late Quaternary times. Local outcrops of blown sand and raised beach structures also occur in this area.

Hydrogeology

Most of the catchment is underlain by rocks with generally low permeability and primary porosity. These include the Carboniferous rocks and the Dartmoor Granite. In these rocks groundwater flow is effectively restricted to weathered zones and rock fractures, yielding relatively small amounts of water to boreholes. In spite of their 'tight' nature, groundwater stored within these rocks plays a significant role in the catchment hydrology by providing reserves of groundwater which naturally maintain river baseflow during dry weather. Groundwater flow through the fracture networks in such rocks can be rapid, and any pollutants can travel over moderate distances in relatively short periods, weeks to months in some cases.

Torridge Catchment
River Profiles



Height - metres (above OD)
Distance from source to tidal limit - kilometres (km)

Small areas of strata have sufficient porosity and permeability to support significant groundwater abstractions although their small areal extent limits sustained long term development. These include Permian breccias near Exbourne and Hatherleigh, alluvium along the main river valley and wind blown sand near Westward Ho!.

Widespread use is made of small-scale abstraction from boreholes, wells and springs for potable and agricultural supplies. The size of the abstractions, generally less than 20 m^3/day, is limited primarily by poor transmissivity rather than the availability of groundwater held in storage. Information on groundwater sources is sparse as much of the catchment forms part of an exemption zone within which most groundwater abstraction is exempt from licensing.

Hydrology

Analysis of the 32 year flow record for the Great Torrington gauging station indicates a mean daily flow at Great Torrington of 15.3 m3/s, and a measured Q95 flow (the flow which, on average, is equalled or exceeded for 95% of the time) of 0.918 m3/s. These flows include the artificial effects of Meldon Reservoir releases at times of low flow.

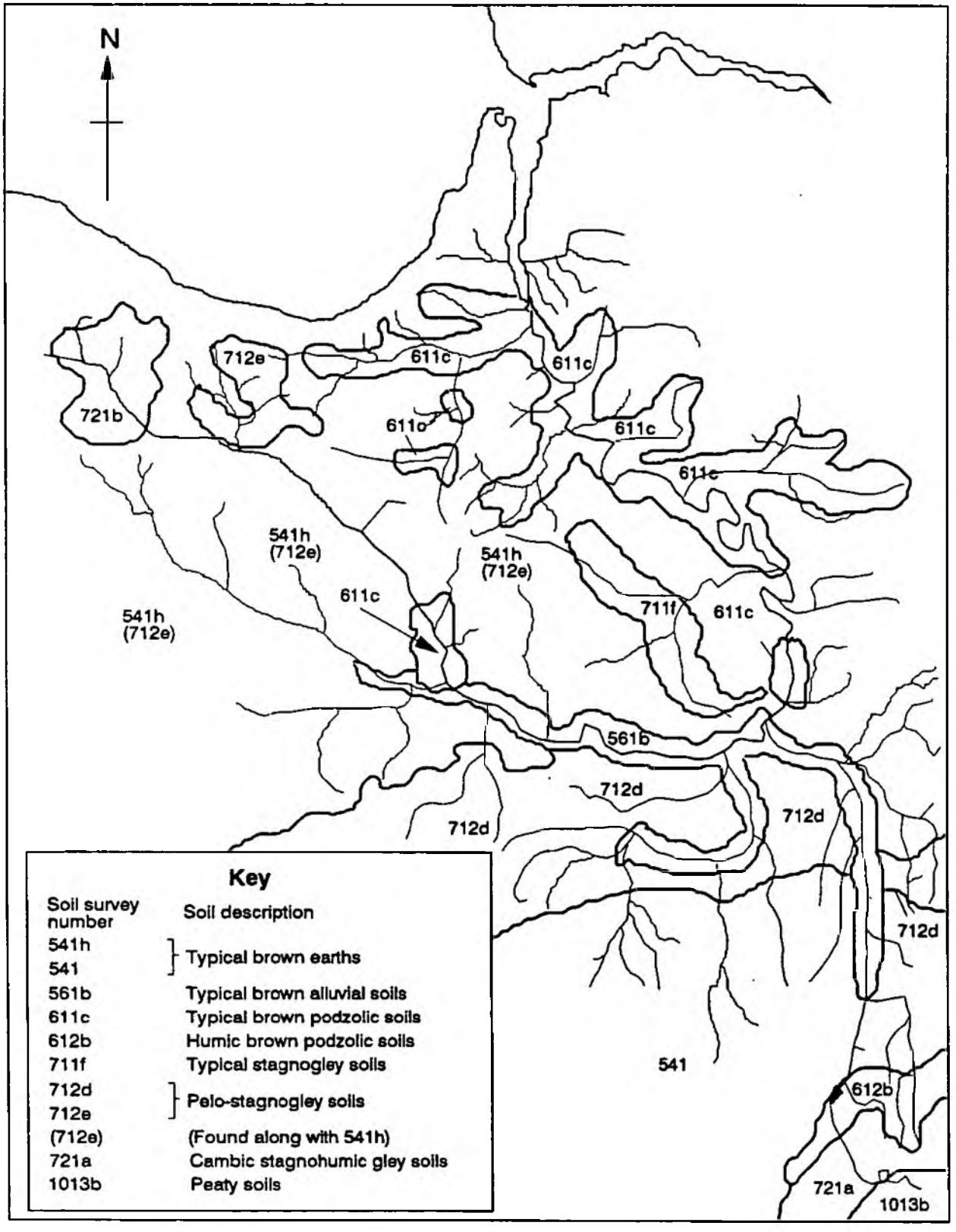
The Q95 flow represents 6% of the mean daily flow. This percentage is low and reflects the "flashy" nature (i.e. responds quickly to rainfall) of this river system due to its soil, subsoil and the low groundwater storage capacity within the catchment. The flashy river response is characterised by a rapid rise in river levels, high flood peaks and steep recession curves, and this is enhanced in the steeper upper reaches of the river. The maximum mean daily flow of 334 m^3/s and maximum instantaneous flow of 730 m^3/s were both recorded at Great Torrington on 28 December 1979.

On average, flows may be expected to fall below the Q95 flow for 18 days per year. In the drought years of 1976, 1984 and 1989, flows fell below Q95 for 99, 76 and 65 days, respectively. These periods of low flow were exacerbated by Drought Orders which were in place during these years and allowed reduced compensation flows from Meldon Reservoir. The minimum flow, recorded on 4 August 1976 was 0.120 m^3/s, less than 1% of the mean daily flow.

In recent years, 1990, 1991 and 1992, flows were below Q95 for 28, 22 and 14 days respectively. This indicates that in 1990 and 1991, based on Q95, flows were slightly lower than average, and in 1992, flows were slightly above average.

A compensation flow is released from Meldon Reservoir to the headwaters of the West Okement River to mitigate its impact. This is beneficial at times of extreme low flow. The Meldon Discharge Order 1983 allowed SWWSL to reduce compensation flow by half to 0.045 m^3/s until July 1993, in order to help meet public water supply needs until the Roadford Reservoir Scheme was commissioned. The compensation release will then revert to 0.090 m^3/s.

Torridge Catchment
Pedology



An analysis of the 1963 to 1992 flow record for the Great Torrington river gauging station has not highlighted any significant trend towards an increase in the frequency of low flows or high flows, except as reflected by natural droughts and wet years. However, there is some evidence to suggest that the frequency of high flows has increased.

Pedology

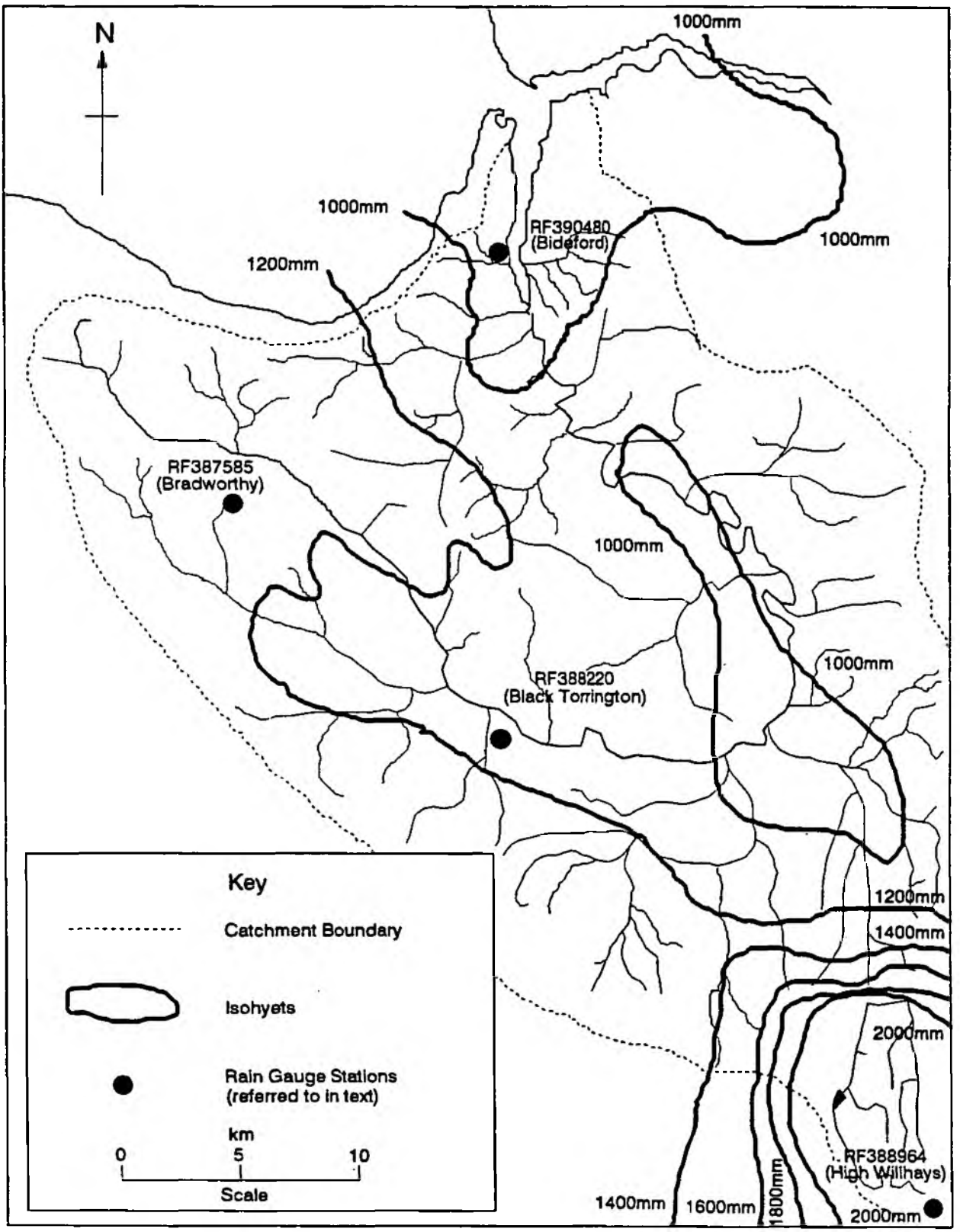
Most of the soils in the Torridge Catchment are on the Carboniferous outcrop which is mainly shales or sandstones with lesser areas of slate (Ref 3). In addition, soils which mantle the granite cupola of the Dartmoor uplands are of a peaty nature. Other soils form over the smaller outcrops of Permian breccias and oligocene clays.

Overlying the Bude Formation are brown earths and surface-water gleys. Generally, the former is associated with relatively high, broadly convex ridge crests and flanks, whereas the latter can be found in the shallow basins.

The Crackington Formation is overlain by three major soil groups, the pelosols, brown earths and surface-water gleys. The pelosols cover most of the gently undulating land for a few kilometres south of Hatherleigh, on the ridges or crests of hills. The brown earths occupy much of the concave ridges below the pelosols, while the surface-water gleys can be found in the basins of the river valleys.

Brown alluvial soils occupy much of the middle reaches of the Torridge between the confluence with the Waldon and the Okement. As the river becomes less steep, the flood plain is formed of typical brown podzolic soils, adjacent to which are found the typical brown earths, which occupy the concave ridges of the river valley.

Torridge Catchment
Rainfall Distribution



2.5 Climate, Rainfall and River Flow

The limited temperature range and high winter rainfall found in the Torridge Catchment basin are typical of Atlantic Britain.

Generally, the climate is of warm and moderately dry summers, with wet and mild winters. However, over the past 15 years, there have been six significant droughts (1975, 1976, 1984, 1989, 1990 and 1991).

Average annual rainfall varies with altitude from 900 mm near Bideford to over 2000 mm on high Dartmoor. Much of the area receives between 1100 and 1300 mm per annum and the variations are shown below.

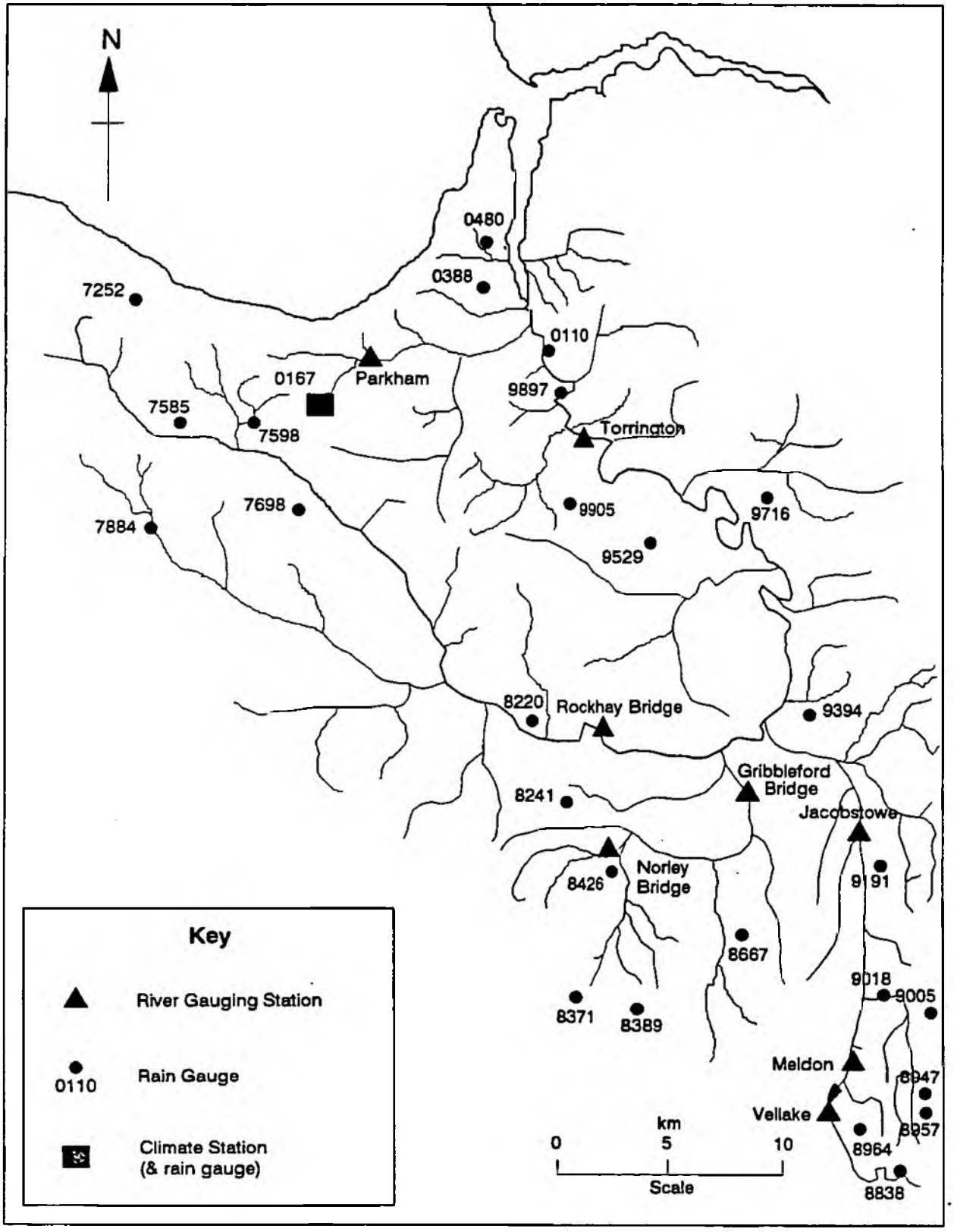
Average yearly rainfall (1941-1970)
at specific sites in the Torridge Catchment

Rain Gauging Station	NGR	Position in Catchment	Averages Yearly Rainfall (mm)
RF390480	SS 454271	Bideford, King Georges Fields (Lower Torridge)	912
RF388220	SS 461064	Black Torrington (Middle Torridge)	1100
RF388964	SX 585890	High Willhays, Dartmoor (Okement)	2300
RF387585	SS 337163	Bradworthy, Jasmine Cottage (Upper Torridge)	1300

The rainfall distribution map has been produced using data collected from the 26 rainfall stations in the catchment.

Temperature affects plant growth and the growing season, (that period when temperatures are above 6°C), ranges from 175 days on Dartmoor to 300 days near Bideford.

Torridge Catchment
Hydrometry



2.6 Hydrometry

There are eight river flow gauging stations in the Torridge Catchment from which data is recorded every 15 minutes, validated and stored in the Hydrometric Archive.

Flow Gauging Stations	River	NGR	No. Years Data Collected
Gribbleford	Lew	SS 528014	5
Meldon	West Okement	SX 563917	20
Norley	Lew	SX 501999	5
Parkham	Yeo	SS 393221	17
Rockhay	Torridge	SS 507070	5
Torrington	Torridge	SS 500185	32
Vellake	West Okement	SX 557903	17
Jacobstowe	Okement	SX 528014	Opened 11/09/91

There are also five instantaneous water level stations used for flood warning purposes. These are monitored daily and data is stored on hard copy.

Flood Warning Stations	River	NGR
Bradworthy	Waldon	SS 319141
Dolton	Torridge	SS 547112
East Okement Farm	East Okement	SX 605913
Sheepwash	Torridge	SS 486057
Weare Giffard	Torridge	SS 472226

There are no groundwater stations in the Torridge Catchment.

2.7 Population

The Torridge Catchment is sparsely populated with a few small towns, villages, hamlets and isolated farmsteads. The major urban areas within the freshwater catchment of the Torridge include Great Torrington, Okehampton and Hatherleigh. The most accurate assessment of the population for the Torridge Catchment is the 1991 Census which suggests a total of 33,288, giving a density of 38 persons/km^2. The following table gives a breakdown of the population for the Torridge River Catchment.

Population Statistics

Sub-Catchment	Population Census			% Change from
	1961	1981	1991	1981 - 1991
Upper Torridge	3,398	3,843	5,649	+ 47%
Waldon	1,827	2,003	2,252	+ 12%
Torridge/Waldon-Lew confluences	2,127	2,197	2,422	+ 10%
Lew	2,718	2,933	3,324	+ 13%
Okement	6,186	6,648	6,978	+ 5%
Torridge/Okement to Beam	5,963	7,697	8,559	+ 11%[a]
Mere	1,373	1,402	1,591	+ 13%
Yeo	2,067	2,166	2,515	+ 16%
Sub Total	25,659	28,889	33,288	+ 15%

[a] Majority of increase from Great Torrington (4,493)

Decreases have occurred in rural areas, with a shift of population to the larger towns within the catchment.

NB : These figures are total parish populations, no allowance has been made for part parish numbers straddling two catchments. Population statistics were obtained from North Devon District Council.

See Appendix 8.1 for parishes included in sub-catchments.

CATCHMENT USES

3.1 Introduction

The purpose of this section is to describe current and future uses of the natural water environment within the catchment. (Current uses include activities planned to be completed in the short-term. Future uses include potential, possible and likely uses). For each of the catchment uses the following information is provided :

(i) a page of text divided into the following sections :

General - this describes some of the general characteristics of the use, the scope of the use heading and any key relationships the use may have with other uses.

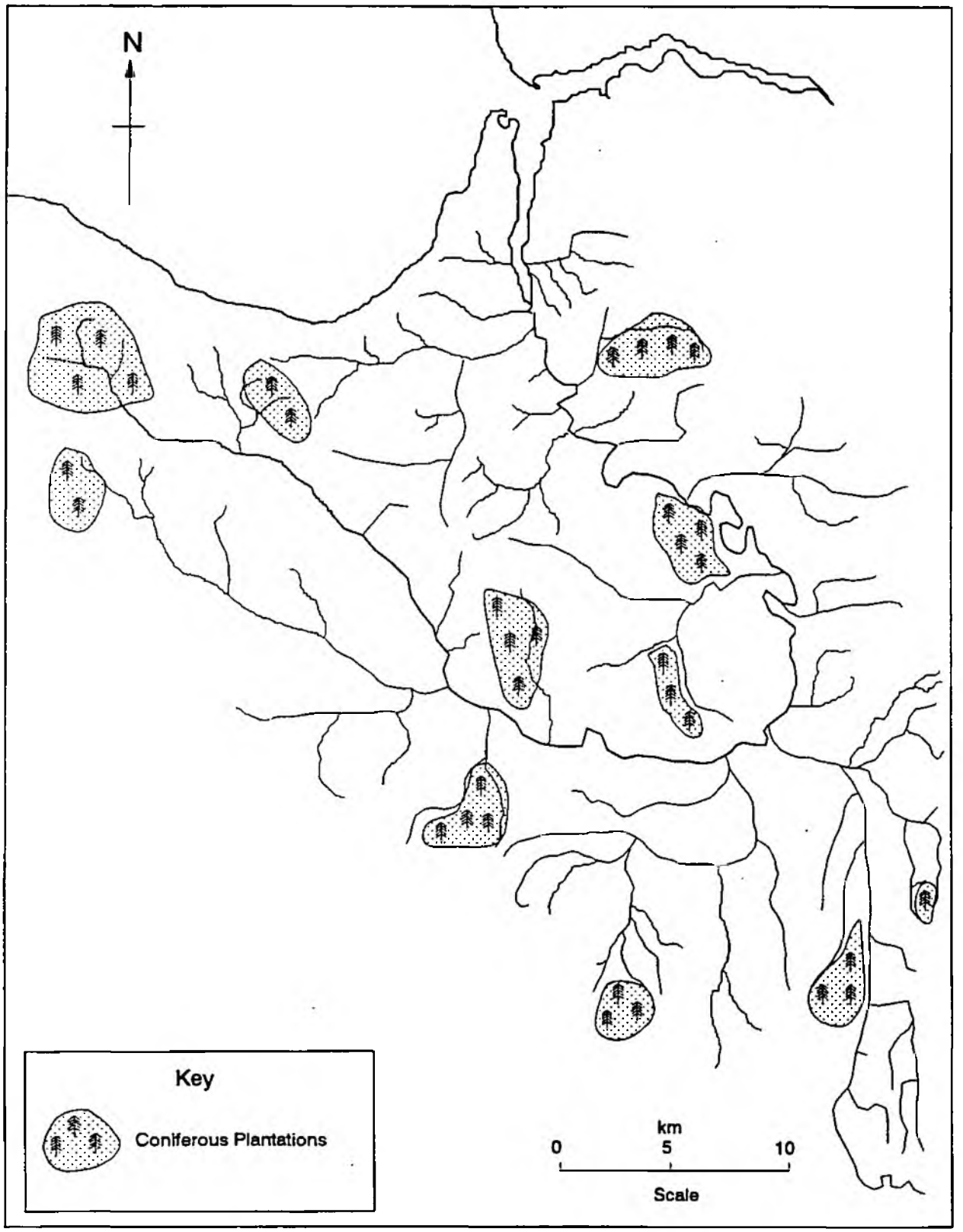
Catchment Perspective - this describes how the use manifests itself with the River Torridge catchment. Two sub-headings are provided: current use and future use.

Objectives - this contains draft objectives for the conservation and enhancement of the use and/or the water environment. The objectives are broadly based and could form the basis for a future catchment strategy.

(ii) a synoptic map designed to enhance the information in the text and highlight the geographical context of the use.

In most cases the description of the use is a summary of detailed technical studies produced by the NRA and/or other organisations. Support documents may therefore be available for those interested in learning more about the catchment.

Torridge Catchment
Forestry



3.2 Agriculture and Forestry

General

This use covers commercial forestry and all types of agriculture. These activities may affect the quality of surface and groundwaters, for example through leaching of pesticides and nitrates. They may require flood defence or land drainage activities to be undertaken to ensure field drains operate freely. They may adversely affect river corridor habitats, for example through soil acidification associated with conifer forestry.

Catchment Perspective

Current Use

Grassland is the primary land-use for agriculture in the catchment supporting about 88,000 livestock units comprising 35,000 dairy cattle, 39,000 beef and 14,000 sheep (1982). In the period 1952 to 1982 grassland increased by 25%, rough grazing decreased by 57%. This reflects the major increase (160%) in dairy cattle during the 30 year period.

Generally, the most intensive dairy farming areas are centred round the Dipple Water sub-catchment and areas downstream of its confluence with the Torridge to Woodford Bridge. Parts of the Mere sub-catchment are also used for intensive dairy farming.

Arable farming is limited in the catchment and has decreased since 1952 along with areas of rough grazing.

Detailed information on land use has been reviewed by T R Harrod (Ref 3). A further report on land use changes between 1952 and 1988 in specific sub-catchments of the Torridge by N Cullen (WRc) provides further evidence of rapid change to a permanent grass agricultural system (Ref. 4).

Woodland and forestry occupy 7% of the area, whilst moorland and heath comprise 6.4%. Woodland and forestry ranges from scrub invading neglected pastures, through to managed deciduous woodlands and coniferous monoculture.

Coniferous woodland covers 64% of the wooded area of the catchment occupying land of limited agricultural potential, such as steep valley sites and land where soil drainage is impaired due to low permeability. These areas include river valleys and isolated plantations in the upper reaches of the Torridge.

The majority of the upper Torridge is unforested, limiting the capacity of the land to hold water. Indeed, much of the banks of the Torridge and its tributaries remain unforested before the confluence with the River Okement.

Future Use

Agricultural use of the Torridge catchment will continue to be mainly dairy farming but perhaps with fewer large 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.

Forestry is not likely to be significantly developed unless incentives change.

Objectives

* Where water is abstracted for agricultural use the water quality should be maintained to meet appropriate standards with the aim of safeguarding public health, avoiding damage to crops and protecting the well-being of supplied animals.

