RIVER DERWENT
CATCHMENT MANAGEMENT PLAN
CONSULTATION REPORT

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NRA

National Rivers Authority
Northumbria & Yorkshire Region

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RIVER DERWENT CATCHMENT PLAN

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1.0 INTRODUCTION

Established on the 1st of September 1989, the National Rivers Authority (NRA) came into being as a result of the 1989 Water Act. It was created as a public body whose main task is to protect and improve the water environment in England and Wales and provide protection against flooding from rivers and the sea.

1.1 THE AIMS OF THE NATIONAL RIVERS AUTHORITY

Mission Statement

The National Rivers Authority will protect and improve the water environment. This will be achieved through effective managment of water resources and by substantial reductions in pollution. The NRA aims to provide effective defence for people and property against flooding from rivers and the sea. In discharging its duties it will operate openly and balance the interests of all who benefit from and use rivers, groundwaters, estuaries and coastal waters. The NRA will be business-like, efficient and caring towards its employees.

THE AIMS OF THE NATIONAL RIVERS AUTHORITY ARE TO:

- Achieve a continuing improvement in the quality of rivers, estuaries, and coastal waters, through the control of pollution.
- Ensure that dischargers pay the costs of the consequence of their discharges, and, as far as possible, to recover the costs of water environment improvements from those who benefit.
- Assess, manage, plan, and conserve water resources and to maintain and improve the quality of water for all those who use it.
- Provide effective defence for people and property against flooding from rivers and the sea.
- Provide adequate arrangements for flood forecasting and warning.
- Maintain, improve and develop fisheries.
- Develop the amenity and recreational potential of waters and lands under NRA control.
- Conserve and enhance wildlife, landscape, and archaeological features associated with waters under NRA control.

- Improve and maintain inland waters and their facilities for use by the public where the NRA is the navigation authority.

- Influence planning authorities to control development so as to avoid conflict with NRA objectives and initiatives through Town and Country Planning liaison.

- Improve public understanding of the water environment and the NRA's work.

To achieve these aims the NRA works with local authorities, industry, commerce, the farming community, interested groups and the general public to promote environmental awareness and to enforce appropriate environmental standards.

1.2 THE NRA AND CATCHMENT MANAGEMENT PLANNING

To plan for the future of the water environment the NRA has established a process called catchment management planning (CMP).

Unlike many other organisations the regions of the NRA are defined in terms of natural river catchment boundaries. These have provided the logical focus for managing the water environment over many years and this approach is reflected in the CMP process.

The Catchment Management Planning process focuses attention on the water environment of a specific river catchment. The process is intended to create a consistent framework for the co-ordination of the NRA's activities within each catchment. The CMP process will enable the optimum deployment of investment and resources to ensure the NRA achieves efficient and effective operations within each catchment. It is seen as the means by which the NRA can identify catchment uses and issues, address any conflicts and assign priorities to ensure that the water environment is protected and improved. The final CMPs will result in the production of action programmes. These programmes will provide the detail and timescales of improvements to be carried out.

The plans are prepared for a five- to ten-year period and are the product of wide consultation both within the NRA and with outside organisations. Once completed the plans will be updated and revised on a regular basis to take account of changing circumstances.

NATIONAL RIVERS AUTHORITY
NORTHUMBRIA & YORKSHIRE REGION
RIVER DERWENT CATCHMENT

MAP No. 1

THE RIVER DERWENT CATCHMENT MANAGEMENT PLAN

The Derwent Catchment Management Plan is the second of 17 to be undertaken in the Northumbria & Yorkshire Region. The other catchments are scheduled to be completed over the next two years.

This large and varied, mainly rural catchment is of international and national importance for wildlife conservation and has a high landscape value. A considerable proportion of the catchment lies within the North York Moors National Park. The NRA places prime importance on the protection and improvement to the already predominantly high quality of the water environment of this catchment.

THE CONSULTATION PROCESS

The publication of this consultation report marks the start of a three month period of formal consultation enabling external organisations and the general public to work with the NRA in planning the future of the water environment of the Derwent Catchment.

This report describes the catchment, reviews the state of the water environment and identifies the uses and issues which need to be addressed. It does not define in detail the action plans nor the guiding policy objectives to tackle the key issues for the water environment.

Through detailed consultation with all interested organisations the consultation process will enable the NRA to:

- confirm the range and extent of catchment resources, uses and activities.
- obtain views on the issues facing the water environment identified in the Report.
- begin the process of identifying and agreeing action plans.
- ensure decisions on the future management of the catchment are based on a wide range of views from interested parties.

When commenting on this document the NRA requests that organisations and the general public will consider both points of detail and the following questions;

- have the issues been adequately assessed ?

- what are the opinions of the consultees on these issues and the actions proposed?
- are there any issues which have not been addressed ?
- how should the development of strategies and actions plans be progressed?

Following the consultation phase the responses will be considered in detail before producing a definitive Catchment Management Plan. The final plan will define both a strategy for future management of the catchment and a series of action plans for the NRA working with others to implement.

In the light of the actions identified project groups will be set up to implement and monitor the action plans. An annual review of progress against the actions identified in the catchment will be made by the NRA. The review will assess progress made by all relevant groups, organisations and individuals identified within the plan.

During the consultation period please send any comments in writing to the Catchment Management Officer:

Derwent Catchment Management Plan
National Rivers Authority Northumbria & Yorkshire Region
Coverdale House
Aviator Court
Amy Johnson Way
Clifton Moor
York
North Yorkshire YO3 4UZ

All comments must be received by the 31st January 1994.

Note: Whilst every effort has been made to ensure the accuracy of information in this Report it may contain some errors or omissions which we will be pleased to correct.

2.0 THE CATCHMENT

The purpose of this section is to review the physical and natural resources of the catchment in relation to the water environment. Following a short introduction to the catchment the following topics will be briefly described;

Topography

Geology

Hydrogeology

Rainfall and Flow Monitoring

Ecology

Fisheries

The main facts are summarised in the Key Details section 2.8.

2.1 INTRODUCTION

The Derwent rises on Fylingdales Moor in the North York Moors National Park and joins the Ouse at Barmby-on-the-Marsh. The principal rivers which drain the North York Moors and which all join the River Derwent upstream of Malton are:- the Rye, Costa Beck, the Dove, the Seven, the Riccal, Thornton Beck, Pickering Beck, Hodge Beck, Wath Beck, Holbeck and the River Hertford.

The Derwent assumed its present course at the end of the Ice Age. By Doomsday (1086) mill dams obstructed its natural flow at a number of places including Old and New Malton, Kirkham and Howsham and further dams are recorded at other locations from the 13th Century onwards. Today dams across the river still exist at five of these historic locations between Malton and the mouth of the river at Barmby.

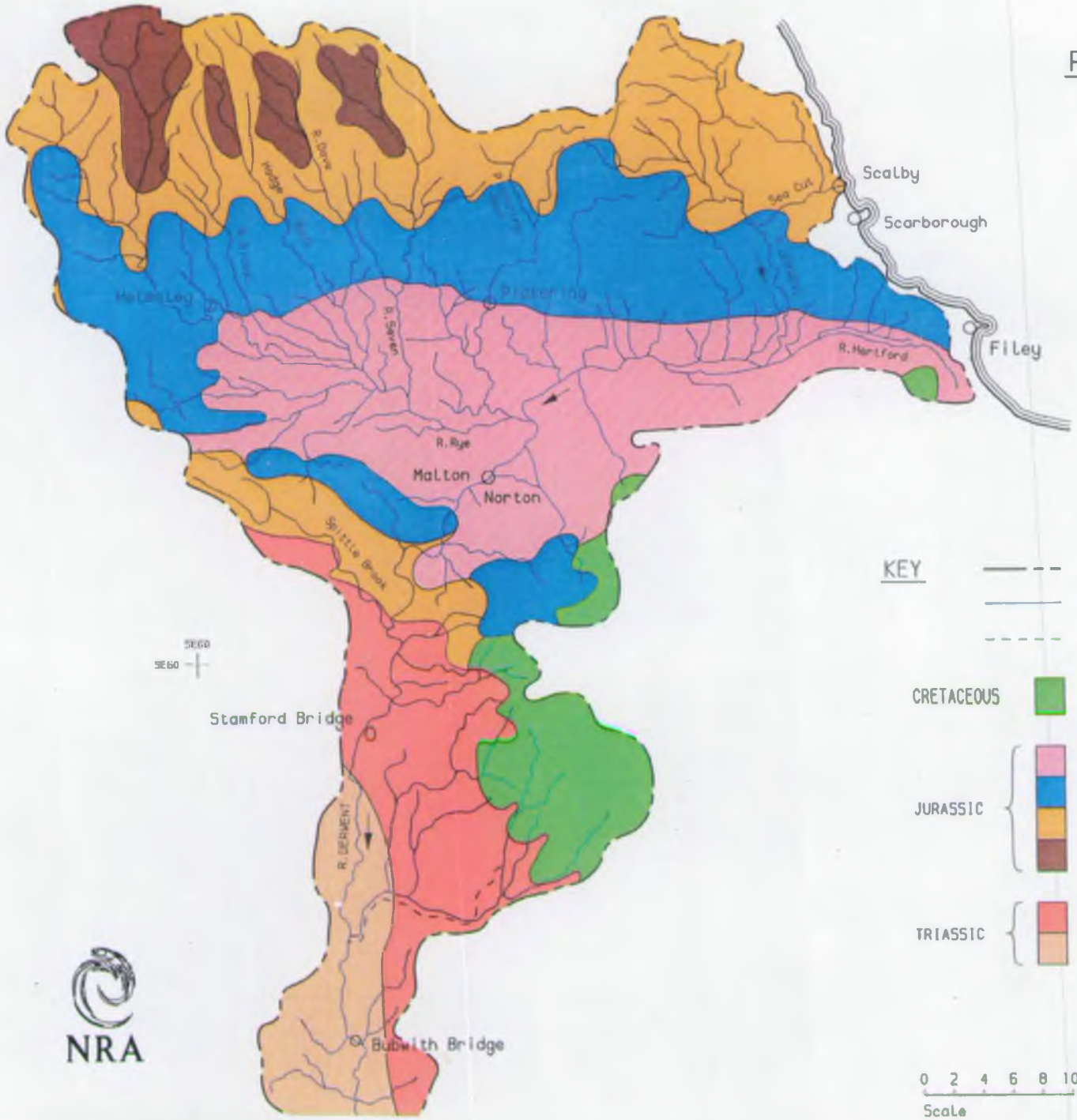
It is principally a rural catchment with an area of 2057 km2 draining one-tenth of Yorkshire. The River Derwent is one of the few largely undisturbed lowland rivers in England and Wales. There are over 40 SSSIs (Sites of Special Scientific Interest) within the catchment plus two National Nature Reserves and an Area of Outstanding Natural Beauty (AONB). The lower part of the river is designated as an SSSI along a continuous length of river from Ryemouth to Barmby. The seasonally flooded meadows in the lower Derwent valley are of international importance for over-wintering and breeding wildfowl, with 1000ha designated as a Special Protection Area for wild birds (EC Birds Directive) and a wetland of international importance under the Ramsar Convention.

The Derwent catchment is Yorkshire's largest source of drinking water, supplying water to Leeds, Wakefield, Sheffield and Hull as well as to towns within the catchment. As a result, there is an unquestionable need to maintain high quality standards and a tight system of pollution control. Barmby Tidal Barrage operates at the bottom of the catchment at the confluence with the River Ouse as part of a flood control mechanism and as a Water Resources facility to prevent the ingress of the tidal waters into the Derwent.

2.2 TOPOGRAPHY

The boundary of the catchment is defined to include all land which contributes surface water to the River Derwent and its main tributary the River Rye and all their subsequent tributaries. It also includes the Sea Cut, a manmade channel connecting the River Derwent with the North Sea near Scarborough, but it does not include the coastal strip from Whitby through to Flamborough Head.

RIVER DERWENT CATCHMENT GEOLOGY



NORTH SEA

KEY

- CATCHMENT BOUNDARY
- RIVER
- CANAL

CRETACEOUS
- CHALK

JURASSIC
- KIMMERIDGE CLAY
- CORALLIAN LIMESTONE
- SANDSTONE
- LIAS

TRIASSIC
- MERCIA MUDSTONE
- SHERWOOD SANDSTONE

0 2 4 6 8 10km
Scale

NRA

The Derwent Catchment is bounded by the Cleveland Hills, North York Moors and Hambleton Hills to North, The Wolds and coast to the East, the Vale of York to the West and the Humber Estuary to the South.

The Cleveland Hills and North York Moors reach heights of the order of 400m AOD (Above Ordnance Datum or mean sea level), with the highest points exceeding 454 and 430m altitude respectively, while the Hambleton Hills exceed 370m AOD.

The waters of the Derwent drain south towards its confluence with the River Ouse near Barmby-on-the-Marsh, and thereafter flow into the Humber Estuary and the North Sea. Flowing for 115km, the River Derwent falls from 260m AOD where it rises on the Fylingdales Moor to below 10m AOD at its confluence with the Ouse.

2.3 GEOLOGY

The main rock types found in the Derwent Catchment are detailed in Table 1. The geology of the Derwent Catchment is summarised on map 2.

2.4 HYDROGEOLOGY

The major aquifers within the catchment are the Chalk, Corallian Limestone and the Sherwood Sandstone.

Only the western and northern escarpments of the Chalk aquifer are included in the Derwent catchment. The springs on these escarpments contribute a significant flow to the River Derwent. Four major springs are licensed for abstraction for public water supply.