* To ensure that the 'main river' watercourses are adequately maintained and that free drainage of agricultural drains is maintained.

* To ensure that when agriculture and forestry developments occur, they do not cause detriment to existing environmental standards and they comply with future standards to protect downstream uses.

Ecology

Map to be developed

3.3 Ecology

General

This use relates to the protection of all aquatic flora, fauna and dependent organisms. Dependent organisms are plants and animals which rely, at some stage of their life cycle, on the aquatic environment or associated land.

The NRA's conservation duties are set in sections 8 and 9 of the Water Resources Act 1991. This requires the NRA, whilst carrying out its own functions or dealing with proposals by others, to further the conservation of flora, fauna, geological and physiographical features of special interest and the enhancement of natural beauty.

This requires the NRA to influence the management of the environment, either directly through its own functions or indirectly through advising others, to provide the correct aquatic conditions to maintain a balanced ecology.

Catchment Perspective

Current Use

The River Torridge Catchment forms a rich and diverse assemblage of aquatic ecosystems which range from upland streams on Dartmoor to lowland meanders with watercourses rich with mammals, birds, insects and plant life. The value of the area is recognised by the large number of nature conservation designations. With a catchment of such importance the maintenance of the existing status is the major conservation concern. However, areas where scope exists for environmental improvement, schemes should be identified.

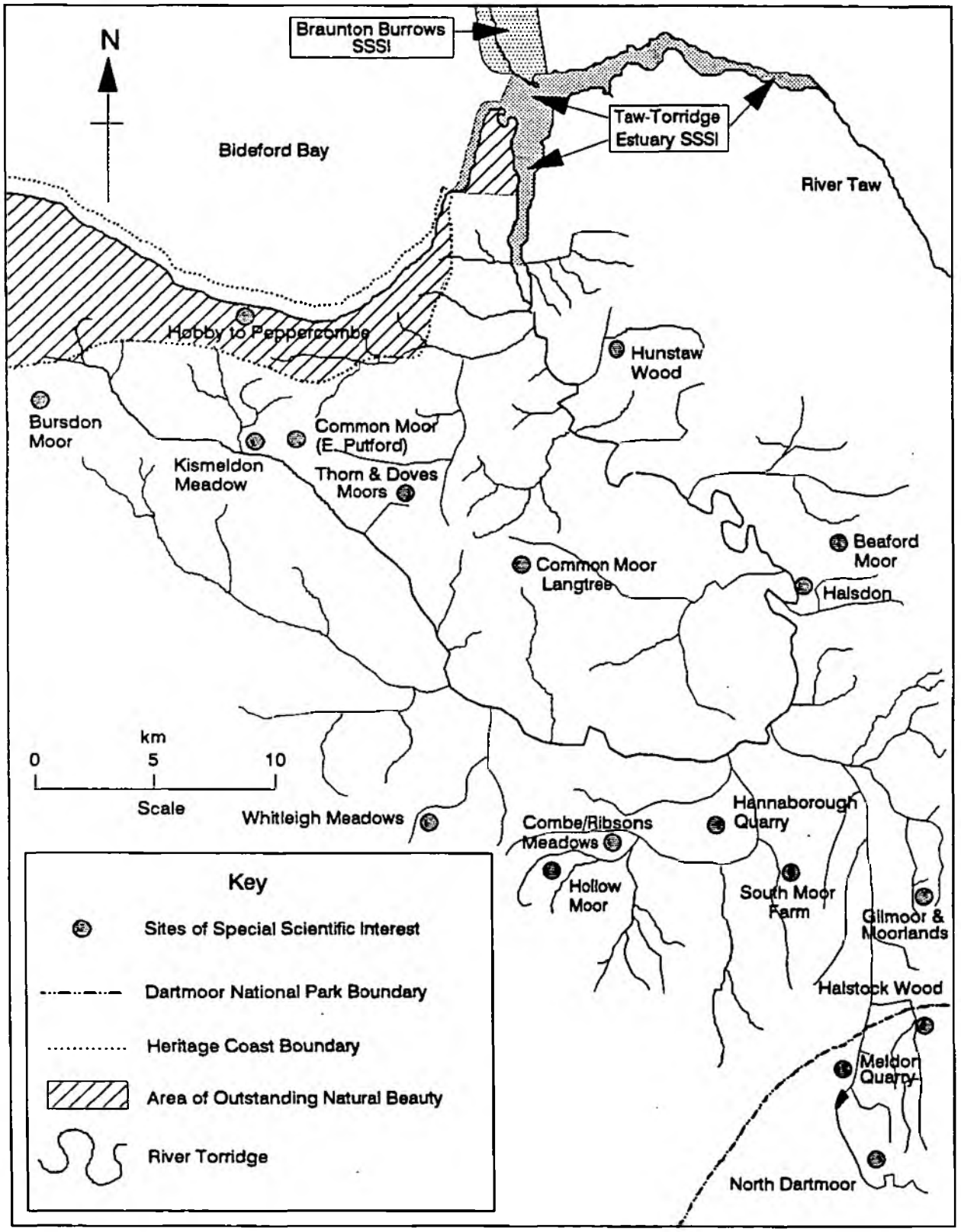
Future Use

Further exploitation of the recreational use of the catchment may lead to conflict with ecological use. The NRA will seek the support of others in helping to protect the ecology of the River Torridge.

Objectives

* To conserve and enhance the river corridor and landscape so as to protect all aquatic life and dependent organisms.

Torridge Catchment
Special Conservation Areas



3.4 Special Conservation Areas

General

This use relates to the protection of areas formally designated as being of particularly high conservation value. These include National and Local Nature Reserves and all Sites of Special Scientific Interest (SSSI), National Parks, Areas of Outstanding Natural Beauty (AONB), sites of historical or architectural interest and ancient monuments. However, the lack of a specific designation does not remove the responsibility to consider value.

Catchment Perspective

Current Use

As with much of the South West Region the River Torridge Catchment contains many features of worth in terms of its landscape, wildlife and archaeological heritage. The river rises, in part, within the Dartmoor National Park and flows through scenic valleys of high wildlife importance until it merges with the estuarine waters where SSSI status exists.

A wealth of information is available and can be obtained from Devon County Council, National Park Authorities and other conservation organisations.

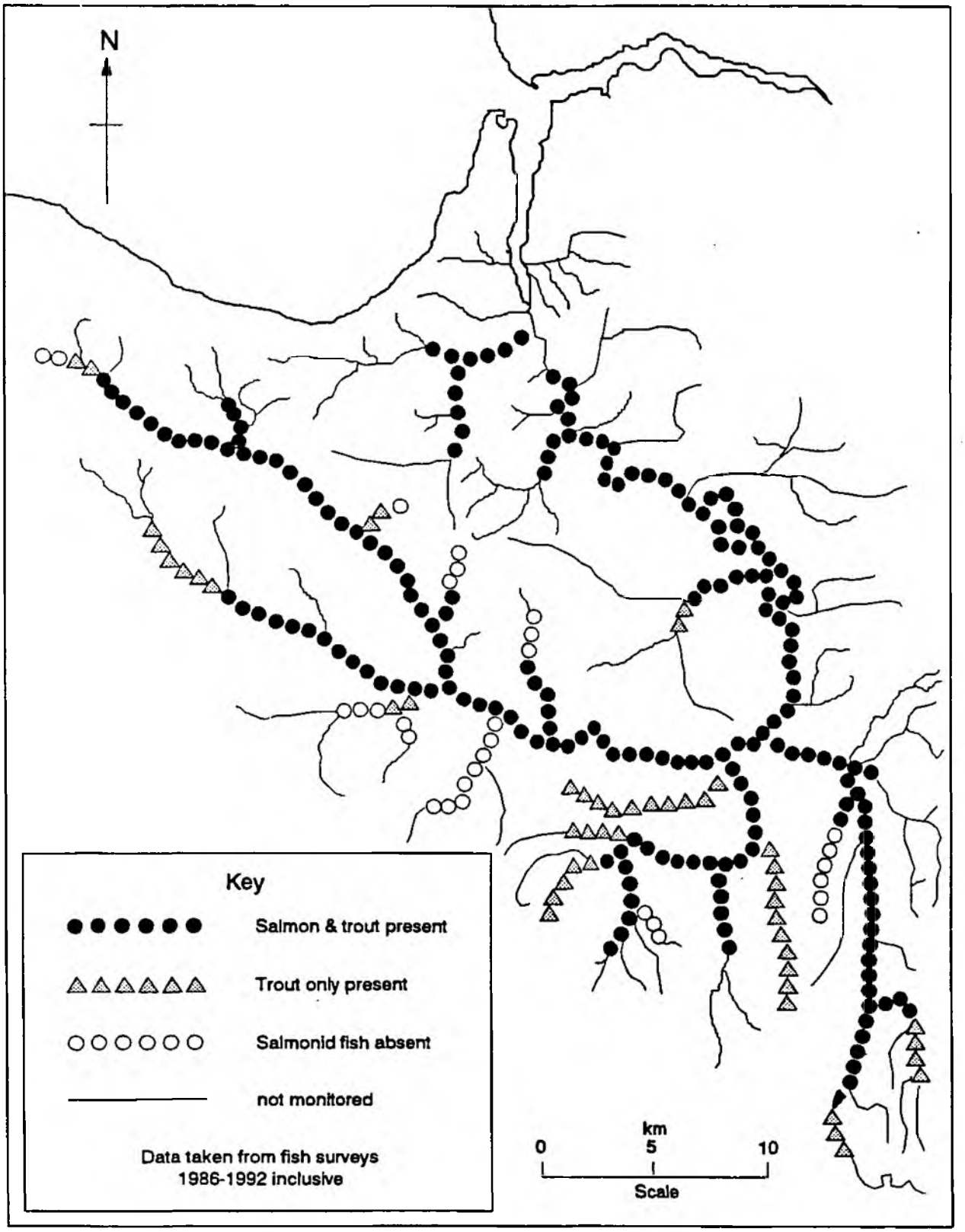
Future Use

As water quality and the aquatic environment continues to improve, further opportunities will present themselves to the NRA and others.

Objectives

* To maintain and enhance where appropriate, water quality, water resources, fisheries and river catchment features, so as to safeguard the identified special conservation interests.

Torridge Catchment
Fisheries - Salmonid



3.5 Fisheries - Salmonid

General

This use relates to the maintenance of satisfactory populations of salmonids and to the conditions necessary for their successful migration both within freshwater and between the sea and freshwater. The European Commission (EC) Freshwater Fisheries Directive (78/659/EEC) "on the quality of waters needing protection or improvement in order to support fish life" provides a statutory basis for the protection of water quality in certain rivers.

Catchment Perspective

Current Use

The salmonid fishery has declined since 1951, and the reasons for this decline are discussed in section 4.4. The decline is not only of concern to the riparian and commercial sport-fishing interests but also to the net fishery in the estuary. Since 1981 a number of statutory and voluntary measures have been introduced to reduce cropping by licensed nets and anglers.

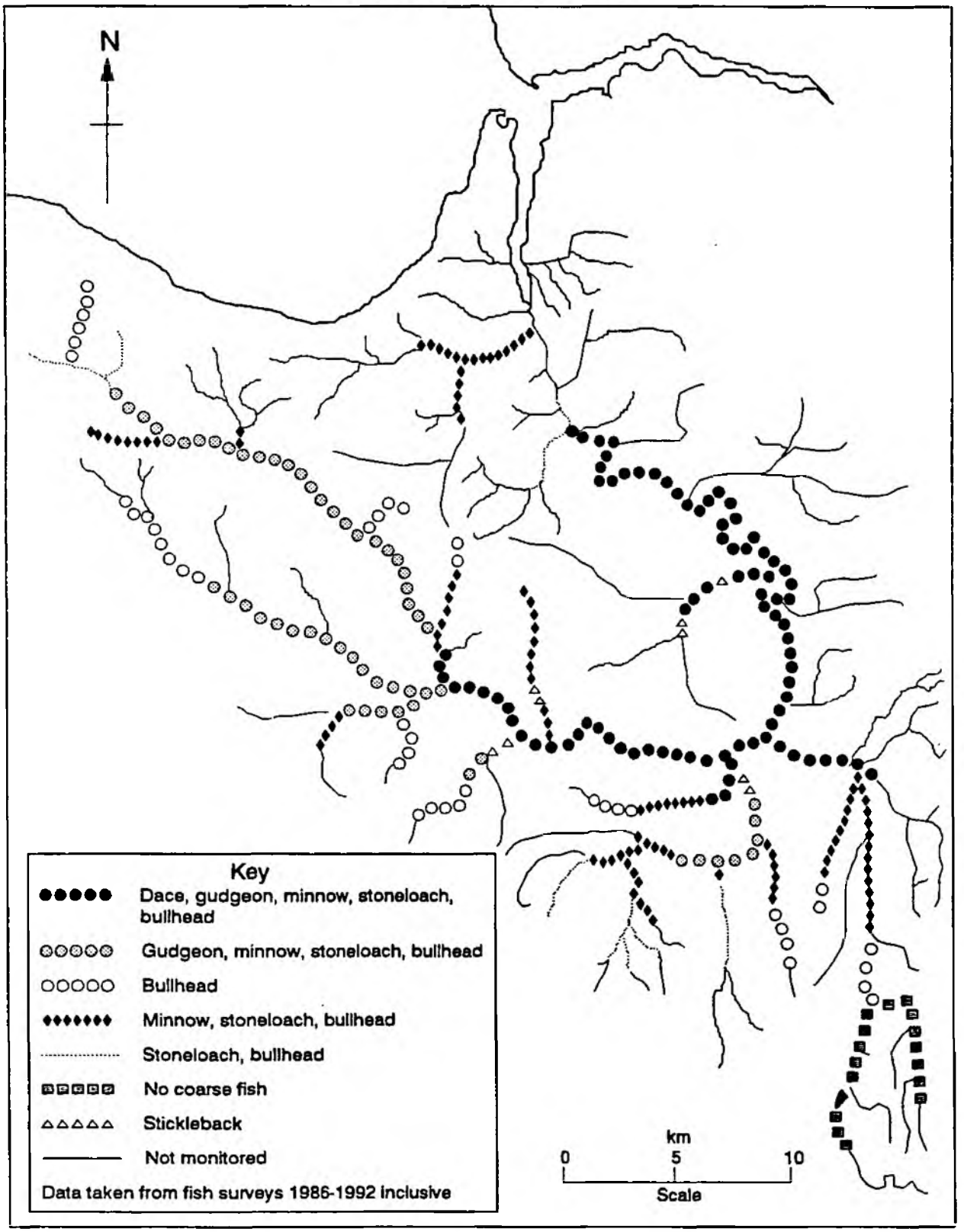
In 1990, a voluntary agreement was reached with salmon netters who, in exchange for compensation, have undertaken to cease netting for the five years up to and including 1995. A byelaw was made in 1992 which formalised the existing bag limits applied to rod fishing on the River Torridge (Appendix 8.2). This byelaw expires at the end of the fishing season in 1995. Both these measures are aimed at increasing spawning escapement and thus augmenting salmonid stocks throughout the catchment.

In 1991, it was recognised that there was a need to set up a contingency stock of juvenile salmon from the river, to be used in mitigation after fish kills and for enhancement of stocks in areas of sub-optimal production. Efforts to set up such a stock using eggs stripped from River Torridge salmon have met with only limited success to date. Methods to provide a similar contingency stock from River Torridge brown trout are also being investigated.

To improve salmonid habitat and accessibility, trash dam clearance work has been carried out in the upper River Torridge, River Waldon and River Lew. Reinstatement of spawning gravels has been undertaken throughout the catchment. This work has been carried out in conjunction with the Torridge Riparian Owners and Fishermans Association.

Encouraging signs of success from the statutory, voluntary and fisheries management measures have been seen in recent rod catches and juvenile electric fishing surveys (Appendix 8.3). However, the catastrophic pollutions and subsequent fish mortalities in the River Okement in recent years have further emphasised the frailty of the salmonid stock of the river.

Torridge Catchment
Fisheries - Freshwater



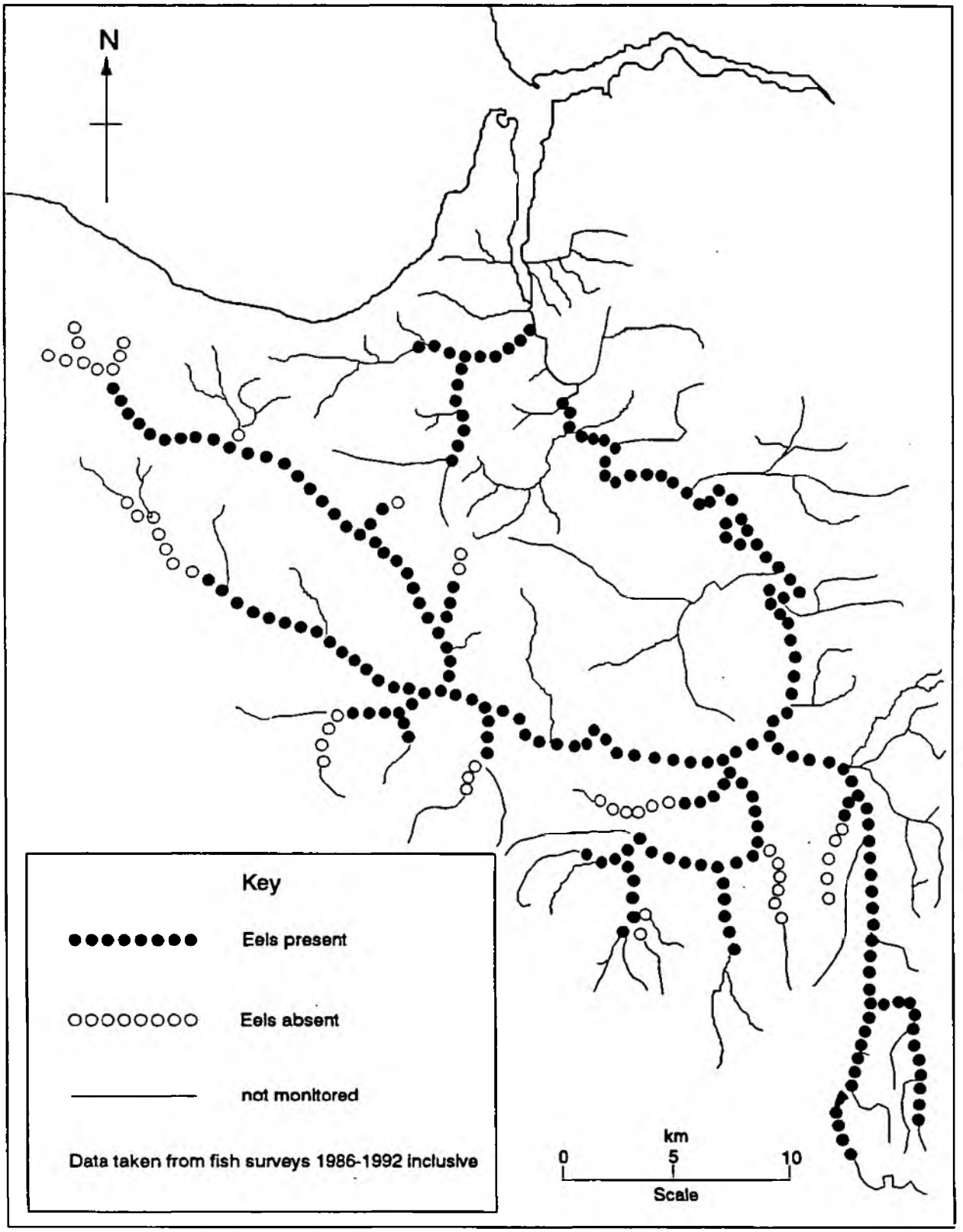
Future Use

As the salmonid fishery recovers and security of stocks is re-established this future use of the catchment, which to many was in serious doubt, will revitalise angling and netting. The tourism and amenity benefits must be balanced in line with a sustainable salmonid population.

Objectives

* To maintain water quality, water resources and catchment features so as to sustain salmonid populations appropriate to a river in such a geographical situation and to protect the migratory passage of salmonids to and from freshwater.

Torridge Catchment
Fisheries - Eel



3.6 Fisheries - Freshwater and Eel

General

This use relates to the maintenance of river conditions for the support of populations of freshwater fish and eels (i.e. non-salmonid fish), the former as sport fish and the latter as a commercially exploited food source.

Catchment Perspective

Current Use

The freshwater fishery is localised in extent and little exploited in this predominantly salmonid fishery. The level of exploitation of the eel fishery is low and confined to the estuary. Minimal fishing effort is directed to the apparently small elver run.

The distribution of freshwater fish and eel species is shown in the two maps. No management effort is applied to the freshwater fishery and its extent satisfies local demand. Only one eel fishing licence was issued in 1992.

Future Use

A new byelaw is currently being advertised (1993) which will formalise existing eel netting and trapping conditions in the South West. It is unlikely this use will see rapid or significant expansion in the medium term, but concomitant with the improving river environment, opportunities to exploit this resource will increase. The NRA is also developing a strategy towards coarse fish.

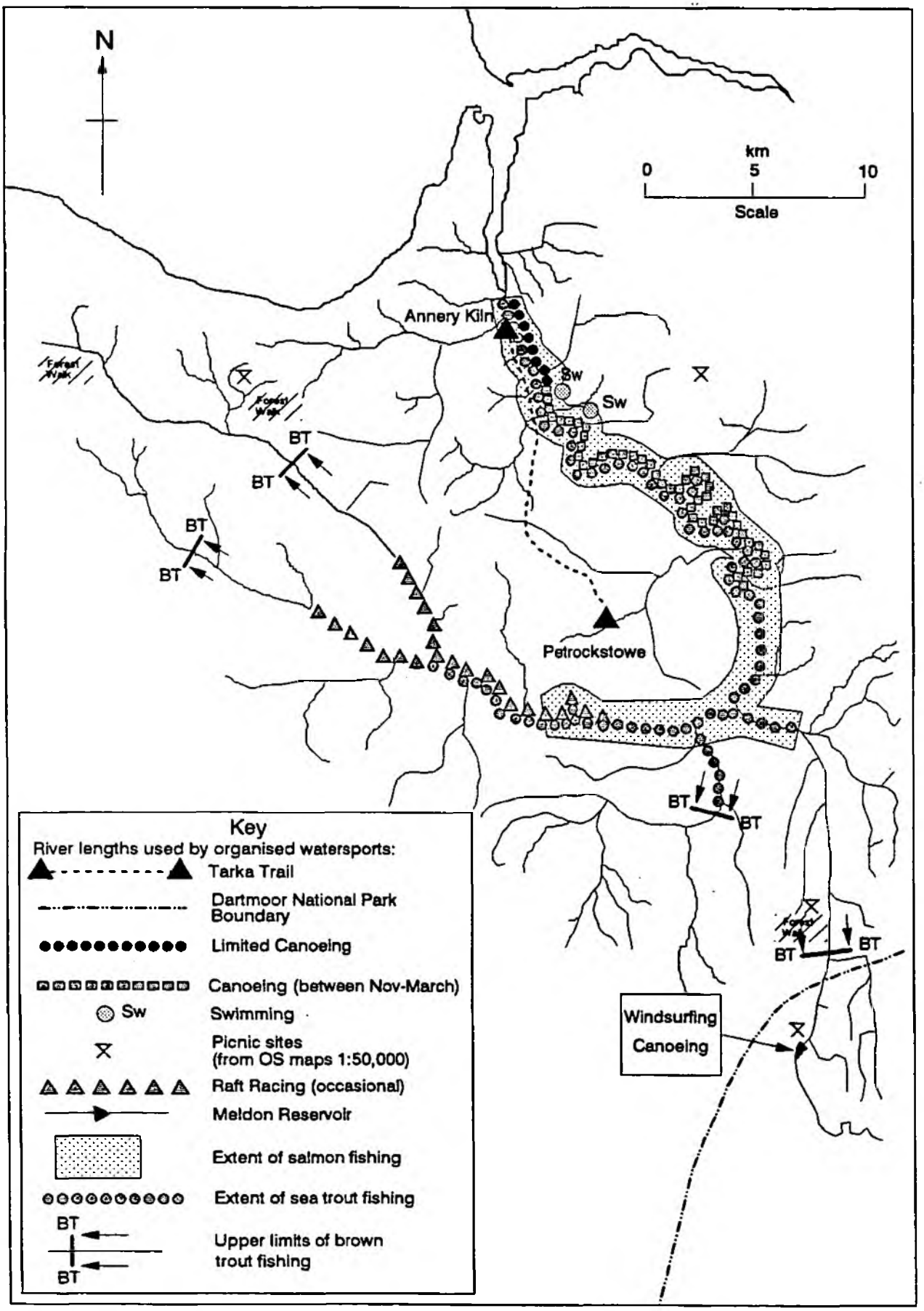
Objectives

* To maintain water quality, water resources and catchment features so as to sustain a natural freshwater and eel fish population appropriate to a river in such a geographical situation.

* To limit or regulate licensable abstractions so that detrimental impacts are not caused to freshwater and eel fisheries.

* To regulate impoundments to ensure their design and construction will allow for the passage of migratory fish and eel species.

Torridge Catchment
Amenity and Recreation



3.7 Amenity and Recreation

General

The Recreation and Amenity duties of the NRA are set out in section 16 of the Water Resources Act 1991. The Act generally empowers the NRA to conserve and enhance the natural beauty and amenity of inland and coastal waters and associated land, as well as the use of such waters and land for recreational purposes.

Activities such as walking, bird watching, angling, boating, sailing, rowing and picnicking bring people into close proximity with the water. The principal concerns are general aesthetic acceptability of water features, access to and along watercourses and the provision of appropriate facilities.

This use also deals with those sports such as canoeing and water skiing, where there is a risk of intimate contact with the water.

Catchment Perspective

Current Use

While Meldon Reservoir is the focus of attention for outdoor activities in the headwaters of the River Okement, it is the middle and lower reaches of the River Torridge which present the greatest opportunities.

The Torridge Catchment has a wealth of natural beauty and the public expects high standards to be maintained. The Tarka Trail, which includes a public footpath between Annery Kiln and Petrockstowe, provides a means of public access to the river environment; more details can be obtained from The Tarka Project in Torrington. Other footpaths exist, including some within the Dartmoor National Park.

Canoeing is prevalent on the River Torridge, with several clubs operating in the catchment, in particular Bideford Canoe Club. However, there is limited canoeing upstream of Halfpenny Bridge, Weare Giffard. The official canoeing season is from November to March. Annual fe^tes may use the river for raft races, but again these are very limited and occur only around the Sheepwash area. Fremington Army Camp also use the river for aquatic activities. Swimming takes place at Torrington NGR SS 479 196 and SS 475 187. However, there are no specific changing, showering, toilet or lifesaving facilities available at these sites.

Angling, mainly for salmon, sea trout and brown trout, is very popular on the Torridge. Freshwater fish and elvers are lightly exploited. A modest quantity of brown trout is stocked by riparian and fishery owners.

Since 1982, the average annual reported rod catches for salmon and sea trout in the Torridge are 51 and 250, respectively. There has been a marked decline in catches of both species in the last 10-15 years, although catches have recovered slightly in recent years.

Future Use

It is likely that this use of the catchment will develop and expand; where activities conflict with other uses the NRA will ensure a balance through its own statutory duties and powers; by influencing those of others.

Objectives

* To maintain water quality so as to prevent public nuisance arising from smell and visual problems.

* To maintain water quality, water resources and river topography so as to :

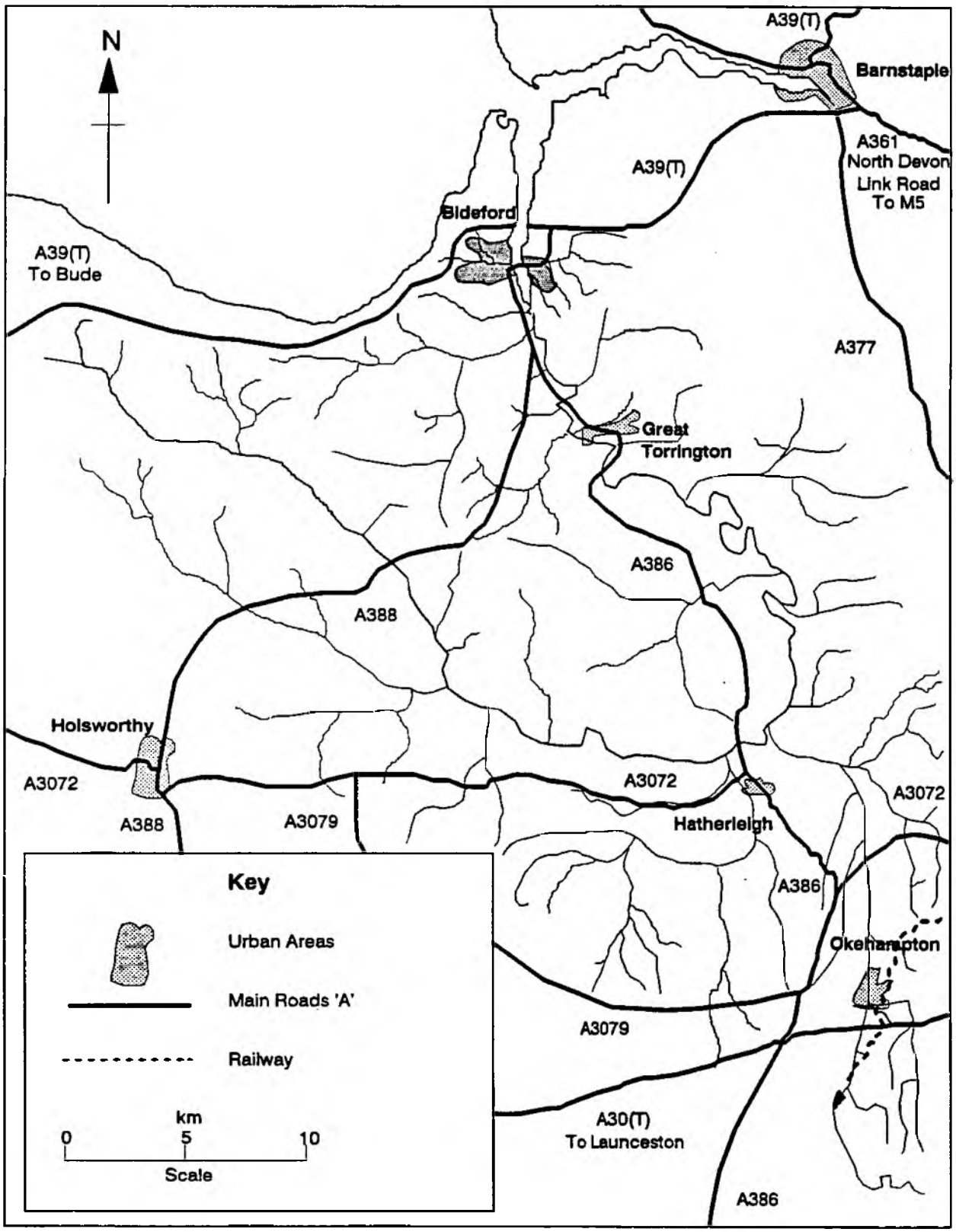
  (i) protect those involved in water contact sports;

  (ii) provide suitable conditions for the activity concerned.

* To provide safe and easy access to the river corridor, in a way which does not impinge unreasonably upon other uses.

* To maintain and improve the natural beauty and amenity value of the river corridor.

Torridge Catchment
Infrastructure and Communications



3.8 Infrastructure and Communications

General

This use deals with roads, railways, power supply, etc. The provision of these elements may lead to significant impact on the natural water environment.

Catchment Perspective

Current Use

The provision of potable supplies is a fundamental requirement. The catchment lies in the North and East Division of SWWSL, which provides the mains water supply. The majority of premises are mains connected, though a large number of small private potable supplies exist in the inland rural area.

There are no mainline British Rail services through the area. Rail freight does operate in the southern part of the catchment, transporting much of the ballast for the British Rail network in southern England.

Recent changes in EC lorry loading regulations require rebuilding of many main and minor road bridges. There are ten crossing rivers in the Torridge Catchment which have to be rebuilt. Four have been reconstructed since late 1991, all strictly in accordance with NRA requirements for work affecting watercourses.

The major roads which service the area include the A386 (Okehampton to Bideford), A388 (Holsworthy to Bideford), A3072 (Holsworthy to Exeter) and the A30(T) (Exeter to Launceston) which transverses the southern part of the catchment. The A386 is the only road in the catchment running parallel to the river for any considerable length; others cross the rivers.

Future Use

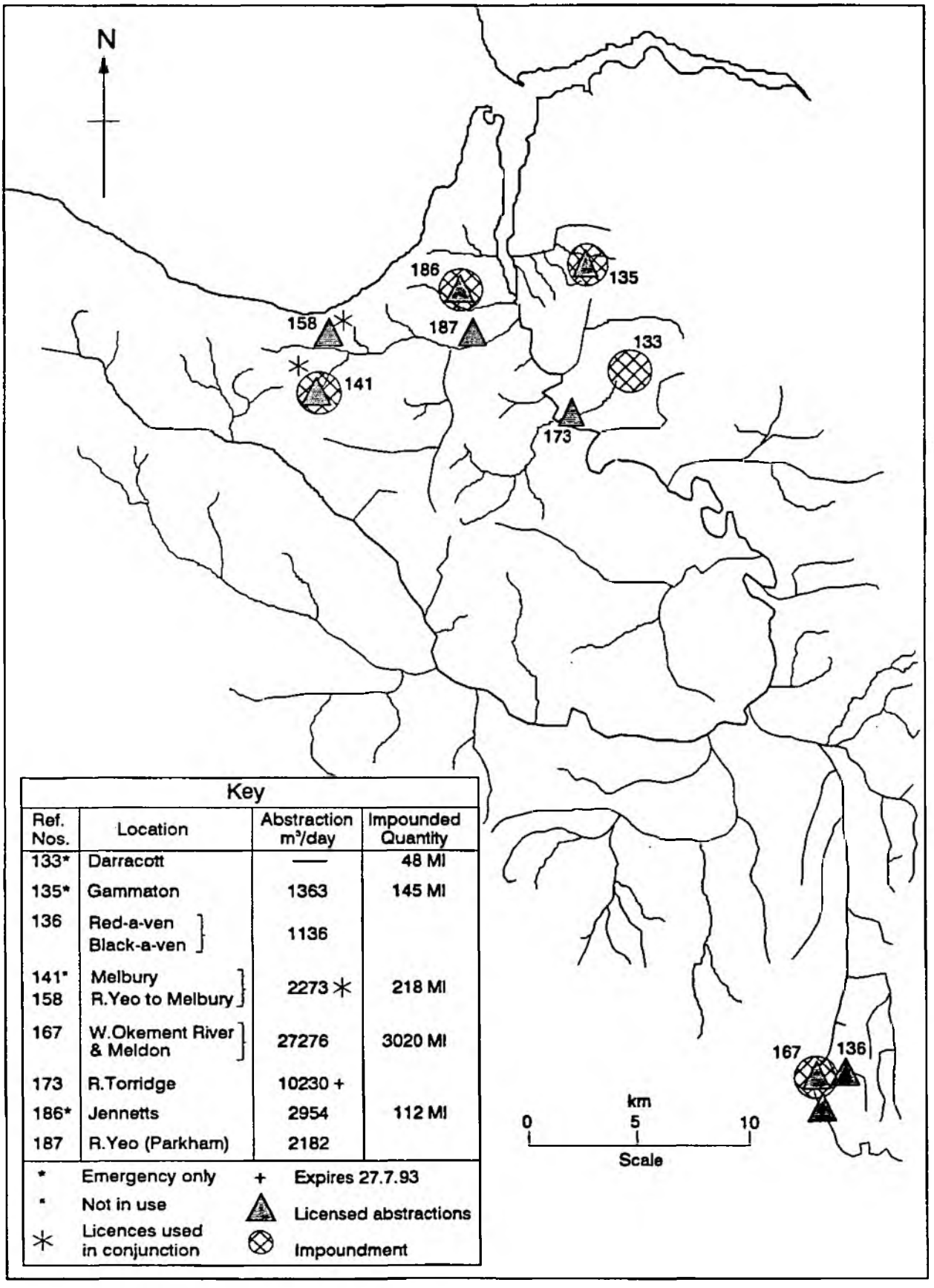
Significant road improvement schemes such as the six bridges to be rebuilt by 1994, and the Hatherleigh by-pass will impact the water environment. The risk of pollution from road run-off or following road or rail traffic accidents will remain, and an increase in traffic will be balanced against safer procedures, including contingency and emergency plans with police, fire and local authorities.

Objectives

* To ensure that infrastructure required to protect and enhance the water environment is provided in advance of its need.

* To influence and control infrastructure provision in such a way that other uses are not compromised.

Torridge Catchment
Licensed Potable Water Abstractions



Key			
Ref. Nos.	Location	Abstraction m³/day	Impounded Quantity
133*	Darracott	—	48 Ml
135*	Gammaton	1363	145 Ml
136	Red-a-ven, Black-a-ven	1136	
141*	Melbury	2273 ✳	218 Ml
158	R.Yeo to Melbury		
167	W.Okement River & Meldon	27276	3020 Ml
173	R.Torridge	10230 +	
186*	Jennetts	2954	112 Ml
187	R.Yeo (Parkham)	2182	

* Emergency only
\+ Expires 27.7.93
* Not in use
▲ Licensed abstractions
✳ Licences used in conjunction
⊗ Impoundment

3.9 Water Abstraction and Water Supply

General

This use deals with surface and groundwater abstractions for potable (i.e. public water supplies) and non-potable (e.g. industrial, agricultural, recreational) supplies. Major potable abstractions are operated by Water Supply Companies. Since 1963 abstractions have been licensed to ensure they do not derogate either existing sources or the natural water environment, including surface water flows. Abstractions of less than $20m^3$ per day for domestic use do not require a licence from the NRA.

Catchment Perspective

Current Use

Historically, public water supply in the catchment has been served by a river abstraction at Torrington, augmented by releases, and by direct abstraction from Meldon Reservoir. Water is treated at Prewley and Great Torrington before passing, mainly by gravity, into the distribution network. There are smaller stand-by reservoirs at Darracott and Melbury.

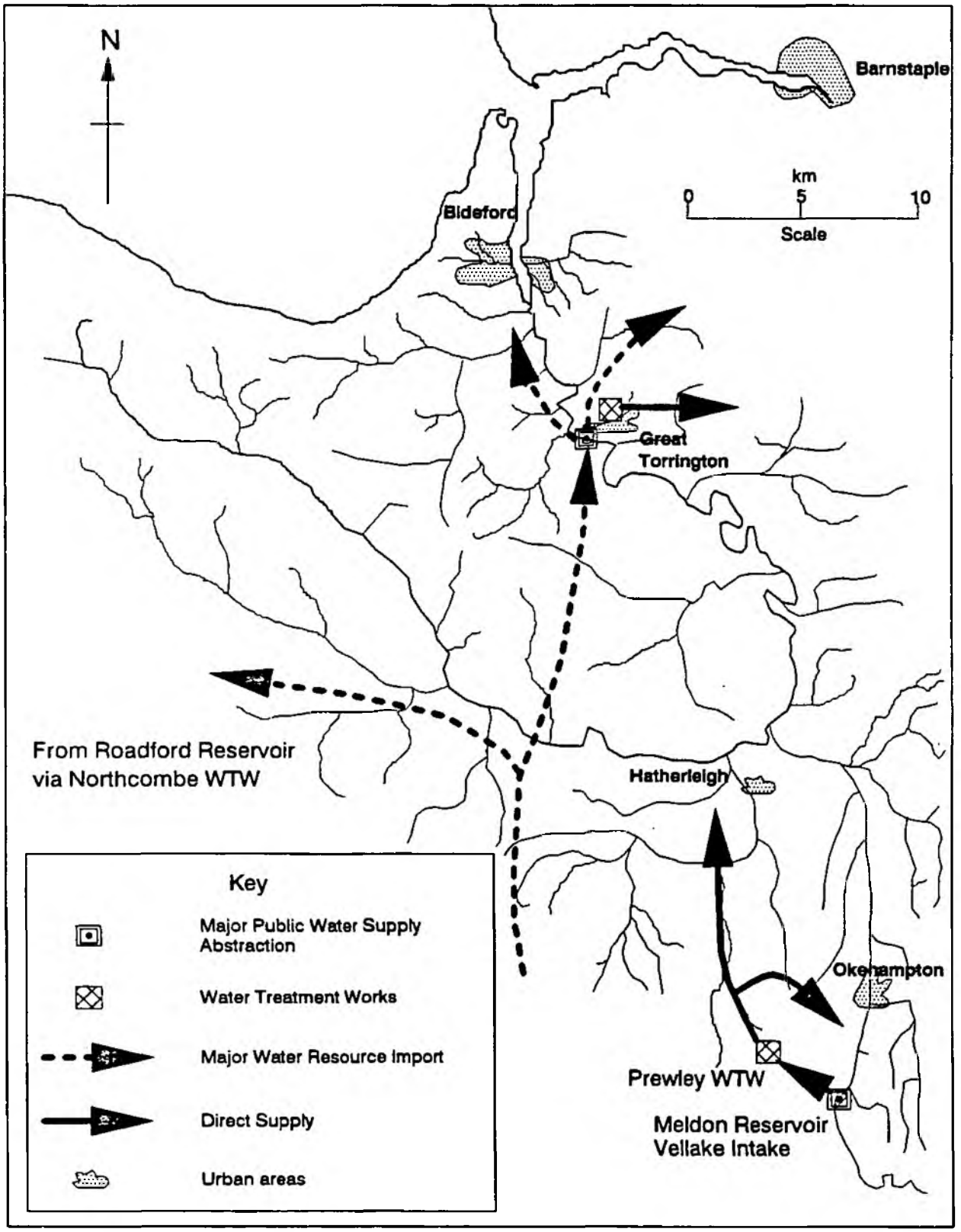
In recent years the development of Roadford Reservoir, in the Tamar Catchment, prompted by the major water supply restrictions during the drought of 1976, has secured a reliable water supply for the Torridge Catchment. In addition a connection between Great Torrington and the Newbridge Water Treatment Works has afforded greater flexibility in water distribution.

The abstractions and supporting impoundments from the headwaters of the West Okement River (SX 560 898) and Meldon Reservoir (SX 563 917), from which up to 27.3 Ml/day can be abstracted, are subject to prescribed flow and compensation release conditions. The river abstraction at Great Torrington (SS 482 191) is licensed for up to 10.2 Ml/day, again subject to prescribed flow conditions, and supportive augmentation releases from Meldon Reservoir at times of low flow. The licence expires summer 1993 and will not be renewed for some years.

A reservoir operating agreement has been drawn up between the NRA and SWWSL for Meldon Reservoir to ensure that the method and timing of releases meet environmental protection requirements. Other minor impoundments and abstractions are licensed for public supply purposes within the catchment. These are shown on the map opposite.

In rural areas with low population density there may be difficulties in supplying mains water at reasonable cost. In these circumstances small-scale groundwater supplies may provide a useful alternative.

Torridge Catchment
Water Supply



The majority of groundwater abstractions in the catchment are exempt from licensing by virtue of the Devon River Authority (Exemption from Control) Order 1970 (see Section 4.3, map 2). The effect of these abstractions cannot, therefore, be easily evaluated.

There is only limited industrial abstraction in the catchment and most businesses derive their water supply from the public water supply.

It is not possible to determine the impact of agricultural abstractions on river flows because many of these are exempt from licensing control and are not known to the NRA.

Future Use

There are no plans to site further storage in the catchment. Future exploitation of water resources and increased abstraction for public water supply, in the longer term, will require pre-emptive monitoring and environmental assessment will be required in order to balance need and impact.

The NRA prefers abstraction in the lower reaches, augmentation of existing storage and tighter control on conservation of water supplies and uses. For example, winter fill of reservoirs reduces impact on river systems.

Little growth is expected in agricultural and industrial abstractions but where growth occurs it is likely to be supplied from the mains.

Spray irrigation has been identified in the regional strategy as a growing use for agriculture and leisure. Farmers and developers will need to assure supplies without detriment to the environment.

Now that Roadford Reservoir is available to back up public water supplies in this catchment, it may be appropriate to consider alternative uses for old, minor reservoirs, such as Darracott, e.g. as fisheries.

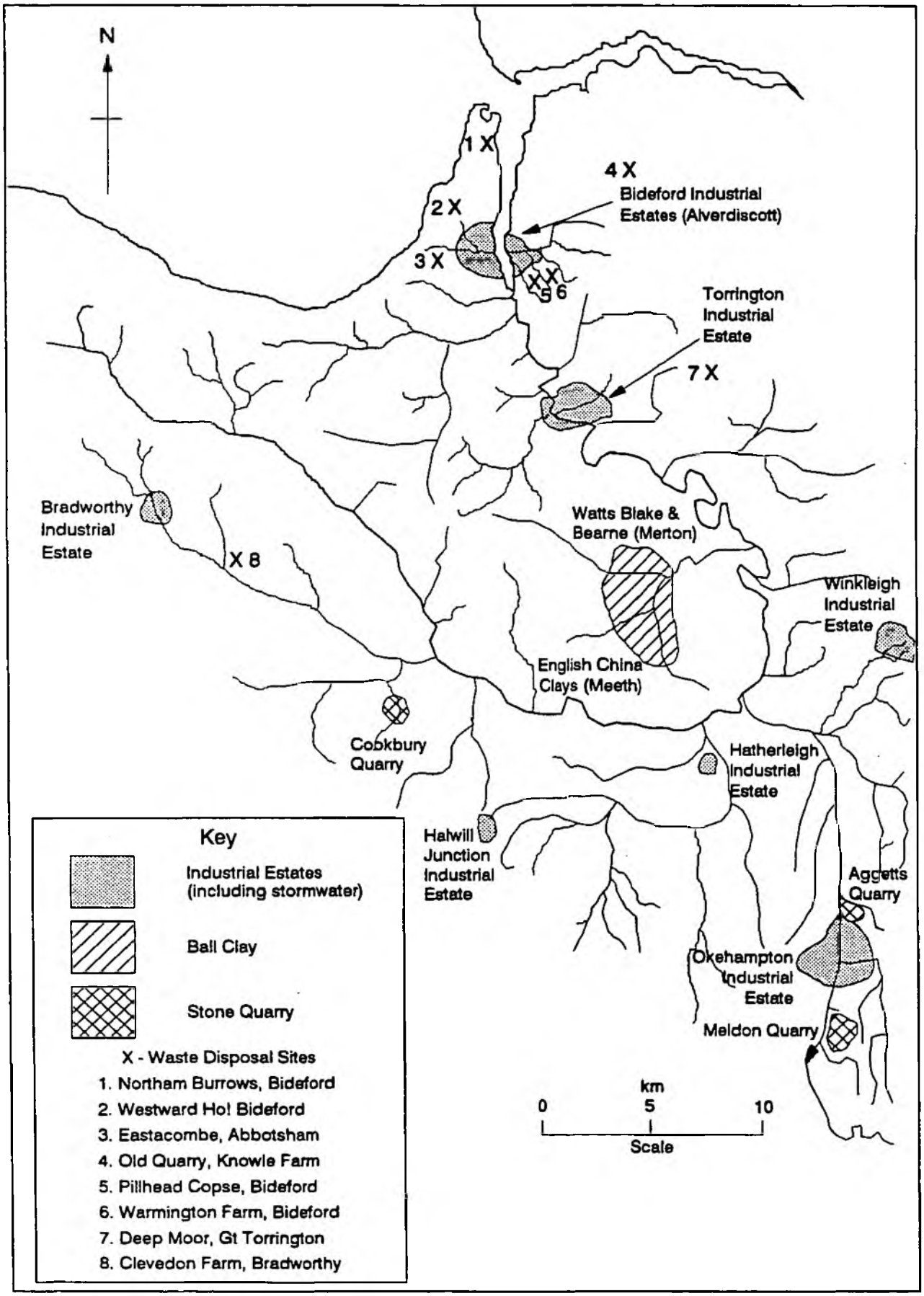
The study into the alleviation of low flows (April 1991) identified six sites in the Torridge catchment where low river flows are significantly affecting the watercourse. However, none fall into the top twenty sites in the region, but action will be required in the longer term should problems recur. A catchment strategy for water resources will need to be developed for the future.

Objectives

* To safeguard potable, industrial and agricultural abstraction points with respect to water quality and quantity. Water quality should be maintained to meet appropriate standards with the aim to safeguard public health, avoid damage to crops and protect the well-being of supplied animals.

* To manage water resources in such a way that a balance is achieved between all abstractors and the natural environment in order that the best use of water resources is made.

Torridge Catchment
Mineral Extraction and Solid Waste Disposal



3.10 Mineral Extraction and Solid Waste Disposal

General

This use deals with mineral extraction, including the potential for infilling with waste together with waste disposal. Mineral extraction has the potential to affect upon the catchment through subsidence, dewatering and stormwater or effluent discharge. Whilst works are both active and closed their potential use as solid waste disposal sites could lead to contamination of ground and surface water. The County Councils are the licensing authority with respect to extraction of natural resources, and must through their Minerals Plan, achieve adequate mineral supplies with minimal environmental cost. The NRA would wish to maximise the environmental benefits associated with site restoration.

Catchment Perspective

Current Use

There are two ball clay extractive industries that operate at Meeth and Merton which are subject to good housekeeping agreements, with the installation of settlement lagoons and surge ponds. This has resulted in improved discharge quality and fewer complaints of discoloration in the receiving waters of the River Mere Catchment. The industries continue to be extensively worked.

Similar good housekeeping practices have been agreed at Meldon Quarry. Improved pH adjustment, settlement and monitoring of the discharge have resulted in more consistent discharge quality. The consent to discharge effluent from the quarry is currently being considered by the Secretary of State.

There are two stone quarries in and around Okehampton which discharge into the River Okement catchment. Discharges from Meldon Quarry have caused significant fish kills in recent years and the five uncontrolled discharges of drainage water have been replaced by one consented discharge with much improved treatment facilities. Another extensively worked small stone quarry operates at Cookbury which discharges into the Cookbury Stream.

The majority of light industrial sites at Bradworthy, Okehampton, Winkleigh and Great Torrington are connected to mains sewerage systems.

The abattoirs at Hatherleigh and Great Torrington dispose of their waste to land via irrigation systems.

Of the twenty-five waste disposal landfill sites which are known within the catchment most are now disused. These rely on dilution, dispersion and attenuation of leachates to limit pollution of the groundwater environment. Although it is known that serious pollution of groundwater and surface watercourses has been encountered in other areas following this approach, it is recognised that the associated groundwater systems are 'local' in character, and that any significant pollution is likely to be evident in emergent springs draining landfilled areas (Ref 5).

The main domestic waste disposal site at Deep Moor, close to Great Torrington, also disposes of leachate to land via an irrigation system. But in late summer (1993) it will go to sewer at Great Torrington.

The dairy at Great Torrington closed down in March 1993 and is operating as a bulk transfer site for milk. The treated effluent used to discharge into the local sewage treatment works. The impact of reduced loading at this sewage treatment works and opportunities for development will need careful planning to minimise environmental problems.