The Corallian Series outcrops on the hills surrounding the Vale of Pickering and is also present beneath the centre of the Vale where it is sandwiched between two impermeable layers, the Kimmeridge Clay above and the Oxford Clay below. The Corallian consists of a sequence of limestones and sandstones of total thickness up to 100 metres which are extensively faulted and dissected by the rivers flowing south from the North York Moors, dividing the aquifer into a series of semi-independent blocks.

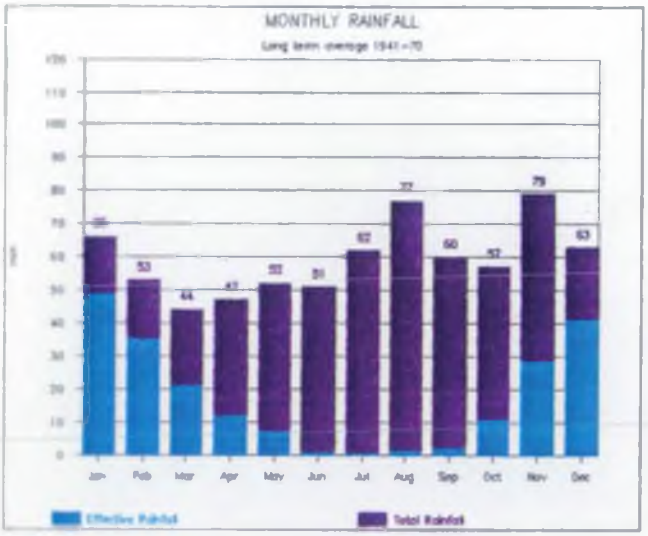
The well-developed fissure system within the Corallian Limestone permits both a rapid response to rainfall (often within 1 day) and the ingress of river water on the north side of the limestone outcrop and its discharge a few kilometres downstream, often at very large springs.

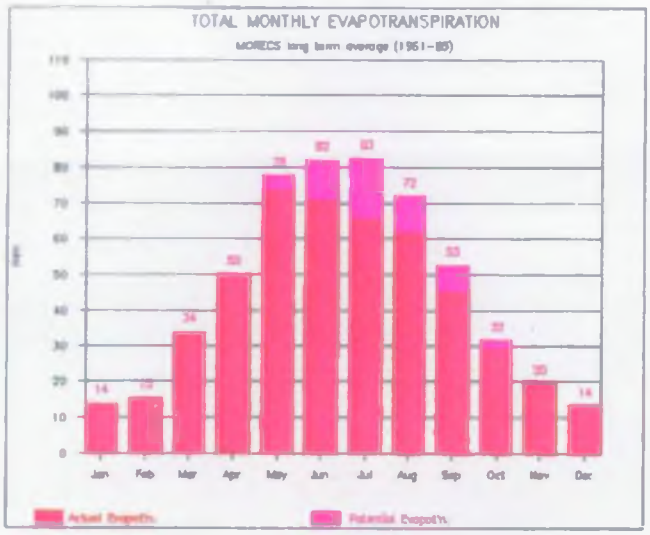
TABLE 1: THE GEOLOGY OF THE DERWENT CATCHMENT

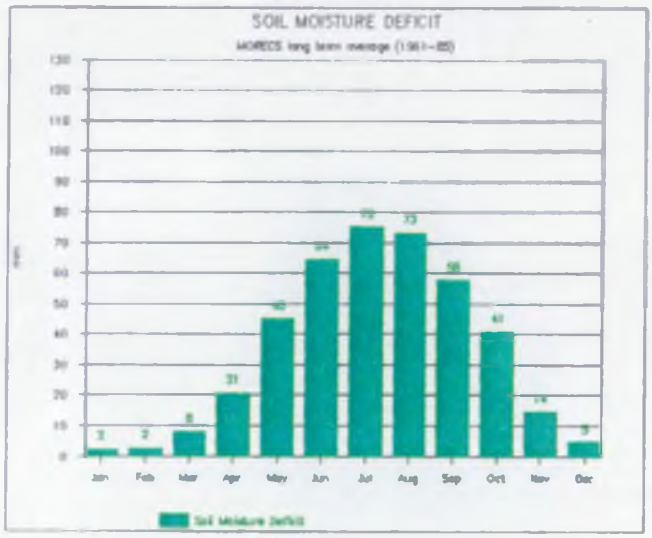
Age	*Rock Type*	*Locations*	*Description*	*Hydro-Geological Classification*
RECENT & PLEISTOCENE	Drift	Part of the Vale of York and Vale of Pickering.	Alluvium, Fluvial Sands & Gravels, Glacial Sands & Gravels, Boulder Clay.	Non-Aquifer
CRETACEOUS	Chalk	Western & Northern Escarpment.	White fine-grained limestone with marl seam and tabular flints.	Major Aquifer
JURASSIC	Kimmeridge Clay		Dark, silty, sandy clay.	Non-Aquifer
	Corallian Series	Vale of Pickering	Alternating calcareous grits and limestones.	Major Aquifer
	Oxford Clay		Dark shaley clays.	Non-Aquifer
	Kellaways		Calcareous sandstones	Minor Aquifer
	Ravenscar Group	North York Moors.	Limestones and sandstones.	Minor Aquifer
	Lias. Group		Shales with thin limestones and sandstones.	Minor Aquifer
TRIASSIC	Mercia Mudstone		Shales and marls with occasional thin sandstones.	Non-Aquifer
	Sherwood Sandstone	Part of Vale of York.	Sandstone with thin beds of marl or mudstone.	Major Aquifer