Future Use

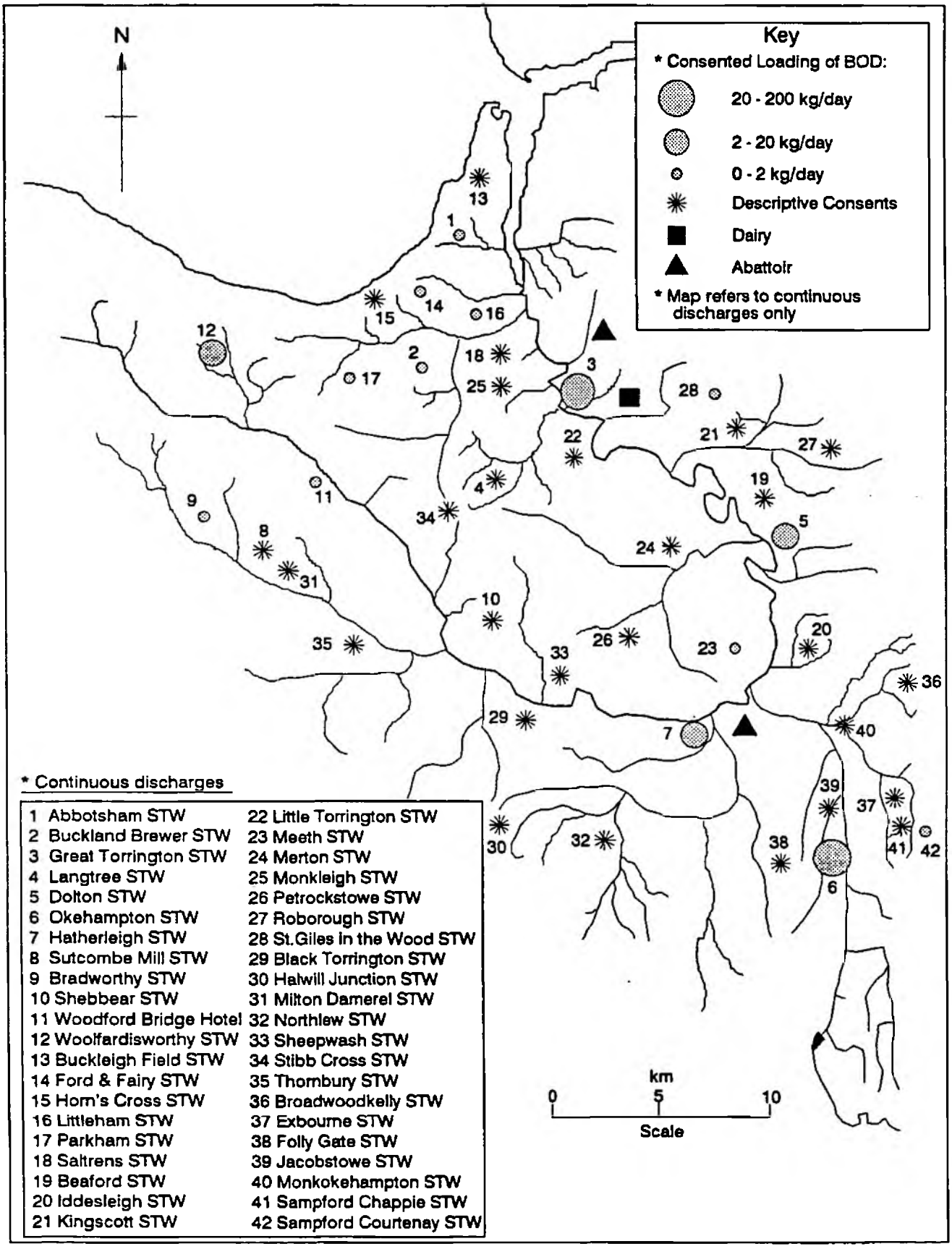
The ball clay and stone quarries will continue to be worked in the catchment for the foreseeable future.

The waste disposal site at Northam Burrows is now closed, but will continue as a civic amenity for the next five years or more.

Objectives

* To control and influence mineral extraction and solid waste disposal in such a way that other uses are not compromised.

Torridge Catchment
Effluent Disposal - Sewage



* Continuous discharges

1 Abbotsham STW	22 Little Torrington STW
2 Buckland Brewer STW	23 Meeth STW
3 Great Torrington STW	24 Merton STW
4 Langtree STW	25 Monkleigh STW
5 Dolton STW	26 Petrockstowe STW
6 Okehampton STW	27 Roborough STW
7 Hatherleigh STW	28 St.Giles in the Wood STW
8 Sutcombe Mill STW	29 Black Torrington STW
9 Bradworthy STW	30 Halwill Junction STW
10 Shebbear STW	31 Milton Damerel STW
11 Woodford Bridge Hotel	32 Northlew STW
12 Woolfardisworthy STW	33 Sheepwash STW
13 Buckleigh Field STW	34 Stibb Cross STW
14 Ford & Fairy STW	35 Thornbury STW
15 Horn's Cross STW	36 Broadwoodkelly STW
16 Littleham STW	37 Exbourne STW
17 Parkham STW	38 Folly Gate STW
18 Saltrens STW	39 Jacobstowe STW
19 Beaford STW	40 Monkokehampton STW
20 Iddesleigh STW	41 Sampford Chappie STW
21 Kingscott STW	42 Sampford Courtenay STW

3.11 Effluent Disposal

General

The River Torridge Catchment is used widely for the disposal of effluents. The majority of the consented discharges made to watercourses are from sewage treatment works. The raw sewage entering a treatment works usually consists of both household sewage and trade effluent from industrial premises. Control of each discharge is achieved by imposing consent conditions which limit the volume and quality of the effluent. The consents are calculated taking account of the upstream water quality and flow in the receiving watercourse and the target water quality assigned to the receiving water. Consenting procedures are detailed in Schedule 10 of the Water Resources Act 1991. Having determined the consent, the NRA has a statutory duty to monitor the discharges and assess compliance against the standards.

Catchment Perspective

Current Use

There are three principle categories of discharges which enter the network of watercourses within the catchment. These are continuous discharges of sewage and trade wastes (see map), intermittent discharges from storm and emergency sewage overflows and diffuse inputs from land run-off.

It is estimated that the total organic load (expressed as Biochemical Oxygen Demand, BOD) discharged directly to the catchment from 144 consent sewage discharges and 35 consented trade discharges is just over 500 kg per day. These discharges are located throughout the catchment but only 15 account for 95% of the total consented loading, as indicated on the attached map.

Very few of the consented discharges contain conditions which limit concentrations of ammonia in the discharge and none contain conditions for nutrients such as nitrates and phosphates.

There are at least 35 storm sewage overflows which discharge within the catchment and at least seven of these are considered to operate frequently. These are located mainly in the Great Torrington area.

Data collected by South West Water Authority in 1978 indicates that 54% of the catchment population are not connected to sewer. Many properties use soakaway systems which have only recently become subject to discharge consents; consequently, historical information is sparse.

Agricultural expansion in the past twenty years has increased pressure on the catchment with greater volumes of liquid waste products from abattoirs at Great Torrington and Hatherleigh and the dairy at Great Torrington. In recent years significantly improved control of effluents has been achieved in Great Torrington at the abattoir and with the closure of the dairy.

Future Use

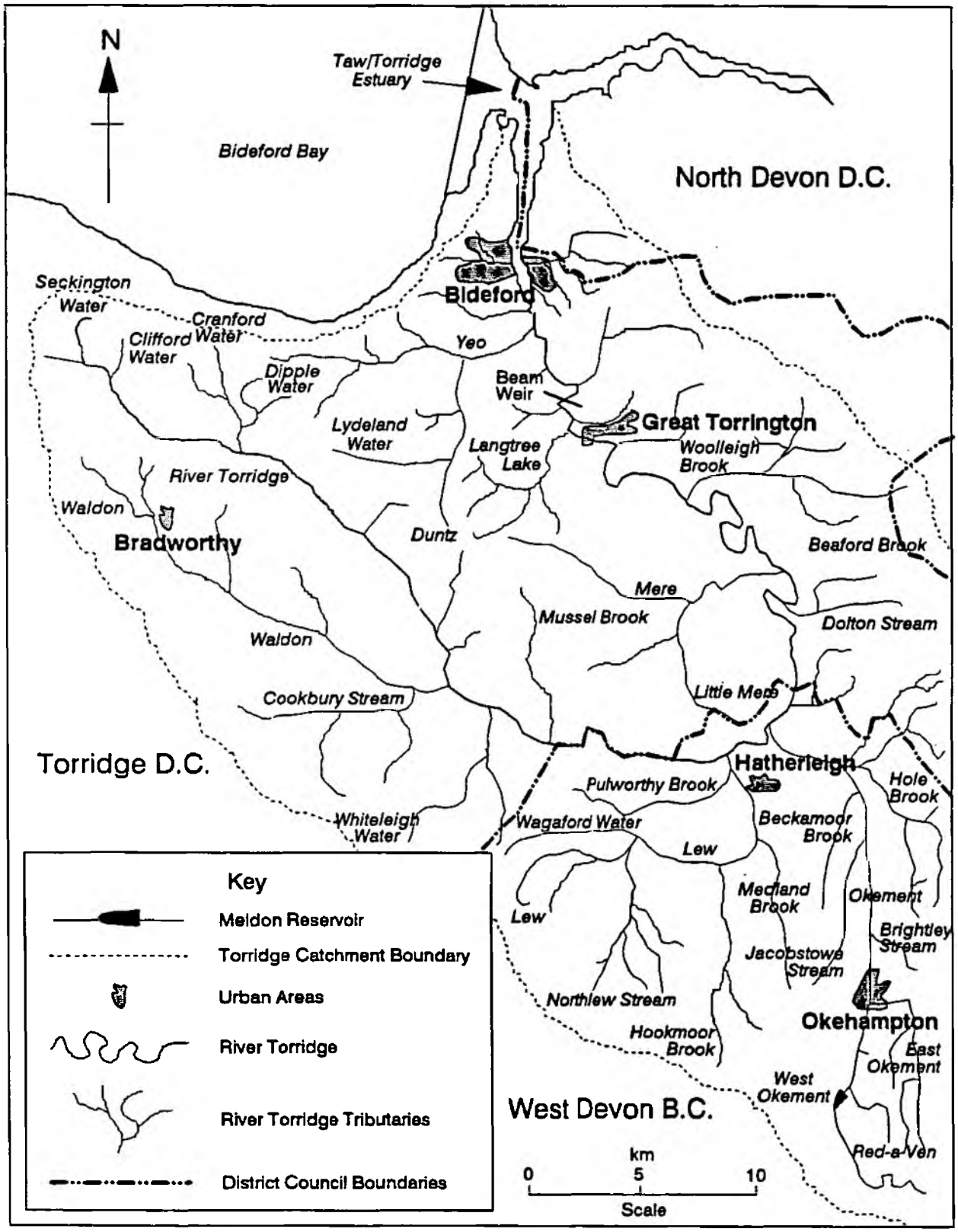
A systematic review of consent conditions will be necessary for discharges which contribute to failure of environmental quality standards. In addition, implementation of the provisions of the EC Urban Waste Water Treatment Directive (91/271/EEC) will be introduced in accordance with specified timescales. This will require a minimum of secondary (biological) treatment at all sewage works and adequate alternation of storm sewage flows. Application of a 'no deterioration' policy will require higher treatment standards to accommodate further development within the catchment.

Objectives

* To control the discharge of effluent to the water environment in such a way that water quality objectives are achieved and maintained and other uses are not compromised.

* To maintain the flow regime at a level necessary to provide adequate dilution for effluent discharges.

Torridge Catchment
District Council Boundaries



3.12 Built Environment

General

This use covers residential, commercial and industrial developments. Land use planning matters are the responsibility of County and District Authorities and Dartmoor National Park. However, the NRA is a statutory consultee in the planning process and can play a key role in influencing such matters.

Catchment Perspective

Current Use

Currently the County and District Councils are revising their statutory land use development plans. These strategic and local plans will dictate future land use policy in the catchment which will influence or interact with the natural water environment. Dartmoor National Park are also producing their own plans.

The NRA recommendations are made, where appropriate, for the inclusion of policy statements in structure, local and other plans to protect the public interest, NRA assets and the water environment. At the local plan level the NRA offers constructive and critical advice on areas proposed for development, such as flood plain and washlands, flooding problems, aquifers and gathering grounds.

In order to fulfil its role of liaison on planning matters the NRA has developed a guide which is regularly updated to take account of the changing environment (Ref 6).

Future Use

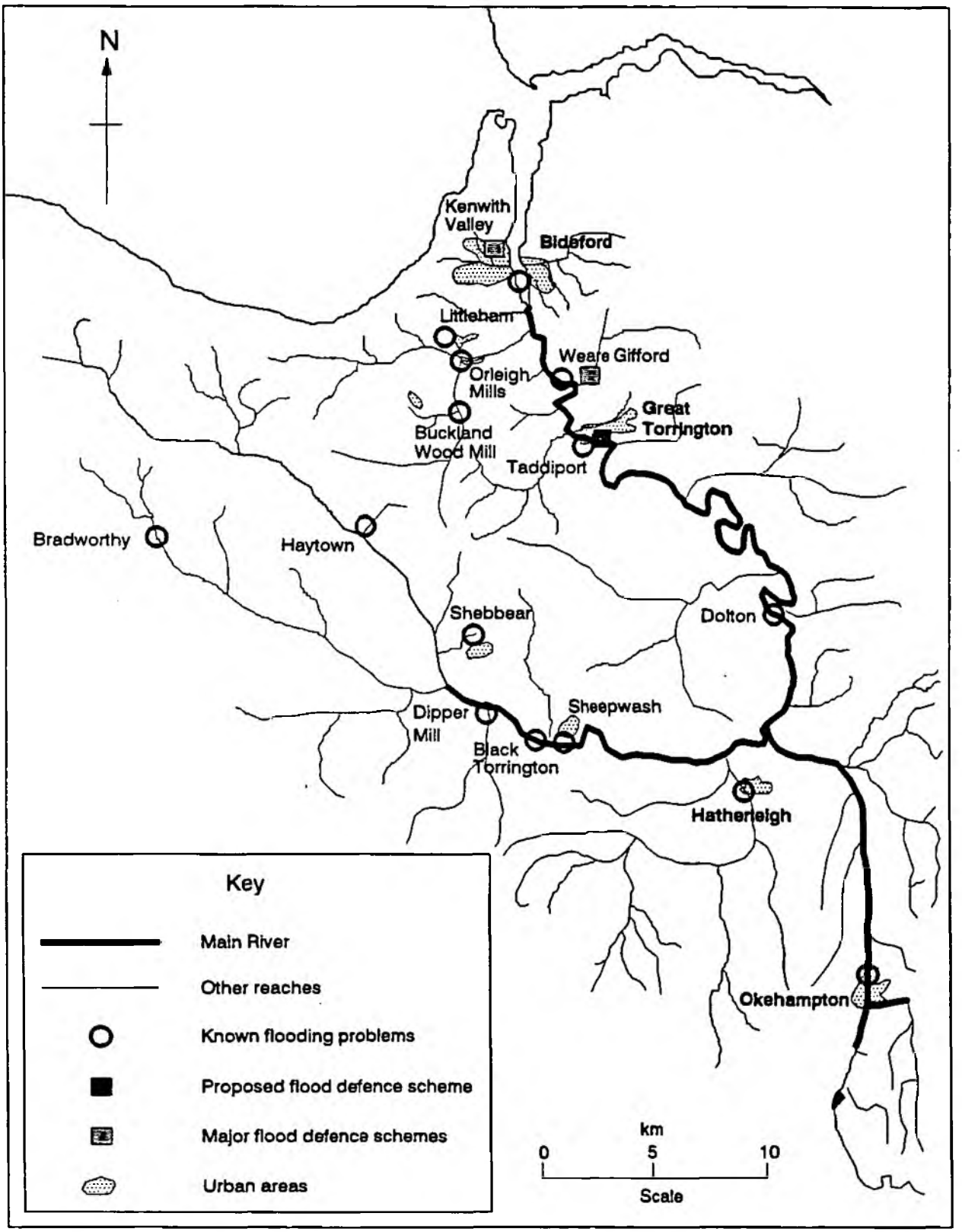
Local authorities play a vital role in the management of the Torridge Catchment and a close professional relationship is developing between the local community, their representatives and the NRA.

Objectives

* To influence and control future built development in such a way that other uses are not compromised.

* To seek enhancements to the water environment through built development.

Torridge Catchment
Flood Defence



3.13 Flood Defence

General

This use identifies the basic role of the river as the conveyance of water from land in the catchment to the sea. There is a requirement to protect people and property against flooding from natural watercourses by containing water within the river channel and controlling its release to the wider flood plain, particularly at times of high flow.

Flood events are described in terms of the frequency at which a certain severity of flood is exceeded: the larger the flow, the longer the return period. The standard of Flood Protection can be measured in terms of the frequency at which, on average, it will prove ineffective, for example, 1 in 100 years. The standards considered appropriate vary according to land-use to be protected, and the economics of providing the service. In built-up areas, flood defences are commonly designed to withstand a flood return period of 100 years. In agricultural areas upstream or downstream of towns, river defences could be designed for a flood return period of five years.

For management purposes, certain watercourses are identified as statutory "Main River". On Main Rivers the NRA have permissive powers to construct new defences, maintain defences, and control the actions of others. Any proposal to interfere with the bed or banks of the river or obstruct the flow requires a Land Drainage Consent. The NRA has powers on all other watercourses in respect of Flood Defence, but on non-main rivers, Local Authorities are the first point of contact. However, flooding from sewers is the responsibility of the Local Authority and SWWSL.

By influencing and controlling the actions of others, the risk of flooding to existing and future uses, for example housing development, can be minimised.

Flood defence work is closely associated with the physical form of the river and adjacent areas. Therefore, there is the potential for conflict with uses which depend on the structure of the river, e.g. fisheries and ecology.

Catchment Perspective

Current Use

The catchment is predominantly rural with few significant locations still liable to flooding, apart from the estuary which is covered in a separate management plan (Ref 7). A scheme is included in the five year capital programme to protect Taddiport at Great Torrington.

There has been some historical pioneer clearance work on the main river sections but no arterial drainage schemes are proposed.

In the past, flood defence works have come into some conflict with other river uses - notably conservation and fisheries. However, great progress has been made over the last ten years in achieving hydraulic performance targets without significant impact to the river habitat.

Future Use

Detailed design of the proposed Hatherleigh by-pass has taken into account all NRA interests. It has been designed to provide appropriate standards of protection against flooding in the village and surrounding area.

Objectives

* To provide effective defence for people and property against flooding from main rivers.

* To provide adequate arrangements for flood forecasting and warning.

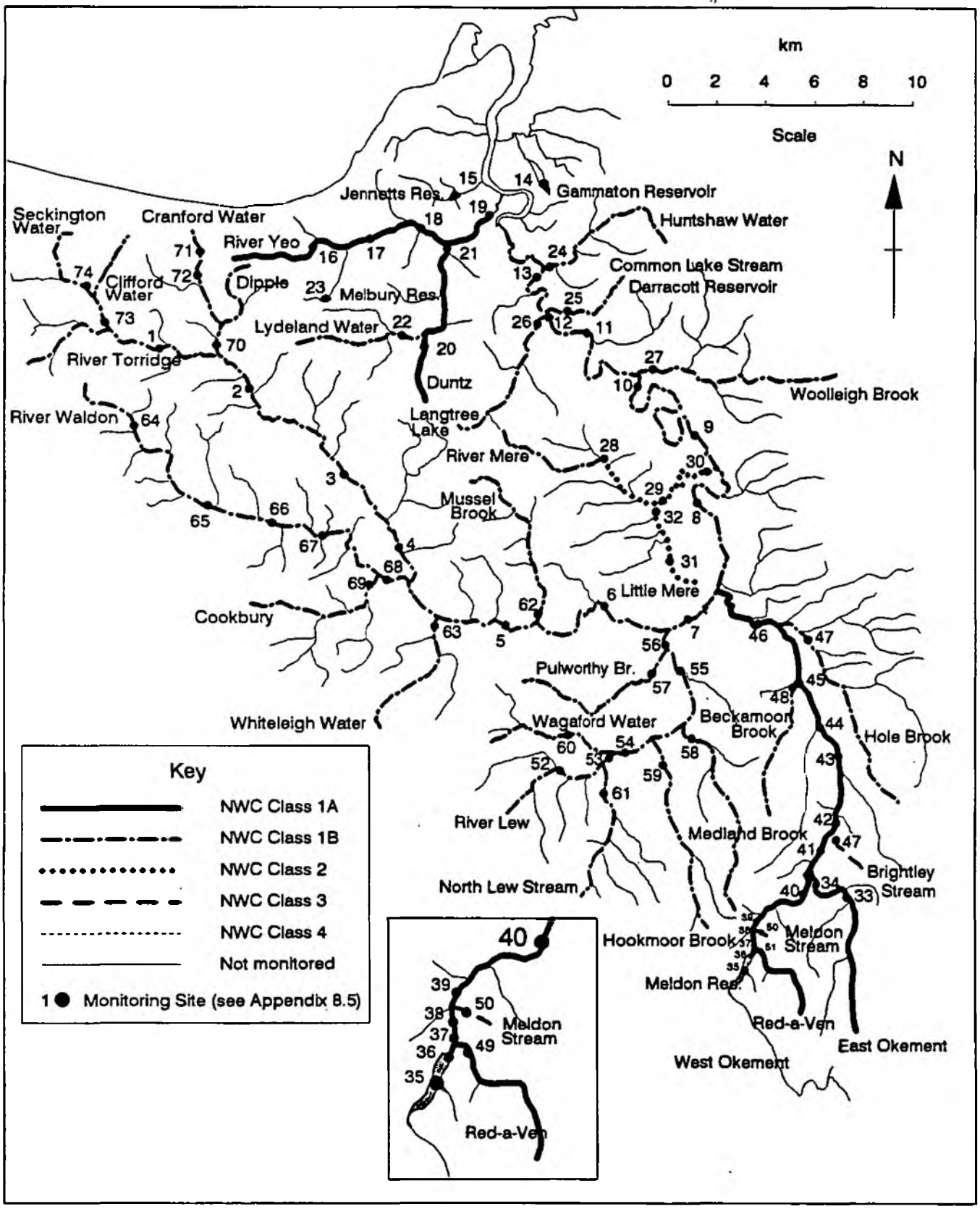
CATCHMENT STATUS

4.1 Introduction

The purpose of this section is to compare the current status of the catchment (where it is known) with overall standards/targets in respect of water quality, water resources, flood defence and conservation.

Comparison of the 'current status' with the 'overall target' enables issues - which may be problems due to failures to meet targets, or conflicts due to differing uses having opposing requirements - to be identified. The issues are presented in detail in Section 5.

Torridge Catchment
River Quality Objectives



4.2 Water Quality - Current Status

The NRA aims to maintain and improve the quality of water for all those who use it.

In order to achieve this, the chemical quality of rivers is monitored against relevant statutory and non-statutory standards set out in European Community (EC) Directives and non-statutory River Quality Objectives (RQOs). The biological condition of the river is also monitored, to provide an indication of the overall ecological quality of the river.

To date, there has only been limited monitoring of groundwater quality within the Torridge River Catchment. However, the recently published document "Policy and Practice for the Protection of Groundwater" (Ref 8) has established a framework for protecting groundwater quality.

A new classification system known as "Statutory Water Quality Objectives" (SWQOs) will be introduced shortly which will apply to surface waters such as rivers and lakes, and which may, in the future, also apply to groundwaters (Ref 9). Although similar to the existing RQO system, water quality will be more clearly related to the current and future use of these waters.

Surface Water Quality - Chemical Status

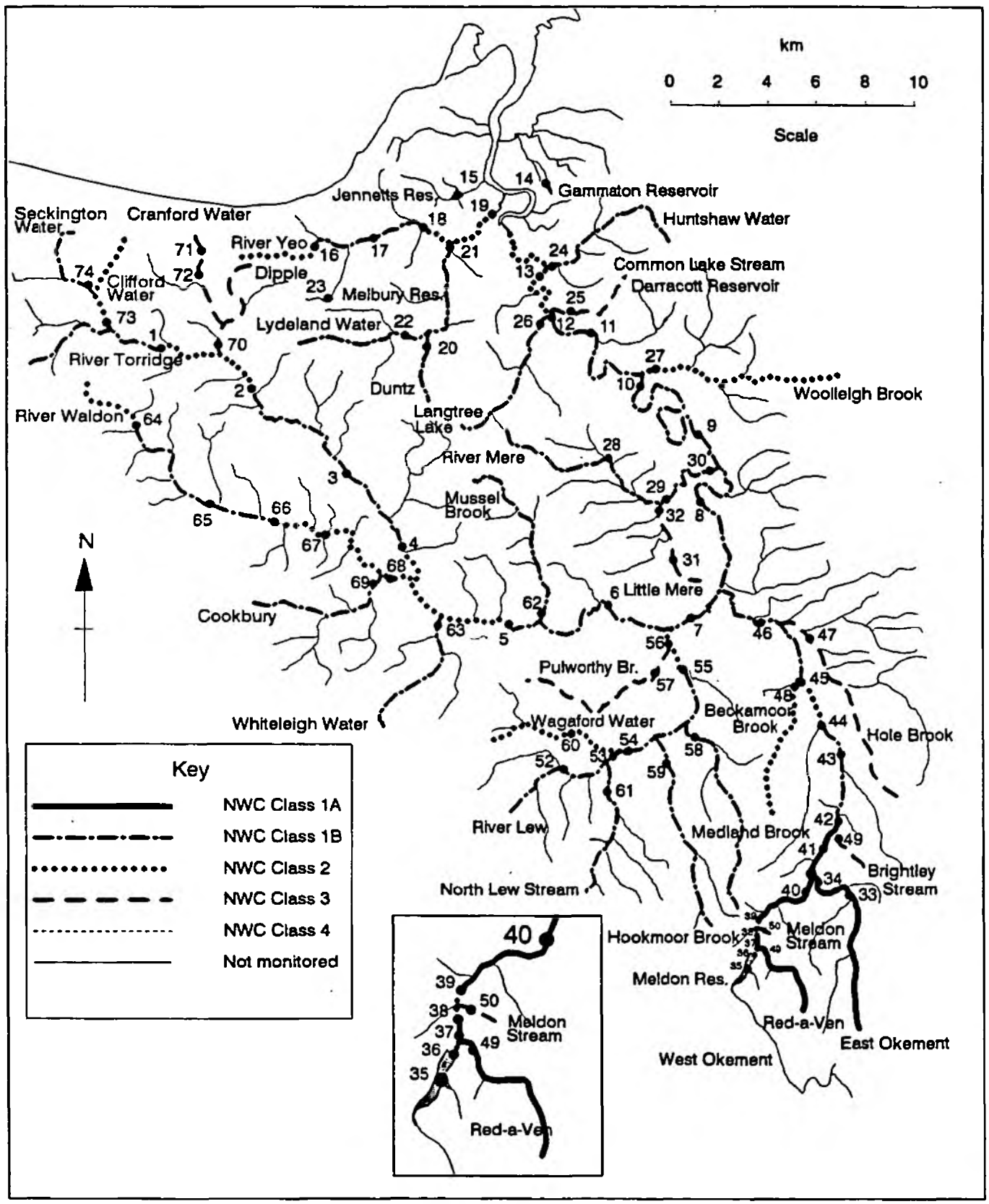
River Quality Objectives and NWC River Classification System

The NRA currently uses a system of RQOs for the classification and assessment of the water quality of watercourses. This system is derived from a 1978 National Water Council (NWC) policy document, and was established in 1979 (Ref 10). The system is based on setting water quality standards which protect water quality for a variety of uses, such as fisheries, abstraction for potable water supplies and amenity value (Appendix 8.4). Objectives were set regionally on the basis of local knowledge of the existing uses made of the river, and existing water quality data at that time. Chemical quality standards were drawn up for these objectives so that the degree of compliance could be objectively assessed. All classified watercourses were given a current objective. Some stretches of water were given future objectives where improvement was desirable but not immediately practicable.

The five classes of the NWC classification system are given below:

Class	Description
1A	Good Quality
1B	Lesser Good Quality
2	Fair Quality
3	Poor Quality
4	Bad Quality

Torridge Catchment
Water Quality - 1991



The majority of the River Torridge catchment was assigned an RQO of Class 1B in order to protect the uses for potable water supply and salmonid fishery, whilst recognising that due to influences such as land use, geology and pedology, these waters were unlikely to be able to consistently achieve Class 1A status. Some of the River Mere sub-catchment was assigned an RQO of Class 2, due to the impact of the ball clay extractive industry which was considered, at the time, to be uncontrollable through legislation. Two small tributaries within the River Okement Catchment, the Brightley Stream and Meldon Stream were assigned RQOs of Class 3 as they cannot support fish, and water quality is frequently very poor with low pH values and high metal concentrations, due to the mineralised geology in the area.

Each year river water quality is monitored at the sites shown in Appendix 8.5 and river reaches are given an NWC classification based on the concentrations of certain determinands, principally ammonia, biological chemical demand (BOD) and dissolved oxygen, which are expected to be achieved in 95% of sample results. The NWC system also allows for the use of other key determinands recommended by the European Inland Fisheries Advisory Committee (EIFAC) (Ref 11). As a result, this NRA region has incorporated standards for pH, suspended solids, temperature, unionised ammonia, dissolved copper and total zinc into the classification scheme.

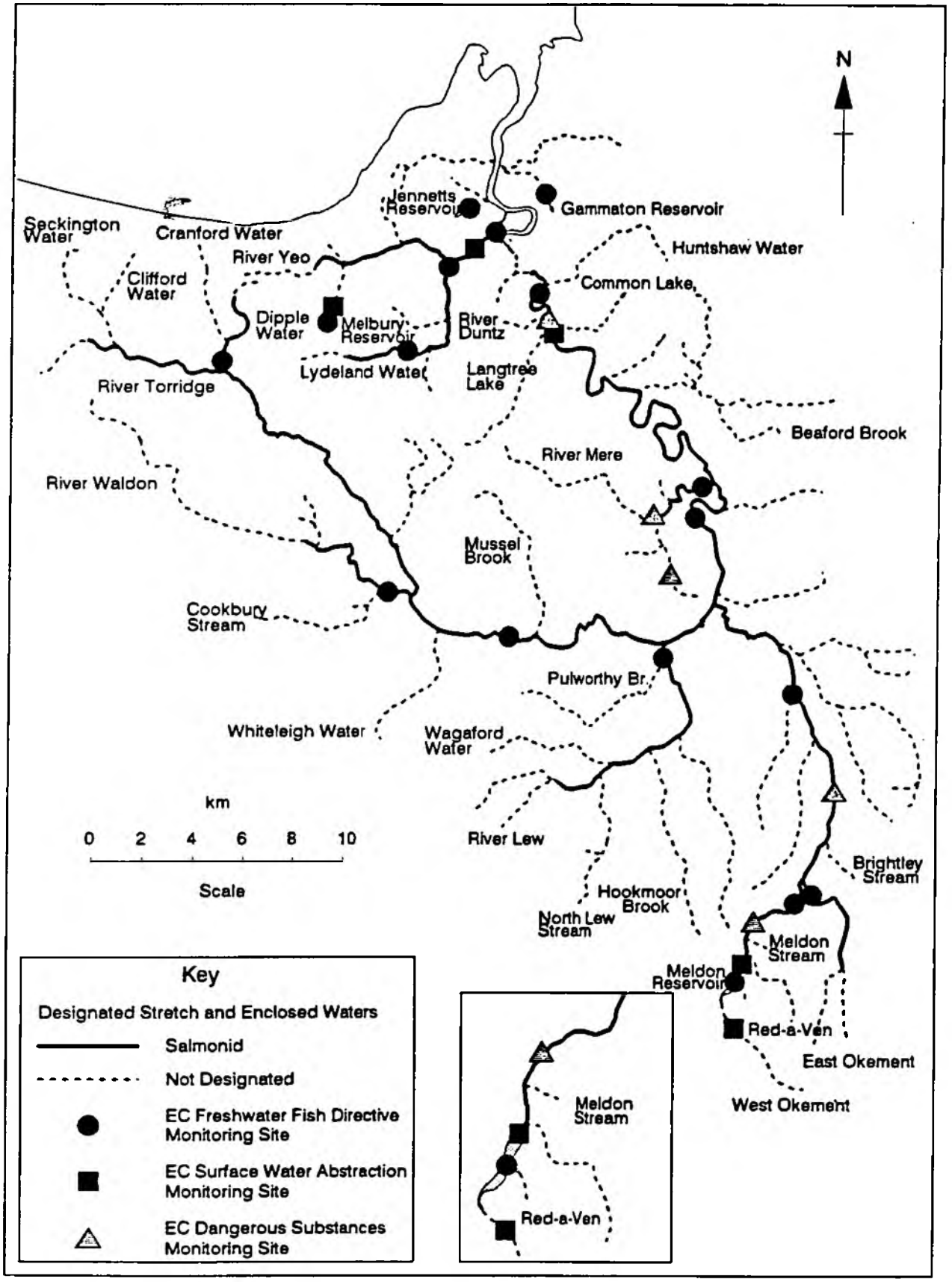
In 1991, the last year for which a full assessment is available, several river stretches failed to meet their RQOs. The following stretches failed to comply with the standard for BOD: Main River Torridge at Kingsley Mill; Gammaton Stream; Jennett's Stream; River Yeo (Bideford); River Duntz; Common Lake; Woolleigh Brook; lower reaches of the River Okement; Hole Brook; middle reaches of the River Lew; Pulworthy Brook; Wagaford Water; lower reaches of the River Waldon; Dipple Water; upper reaches of Cranford Water and Clifford Water.

The following stretches failed to comply with the standard for ammonia: upper reaches of the River Duntz; Common Lake; the River Okement at South Dornaford; upper reaches of the River Waldon; the Dipple Water; Cranford Water and Clifford Water.

The following stretches failed to comply with the standard for dissolved oxygen: Jennett's Reservoir; lower reaches of the River Yeo (Bideford); Beckamoor Brook and Pulworthy Brook.

The table below summarises river water quality in terms of the difference between the percentage length of river assigned an RQO and the actual NWC Classification achieved. In 1990, the determinand suspended solids was included in the assessment and this resulted in more river lengths being given a classification of Class 3.

Torridge Catchment
EC Directive Monitoring



Difference (%) between River Quality Objectives and Water Quality Classification

NWC Class	1989	1990	1991	Comment
1A	-6.6%	-9.0%	-11.6%	Deteriorating
1B	-33.5%	-30.7%	-20.0%	Improving
2	+40.2%	+27.0%	+19.1%	Improving
3	-0.1%	+12.8	+12.4%	No change
4	-	-	-	
Compliant River Length (%)	58%	48.5%	57.2%	

Surface Water Quality - EC Directives

There are three EC Directives that currently apply to the River Torridge catchment. As the competent authority for implementing the directives, the NRA monitors water quality and reports the results to the Department of the Environment (DoE), who assess and report compliance with the Directives to the EC.

The Freshwater Fisheries Directive "on the quality of waters needing protection or improvement in order to support fish life", 78/659/EEC, is concerned with ensuring that water quality in designated stretches of water is suitable for supporting fisheries. This Directive contains two sets of quality standards, one at levels to support a cyprinid fish population (i.e. coarse fish) and another set at stricter levels to support a salmonid fish population (e.g. salmon and trout) (Appendix 8.6). There are two sets of standards for each fishery type, imperative standards, which must be achieved and guideline standards which Member States should aim to achieve.

Reaches of the Main River Torridge including Dipple water, reaches of the River Yeo sub-catchment, the Mere sub-catchment, the Okement sub-catchment, Lew sub-catchment, and Waldon sub-catchment have been designated as salmonid fishery. There are no stretches designated as cyprinid fishery.

There are two stretches of the river, the West Okement and East Okement, which because of the natural geology, have low pHs, and therefore are derogated from the pH standard set out in this Directive.

In 1991, the River Torridge at Beam Bridge, the West Okement, the East Okement and Dipple Water exceeded the imperative standard for zinc. All other imperative standards were met.

The Dangerous Substances Directive "on pollution caused by certain substances discharged in the aquatic environment of the community", 76/464/EEC, is concerned with controlling certain substances considered harmful which are discharged to the aquatic environment. (Ref 12). The Directive established two lists of compounds. List I contains substances regarded as particularly dangerous because of their toxicity, persistence and bioaccumulation. Discharges of List I substances must be controlled by Environmental Quality Standards (EQSs) issued through Daughter Directives. List II contains substances which are considered to be less dangerous but which still can have a deleterious effect on the aquatic environment. Discharges of List II substances are controlled by EQSs set by the individual Member States (Appendix 8.7).

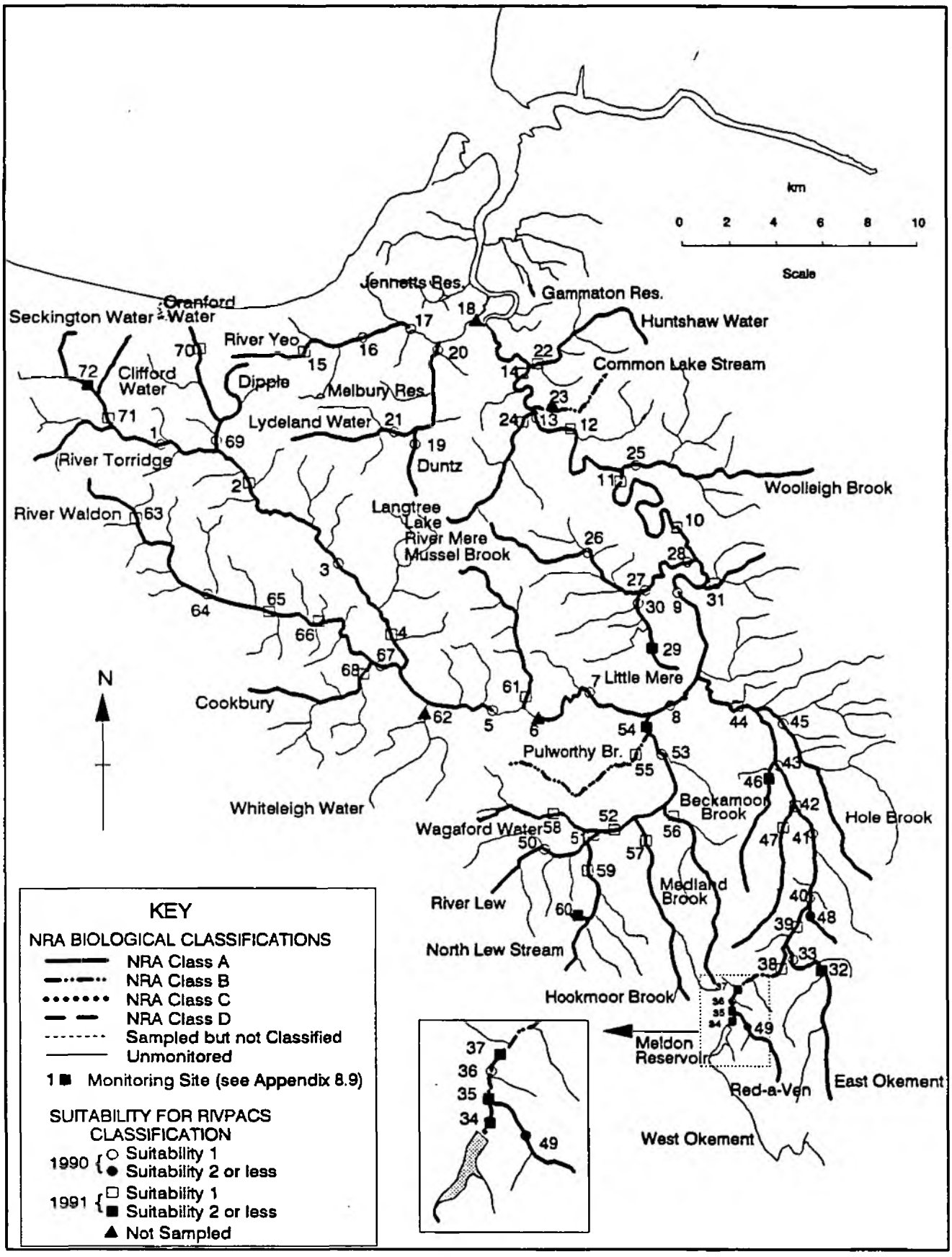
The River Torridge is sampled downstream of Great Torrington Sewage Treatment Works (STW). The River Okement is sampled downstream of Okehampton (Hill Barton) STW, the West Okement is sampled downstream of Meldon Quarry Adit, the River Mere is sampled downstream of discharges from the ball clay industry, the Little Mere is sampled downstream of Stockleigh Quarry. The background concentration of Dangerous Substances in the catchment is monitored at Beam Bridge on the River Torridge.

In 1991, the West Okement downstream of Meldon Quarry Adit exceeded the List II EQSs for copper and zinc. The River Okement downstream of Okehampton STW exceeded the List II EQSs for copper, zinc, lead and pH. This is thought to be due to the high background concentrations of these substances from Meldon Quarry and due to the geology rather than the sewage treatment works. No other standards were exceeded at any of the other sites monitored.

The Directive "concerning the quality required of surface water intended for the abstraction of drinking water in the Member States" (75/440/EEC), ensures that surface water abstracted for use as drinking water meets certain standards and is given adequate treatment before entering public water supplies. The Directive sets out imperative standards which must be achieved, and guideline standards which Member States should aim to achieve, for water for public supply which is to be given different levels of treatment (Appendix 8.8).

The River Torridge at Great Torrington, the West Okement River, Meldon Reservoir and Melbury Reservoir are sampled for this Directive. In 1991, none of the imperative standards were exceeded at any of these sites.

Torridge Catchment
NRA Biological Class - 1990/91



There are two other EC Directives which apply to surface waters which do not as yet have implications for improvements to the River Torridge catchment. The EC Directive "concerning urban wastewater treatment", (91/271/EEC) lays down minimum standards for the provision of sewerage treatment systems and sewage treatment. The Directive specifies secondary treatment as the norm, but provides for higher standards of treatment for discharges to "sensitive" areas. Sensitive areas are those where waters are used for surface water abstractions; where the nitrate concentration exceeds the standards in the Surface Water Abstraction Directive (75/440/EEC); where surface waters are or may become eutrophic in the near future; or where more stringent treatment is required to fulfil the requirements of other EC Directives.

The River Torridge downstream of Great Torrington was nominated as a sensitive area. Data is being collected with a view to propose designation of this area as sensitive in the future.

The EC Directive "concerning the protection of waters against pollution caused by nitrates from agricultural sources" (91/676/EEC), requires Member States to identify waters affected by pollution from nitrates or which could be affected by pollution from nitrates if protective measures are not taken. The land draining to these areas is designated as "vulnerable zones" and action plans must be established to reduce existing nitrate pollution and preventing further pollution. In the UK, the identification of vulnerable zones has been limited to catchments around strategic public water supply sources where existing data shows that standards for nitrate drinking water have been or will be exceeded by 2010. In the Torridge catchment, the public water supply abstraction at Great Torrington was identified. However, data from this site shows that concentrations of nitrate have always been well within the standard for drinking waters. Therefore, no "vulnerable zones" are currently proposed for identification in the River Torridge catchment.

Surface Water Quality - Biological Classification

The ecological quality of the River Torridge catchment is monitored using benthic macroinvertebrates. These are small animals which inhabit the river sediments. They are unable to move far and so respond to long-term conditions within the watercourse throughout the year. They provide an overall indication of the ecological condition of the river which complements the chemical classification provided by the NWC system.

Samples are collected from the sites shown in Appendix 8.9 during Spring, Summer, and Autumn, and are analysed to give a complete list of macroinvertebrate families (taxa) present. The diversity of taxa found is related to water quality using the Biological Monitoring Working Party (BMWP) scoring system. The actual score is compared to a predicted score for a physically similar river of good ecological quality and the difference between what was found and what was predicted is used to classify the river given below:

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

In 1990/1991, the last years for which an assessment is available, most of the waters in the Torridge catchment were of good ecological quality. 317.3 km were Good Quality, 16.4 km Class B, Moderate Quality; and 0.3 km were Class C, Poor Quality. There were no stretches of river of Class D, Very Poor Quality.

The Common Lake Stream, Pulworthy Brook, and the Okement upstream of Meldon Quarry bridge were of moderate ecological quality. The West Okement immediately downstream of Meldon Dam was of poor ecological quality.

A full assessment of ecological quality of the River Torridge is in preparation.

Surface Water Quality - Pollution Incidents

The number of recorded pollution incidents each year is increasing. This is thought to reflect greater public awareness, and therefore reporting of incidents rather than an actual decline in standards. However, this does not reduce the importance attached to the effect of these incidents on the natural water environment.

The majority of all pollution incidents reported in the catchment are related to agriculture. Numbers of category 1 (major), 2 (significant) and 3 (minor) incidents for 1990, 1991 and 1992 are given below.

	Categories		
	1	2	3
1990	5	24	81
1991	8	27	248 *
1992	2	15	144 *

* These figures include taskforce inspections.

Information now being collected indicates a fall in the number of major (category 1) incidents. A definition of pollution incident categories is given in Appendix 8.10.

Groundwater Quality - Chemical Status

Only a limited amount of data, collected during the 1992 survey of minor aquifers in the South West region, is available for the water quality of groundwater in the Torridge catchment. However, further evidence of the water quality of groundwater is available from the analysis of river water quality during periods of low flow, and from other parts of the county with similar hydrogeological settings.

The survey results suggest that a proportion of small-scale groundwater supplies for potable use are contaminated with bacteria and may contain elevated concentrations of other contaminants, including iron, manganese and nitrate.

The NRA is continuing to investigate the water quality of groundwaters including more sites within the Torridge catchment. The 1993 survey will sample additional sources in order to establish a baseline from which to assess any future quality changes. These data will enable the NRA's objective of no deterioration in groundwater quality to be applied.

Groundwater Quality - EC Directives

There is one EC Directive which currently applies to groundwaters in the Torridge catchment. The EC Directive "on the protection of groundwater against pollution caused by certain dangerous substances", (80/68/EEC) is concerned with protecting groundwaters from pollution from certain substances considered dangerous on the basis of their toxicity, persistence, bioaccumulation and carcinogenic, mutagenic or teratogenic properties in the aquatic environment. The Directive identifies two lists of compounds similar to those listed in the Dangerous Substances Directive (76/464/EEC). List I contains substances which are not allowed to enter groundwaters and List II contains substances which must only have a limited entry to groundwaters. This Directive applies to all discharges to groundwaters for example discharges from waste disposal sites and disturbance of contaminated land. The NRA carries out its duties under this Directive as Statutory Consultee to the Waste Regulation Authorities (WRAs), providing advice during the issuing of waste disposal licences, and auditing monitoring data collected by waste disposal site operators.

The EC Directive "concerning the protection of waters against pollution caused by nitrates from agricultural sources" (91/676/EEC), also applies to groundwaters (see Surface Water Quality - EC Directives). However, in the UK, the identification of vulnerable zones is limited to areas around strategic public water supply boreholes. There are no strategic public water supply boreholes in the Torridge catchment, therefore, no vulnerable zones have been identified in this catchment.

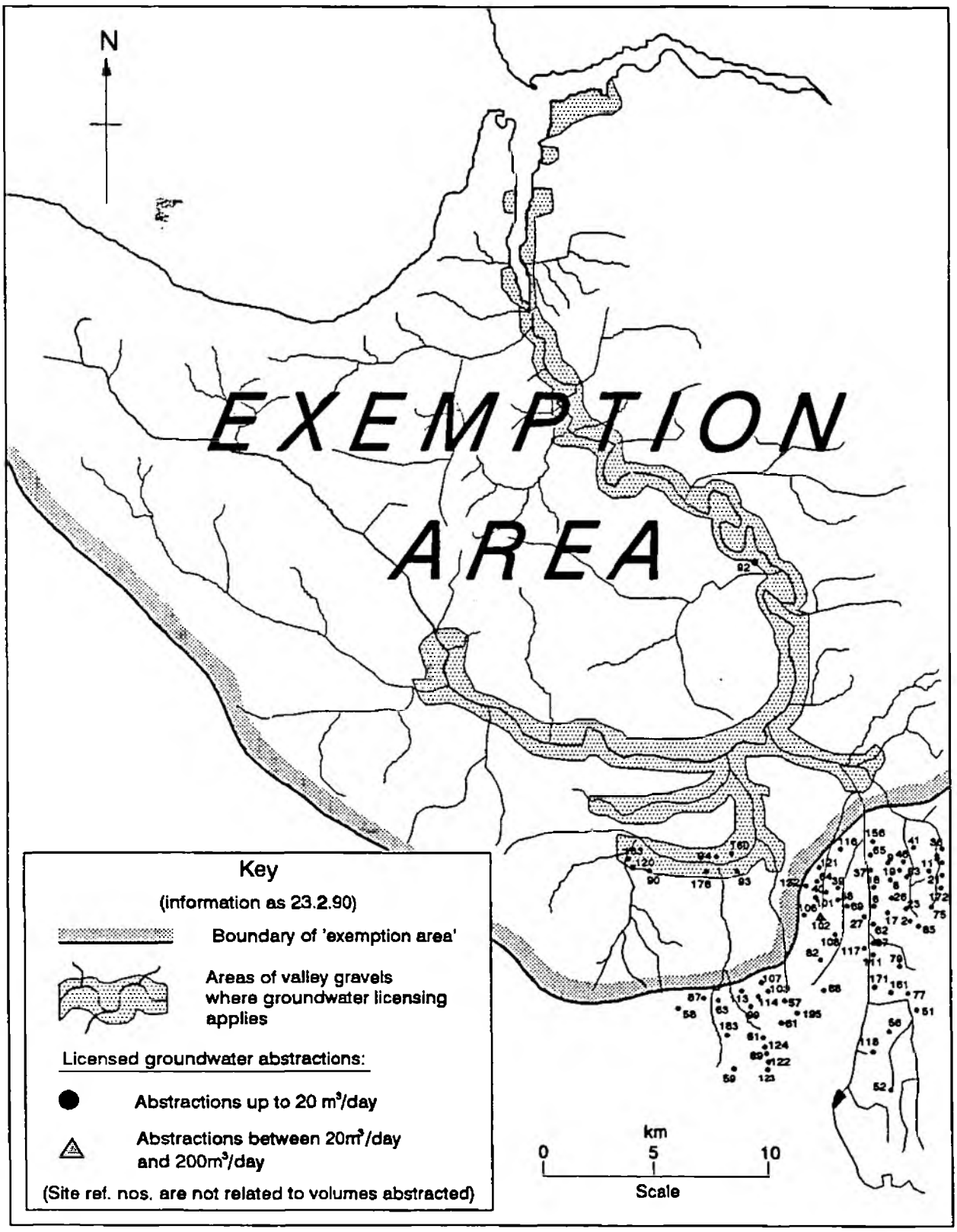
Targets

(i) To develop, consult and set a timetable for the achievement of Statutory Water Quality Objectives for the catchment, meanwhile to continue the improvements to achieve current River Quality Objectives.

(ii) To ensure compliance with the standards laid down in current and future EC Directives when reviewing existing discharge consents and, where necessary, issuing new discharge consents.

(iii) To undertake pollution prevention work such as task force action to minimise diffuse pollution and prosecute illegal discharges.

Torridge Catchment
Water Resources (Map 1)



4.3 Water Resources - Current Status

The NRA's aim is to assess, manage, plan and conserve water resources. One of our key objectives is to develop and implement a water resources strategy.

Following the publication of a National Water Resources Development Strategy (Ref 13) a regional strategy is currently being prepared, which will ultimately be followed by specific catchment strategies. It is therefore too early to report on a definitive strategy for the Torridge Catchment but the NRA's approach is to achieve the right balance between protecting public water supplies and safeguarding existing water rights, uses and the water environment.