DERWENT CATCHMENT CLIMATE INFORMATION

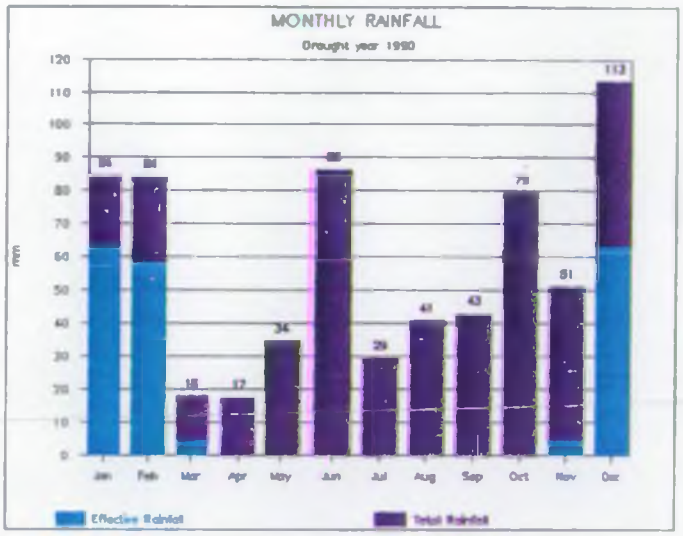
LONG TERM AVERAGE

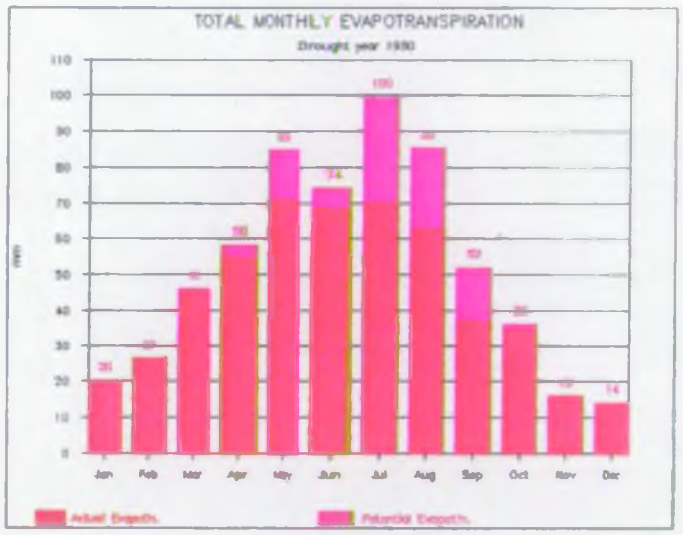


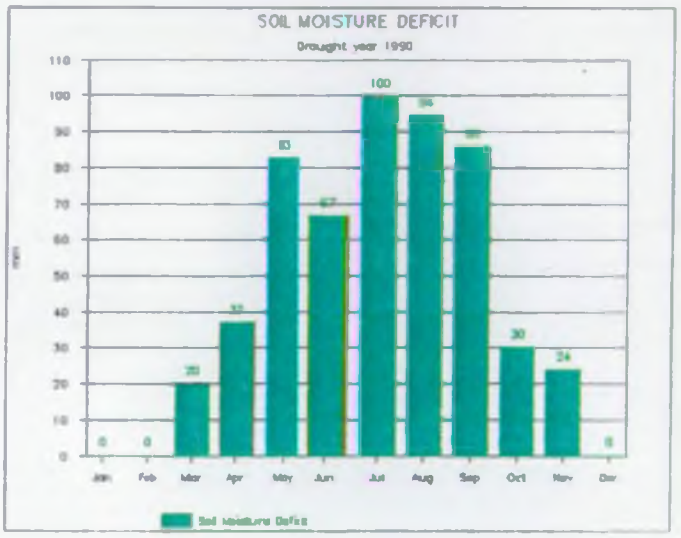




DROUGHT YEAR - 1990







This situation both enhances the resources of the aquifer and renders it especially prone to pollution. Groundwater quality is normally very good in the unconfined part of the aquifer. The river Rye and the river Derwent at West Ayton have swallow holes in the river bed where a considerable amount of water is lost to the aquifer. The aquifer is chiefly developed by a small number of large public supply sources close to the natural discharge points.

The Sherwood Sandstone Group (Triassic Sandstone) consists of a thick sequence (up to 300 metres) of fine- to medium-grained sandstones with frequent marly layers. It outcrops in the southern part of the River Derwent catchment and dips under the Mercia Mudstone on the east.

Most of the outcrop area is low-lying, resulting in low hydraulic gradients within the aquifer and only small seasonal fluctuations in water levels (typically 2 to 3 metres). Much of the area is covered by glacial Drift, causing artesian heads in some places. Both fissure flow and inter-granular flow are important methods of groundwater movement. There is a complex hydrogeological relationship between the Drift and the underlying Sherwood Sandstone.

Groundwater quality is often good but deteriorates markedly near the eastern edge of the outcrop where hardness and high sulphates are associated with the Mercia Mudstone or with thick Drift. Concentrations of iron and manganese may pose problems for potable supplies, as may nitrates on the areas with thin or sandy drift cover.

The Drift deposits, the Kellaways Rock and the Ravenscar Group are minor aquifers.

2.5 RAINFALL AND FLOW MONITORING

The NRA manages a regional rainfall monitoring network which includes 27 rain gauges in the Derwent catchment. These enable the variations in long term average rainfall to be calculated. The annual rainfall within the Derwent catchment ranges from 600mm near Barmby to 1100mm on the North York Moors, as shown on map 3. Rainfall in the Derwent catchment is less than that in the Pennine catchments further west of a similar altitude. Effective rainfall is virtually zero during summer months, especially during drought years such as 1990 as indicated by the graphs opposite.

Potential evapotranspiration is slightly above the Yorkshire average of 543mm over the catchment. In drought years potential evapotranspiration is likely to increase,

while actual evapotranspiration decreases. Soil moisture deficits reach close to 60mm during an average summer, but can double to in excess of 100mm under drought conditions, especially in the drier south of the catchment.

In addition to the rainfall gauges there is a network of 16 river gauging stations, which provide information on river flows and levels throughout the catchment. There are also five water level only monitoring stations which operate on the lower Derwent. The data from these stations are used to produce flow statistics both on a long term and annual timescale. To supplement the data, monitoring is undertaken at Barmby Barrage to enable the outflow from the River Derwent to the River Ouse to be quantified.