The key requirements of such a catchment strategy for the River Torridge are :

i) to protect river low flows so that abstractions do not reduce the river flow below the Q95 flow, until such time as minimum acceptable flows or ecological acceptable flows have been developed (Ref 14);

ii) to assess what limitations should be made to total abstraction over the period April to September, as a given multiple of the daily Q95 flow, so as to protect the character of the river regime;

iii) to ensure detailed environmental studies are completed to identify environmental flow protection requirements for the lower freshwater reach and the estuary below the Great Torrington public water supply abstraction intake, prior to any new licence being granted;

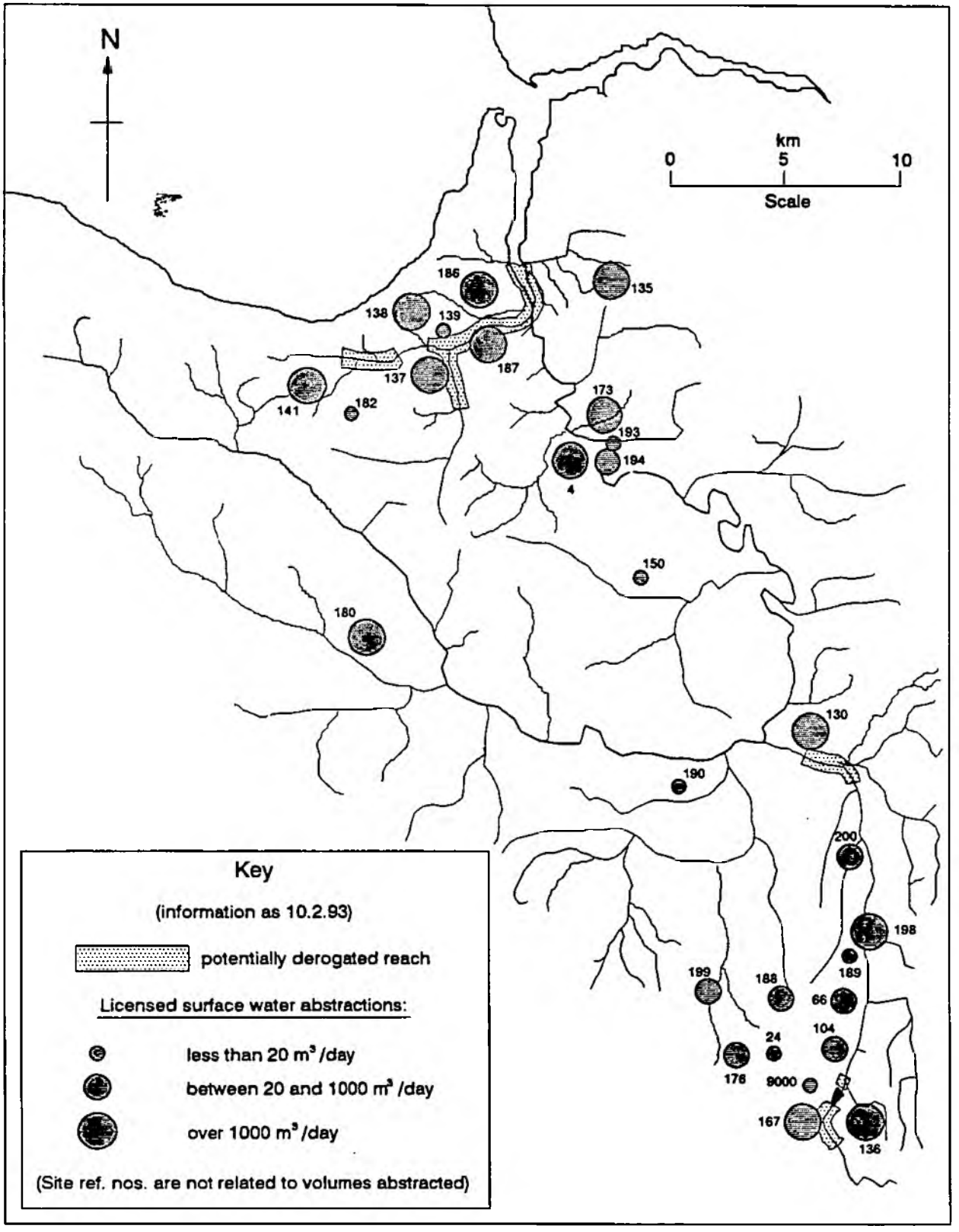
iv) to review the exemption area and investigate the need for any variation.

The total licensed abstractions from the catchment are tabulated below:

Source by Type	No. of licensed sources in yield range m^3/d					Cumulative m^3/d	Abstraction m^3/d p.a.*	Annual licensed quantity expressed as Equivalent Daily Rate (m^3/d)
	<20	>20 <200	>200 <1000	>1000	Total			
Groundwater	76	1	-	-	77	324	105,154	(288)
Surface Water*	10	5	-	13	28	59,971	17,148,384	(46,982)
All	86	6	-	13	105	60,295	17,253,538	(47,269)

Note* Many of these abstractions are returned to the river system with little or no loss of resources except for a short reach which may be bypassed locally.

Torridge Catchment
Water Resources (Map 2)



An Exemption from Control Order, 1970, granted to the Devon River Authority under Section 25 of the Water Resources Act 1963 (Ref 15), allows groundwater to be abstracted without a licence within certain areas of the catchment (see map 1) except for shaded river gravel areas. The NRA have no information on the numbers of abstractors or the quantity of water abstracted from groundwater within the Exemption Area. No assessment has been made of the impact of this Order on the NRA's ability to manage groundwater quality.

Groundwater abstractions within small areas of valley gravels in the Exemption Area are still licensable because of the likelihood of higher yields and the direct impact on river flows.

The hydrological statistics calculated for the tidal limit from the measured flow at Great Torrington catchment area and rainfall (excluding the River Yeo sub-catchment which flows into the Torridge below the tidal limit) are as follows :

Catchment Area	287 km^2	
Theoretical Average Daily Flow		16.71 m^3/sec
Theoretical Q95 Flow	1.31 m^3/sec	

The total licensed annual water abstraction represents 3.3% of the total catchment resources. Of this, only 1% is groundwater abstraction. Daily authorised maximum licensed abstractions represent 4.2% of the average daily flow and 53% of the Q95 flow.

However, a number of the larger surface water abstractors return the bulk of the water abstracted to the river so the figures exaggerate the impact of these abstractions.

The accompanying map (2) shows the surface water abstraction sites and indicates a number of problem areas.

Abstractions can cause two detrimental effects to river flows :

i) reducing them to around Q95 values for prolonged periods;

ii) causing serious flow reductions to particular reaches (e.g. where they are bypassed by a leat).

All significant abstractions are now only licensed subject to prescribed flow conditions to protect the river at times of low flows. Each prescribed flow condition is weighted to take account of water quality standards, existing abstractions, and consented discharges. When flows fall below the prescribed flow, abstraction must cease. This was not the case for historical licences or licences of entitlement.

Licences are only required for groundwater abstractions in the south of the catchment, outside the Exemption Area or along valley bottoms where river gravels occur. The known abstractions shown on map 1 suggest that the number within the Exemption Area may be significant. The cumulative impact of these is not known but since the alternative in the majority of cases could be exempt direct abstractions from surface water, the impact is not perceived to be a significant water resources management problem.

The cumulative impact of the presumed large number of exempt surface water abstractions for agricultural purposes is also unknown. It is unlikely that there will be any change in their status as protected rights in the short term.

Meldon Reservoir is intensively used both for direct supply and to support abstractions at Great Torrington at times of low flow.

The availability of these resources together with the ability of SWWSL to import supplies into the catchment from Roadford Reservoir is likely to limit future requirements for additional resources for public supply from within the catchment. The current longer term strategy assumes maximisation of the river abstraction at Torrington in due course. Studies will be necessary to determine appropriate licence conditions to fully protect designated water uses. Since the intake is close to the tidal limit, the NRA has no objection in principle to direct abstraction, subject to appropriate prediction being provided for the river and estuarine environment and water interests downstream, and arrangements to protect fish movements past the intake.

There is a requirement to increase the compensation flow from Meldon Reservoir in 1993. Consideration will be given to the most appropriate use for this water for environmental benefit.

Less use is now made of minor impoundments in the catchment for supply purposes, and alternative cases for these resources could be considered - such as their development as fisheries, if appropriate, or to augment flows, e.g. when pollution events occur, if their water quality is acceptable for such uses.

For further information on Water Resources see Ref 16 and 17.

Targets

(i) To regulate abstractions and impoundments in accordance with NRA policies.

(ii) To impose protection conditions on all significant licensable abstractions to ensure they do not cause the river flow to fall below the Q95 flow.

(iii) To enforce abstraction and impoundment conditions by means of a routine programme of site inspections, in accordance with NRA guidelines.

(iv) To develop maximum licensable volume criteria to limit the artificial extension of low flows.

(v) To report on how the regional water resources development strategy will ensure public water supplies are maintained within the catchment.

(vi) To assess the full impact of future water resources schemes and ensure sufficient protection conditions are included in licences and agreements. This is particularly applicable to any future SWWSL proposals for increased abstraction from the Torridge Public Water Supply Intake.

(vii) To review the use of Meldon Reservoir and promote operating agreement conditions with SWWSL in line with NRA water resources strategy statements and ensure compensation flows return to pre-Meldon discharge order levels.

(viii) To investigate possible use of part of the compensation flow resource to provide a bank of water in Meldon reservoir to assist in the achievement of NRA fisheries objectives.

(ix) To consider the benefits of river augmentation arrangements which are available to SWWSL to assist in the achievement of NRA objectives.

(x) To monitor and report on the water resources situation on a regular basis, including availability, usage and demand.

(xi) To develop and implement appropriate arrangements to manage resources in droughts.

(xii) To develop and review the Catchment Management Plan to secure proper conservation and use of water resources.

4.4 Fisheries - Current Status

The River Torridge catchment supports salmon and trout (both migratory and non-migratory forms), freshwater (coarse) and eel fisheries.

The salmonid fishery has declined since 1951. Within the catchment poor water quality, pollution incidents and the progressive degradation of physical habitat have all affected juvenile salmonid production and subsequently limited adult numbers. Recruitment of both salmon and trout is considered to be poor in all parts of the catchment other than the River Okement, although recent electric fishing surveys have shown an increase in juvenile production in the main River Torridge downstream of Okement Foot and in the River Lew. In the River Okement, fish stocks have been periodically affected by discrete pollution incidents over the past ten years. Additionally, illegal exploitation of adults in both the estuary and the river has increased pressure on adult stocks, although this is now under control.

Outside the catchment, over-exploitation of salmon in uncontrolled high-seas fisheries, and overfishing of sand eels leading to declines in sea trout are thought to have contributed to reductions in stocks of salmonids in the River Torridge Catchment. However, these activities are outside the control of the NRA.

Freshwater (coarse) fish species are distributed throughout the catchment. A sport fishery exists which is localised in extent and little exploited.

Eels are found in most parts of the River Torridge, forming the basis of a limited commercial fishery. Stocks appear to be satisfactory.

The following problems have been identified in the Torridge Catchment with particular regard to salmonid fish stocks:

(i) The successful survival of fish, particularly at the juvenile stage, has been limited apparently by declining water quality, acute pollution incidents and reduced river flows.

(ii) Spawning beds deteriorating apparently as a consequence of agricultural and forestry practices resulting in siltation. Trash dam build-up has contributed here.

(iii) Illegal exploitation of adult fish.

Targets

The overall objective for the Torridge fishery can be summarised as the recovery of the game fishery to a suitable level that will support the commercial and sport fishery interests and allow sufficient escapement for natural production. Appropriate targets for salmon, sea trout and brown trout populations have been set. Parr production levels are seen as the most meaningful indicators of stock recovery.

(i) Establishing levels of parr and fry production for different parts of the catchment based on the 1964 survey levels.

(ii) Ensuring the provision of adequate spawning areas and nursery territory.

(iii) Maintaining access for migratory fish to spawning territory by the establishment and maintenance of fish passes and the removal of trash dams.

(iv) Establishing protection zones for salmonid spawning and nursery areas.

(v) Establishing adequate enforcement measures to protect migratory fish.

(vi) Proposing cropping levels for the commercial and rod fisheries.

(vii) Maintaining adequate monitoring of fish stock levels, an example of target abundance is suggested at Appendix 5.

(viii) Effluents should be kept to a level that will be diluted by the existing flow.

(ix) Ensuring that sewage effluent outlets do not hinder the passage of migratory fish.

(x) Controlling agricultural effluent disposal to protect juvenile salmonid stocks which are particularly at risk from this source of pollution.

4.5 Flood Defence - Current Status

Because of the predominantly rural nature of the catchment there are limited flooding problems.

Several major schemes were carried out in the period 1982-89 to deal with urban flooding from the Kenwith, Northern and Westcombe streams which drain the western part of Bideford to the estuary. Pioneer clearance was carried out in 1977-80 on the main river lengths of the River Torridge and in 1981-83 on the main river lengths of the River Okement.

Locations set out below were identified in the Section 24(5) Survey carried out under the Water Act 1973 as liable to flooding.

Okehampton	-	River East and West Okement
Weare Giffard	-	River Torridge
Taddiport	-	River Torridge
Hatherleigh	-	River Lew
Sheepwash	-	River Torridge
Shebbear	-	Unnamed Stream
Buckland	-	River Duntz
Orleigh Mills	-	River Duntz
Littleham	-	Unnamed Stream

The NRA intends to investigate all urban locations shown as liable to flooding and to promote schemes for flood defence where these are economically justified. Promotion of schemes within the capital programme is determined by the Regional Flood Defence Committee according to a points rating system.

Flood alleviation work was completed at Weare Giffard in April 1993; a scheme is included in the five year capital programme to protect Taddiport. A detailed feasibility study on flooding at Okehampton indicated that flood defence works were not viable on cost benefit grounds and the scheme was removed from the capital programme. No investigations have yet been undertaken on the other sites indicated above.

Targets

(i) In protected built-up areas, the river bank should not be breached or overtopped by a flood flow with a specified return period: generally 100 years for built-up areas.

(ii) In rural flood plains, the return period is generally determined by land use.

(iii) A national system for evaluating levels of service for flood defence is in preparation. When completed, the catchment will be assessed against the national standards to determine any works necessary to reduce frequency of flooding of agricultural land. Because of the generally low grade of the land involved, it is unlikely that any works will be required and present flooding is likely to be considered acceptable.

(iv) To seek to influence or control developments to the built environment in floodplains to minimise future potential for increases in flood risk.

4.6 Conservation - Current Status

State of catchment
Wildlife
Landscape
Archaeology

Surveys

Historic
Present and on going

External Initiatives

Targets

(i) To undertake an environmental assessment on all major direct labour works (capital and maintenance) and ensure conservation measures and enhancements are incorporated in the design and implementation.

(ii) To screen all operational activities and comment on key matters.

(iii) To screen all NRA discharge consent and abstraction licences and when required recommend mitigating measures.

(iv) To undertake conservation enhancements to protect and improve the river corridor and associated lands.

(v) To undertake a full land survey analysis using aerial photograph interpretation and continue the detailed site monitoring presently undertaken in accordance with approved NRA methodologies.

(vi) To liaise with all relevant conservation bodies to ensure that activities are integrated with these other bodies.

4.7 Recreation - Current Status

State of Catchment

Existing recreational use of waters and associated land both passive and active.

Surveys

Historic
Present and on going

External Initiatives

Targets

(i) To ensure the protection of existing recreational facilities when undertaking any direct labour works and to develop further such activities when possible.

(ii) To screen all significant operational activities, consents and consultations to protect, and enhance where possible, the use of waters and associated land.

(iii) To survey and monitor all NRA holdings and waters under NRA control according to approved NRA methodologies.

(iv) To liaise with all relevant bodies to ensure an integrated approach to recreational promotions.

CATCHMENT ISSUES

5.1 Introduction

Through the preparation of this plan we have been able to identify a number of issues which require consideration by all those interested in the future of the catchment's natural water environment.

Each issue is presented in the following manner :

(i) A short description of the **issue**.

(ii) An attempt to determine the **options** to address the issue.

(iii) An assessment of the **advantages** and **disadvantages** associated with a particular option.

5.2 Issues and Options

5.2.1 Issue No. 1 Impact of Agriculture and Forestry

Continue to minimise the impact of agricultural activity including forestry. Much of the catchment is rural and agriculture contributes positively to the general appearance and rural structure. However, negative influences have been seen on water quality, fisheries and water resources in much of the catchment. Major improvements are now being undertaken and the health of the catchment is improving in all respects. There are several options to maintain this improvement :

Option No. 1 Develop the production of farm waste management plans with MAFF, farmers and their representatives to better the control of the collection, storage and disposal of farm wastes and agricultural by-products, pesticides, herbicides and medicines.

Option No. 2 Seek to determine the livestock density appropriate to the environmental capacity of the catchment with MAFF, farmers and their representatives.

Option No. 3 Enforce the Water Resources Act 1991 and the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991 in a fair, consistent and effective manner, seek to recover costs.

Option No. 4 Carry out pollution prevention visits to ensure adherence with "best practice", seeking compliance with the Code of Good Agricultural Practice for Protection of Water and Forestry and Aquaculture Guidelines and to identify any areas of pollution risk on farms.

Option No. 5 Maintain close links with all farmers and farming organisations and promote "pollution prevention pays".

Option No. 6 Seek to become a consultee on felling licences and woodland grant schemes.

5.2.2 Issue No. 2 Impact of Effluent Discharges

Minimise the impact of effluent discharges.

Option No. 1 Carry out appropriate monitoring to identify changes and give early warning of deterioration of water quality caused by effluent discharges. Develop and introduce improved techniques for monitoring pollution and ameliorating the impact of pollution when it occurs.

Option No. 2 Monitor effluent discharges to ensure compliance with existing consent conditions and enforce the Water Resources Act 1991 where appropriate.

Option No. 3 Review effluent discharge consents in line with NRA policy; determine new standards and revoke redundant consents as necessary; introduce nutrient and detergent standards where appropriate.

Option No. 4 Encourage and enforce new discharge consents at the Ball Clay Quarries, Meldon Quarry, Hatherleigh Abattoir and significant storm sewage overflows.

Option No. 5 Carry out pollution prevention visits to ensure adherence with "best practice" and "good housekeeping" principles at sewage works and industrial sites.

Option No. 6 Maintain close links with industry and commercial organisations to promote and publicise environmental protection and enhancement.

5.2.3 Issue No. 3 Acidic and Metalliferous Run-Off

To identify the sources and minimise the impacts of acidic and associated metalliferous contamination in the River Okement.

Option No. 1 Encourage the use of limestone in appropriate areas to buffer soils having regard to the need to prevent deleterious impacts on the natural fauna and flora.

Option No. 2 Consider reducing rapid run-off through land drains carrying acidic and metalliferous discharges by blocking, removal or redirection with the co-operation of land owner.

Option No. 3 Develop contingency plans for identified sources of acidic and metalliferous run-off to ameliorate impacts at the end of extended dry periods.

Option No. 4 Install and maintain continuous water quality monitors to record quality and provide early warning of an acidic pollution incident.

5.2.4 Issue No. 4 Investigate Groundwater Quality

Identify and protect groundwater quality and investigate non-compliance.

Option No. 1 Implement a groundwater monitoring programme to report existing groundwater quality; and identify changes and non-compliance with EC Directives to provide baseline for groundwater quality management.

Option No. 2 Liaise with local environmental health officers to ensure proper investigation of contamination in private water supplies.

Option No. 3 Continue monitoring and review quality of groundwater associated with waste disposal activities, notably Deep Moor Tip.

Option No. 4 Implement the NRA Policy and Practice for the Protection of Groundwater.

5.2.5 Issue No. 5 Impact of Nutrient Enrichment

Identify the causes of eutrophication and minimise the sources of excessive nutrient enrichment of the lower reaches of the River Torridge.

Option No. 1 Review monitoring information.

Option No. 2 Seek to reduce run-off from farmland and excessive use of fertilisers.

Option No. 3 Control the concentration of phosphates and nitrates from effluent discharges.

5.2.6 Issue No. 6 Monitor Water Resources

The water resources situation, including reservoir levels, needs to be effectively monitored to provide information for both long term planning and resource management, particularly at times of low flow and in droughts.

Option No. 1 Maintain existing hydrometric network to relevant standards to effectively monitor water resource availability.

Option No. 2 Review need for a river gauging station in the Upper Torridge catchment and if required, promote capital scheme to commission

Option No. 3 Review need for groundwater level monitoring at a number of representative sites in the catchment.

Option No. 4 Review drought monitoring arrangements at key water resources sites, including Meldon Reservoir, primary river gauging stations and in the River Torridge, downstream of major abstractions.

Option No. 5 Continue weekly water resources situation reporting for key sites in standard format to ensure relevant summary information is routinely available for management purposes.

5.2.7 Issue No. 7 Minimise Impact of Abstractions

Minimise the impact of abstractions and impoundments, particularly at times of low flow.

Option No. 1 Review water resources information and abstraction returns to identify sites where future impacts are likely to be detrimental at times of low flow, and assess whether alleviation is required using national guidelines.

Option No. 2 Monitor abstractions to ensure compliance with existing licence conditions and enforce Water Resources Act 1991 where appropriate.

Option No. 3 Undertake pilot study to identify the scale of non-licensed abstraction and take appropriate action.

Option No. 4 Review hydrological impact of Orleigh Mill hydro-electric power abstraction on the River Yeo and assess need for environmental impact assessment and/or alleviation measures.

Option No. 5 Review environmental status of West Okement River below Meldon Reservoir following restoration of full compensation flow in July 1993 and identify what (if any) additional measures are needed to alleviate the impact of low flows.

Option No. 6 Take advantage of any opportunities which arise to develop and implement cost-effective remedial action at sites where low flow problems of a minor nature are known to exist. In particular Monkokehampton on the Okement, Thornbury on the Waldon, at Monkleigh Mill on the Duntz and the existing public water supply abstraction at Great Torrington.

5.2.8 Issue No. 8 Develop Operating Arrangements to Secure Proper Resources Use

Develop water storage and abstraction operating arrangements to ensure opportunities are taken for proper use of those resources and, where appropriate provide environmental gain.

Option No. 1 Develop a drought management strategy for existing public water supply sources within the catchment incorporating water from Roadford Reservoir where necessary, to maintain supplies.

Option No. 2 Review operating arrangements for Meldon Reservoir with SWWSL. Consider changes to allocation arrangements for the impounded resource including a routine "standby" arrangement to enable spare resources to be released quickly, to ameliorate acid and metalliferous run-off incidents in the West Okement.

Option No. 3 Review with SWWSL other environmental uses for Gammaton, Jennetts and Melbury reservoir resources which do not conflict with public water supply source requirements.

Option No. 4 Consider conjunctive use arrangements for existing SWWSL licensed sources to increase reliable yields and delay the need for further public water resources to be developed, or to provide additional environmental gain.

Option No. 5 Review SWWSL future need for existing minor public water sources with a view to abandonment or standby status to provide local environmental gain.

5.2.9 Issue No. 9 Develop Water Resources Strategy to Meet Future Needs

Develop water resources strategy to ensure water resources are developed where necessary to meet future needs, particularly for public water supplies, and to ensure relevant schemes incorporate an element of environmental gain.

Option No. 1 Review SWWSL strategic water resources strategy, to ensure public water supplies will continue to be available in the catchment, and liaise with others including SWWSL to seek opportunities to develop such schemes to help meet other needs.

Option No. 2 Review the need for and timing of a scheme to augment public water supplies by continued or increased abstraction from the Torrington Intake, taking account of the need to ensure that water conservation measures and demand management measures are undertaken to an appropriate level.

Option No. 3 Ensure appropriate baseline environmental monitoring is planned and implemented for any future resource development schemes at the appropriate time. This will assist the timely assessment of appropriate protection conditions when applications are made for relevant authorisations.

Option No. 4 Develop a strategy for meeting other anticipated water needs in the catchment to a planning horizon at 2021 in a manner which will ensure appropriate protection is provided for the water environment and for existing legitimate uses.

5.2.10 Issue No. 10 **Reverse Decline of Salmon, Sea Trout and Trout Stocks**

In common with many rivers in the South West the Torridge has seen a decline in salmon, sea trout and trout stocks. In order to redress this decline several recovery programmes have been developing and the current fishery rehabilitation plan has been operating since 1990. There are common options to all plans :

Option No. 1 Maintain net and rod catch controls in the catchment.

Option No. 2 Develop broodstock for salmon, sea trout and brown trout.

Option No. 3 Planting out fry in tributaries which have been raised in a hatchery. Obtaining eggs for growing on at Colliford and Endsleigh Hatchery has been fraught with difficulty. It is now believed that procedures can be successful and the NRA have the expertise.

Option No. 4 Tackling the source of the problem at sea is outside the powers of the NRA. The wider issues should be pursued with organisations such as MAFF, NASCO and AST. Appropriate research will be required to support, justify and further sea fishery controls.

Option No. 5 Review evidence of fish monitoring studies and limit exploitation with the development of fishery targets and continued stock improvement. Striking the correct balance is essential.

Option No. 6 Consider imposition of byelaws to control netting.

Option No. 7 Seek to control methods of rod fishing, baits and lures, season timing and catch and release practices.

Option No. 8 Ensure adequate quality and quantity of water to facilitate fish passage and production.

5.2.11 Issue No. 11 Determine Fishery Targets

The development and setting of targets for the fishery has long been debated and the NRA is making a proposal. A target will allow better planning, but in view of the exigencies of nature it is sensible to adopt a flexible scheme which can be regularly reviewed.

Option No. 1 Adopt the proposed NRA system based on juvenile densities at Appendix 3.

Option No. 2 Develop alternative systems, for example setting net and rod quotas.

Option No. 3 Introduction of targets will depend on the scheme adopted. It will be important to publicise, report and monitor the progress to achieve fishery targets.

5.2.12 Issue No. 12 Reduce Impact of Predators on Fish

Concern has been expressed about the impact that predation may have on fish stocks. Particularly in relation to cormorants the NRA has developed an interim policy and is undertaking research on the Ribble Catchment. The findings will determine if, how and where controls could be applied to the Torridge.

5.2.13 Issue No. 13 Siltation and Compaction of Spawning Gravels

As part of the NRA's catchment action plan work has been undertaken to recover fish spawning areas by loosening compacted gravel. This element of routine fishery management, sorely neglected, has been re-established with the support of riparian and fishery owners.

Option No. 1 The precursor to carry out work is to identify sites which could benefit from gravel rehabilitation.

Option No. 2 Physical disturbance and regrading of the river bed, using a variety of techniques, at identified locations; taking into account the need to minimise impacts on other water users downstream.

Option No. 3 As areas are cleaned it will be important to monitor their success to justify maintenance of them in future years. Success will be judged on their use by spawning fish, and production of juveniles.

Option No. 4 For the longer term the cause of the siltation of spawning beds should be sought and increase in water flow or reduced run-off from land will need addressing.

5.2.14 Issue No. 14 Improve Fish Passage

Although recent works have significantly improved fish passage on the Okement and within the Upper Torridge, it will be necessary to keep this issue under review.

Option No. 1 Identification of weirs and maintenance of fish passes is already routinely undertaken and proposals for improvements are made annually subject to budget provision.

Option No. 2 Where weirs compromise fish passage, passes can be installed.

Option No. 3 An ongoing programme of removing trash dams and other obstacles is underway.

Option No. 4 Water quality and quantity must be maintained and appropriately improved to ensure fish passage.

5.2.15 Issue No. 15 Coarse Fisheries and Amenity Ponds

The development of coarse fisheries and general amenity ponds are likely to become an issue for the catchment. Where they are developed the NRA will advise in accordance with the coarse fish strategy and relevant water resource and flood defence requirements.

Option No. 1 To follow the NRA draft policy on development of coarse fisheries and amenity ponds.

Option No. 2 To extend influence through the planning consultation process to secure proper development of coarse fisheries and amenity ponds.

5.2.16 Issue No. 16 Recreation

To promote recreational use of the catchment whilst protecting the natural fauna and flora and reducing conflicts.

Option No. 1 Review land holdings to determine their potential for recreational use and develop appropriate action plans.

Option No. 2 Integrate recreational use within proposals for capital and maintenance schemes undertaken by the NRA.

Option No. 3 Make appropriate comment and provision in discharge consenting and abstraction licensing to protect recreational use.

Option No. 4 Seek to promote recreational use of the water environment through the planning process.

Option No. 5 Encourage other organisations and individuals to recognise recreational potential and encourage sensitive application.

Option No. 6 Develop special projects to enhance such recreational pursuits as walking, canoeing, bird watching and so on.

5.2.17 Issue No. 17 Maintain Flood Defences

Whilst there are no specific proposals to undertake works in the freshwater catchment to prevent flooding it is important to keep the issue under review.

5.2.18 Issue No. 18 Development Control

The crucial role of planning authorities in determining development of the built and rural environment cannot be overstated. The NRA's ability to influence issues will depend on clarity, consistency and understanding.

Option No. 1 Close liaison is maintained at present with planning authorities, the highways authority, South West Water and the Waste Regulation Authority. Road drainage, sewage disposal and waste disposal have significant influences on water quality, water quantity and flooding.

Option No. 2 The production of local, strategic and national plans by Planning Authorities allow the NRA to ensure water protection is considered within the planning process.

5.2.19 Issue No. 19 Planning for Climatic Change

Climate change has been predicted. Likely increase in sea level and temperature have been published. Research continues to identify likely impacts on water resources availability and demands for different uses. Impacts on river flows in "flashy" catchments like the Torridge could be critical, but until acceptable scientific forecasts are available, an appropriate strategy cannot be formulated.

Option No. 1 Once acceptable evidence on likely changes become available, forecast likely impacts on the water environment of the Torridge, and consider measures to ameliorate deleterious ones.

Option No. 2 Review prescribed flow conditions on existing abstractions and operating arrangements for Meldon Reservoir to ensure detrimental environmental impacts are minimised and resources continue to be available to support relevant uses to agreed standards.

Option No. 3 If climate change indicates, additional resources need to be developed to maintain supplies, promote the timely development of additional resources to meet needs in an acceptable manner and incorporating proper protection for the water environment.

5.2.20 Issue No. 20 Promote Conservation Initiatives

As the water environment continues to improve opportunities to promote conservation initiatives will increase. Proposals internally and externally driven should be seized where appropriate. This area of NRA work in the catchment has yet to be fully developed although land use assessments are now being undertaken to support earlier river corridor surveys. Aerial surveys will identify land use and enable sensitive development of water fringe habitats.

Option No. 1 Management advice about conservation is already incorporated into all aspects of the NRA's work. Externally appropriate comments are made through the planning process and in response to specific schemes.

Option No. 2 Positive management could incorporate undertaking habitat and species enhancement projects. It is unlikely that this would be driven or fully funded by the NRA.

Option No. 3 To ensure coordination of conservation interests it is necessary to maintain close links with all conservation interests, together with statutory bodies such as MAFF and DoE locally and nationally. Such communication will speed the adoption of initiatives for the Torridge.

Option No. 4 The Tarka Trail is one initiative that has already opened up specific water environments and is seen as a developing concept. Where specific water resources, water quality and fishery enhancements are required the NRA would expect to contribute financially.

Option No. 5 Many initiatives are now being brought forward by the Countryside Commission "Countryside Stewardship Scheme", MAFF's, ESA's, Habitat Improvement Scheme, Set Aside Scheme etc that are aimed at general and specific conservation issues. The NRA would expect to contribute to any such initiatives in addition to its own subject to budget provision.

5.2.21 Issue No. 21 Visionary Issues

It seemed appropriate within this consultation document to describe some visionary issues for the catchment. In an attempt to determine how the water environment will develop the following options should be considered :

Option No. 1 The concept of buffer zones is readily understood, the practicality less so. Undoubtedly in the catchment buffer zones should have a value in protecting water quality and fisheries, stabilising river banks, extending habitats with appropriate management and so on. The problem is who pays?

Option No. 2 There are powers in the Water Resources Act 1991 to determine water protection zones. It is likely that these will be voluntary at first similar to the Nitrate Sensitive Areas and the Groundwater Protection Policy but the NRA should seek consultation on where such zones may benefit the catchment.

Option No. 3 Any proposal to develop forestry in the catchment as an alternative to intensive agriculture is fraught with new and different challenges for the water environment; care would be required in ensuring forestry did not detrimentally affect the catchment.

Option No. 4 In support of the development of broodstock, the development of a fish hatchery has been suggested at regular intervals in recent years. Indeed one did exist in the earlier part of the century. Perhaps the time is appropriate to reconsider this option to secure fish stocks.

Option No. 5 Public access to the countryside is increasing. The expectation that rural areas will not develop, as have the national parks, is no longer a presumption, with rural communities suffering from changes brought by the Common Agricultural Policy and the General Agreement on Trade and Tariffs. The opening up of the Torridge for amenity and recreation must realise conflicts and be managed accordingly. Conservation not preservation should be the priority. It will be interesting to hear the views of consultees on the role the NRA should play in this aspect of water management.

5.3 SUMMARY OF ISSUES AND OPTIONS

ISSUE NO. 1 - IMPACT OF AGRICULTURE AND FORESTRY			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Farm Waste Management Plans	MAFF/NFU/CLA/Farmers	Individual and long-term control self-regulation	Acceptance Ability and Cost
2. Stocking density control	MAFF	Long-term control; simple to enforce	Regulation Complex to determine
3. Enforcement	NRA	Straightforward Avoids involving other agencies Relatively cheap	Addresses symptom not cure Short-term Combative
4. Pollution prevention visits	NRA/MAFF	Individual guidance, long-term solutions targeted at individuals Codes exist already	Expertise of advisors Cost
5. Promotion and publicity	NRA/MAFF	Underway Targeting of issues and problems	Cost
6. Consultee on felling and grants	NRA	Pollution prevention at planning stage	Workload/time

ISSUE NO. 2 - IMPACT OF EFFLUENT DISCHARGES			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Monitoring of watercourses and groundwater	NRA	Better data and planning	Cost/Support
2. Monitoring of discharges	NRA/Dischargers	Better data and maintenance	Cost/Support
3. Review discharge consents	NRA	Update standards	None/Cost
4. New discharge consents	NRA	Extend control of discharge	None
5. Pollution prevention visits	NRA	Close pollution control Individual targets	Cost
6. Publicity and promotion	NRA	Community action Better understanding and control	Cost

ISSUE NO. 3 - ACIDIC AND METALLIFEROUS RUN-OFF			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Buffer soils with limestone	Landowners	Reduce acidic impacts	Artificial flora and fauna Cost
2. Block land drains	Landowners	Encourage wetlands	Flooding, poor drainage
3. Contingency plans	NRA	Addresses intermittent problem No long-term changes	Early warning Weather related Risky
4. Continuous monitors	NRA/Discharger	Better warning and identification	Cost

ISSUE NO. 4 - INVESTIGATE GROUNDWATER QUALITY			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Groundwater monitoring	NRA	Information to make assessments	Cost Complexity
2. Liaise with EHO's	NRA	Wider and faster data collection	Assesses existing use only
3. Waste Disposal Monitoring	NRA/WRA/WDA	Protection of groundwater	None, but cost of compliance
4. Groundwater Protection Policy	NRA	Protection of groundwater	None, but cost of compliance

ISSUE NO. 5 - IMPACT OF NUTRIENT ENRICHMENT			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Review information	NRA	Understanding	Cost
2. Reduce land run-off	NRA/Landowners	Reduce diffuse discharges	Cost/Complexity
3. Review waste disposal practices	NRA/WRA	Protection groundwater	Cost/Complexity
4. Control and reduce significant phosphate and nitrate inputs	NRA	Better control of algal blooms	Cost/may not be totally successful

ISSUE NO. 6 - MONITOR WATER RESOURCES			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Maintain hydrometric network	NRA	Effective planning and management	-
2. Upper Torridge River Gauging Station	NRA	Better management	Cost
3. Groundwater level monitoring	NRA/Owners	Better management	Cost
4. Drought monitoring arrangements review	NRA/SWWSL	Better management in droughts	Minor costs
5. Continue Weekly Water Situation reporting	NRA/SWWSL	Effective planning and management	-

ISSUE NO. 7 - MINIMISE IMPACT OF ABSTRACTIONS			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Assess alleviation options	NRA	Environmental gain	Cost
2. Monitor and enforce abstractions	NRA	Reduce impact on environment	Cost
3. Study non-licensed abstractions	NRA	Impact assessment	Cost
4. Study Orleigh Mill abstraction impact	NRA	Impact assessment	Cost
5. Meldon Low Flow Study	NRA/SWWSL	Reduce impact on environment	Cost
6. Opportunistic low flow measures	NRA	Reduced impact on low flows	Cost

ISSUE NO. 8 - DEVELOP OPERATING ARRANGEMENTS TO SECURE PROPER RESOURCE USE			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Drought management strategy	NRA/SWWSL	Reduced impacts in droughts	-
2. Review Meldon operating arrangements	NRA/SWWSL	Better use of spare resources	Cost
3. Review use of other SWWSL reservoirs	NRA/SWWSL	Better use of spare resources	Cost
4. Consider conjunctive use of SWWSL sources	NRA/SWWSL	Increased yield/environmental gain	Cost
5. Review minor SWWSL source use	NRA/SWWSL	Environmental gain	Cost

ISSUE NO. 9 - DEVELOP WATER RESOURCES STRATEGY TO MEET FUTURE NEEDS			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Review SWWSL strategy	NRA	Effective planning for future needs	-
2. Review timing for new licence application for Torrington abstraction	NRA/SWWSL	Secure timely resource availability with minimal impact	Cost
3. Baseline environmental monitoring prior to new schemes	NRA/SWWSL	Proper planning for optimal use and effective protection	Cost
4. Strategy to meet future needs for other uses	NRA/Others	Effective use of resources to meet needs	Cost

ISSUE NO. 10 - REVERSE DECLINE OF SALMON, SEA TROUT AND TROUT STOCKS			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Catch controls	NRA	Reduce exploitation Faster results	Data collection to support case Cost Riparian dissent
2. Develop broodstock	NRA/Others	Wide gene pool, long-term options	Cost
3. Plant out juveniles	NRA	Underway	-
4. Reduce sea fishing	NRA/MAFF	Protection at sea	Cost/complexity
5. Balance exploitation and stock enhancement	NRA	Long-term goal	Complex, debatable issue
6. Byelaw to control netting	NRA	Rapid reduction in exploitation	Time/Cost
7. Control fishing methods	NRA	Greater fish escapement	Policing
8. Maintain water quality and quantity	NRA/Others	Habitat protection Underway	-

ISSUE NO. 11 - DETERMINE FISHERY TARGETS			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Adopt suggested system	NRA	Better planning	None
2. Develop alternative system	NRA/Others	-	None
3. Introduce targets	NRA	-	Cost

ISSUE NO. 12 - REDUCE IMPACT OF PREDATORS ON FISH			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Investigate the problem and determine impact	NRA	Knowledge of impact	Cost
2. Follow NRA draft policy	NRA	-	-
3. Introduce controls where damage proven	MAFF/DoE	Reduced impact	Conservation loss Cost

ISSUE NO. 13 - SILTATION AND COMPACTION OF SPAWNING GRAVELS			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Identify appropriate sites	NRA	-	-
2. Maintain gravels	NRA/Riparian Owners	Available spawning gravels	Renewed siltation
3. Monitor improvements in spawning	NRA	Assess benefit	No assessment of benefit
4. Increase water flow	NRA/Others	Gravels stay clear	Practicability

ISSUE NO. 14 - IMPROVE FISH PASSAGE			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Identify weirs and maintain fish passes	NRA/Riparian Owners	Improve fish passage	None
2. Install fish passes as required	NRA/Riparian Owners	Community involvement	Cost
3. Remove trash dams and obstacles	NRA/Riparian Owners	Improved fish passage	Cost
4. Maintain water quantity and quality	NRA	See other issues	Cost

ISSUE NO. 15 - COARSE FISHERIES AND AMENITY PONDS			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Follow NRA draft policy	NRA/Fishery Owner	Planned development	None
2. Exert planning controls	Planning Authority	Planned development	None

ISSUE NO. 16 - RECREATION			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Review potential	NRA	Baseline	Time
2. Integrate recreational use	NRA	Underway	-
3. Protect use through authorisation	NRA	Underway	-
4. Exert planning controls	NRA/Planning Authority	Better planning	Over use
5. Publicise recreation	NRA/Others	Wider use	Over use
6. Develop specific projects	Others/NRA	Wider use	Cost/Impact

ISSUE NO. 17 - MAINTAIN FLOOD DEFENCES			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Take into account global warming, managed retreat and NRA policy	NRA	-	Cost

ISSUE NO. 18 - DEVELOPMENT CONTROL			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Maintain close liaison with planning authorities, highway authorities, SWWSL and the Waste Regulation Authority.	NRA/DCC/TDC/WDBC	Better planning co-ordination	Conflicting needs and aims
2. Input to local plans, strategic plans and specific development initiatives	NRA	Introduce water protection at the planning stage	-

ISSUE NO. 19 - PLANNING FOR CLIMATIC CHANGE			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Forecast changes	NRA	Proper planning	Cost
2. Review resource management arrangements	NRA/SWWSL/Others	Minimise environmental impacts	Cost
3. Additional schemes	NRA/SWWSL	Future needs met and impact minimised	Cost

ISSUE NO. 20 - PROMOTE CONSERVATION INITIATIVES			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Incorporate conservation management advice in to all NRA direct works consents and consultation	NRA	Completed	Time
2. Undertake habitat/species enhancement projects	NRA/Other	Wider use	Cost
3. Maintain close links with conservation interests	NRA/Conservation Interests	Better planning and control	Time
4. Support Tarka Trail	NRA	Water protection	Cost
5. Support conservation projects in the water environment	Conservation/Planning Authorities	-	Cost

ISSUE NO. 21 - VISIONARY ISSUES			
Options	**Responsibility**	**Advantages**	**Disadvantages**
1. Develop buffer zones	Landowners/Countryside Commission	Reduce diffuse pollution and flooding	Cost
2. Develop water protection zones	NRA	Water protection	Cost
3. Develop mixed forestry	Landowners/Forestry Authority	Less intensive livestock agriculture	Cost
4. Fish hatchery	Riparian/Fishing interests	Security for restocking	Cost
5. Develop public access and use of water-based recreation	NRA/Others	Amenity	Conflict of uses

6.0 THE WAY FORWARD

This document has been produced through internal discussion and a desk study of readily available reports produced by organisations such as local authorities. It builds on the consultation in 1990 on the pilot Catchment Management Plan and the issues raised in the Catchment Action Plan.

Whilst every effort has been made to ensure the accuracy of the information in the plan we are aware that it may contain a number of omissions and inaccuracies. Our next step, therefore, is to consult with organisations, groups and individuals interested in the future of the catchment's water environment. We believe that consultation will enable us to :

- clarify the extent and distribution of current uses of the catchment;
- assess the importance of catchment uses;
- identify the wide range of likely, possible and potential future catchment uses;
- expose catchment specific issues to a wide audience;
- ensure decisions on the future management of the catchment are based on accurate information and the fullest possible range of views from interested parties.

In commenting on this plan we hope that you will tackle both points of detail and strategic issues. In particular we are keen for you to consider the following questions:

- have we correctly identified both current and future uses of the catchment?
- have we fairly assessed the issues and what opinions do you have on them?
- have we missed any issues?
- how should we progress evaluation of the issues and the development of strategies and action plans?

During the consultation period comments can be submitted in writing to :

Torridge Catchment Management Plan
Sarah Underdown
Catchment Planning Assistant
National Rivers Authority
South West Region
Manley House
Kestrel Way
Exeter EX2 7LQ

All comments must be with us by Tuesday 31 August 1993.

Our consultation phase incorporates a number of separate but linked activities. These include :

- distribution of the full plan to key organisations, groups and individuals;
- a general leaflet and display for use in libraries and other public areas; and
- organisation of a forum for key consultees to discuss issues towards the end of the consultation phase.

At the end of the consultation phase we will have to consider in detail the results of the process before producing a definitive Catchment Management Plan. The Final Plan will define both a strategy for the future management of the catchment and a series of action plans for the NRA and others to implement in order to deliver the strategy.

The information and views you provide us with now are therefore a very important step in the overall process. We hope you will respond positively to our initiative so that we can jointly develop a vision for the River Torridge Catchment. The next steps are shown below.

Who's Involved	The CMP Steps	Timetable
NRA	Production of Draft CMP by NRA SW	by 31st June 1993
NRA and everyone interested in the future of the catchment	Consultation with organisations, groups and individuals	from 1st July 1993
NRA and key groups, organisations, and individuals	On-going discussions as appropriate with key groups and individuals	until 31st August 1993
NRA	Production of Final CMP	1st November 1993

7.0 REFERENCES

1. (2.2) South West Water, "Environmental Investigation of the River Torridge." Environmental Protection Report, 117 pp and appendices, 1986.

2. (2.4) British Geological Survey - British Regional Geology - South West England, HMSO 1975.

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4. (3.2) N Cullen - Changes of Agricultural Land Use in Sub-Catchments of the River Torridge 1952-1988, WRC.

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12. (4.2) European Council Directive on Pollution Caused by the Discharge of Certain Dangerous Substances into the Aquatic Environment (76/464/EEC).

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The Surface Waters (Dangerous Substances) (Classification) Regulations 1992.

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13. (4.3) T R Turner, Water Resources Planning - Strategic Options, R & D Note 35, December 1991.

14. (4.3) Review of Rivers Suffering from Low Flow - Report made to the Regional Rivers Advisory Committee - 3 July 1990.

15. (4.3) The Devon River Authority (Exceptions from Control) Order 1970 SI No. 137.

16. (4.3) National Water Research Council, A Discussion Document - March 1992.

17. (4.3) Water for the South West - A Consultation Document.

8.0 APPENDICES

(8.1) River Torridge Population - Parishes in Sub-Catchment

(8.2) Fisheries Bag Limit Byelaw

(8.3) Juvenile Salmonid Monitoring/Target Abundance

(8.4) River Quality Objective Standards

(8.5) River Quality Objective Monitoring Sites

(8.6) Freshwater Fisheries Directive - Standards

(8.7) Dangerous Substances Directive

(8.8) Surface Water Abstraction Directive

(8.9) Routine Biological Monitoring Sites

(8.10) Pollution Incident Categories

APPENDIX 8.1

PARISHES INCLUDED IN THE SUB-CATCHMENTS

Waldon Catchment

Bradworthy
Sutcombe
Thornbury
Cookbury
West Putford
Milton Damerel

Lew Catchment

Halwill
Beaworthy
Highampton
Northlew
Inwardleigh
Hatherleigh

Torridge-Okement to Beam

Iddesleigh
Huish
Dowland
Dolton
Merton
Beaford
Roborough
St Giles in the Wood
Little Torrington
Langtree
Frithelstock
Great Torrington

Upper Torridge Catchment

Hartland/Landcross
Clovelly
Woolfardisworthy
West Putford
East Putford
Bulkworthy
Abbot Bickington/Ashwater
Newton St Petrock
Milton Damerel
Shebbear
Bradford

Torridge - Waldon to Lew Confluences

Shebbear
Bradford
Black Torrington
Peters Marland
Buckland Filleigh
Sheepwash
Highampton

Okement Catchment

Inwardleigh
Belstone
Okehampton
Sampford Courtenay
Jacobstowe
Exbourne
Monkokehampton
Iddesleigh
Broadwoodkelly

Mere Catchment

Petrockstow
Peters Marland
Langtree
Merton
Huish

Yeo Catchment

Parkham
Alwington
Littleham
Frithelstock
Buckland Brewer
East Putford

NRA

NATIONAL RIVERS AUTHORITY – SOUTH WEST REGION

REHABILITATION OF SALMON AND SEA TROUT ON THE RIVERS TAW AND TORRIDGE

MANDATORY BAG LIMITS

1. As part of the programme to rehabilitate salmon and sea trout stocks in the Rivers Taw and Torridge, the NRA introduced a byelaw in 1992 which restricts the numbers of fish anglers may catch on these rivers. This byelaw formalises the voluntary bag limits which have operated on the rivers over the past few years. The byelaw expires on 30 September 1995.

2. Bag limits are as follows:–

		PERIOD		
		24 hours	7 days	Season
RIVER	SPECIES			
TAW	Salmon	2	3	10
	Migratory trout	5	15	40
TORRIDGE	Salmon	–	2	5
	Migratory trout	2	5	20

There is no bag limit for brown trout.

3. Anglers who catch the bag limit for a species on a river in any period must cease fishing for that species on the river in question for the remainder of the given period. However, having reached the bag limit for one species, the angler may continue fishing for the other species.

4. By way of illustration, an angler who has caught 2 salmon in 24 hours on the River Taw may continue fishing for sea trout on the Taw, using recognised methods for sea trout, until the bag limit for these fish is reached. Any salmon caught accidentally whilst sea trout angling in this way after reaching the salmon bag limit, must be returned unharmed to the river.

5. Whilst fishing for the bag limit, anglers are at liberty to return fish of any species to the river after catching them i.e. operating a "catch and release" system. However, such fish will count towards the bag limit. Fish caught and returned in this manner should be recorded on the rod licence return form with a note to indicate that they were returned to the water.

6. For further information and full details of fishing byelaws, contact the Fisheries Department at:

NRA SW Region
Manley House
Kestrel Way
EXETER
Devon
EX2 7LQ
Tel: 0392 444000

APPENDIX 8.3

JUVENILE SALMONID MONITORING

Salmon and Trout Quality Classes

These classes have been determined in the following manner: density data is taken from electric fishing survey sites and given a score according to the density range :

Fry Density	Parr Density	Score
Absent	Absent	0
0.01 - 10.00		0.01 - 5.00 1
10.01 - 25.00		5.01 - 10.00 2
25.01 - 50.00		10.01 - 20.00 3
50.01 -> ∞		20.01 -> ∞ 4

Using scores for fry and parr densities, quality classes are assigned to site data according to the following matrix table:

		Fry (0+) Score				
		4	3	2	1	0
Parr (and older score)	4	A	A	A	B	C
	3	A	A	B	B	C
	2	A	B	B	C	D
	1	B	B	C	D	D
	0	C	C	D	D	E

This system ensures that both fry and older fish densities are taken into consideration when assessing the quality of fish stocks at a given site.

The same density ranges have been applied to both salmon and trout populations. Trout stocks may thus appear to be of better quality when compared with the abundance categories for salmon stocks. However, it would be unwise to make comparisons between species using this system. Comparisons should be made between years only within a single species in a single river.

Target Abundance Categories

These categories for the Main Torridge, River Waldon and River Lew have been calculated from data gathered in the 1964 fish survey. This survey did not take into account salmonid fry (0+). Abundance categories have been calculated for this survey by assuming that the fry score for each site was the same as the parr score for that site. Hence, the base-line abundance data here may be over-optimistic.

APPENDIX 8.3 CONTD

Target abundance categories for the River Okement have been determined from the best results obtained from surveys carried out since the opening of the Monkokehampton Fish Pass. Minor tributaries of the River Torridge have been designated arbitrary targets based on a subjective assessment of their potential for salmonid production.

The catchment has been divided into appropriate sections :

Upper Main River Torridge (upstream of confluence with River Waldon)

Middle Main River Torridge (between the confluences with the River Waldon and Okement)

Lower Main River Torridge (below the confluence with the River Okement)

River Okement (with a further sub-division of East and West Okements for salmon)

River Lew

River Waldon

Minor Tributaries

Each of these sections (except the Lower River Torridge, whose large size prevents quantitative surveys from being carried out) has been given an overall target quality class based on an assessment of the site specific data from previous electric fishing surveys (see above). It is expected that sites in any future survey will attain that target quality class assigned to the particular part of the catchment in which the sites fall. In the context of the River Torridge, the objective is that targets in all stretches should be met at the end of the five year period commencing 1991.

N.B. Systems for assessing the optimum carrying capacity of rivers for juvenile salmonids and methods of classifying rivers on the basis of expected and actual fish stocks are currently under review nationally. This proposed system will be used until the introduction of a national system.

APPENDIX 8.4 : RIVER QUALITY OBJECTIVE (RQO) STANDARDS

River Class	Quality criteria	Remarks	Current potential uses
	Class limiting criteria (95 percentile)		
1A Good Quality	(i) Dissolved oxygen saturation greater than 80% (ii) Biochemical oxygen demand not greater than 3 mg/l (iii) Ammonia not greater than 0.4 mg/l (iv) Where the water is abstracted for drinking water, it complies with requirements for A2* water (v) Non-toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available)	(i) Average BOD probably not greater than 1.5 mg/l (ii) Visible evidence of pollution should be absent	(i) Water of high quality suitable for potable supply abstractions and for all abstractions (ii) Game or other high class fisheries (iii) High amenity value
1B Good Quality	(i) DO greater than 60% saturation (ii) BOD not greater than 5 mg/l (iii) Ammonia not greater than 0.9 mg/l (iv) Where water is abstracted for drinking water, it complies with the requirements for A2* water (v) Non-toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available)	(i) Average BOD probably not greater than 2 mg/l (ii) Average ammonia probably not greater than 0.5 mg/l (iii) Visible evidence of pollution should be absent (iv) Waters of high quality which cannot be placed in Class 1A because of the high proportion of high quality effluent present or because of the effect of physical factors such as canalisation, low gradient or eutrophication (v) Class 1A and Class 1B together are essentially the Class 1 of the River Pollution Survey (RPS)	Water of less high quality than Class 1A but usable for substantially the same purposes
2 Fair Quality	(i) DO greater than 40% saturation (ii) BOD not greater than 9 mg/l (iii) Where water is abstracted for drinking water it complies with the requirements for A3* water (iv) Non-toxic to fish in EIFAC terms (or best estimates if EIFAC figures not available)	(i) Average BOD probably not greater than 5 mg/l (ii) Similar to Class 2 of RPS (iii) Water not showing physical signs of pollution other than humic colouration and a little foaming below weirs	(i) Waters suitable for potable supply after advanced treatment (ii) Supporting reasonably good coarse fisheries (iii) Moderate amenity value
3 Poor Quality	(i) DO greater than 10% saturation (ii) Not likely to be anaerobic (iii) BOD not greater than 17 mg/l. This may not apply if there is a high degree of re-aeration	Similar to Class 3 of RPS	Waters which are polluted to an extent that fish are absent only sporadically present. May be used for low grade industrial abstraction purposes. Considerable potential for further use if cleaned up
4 Bad Quality	Waters which are inferior to Class 3 in terms of dissolved oxygen are likely to be anaerobic at times	Similar to Class 4 of RPS	Waters which are grossly polluted and are likely to cause nuisance
X	DO greater than 10% saturation		Insignificant watercourses and ditches not usable, where the objective is simply to prevent nuisance developing

Notes (a) Under extreme weather conditions (eg flood, drought, freeze-up), or when dominated by plant growth, or by aquatic plant decay, rivers usually in Class 1, 2, and 3 may have BODs and dissolved oxygen levels, or ammonia content outside the stated levels for those Classes. When this occurs the cause should be stated along with analytical results.