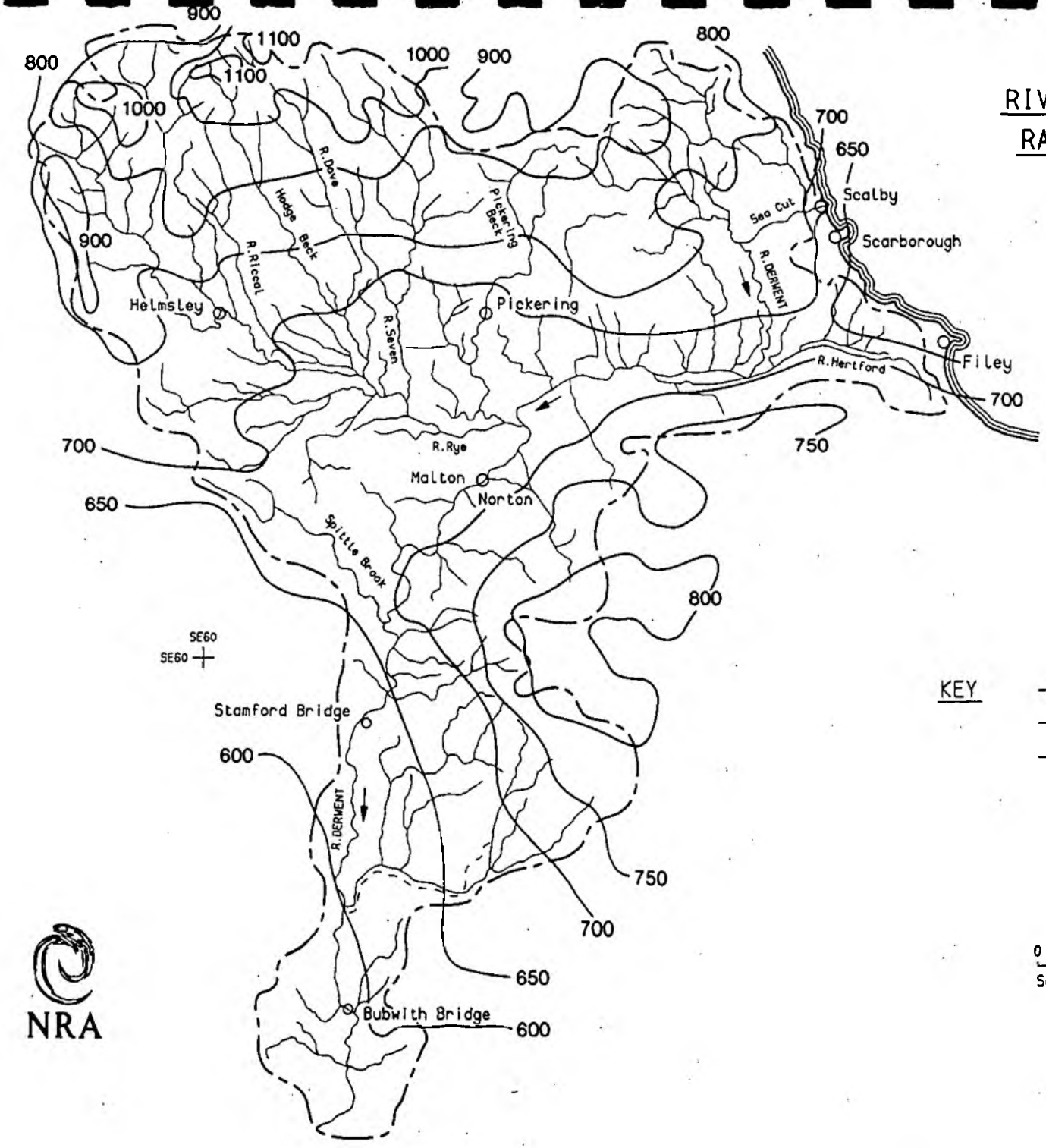
Six of the gauging stations will eventually be incorporated in to the Regional Telemetry System (RTS) which is being introduced to the Region. The Regional Telemetry System allows up-to-the-minute information to be gathered by computers at an NRA office from outstations within the catchment. There are a further 6 sites for stations identified within the Derwent catchment; at Howe Bridge, Stamford Bridge, Elvington, West Ayton, Sands Hill Bridge and Snainton Ings Farm. These 12 sites will be able to collate river level, flow, and water quality data.

2.6 ECOLOGY

The River Derwent and its tributaries form one of the most important catchments in England and Wales for wildlife conservation. The fauna and flora of the rivers and streams within the catchment are very varied, affected by geology, topography, land use and human influences. The upper reaches support an exceptional number of aquatic plant communities (11 have been defined) and the lower reaches sustain one of the largest remaining flood plain grassland communities in Western Europe. There are over 40 Sites of Special Scientific Interest (SSSIs) within the catchment area, plus two National Nature Reserves (NNRs)and one proposed NNR.

The lower part of the river from the River Rye confluence to Barmby is a Site of Special Scientific Interest by virtue of the assemblage of aquatic plants and animals. The river is one of the few largely undisturbed lowland rivers in England and Wales. The Pocklington Canal which joins the river in this length is also of national significance for conservation. Around the lower part of the river the complex of seasonally flooded meadows are of international significance for over-wintering and breeding wildfowl. A number of SSSIs afford protection to these flood meadows, as well as the River Derwent and its banks and much of the Pocklington Canal. The ecology of these SSSIs is interlinked and they are known collectively as the Lower Derwent Valley. Approximately 400 ha of the Lower Derwent Valley is managed as a National Nature Reserve. The

RIVER DERWENT CATCHMENT RAINFALL DISTRIBUTION



NORTH SEA

KEY

CATCHMENT BOUNDARY

RIVER

CANAL

0 2 4 6 8 10km

Scale

NRA

MAP No.3

international importance of the area has been recognised in the designation of 1000ha as a Special Protection Area for wild birds (EC Birds Directive) and a wetland of international importance under the Ramsar Convention. Many of the upper parts of the river and a number of the tributaries are also of importance for conservation, such as the length of the river in Forge Valley which is a National Nature Reserve, although past engineering work, pollution and forestry may have modified this interest to a large extent. The river supports one of the last populations of otters in the Region and with proper management this species may be encouraged to increase in number and recolonise other river systems.

The upper parts of the catchment drain the North York Moors National Park and the Howardian Hills Area of Outstanding Natural Beauty (AONB). Considerable geomorphological interest exists in this general area. Major post-glacial features such as the Vale of Pickering and the melt-water channel of Newton Dale are associated with many lesser features, such as river terraces and glacial deposits which are an integral part of the landscape.

2.7 FISHERIES

Whilst the River Derwent and its main tributary the Rye suffer periodic problems with acidic flushes in their uppermost reaches, both develop into a very good, typical upland brown trout fisheries. The rivers are fast flowing with pools interspersed with shallow riffles, and the river bed consists mainly of boulders and gravel.

Scalby Beck, to the east of the catchment, is important for the maintenance of the north east coast salmonid fishery, providing the only substantial area of suitable sea trout spawning gravels between the River Esk to the north and the Humber to the south.

Below Helmsley on the Rye and the confluence with the Hertford on the River Derwent, the character of the rivers changes significantly with the rocky riffle and pool nature of the streams being replaced by steadier, deeper flows and the appearance of coarse fish.

Between Yedingham and Low Marishes on the Derwent the fish populations consist mainly of chub, dace, roach, gudgeon, pike, perch and eels but grayling are also present.

By the time the Rye joins the Derwent just above Malton it has become deeper and more ponded with abundant areas of weed growth. Coarse fish are the main inhabitants although trout are still present in reasonable numbers. Chub, dace, gudgeon,

barbel, grayling and pike contribute to make it a very good mixed fish population.

At Kirkham Abbey, below Malton, the bed of the River Derwent remains predominantly silt overlaying clays and gravels and it is in this area that the barbel starts to appear on the Derwent. From Kirkham to the top of the original tidal limit at Sutton-on-Derwent, the fishery is dominated by coarse fish species such as chub, dace, roach, bream, gudgeon, grayling, barbel, perch, pike, ruffe, stickleback, minnow and eel although trout (including occasional sea trout) and salmon are also present.

The section of River Derwent between the weir at Sutton-On-Derwent and its confluence with the River Ouse was, until 1975, affected by tidal fluctuations. This section of the river was the last recorded habitat of the now extinct burbot. Following the construction of the Barmby Barrage flows were significantly reduced leading to a generally more ponded environment. Species found within this section include; roach, bream, perch, ruffe, gudgeon, dace, bleak, chub, some barbel, stickleback, eels and small numbers of rudd and tench. Whilst all these species exist the predominant fish caught are dace.

2.8 KEY DETAILS

Area:	2057 km²
Population:	104,000
Geology:	Cretaceous Chalk Kimmeridge Clay Corallian Limestone Lias Mercia Mudstone Sherwood Sandstone

ADMINISTRATIVE DETAILS

County Councils:	North Yorkshire Humberside
District Councils:	Selby Boothferry East Yorkshire Hambleton Ryedale Scarborough
Water Companies:	Yorkshire Water Services Ltd. York Water Works Co.
Sewage Treatment Works:	59
Internal Drainage Boards:	Muston & Yedingham Thornton Rye Foss Wilberfoss & Thornton Ouse & Derwent Lower Ouse
National Parks:	North York Moors National Park

Navigation Authority: Pocklington Canal - British Waterways

River Derwent - No Navigation Authority

Main Towns & Populations 1981 Census Data:

Pickering	- 5,968	Norton	- 5,877
Pocklington	- 5,073	Malton	- 4,136
Helmsley	- 3,788	Stamford Bridge	- 2,858

WATER QUALITY

Length of River in NWC Class - 1992 Survey

		km	%
Class 1A	-	525.0	56.29
Class 1B	-	332.9	35.70
Class 2	-	54.6	5.85
Class 3	-	20.1	2.16
Class 4	-	-	-
Total		932.6	

Length of Canal in NWC Class - 1992 Survey

		km	%
Class 1A	-	-	-
Class 1B	-	14.5	100
Class 2	-	-	-
Class 3	-	-	-
Class 4	-	-	-
Total		14.5	

FLOOD PROTECTION:

Length of Designated Main River	:	263.83 km
Length of Flood Defences on Main River	:	210.00 km
Number of People and Property Protected From Flooding	:	3245 House Equivalents

WATER RESOURCES

Dry Weather River Flow :

Station	River	DWF in Cumecs
Broadway Foot	Rye	0.606
Ness	Rye	0.933
West Ayton	Derwen	0.061
Buttercrambe	Derwent	4.944

CONSENTS:

Total Number of Licensed River Abstractions in 1992 :	174
Total Number of Licensed Groundwater Abstractions in 1992 :	112
Total Number of Consented Sewage and Domestic Discharges in 1992	359
Total Number of Consented Industrial Discharges in 1992 :	23

CONSERVATION:

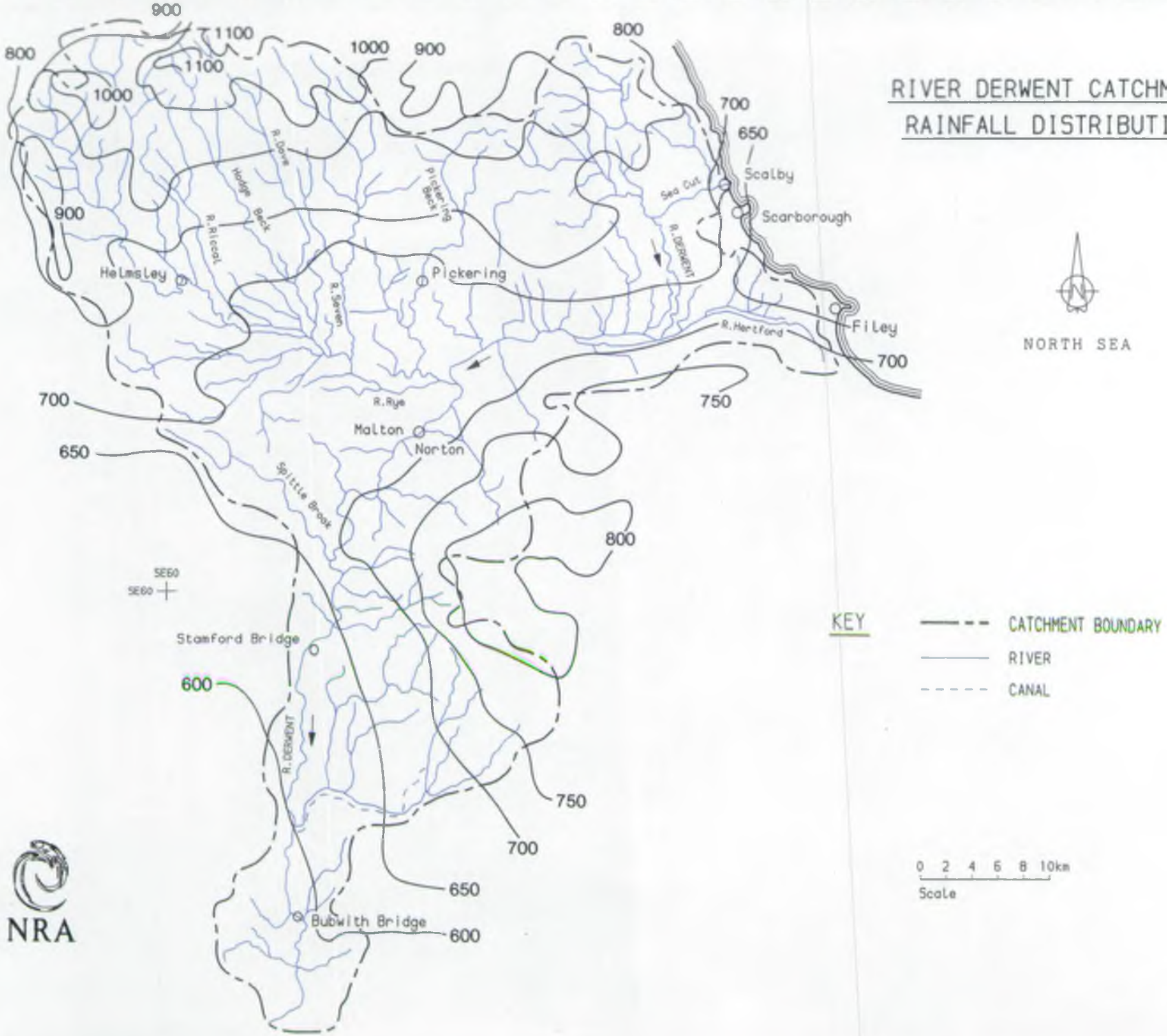
Number of Areas of Outstanding Natural Beauty (ANOB):	1
Number of SSSIs in the catchment :	Over 40
Number of Ramsar Sites in the catchment:	1
Number of Special Protection Areas in the catchment:	1
Number of NNRs in the catchment:	2 1 Proposed

3.0 STATE OF THE CATCHMENT

The purpose of this section is to compare the current status or condition of the catchment, where it is known, with overall standards and targets, where they are available, with respect to water quality, water resources and physical features of the catchment, such as flood defence.

Issues to be addressed are identified at the end of each section.