(b) The BOD determinations refer to 5 day carbonaceous BOD (ATU). Ammonia figures are expressed as NH_4. **

(c) In most instances the chemical classification given above will be suitable. However, the basis of the classification is restricted to a finite number of chemical determinands and there may be a few cases where the presence of a chemical substance other than those used in the classification markedly reduces the quality of the water. In such cases, the quality classification of the water should be down-graded on the basis of biota actually present, and the reasons stated.

(d) EIFAC (European Inland Fisheries Advisory Commission) limits should be expressed as 95 percentile limits.

* EEC category A2 and A3 requirements are those specified in the EEC Council directive of 16 June 1975 concerning the Quality of Surface Water intended for Abstraction of Drinking Water in the Member State.

** Ammonia Conversion Factors

(mg NH_4/l to mg N/l)

Class 1A 0.4 mg NH_4/l = 0.31 mg N/l
Class 1B 0.9 mg NH_4/l = 0.70 mg N/l
0.5 mg NH_4/l = 0.39 mg N/l

APPENDIX 8.5

RIVER TORRIDGE CATCHMENT

1991 RIVER WATER QUALITY CLASSIFICATION

1991 Map Position	River	Reach Upstream of	National Grid Reference	Distance From Source (km)
1	Torridge	Fordmill Farm	SS 3251 1776	6.9
2	Torridge	Putford Bridge	SS 3639 1592	12.5
3	Torridge	Woodford Bridge	SS 3987 1253	18.4
4	Torridge	Gidcott	SS 4222 0942	23.2
5	Torridge	Kingsley Mill	SS 4696 0608	32.0
6	Torridge	Rockhay Bridge	SS 5064 0699	38.1
7	Torridge	Hele Bridge	SS 5401 0632	42.3
8	Torridge	Newbridge	SS 5484 1121	48.8
9	Torridge	Beaford Bridge	SS 5426 1429	54.6
10	Torridge	Undercleave	SS 5179 1655	64.5
11	Torridge	Town Mills, Torrington	SS 4998 1838	69.2
12	Torridge	Rothern Bridge	SS 4791 1974	72.1
13	Torridge	Beam Bridge	SS 4737 2092	74.5
14	Gammaton Stream	Gammaton Reservoir	SS 4847 2505	0.5
15	Jennett's Stream	Jennett's Reservoir	SS 4441 2471	3.2
16	Yeo (Bideford)	Foxdown	SS 3815 2223	3.5
17	Yeo (Bideford)	Tuckingmill	SS 4018 2248	5.8
18	Yeo (Bideford)	Hoopers	SS 4276 2313	8.9
19	Yeo (Bideford)	Heale House	SS 4537 2350	12.6
20	Duntz	Hembury	SS 4294 1782	2.9
21	Duntz	Orleigh Mills	SS 4392 2241	8.6
22	Lydeland Water	Water Bridge	SS 4193 1838	4.9
23	Melbury Stream	Melbury Reservoir	SS 3861 2010	1.0
24	Huntshaw Water	Bridge at Van's Wood	SS 4791 2147	8.0
25	Common Lake	Tantons Plain	SS 4931 1984	3.5
26	Langtree Lake	Service Farm	SS 4776 1922	6.9
27	Woolleigh Brook	Castle Hill	SS 5222 1714	8.1
28	Mere	Coleford Bridge	SS 5023 1326	5.4
29	Mere	A386 Bridge at Merton	SS 5265 1129	9.3
30	Mere	Greatwood	SS 5498 1287	13.1
31	Little Mere River	Wooladon Moor	SS 5336 0841	1.5
32	Little Mere River	Burymoor Bridge	SS 5257 1108	4.4
33	East Okement River	200m above Fatherford Rail	SX 6046 9461	6.9
34	East Okement River	A30 Bridge at Okehampton	SX 5887 9522	9.3
35	West Okement River	Meldon Reservoir	SX 5615 9144	10.4
36	West Okement River	Below Meldon Dam	SX 5643 9184	10.7
37	West Okement River	100m below Red-a-Ven	SX 564 921	10.8
38	West Okement River	Meldon Viaduct	SX 5647 9233	11.2
39	West Okement River	200m below Meldon Quarry Bridge	SX 5667 9335	12.5
40	West Okement River	Okehampton Hospital	SX 5865 9470	15.0

APPENDIX 8.5 CONTD

1991 Map Position	River	Reach Upstream of	National Grid Reference (km)	Distance From Source
41	Okement	Knowle Bridge	SX 5930 9630	17.0
42	Okement	Brightley Bridge	SX 5987 9745	18.4
43	Okement	South Dornaford	SS 5995 0013	21.7
44	Okement	Jacobstowe	SS 5925 0172	24.0
45	Okement	Woodhall Bridge	SS 5847 0340	27.6
46	Okement	Iddesleigh Bridge	SS 5679 0585	30.3
47	Hole Brook	Monkokehampton	SS 583 056	9.4
48	Beckamoor Brook	Terris Bridge	SS 5820 0330	6.1
49	Brightley Stream	Brightley Mill	SX 5970 9709	2.3
50	Meldon Stream	Bridge below Meldon Quarry	SX 5665 9305	1.4
51	Red-a-Ven Brook	Prior to West Okement River	SX 5641 9199	4.3
52	Lew	Hole Stock Bridge	SS 4887 0003	4.3
53	Lew	Bloomaford	SS 5078 0064	7.3
54	Lew	Great Rutleigh	SS 5140 0079	8.2
55	Lew	Hatherleigh Bridge	SS 5406 0416	15.1
56	Lew	Lewer Bridge	SS 5313 0525	16.9
57	Pulworthy Brook	Furzehill	SS 5268 0432	8.1
58	Medland Brook	Waterhouse	SS 5481 0133	7.4
59	Hookmoor Brook	Narracott Ford	SS 5307 0072	9.6
60	Wagaford Water	Wagaford Bridge	SS 4882 0168	5.7
61	Northlew Stream	Northlew	SX 5075 9910	5.7
62	Mussel Brook	Westover	SS 4777 0645	7.8
63	Whiteleigh Water	Dippermill	SS 4389 0638	7.4
64	Waldon	Berridon Cottage	SS 3184 1408	3.5
65	Waldon	Sutcombe	SS 3468 1096	8.9
66	Waldon	Waldon Bridge	SS 3684 1041	11.6
67	Waldon	Berry Farm	SS 3922 0986	14.7
68	Waldon	Henscott Bridge	SS 4151 0804	19.1
69	Cookbury Stream	Bason Cross	SS 4122 0801	6.2
70	Dipple Water	Dipple Bridge	SS 3495 1776	4.8
71	Cranford Water	Lanemill Bridge	SS 3415 2053	2.2
72	Cranford Water	Cranford	SS 3413 2134	3.2
73	Clifford Water	Biteford	SS 3021 1893	5.3
74	Seckington Water	Gorvin	SS 2980 2001	3.9

APPENDIX 8.6

EC DIRECTIVE "ON THE QUALITY OF FRESHWATERS NEEDING PROTECTING OR IMPROVEMENT IN ORDER TO SUPPORT FISH LIFE" (78/659/EEC)

QUALITY STANDARDS APPLIED BY NRA SOUTH WEST

Determinand		Salmonid Waters 'G'	Salmonid Waters 'I'	Cyprinid Waters 'G'	Cyprinid Waters 'I'
Dissolved oxygen as mg/l O_2 (a)		100%>7	50%>9	100%>5	50%>7
pH as pH units		-	6.0 – 9.0	-	6.0 – 9.0
Suspended solids as mg/l (b)		25	-	25	
BOD (total) as mg/l O_2		5	-	8	-
Nitrite as mg/l N		0.15	-	0.46	-
Non-ionised ammonia as mg/l N		0.004	0.021	0.004	0.021
Ammonia (total) as mg/l N		0.03	0.78	0.160	0.78
Total residual chlorine as mg/l HOCl		-	0.005	-	0.005
Zinc (total) as mg/l Zn					
Water hardness (mg/l $CaCO_3$)	0 – 50	-	0.03	-	0.3
	50 – 100	-	0.2	-	0.7
	100 – 250	-	0.3	-	1.0
	> 250	-	0.5	-	2.0
Copper (dissolved) as mg/l Cu					
Water hardness (mg/l $CaCO_3$)	0 – 50	0.005	-	0.005	-
	50 – 100	0.022	-	0.022	-
	100 – 250	0.040	-	0.040	-
	> 250	0.112	-	0.112	-

(a) For dissolved oxygen, 50% median and 100% minimum standard.

(b) For suspended solids the 'G' value is an annual average concentration.

For application of these standards, reference must be made to Article 6 and the Annexes of the Directive, and the appropriate DoE Implementation Guidelines.

APPENDIX 8.7

EC DIRECTIVE "ON POLLUTION CAUSED BY CERTAIN SUBSTANCES DISCHARGED IN THE AQUATIC ENVIRONMENT OF THE COMMUNITY" (76/464/EC)

LIST 1 ENVIRONMENTAL QUALITY STANDARDS (EQSs)

RECEIVING WATERS OF DISCHARGES

	Annual Mean (μg/l)
	Inland Waters
Mercury	1
Cadmium	5
Hexachlorocyclohexane (HCH)	0.1
Carbon tetrachloride	12
para-para DDT	0.01
Total DDT	0.025
Pentachlorophenol	2
Total "drins"	0.03
Aldrin	0.01
Dieldrin	0.01
Endrin	0.005
Isodrin	0.005
Hexachlorobenzene	0.03
Hexachlorobutadiene	0.1
Chloroform	12
1-2-dichloroethane	10
Trichloroethylene	10
Perchloroethylene	10
Trichlorobenzene	0.4

Standards are for Total

APPENDIX 8.7 CONTD

LIST I ENVIRONMENTAL QUALITY STANDARDS (EQSs) - BACKGROUND MONITORING (RIVER TORRIDGE AT BEAM BRIDGE)

	Annual Mean (µg/l)
	Inland Waters
Cadmium	1
Hexachlorocyclohexane (HCH)	0.05

LIST II ENVIRONMENTAL QUALITY STANDARDS (EQSs)
LIST II SUBSTANCES

A' stds-for protection of sensitive aquatic life (annual average's)

Mean Hardness (mg/l)	0–50	50–100	100–150	150–200	200–250	>250
Diss Copper (µg/l)	1	6	10	10	10	28
Diss Chromium (µg/l)	5	10	20	20	50	50
Diss Arsenic (µg/l)	<——— 50 ———>					
Diss Lead (µg/l)	4	10	10	20	20	20
Diss Nickel (µg/l)	50	100	150	150	200	200
Total Zinc (µg/l)	8	50	75	75	75	125
Total Boron (µg/l)	<——— 2000 ———>					
Diss Iron (µg/l)	<——— 1000 ———>					
Tot Vanadium (µg/l)	<——— 20 ———><				——— 60 ——>	
Tot Tributyltin (µg/l)	<——— 0.02 max allow conc ———>					
Tot Triphenyltin (µg/l)	<——— 0.02 max allow conc ———>					

'B' stds-for protection of other aquatic life (annual average's)

Mean Hardness (mg/l)	0–50	50–100	100–150	150–200	200–250	>250
Diss Copper (µg/l)	1	6	10	10	10	28
Diss Chromium (µg/l)	150	175	200	200	250	250
Diss Arsenic (µg/l)	<——— 50 ———>					
Diss Lead (µg/l)	50	125	125	250	250	250
Diss Nickel (µg/l)	50	100	150	150	200	200
Total Zinc (µg/l)	75	175	250	250	250	500
Total Boron (µg/l)	<——— 2000 ———>					
Diss Iron (µg/l)	<——— 1000 ———>					
Tot Vanadium (µg/l)	<——— 20 ———><				——— 60 ——>	
Tot Tributyltin (µg/l)	<——— 0.02 max allow conc ———>					
Tot Triphenyltin (µg/l)	<——— 0.02 max allow conc ———>					

Diss = Dissolved
Tot = Total

APPENDIX 8.8

EC DIRECTIVE "CONCERNING THE QUALITY REQUIRED OF SURFACE WATER INTENDED FOR THE ABSTRACTION OF DRINKING WATER IN THE MEMBER STATES" (75/440/EEC)

Definition of the Standard Methods of Treatment for Transforming Surface Water of Categories A1, A2 and A3 into Drinking Water

Category A1

Simple physical treatment and disinfection, e.g. rapid filtration and disinfection.

Category A2

Normal physical treatment, chemical treatment and disinfection, e.g. pre-chlorination, coagulation, flocculation, decantration, filtration, disinfection (final chlorination).

Category A3

Intensive physical and chemical treatment, extended treatment and disinfection e.g. chlorination to break-point, coagulation, flocculation, decantation, filtration, absorption (activated carbon), disinfection (ozone, final chlorination).

APPENDIX 8.8

CHARACTERISTICS OF SURFACE WATER INTENDED FOR THE ABSTRACTION OF DRINKING WATER

	Parameters	
1	pH	
2	Coloration (after simple filtration)	mg/l Pt scale
3	Total suspended solids	mg/l SS
4	Temperature	°C
5	Conductivity	$\mu s/cm^{-1}$ at 20°C
6	Odour	(dilution factor at 25°C)
7	Nitrates	mg/l NO_3
8	Fluorides	mg/l F
9	Total extractable organic chlorine	mg/l Cl
10	Dissolved Iron	mg/l Fe
11	Manganese	mg/l Mn
12	Copper	mg/l Cu
13	Zinc	mg/l Zn
14	Boron	mg/l B
15	Beryllium	mg/l Be
16	Cobalt	mg/l Co
17	Nickel	mg/l Ni
18	Vanadium	mg/l V
19	Arsenic	mg/l As
20	Cadmium	mg/l Cd
21	Total Chromium	mg/l Cr
22	Lead	mg/l Pb
23	Selenium	mg/l Se
24	Mercury	mg/l Hg
25	Barium	mg/l Ba
26	Cyanide	mg/l Cn
27	Sulphates	mg/l SO_4

A1 G	A1 I	A2 G	A2 I	A3 G	A3 I
6.5 to 8.5		5.5 to 9		5.5 to 9	
10	20 (0)	50	100 (0)	50	200 (0)
25					
22	25 (0)	22	25 (0)	22	25 (0)
1000		1000		1000	
3		10		20	
25	50 (0)		50 (0)		50 (0)
0.7 to 1	1.5	0.7 to 1.7		0.7 to 1.7	
0.1	0.3	1	2	1	
0.05		0.1		1	
0.02	0.05 (0)	0.05		1	
0.5	3	1	5	1	5
1		1		1	
0.01	0.05		0.05	0.05	0.1
0.001	0.005	0.001	0.005	0.001	0.005
	0.05		0.05		0.05
	0.05		0.05		0.05
	0.01		0.01		0.01
0.0005	0.001	0.0005	0.001	0.0005	0.001
	0.01		1		1
	0.05		0.05		0.05
150	250	150	250 (0)	150	250 (0)

	Parameters	
28	Chlorides	mg/l Cl
29	Surfactants (reacting with methyl blue)	mg/l (laurylsulphate)
30	Phosphates	mg/l P_2O_5
31	Phenols (phenol index) paranitraniline 4 aminoantipyrine	mg/l C_6H_5OH
32	Dissolved or emulsified hydrocarbons (after extraction by petroleum other)	mg/l
33	Polycyclic aromatic hydrocarbons	mg/l
34	Total pesticides (parathion, BHC, dieldrin)	mg/l
35	Chemical oxygen demand (COD)	mg/l O_2
36	Dissolved oxygen saturation rate	% O_2
37	Biochemical oxygen demand (BOD_5) (at 20°C with nitrification)	mg/l O_2
38	Nitrogen by Kjeldahl method (except NO_3)	mg/l N
39	Ammonia	mg/l NH_4
40	Substances extractable with chloroform	mg/l SEC
41	Total organic carbon	mg/l C
42	Residual organic carbon after flocculation and membrane filtrations (5 µ) TOC	mg/l C
43	Total coliforms 37°C	/100 ml
44	Faecal coliforms	/100 ml
45	Faecal streptococci	/100 ml
46	Salmonella	

I = mandatory
G = guide
O = exceptional climatic or geographical conditions

A1 G	A1 I	A2 G	A2 I	A3 G	A3 I
200		200		200	
0.2		0.2		0.5	
0.4		0.7		0.7	
	0.001	0.001	0.005	0.001	0.1
	0.05		0.2	0.5	1
	0.0002		0.0002		0.0001
	0.001		0.0025		0.005
				30	
>70		>50		>30	
<3		<5		<7	
1		2		3	
0.05		1	1.5	2	4 (0)
0.1		0.2		0.5	
50		5000		50000	
20		2000		20000	
20		1000		10000	
Not present in 5000 ml		Not present in 1000 ml			

APPENDIX 8.9

RIVER TORRIDGE CATCHMENT

INDEX FOR ROUTINE BIOLOGICAL MONITORING MAPS FOR 1990 AND 1991

Site No. on Map	Watercourse	Biological Site Name	National Grid Reference
1	Torridge	30m u/s of road bridge at Fordmill Farm	SS 3246 1777
2	Torridge	225m u/s of bridge 30m d/s of Quarry at Putford	SS 3638 1613
3	Torridge	200m u/s of Woodford Bridge	SS 3978 1268
4	Torridge	20m u/s of bridge at Gidcott	SS 4220 0941
5	Torridge	50m d/s of Coham Bridge u/s of Kingsley Mill	SS 4610 0632
6	Torridge	50m d/s of bridge at Sheepwash	SS 4865 0574
7	Torridge	50m d/s of Rockhay Bridge	SS 5060 0698
8	Torridge	250m u/s of Hele Bridge	SS 5385 0613
9	Torridge	125m d/s of New Bridge	SS 5489 1112
10	Torridge	50m u/s of Beaford Bridge	SS 5428 1426
11	Torridge	10m u/s of track at end of Undercleave	SS 5178 1652
12	Torridge	300m d/s of Town Mills, Torrington	SS 4987 1870
13	Torridge	100m d/s of Rothern Bridge	SS 4780 1976
14	Torridge	100m u/s of Beam Bridge	SS 4731 2089
15	Yeo (Bideford)	75m u/s of bridge at Foxdown	SS 3809 2217
16	Yeo (Bideford)	30m u/s of Tuckingmill Bridge	SS 4015 2245
17	Yeo (Bideford)	25m u/s of Hoopers Bridge	SS 4273 2317
18	Yeo (Bideford)	Opposite Edge Mill House	SS 4491 2293
19	Duntz	30m u/s of Hembury Road Bridge	SS 4293 1777
20	Duntz	50m u/s of Yeo Confluence (Orleigh)	SS 4395 2242
21	Lydeland Water	50m u/s of Tythecott Mill Bridge	SS 4190 1838
22	Huntshaw Water	30m u/s of bridge at Weare Gifford	SS 4794 2144
23	Common Lake	10m u/s of Tantons Plain	SS 4940 1982
24	Langtree Lake	30m u/s of bridge at Servis Farm	SS 4774 1919
25	Woolleigh Brook	25m d/s of B3220 road bridge	SS 5219 1714
26	Mere	50m u/s of Coleford Bridge	SS 5017 1325
27	Mere	300m u/s of A386 bridge 50m u/s Pylons	SS 5238 1130
28	Mere	150m u/s off farm bridge at Greatwood	SS 5480 1285
29	Little Mere River	25m u/s of track bridge at Wooladon Moor	SS 5336 0841
30	Little Mere River	20m u/s of Burymoor Bridge	SS 5257 1105
31	Dolton Stream	25m d/s of track bridge u/s of Torridge Confluence	SS 5531 1154
32	East Okement River	200m u/s of Fatherford Rail Bridge	SX 6048 9460
33	East Okement River	300m u/s of A30 road bridge at car park	SX 5898 9510
34	West Okement River	100m u/s of Red-a-Ven d/s of Meldon Dam	SX 5641 9190
35	West Okement River	30m u/s of footbrige d/s of Red-a-Ven	SX 5640 9205
36	West Okement River	Okehampton Hospital d/s of Castle car park	SX 5850 9435
37	West Okement River	30m u/s of Meldon Viaduct	SX 5649 9230
38	West Okement River	30m u/s of Meldon Quarry Bridge	SX 5664 9331
39	Okement	100m d/s of Knowle Bridge	SX 5930 9639
40	Okement	75m d/s of Brightley Bridge	SX 5987 9750
41	Okement	South Dornaford	SS 5999 0002
42	Okement	15m u/s of A3072 bridge, Jacobstowe	SS 5920 0169
43	Okement	25m d/s of Woodhall Bridge	SS 5845 0343
44	Okement	100m u/s of Iddesleigh Bridge	SS 5690 0590
45	Hole Brook	50m u/s of Monkokehampton	SS 5836 0545
46	Beckamoor Brook	75m u/s of Terris Bridge	SS 5818 0328

APPENDIX 8.9 CONTD

Site No. on Map	Watercourse	Biological Site Name	National Grid Reference
47	Jacobstowe Stream	20m u/s of Okement Confluence	SS 5913 0161
48	Brightley Stream	25m u/s of road bridge, Brightley Mill	SX 5970 9703
49	Red-a-Ven Brook	75m u/s of West Okement Confluence	SX 5647 9200
50	Lew	50m u/s of Hole Stock Bridge	SS 4885 0005
51	Lew	Bloomaford third field from road	SS 5090 0070
52	Lew	15m u/s of bridge at Great Rutleigh	SS 5140 0079
53	Lew	200m u/s of Hatherleigh Bridge	SS 5398 0400
54	Lew	130m u/s of Lewer Bridge	SS 5318 0515
55	Pulworthy Brook	30m u/s of hedge at Furzehill	SS 5258 0415
56	Medland Brook	10m u/s of bridge at Waterhouse	SS 5481 0131
57	Hookmoor Brook	15m u/s of bridge at Narracott	SS 5310 0070
58	Wagaford Water	75m d/s of Wagaford Bridge	SS 4890 0168
59	North Lew Stream	North Lew 55m u/s of Bridge	SX 5075 9910
60	Stoney Stream	30m u/s of Ford Coombe	SX 5044 9700
61	Mussel Brook	125m u/s of bridge at Westover	SS 4786 0654
62	Whiteleigh Water	40m u/s of bridge at Dipper Mill	SS 4385 0638
63	Waldon	50m u/s of bridge at Berridon Cottage	SS 3182 1412
64	Waldon	200m u/s of Sutcombe Bridge	SS 3465 1100
65	Waldon	10m u/s of Waldon Bridge	SS 3682 1042
66	Waldon	200m u/s of bridge at Berry Farm	SS 3910 0988
67	Waldon	250m u/s of Henscott Bridge	SS 4137 0812
68	Cookbury Stream	125m u/s of bridge at Bason Cross	SS 4118 0795
69	Dipple Water	150m u/s of Dipple Bridge	SS 3492 1787
70	Cranford Water	d/s of rubbish and earth Tip	SS 3407 2005
71	Clifford Water	15m u/s of bridge at Biteford	SS 3020 1896
72	Seckington Water	75m u/s of bridge at Gorvin	SS 2977 2006

u/s = Upstream
d/s = Downstream

APPENDIX 8.10

POLLUTION INCIDENT CATEGORIES

Category 1

A major incident involving one or more of the following :

(a) potential or actual persistent effect on water quality or aquatic life;

(b) closure of potable water, industrial or agricultural abstraction necessary;

(c) extensive fish kill;

(d) excessive breaches of consent conditions;

(e) extensive remedial measures necessary;

(f) major effect on amenity value.

Category 2

A significant pollution which involves one or more of the following :

(a) notification to abstractors necessary;

(b) significant fish kill;

(c) measurable effect on invertebrate life;

(d) water unfit for stock;

(e) bed of watercourse contaminated;

(f) amenity value to the public, owners or users reduced by odour or appearance.

Category 3

Minor

Suspected or probable pollution which on investigation proves unlikely to be capable of substantiation or to have no notable effect.

APPENDIX 8.11

Terms:

AOD	At Ordnance Datum
AONB	Area of Outstanding Natural Beauty
BOD	Biochemical Oxygen Demand
BMWP	Biological Monitoring Working Party
CAP	Common Agricultural Policy
EC	European Community
EIFAC	European Inland Fisheries Advisory Committee
EQS	Environmental Quality Standard
ESA	Environmentally Sensitive Area
GATT	General Agreement on Trade and Tariffs
MAFF	Ministry of Agriculture, Fisheries and Food
NGR	National Grid Reference
NRA	National Rivers Authority
NWC	National Water Council
OD	Ordnance Datum
RIVPACS	River Invertebrate Prediction and Classification System
RQO	River Quality Objective
SSSI	Site of Special Scientific Interest
STW	Sewage Treatment Works
SWQO	Statutory Water Quality Objective
SWWSL	South West Water Services Limited
WDA	Waste Disposal Authorities
WRA	Waste Regulation Authorities

Signs:

$<$ Less than

$>$ Greater than

$\leq$ equal or less than

Definitions:

Q95: The flow that on average, is equalled or exceeded for 95% of the time.

Eutrophication: The enrichment of water by nutrients especially compounds of nitrogen and/or phosphorous, causing an accelerated growth of algae and higher forms of plant life to produce an undesirable disturbance to the balance of organisms present in the water and to the quality of the water concerned.

Units:

m	metre(s)
km	kilometre(s)
km^2	square kilometre(s)
mm	millimetre(s)
°C	temperature, degree(s) Centigrade
m/km	metre(s) per kilometre
m^3/s(ec)	cubic metre(s) per second
m^3/d(ay)	cubic metre(s) per day
m^3 p.a.	cubic metre(s) per year
μg/l	microgramme(s) per litre
ng/l	nanogramme(s) per litre
mg/l	milligramme(s) per litre
Ml	Megalitre(s)
Ml/day	Megalitres per day
kg	kilogramme(s)