RIVER DERWENT CATCHMENT RAINFALL DISTRIBUTION



MAP No.3

R. Dove
Hodge Beck
Pickering Beck
R. Rye
R. Riccal
Helmsley
Pickering
R. Seven
R. Rye
Malton
Norton
Spittle Brook
Stamford Bridge
R. DERWENT
Bubwith Bridge

NRA

RIVER DERWENT CATCHMENT
NWC RIVER CHEMICAL QUALITY 1992

NORTH SEA

KEY

- CLASS 1A - VERY GOOD
- CLASS 1B - GOOD
- CANAL
- CLASS 2 - FAIR
- CLASS 3 - POOR
- CLASS 4 - BAD

0 2 4 6 8 10km

Scale

3.1 WATER QUALITY

All natural waters in the catchment are known as 'controlled waters', as are the reservoirs connected to the river system, for the purposes of water pollution control. The more significant watercourses are classified on a quality scale. Rivers and tributaries in the catchment are mainly high quality water, suitable for abstraction for drinking water and capable of supporting trout fisheries. At the other end of the range there are short stretches of poor water quality capable of supporting limited coarse fisheries which would be unsuitable for drinking water. Comprehensive routine monitoring of the water quality enables the NRA to assess whether or not the river is meeting the standards for its classification.

Water quality is assessed against the following measures;

1. National Water Council (NWC) classes
2. Compliance with River Quality Objectives (RQOs)
3. Biological Classes
4. Compliance with EC Directives
5. Statutory Water Quality Objectives (SWQOs)
6. North Sea Reduction Programme

NATIONAL WATER COUNCIL CLASSIFICATION AND RIVER QUALITY OBJECTIVES

The NRA currently uses a system of River Quality Objectives (RQOs) for the classification and assessment of watercourses including canals. This system is derived from the 1978 National Water Council Policy document.

The National Water Council classes are based upon a limited range of criteria; Biochemical Oxygen Demand (BOD), Dissolved Oxygen (DO) and Ammonia. The classes are ranked in order: 1A, 1B, 2, 3, 4, with 1A being the highest quality.

River Quality Objectives are based upon water quality requirements for different uses of the river, including potable and industrial water supply, the type of fishery, spray irrigation, livestock watering and the level of amenity.

Using local knowledge of the uses of the watercourses and contemporary water quality data, chemical quality standards were drawn up for these objectives so that the degree of compliance can be objectively assessed. The 1992 chemical quality and the River Quality Objectives for the Derwent Catchment are shown on maps 4 and 5.

BIOLOGICAL WATER QUALITY

Biological classes are based on the types of invertebrate fauna present and their abundance, with reference to their sensitivity to pollution. These classes parallel those used for the chemical quality classification, being ranked in order B1A, B1B, B2, B3, B4, with B1A being the highest quality. The continuous exposure of these animals to fluctuations in water quality can result in the biological classification providing a better indication of water quality than the chemical classification.

The 1991/92 biological water quality for the Derwent catchment is shown on map 6. It is predominantly good, notably so in the majority of the River Derwent and also the tributaries of the upper catchment.

Some of the upper reaches of the tributaries draining the North York Moors, for example Hodge Beck, support a fauna which indicates acid conditions.

Many tributaries in the middle and lower catchment have only fair biological quality, as does the River Derwent in the Yedingham area. A very small number of watercourses, such as the River Hertford, have poor biological water quality. There are a number of disparities between biological and chemical classifications. Deteriorations in quality are largely associated with sewage and agricultural activities and are being investigated jointly by biology and pollution control staff.

The biology of the lower 10 km of the River Derwent is not as good as expected and the reasons for this are under investigation.

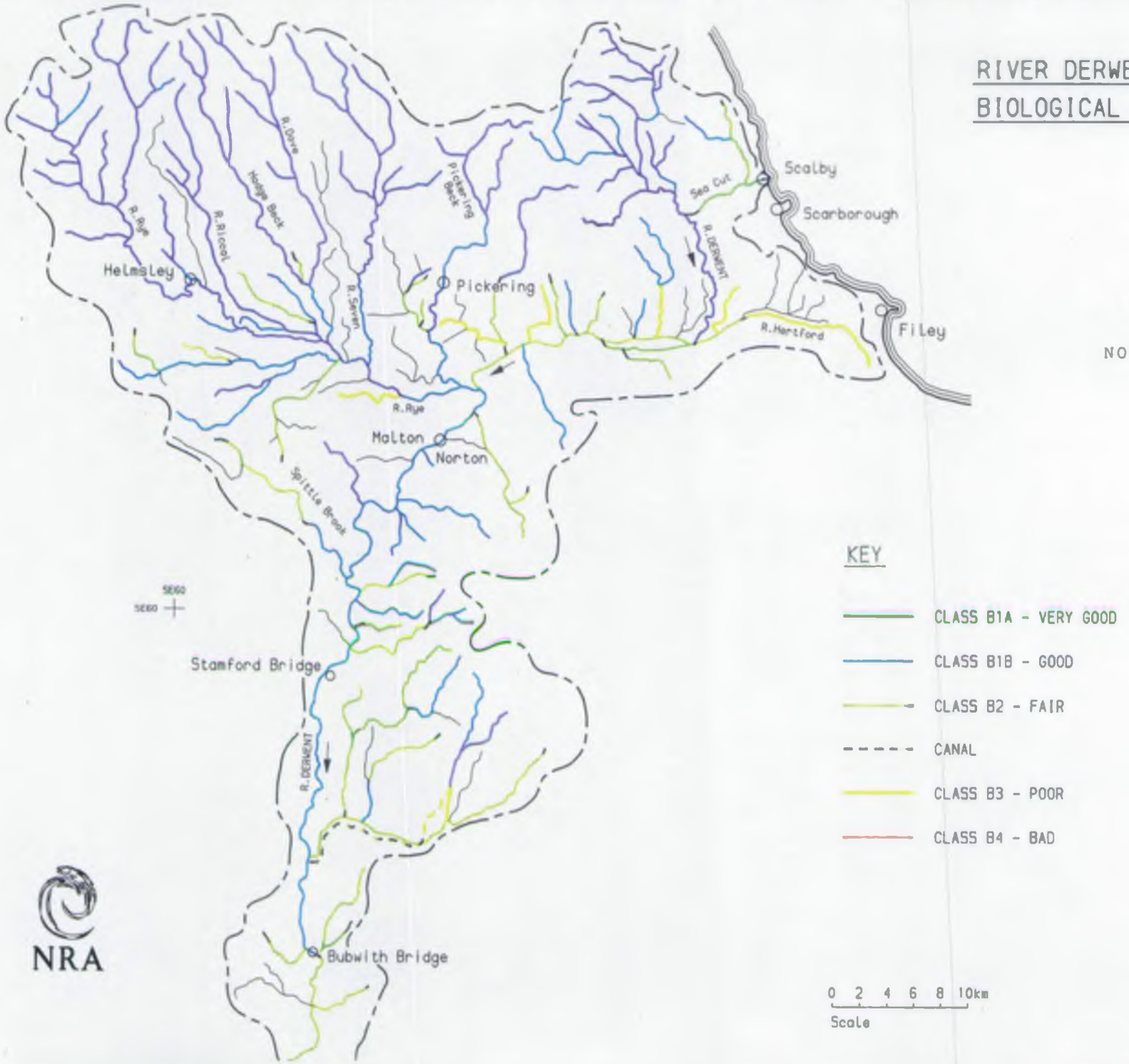
EC DIRECTIVES

EC Directives stipulate standards for relevant parameters which the directive seeks to control. The following directives apply, or will apply, in the Derwent catchment;

Surface Water Abstraction Directive	75/440/EEC
Dangerous Substances Directive	76/464/EEC
Freshwater Fisheries Directive	78/659/EEC
Groundwater Directive	80/68/EEC
Urban Waste Water Treatment Directive	91/464/EEC
Nitrate Directive	91/676/EEC

The national implementation of the Surface Water Abstraction, Urban Waste Water Treatment, Nitrate and the Groundwater Directives are still being finalised.

RIVER DERWENT CATCHMENT
BIOLOGICAL QUALITY 1992



MAP No 6

FISHERIES DIRECTIVE

The Freshwater Fisheries Directive is concerned with ensuring that the water quality of designated stretches is suitable for supporting fish populations. It has two levels of quality standards, one to support cyprinid fish (Coarse fish) and a stricter level to support salmonid fish (trout and salmon).

The 27.5kms of the River Derwent, from its source to the confluence with the River Hertford are designated a salmonid fishery under the directive along with 594.0kms of its tributaries. This includes 373.3kms of the River Rye and its tributaries.

The River Derwent is designated a cyprinid fishery from its confluence with the Hertford downstream to its confluence with the Ouse, some 87.6kms, along with 113.0kms of its tributaries. This includes 35.8kms of the River Rye. The Pocklington Canal is also designated a cyprinid fishery. The remainder of the catchment is unclassified within the terms of the directive.

DANGEROUS SUBSTANCES DIRECTIVE

Compliance with the Dangerous Substances Directive is assessed by monitoring for specific substances downstream of the registered discharges of the relevant substances, and at a reference site in the lower reaches of the catchment.

Compliance was achieved at all sites within the catchment for the List 1 and List 2 substances for 1992.

STATUTORY WATER QUALITY OBJECTIVES

Under the Water Resources Act 1991, a new system of managing controlled waters is to be introduced, known as Statutory Water Quality Objectives. Although similar to the existing system, this will be a new clssification of quality which will be more closely related to the uses of the watercourse.

In addition, groundwater and water bodies such as lakes, will be covered by the scheme. The National Rivers Authority will be responsible for ensuring these objectives are met by the specified date.

The system and timetable for introducing Statutory Water Quality Objectives is still being finalised by the Department of the Environment, but it is anticipated that the Derwent river catchment along with the Aire, Tyne and Tees will be one of the first to be incorporated in to the scheme for the Northumbria & Yorkshire Region.

NORTH SEA REDUCTION PROGRAMME

The NRA is responsible for the co-ordination and implementation of monitoring programmes under the Oslo and Paris Commissions and the North Sea Conference Declarations. These programmes relate to pollution of the marine environment from land-based sources. The objectives of the work include:

- identifying areas of concern
- detecting trends
- achieving 50% to 70% reductions in the loads of the 36 hazardous substances included in Annex 1A of the North Sea declaration within the time period 1985 - 1995.

On a national basis the River Derwent has been identified as a significant source of an agricultural herbicide trifluralin. However, as contamination of the aquatic environment in this case arises from diffuse inputs, direct control by the NRA is not possible.

Issues to be addressed in the catchment;

River Derwent

- Seamer to Yedingham - At risk of failing to achieve RQO downstream of River Hertford confluence due to discharges from Seamer STW and Hunmanby STW.
- Malton to Elvington - At risk of failing to achieve RQO downstream of Malton STW due to elevated ammonia levels.

River Hertford Catchment

- Hunmanby to Derwent confluence - failure to achieve RQO downstream of Hunmanby STW, together with contributions from:-
- Seamer Drain - failure to achieve RQO downstream of Seamer STW and
- Eastfield Drain - failure to achieve RQO downstream of Industrial Estate and combined sewer overflows.

River Rye Catchment

- Hartoft Beck - Impact of elevated copper levels from old mine workings.
- Sykes Sewer - Local effect of Oswaldkirk STW.

- Walmouth Beck/Ellerker Beck - failure to achieve RQO downstream of Harome STW.

- River Dove at Kirby Mills - failure to achieve RQO on dissolved oxygen. This is a natural phenomenon due to the river flowing underground in summer and re-emerging just upstream.

- East Drain - Local effect of an industrial site (now closed for over ten years).

- Costa Beck - failure to achieve RQO downstream at Pickering STW.

3.2 WATER RESOURCES

The NRA aims to assess, manage, plan and conserve water resources and to maintain and improve the quality of water for all those who use it. A key objective is to develop and implement a water resources strategy which provides for sustainable development to meet genuine needs and safeguards the environment.

A Water Resources Development Options Report is currently being prepared by Sir William Halcrow and Partners. The brief for this report covers all aspects of water resources and the completed document, due by December 1993, will form the basis for all "targets" set within the catchment.

The report will include:-

1. A review of the current developments and use of water resources to meet the existing demand for water within the Region. This will be based principally on information and data provided by the NRA and Water Companies.

2. A review of estimates for future demand for Public Water Supply and all other water requirements in the Region involving abstractions up to the year 2021. The basis and consistency of each estimate will be considered fully.

3. The scope and options available to the Region to formulate a sustainable policy based on the reviews undertaken in 1 and 2. This policy will plan for developing and augmenting water resources to meet existing and estimated future demands for water up to 2021.

4. The advantages and disadvantages of each option and proposal together with the extent and circumstances in which they may be appropriate. It will take account of environmental impact and other relevant criteria whilst giving due weight to cost and economic considerations.

The issues and proposals in the report have highlighted a need to:

1. achieve improvements in demand management through leakage control etc to reduce demand for water within the catchment.

2. develop conjunctive use of resources within and outside the catchment to ensure optimum utilisation and reduce demand.

3. develop bankside areas for winter storage of water to be used for public supply during drought conditions.

4. undertake investigations to alleviate problems which occur at times of low flow on the Rye at Helmsley and the Derwent at West Ayton.

R.Dove
Hodge Beck
Pickering Beck
R.Riccal
R.Rye
Helmsley
R.Seven
Pickering
R.Rye
Malton
Norton
Spittle Brook
SE60
SE60
Stamford Bridge
R.DERWENT
Bubwith Bridge

NRA

RIVER DERWENT CATCHMENT
STANDARDS OF SERVICE

NORTH SEA

KEY

CATCHMENT BOUNDARY

RIVER

LAND USE		DESCRIPTION	RETURN PERIOD (years)
	A	Urban, densely populated.	50 - 100
	B	Residential, but lower density than A.	25 - 100
	C	Isolated rural/communities/ intensive agriculture.	5 - 50
	D	Isolated properties agricultural use.	1.25 - 10
	E	agriculture, amenity interests limited.	< 2.5

0 2 4 6 8 10km

Scale

MAP No. 7

3.3 FLOOD DEFENCE

Some watercourses are classified by the Ministry of Agriculture Fisheries and Food (MAFF) for flood defence purposes; these classified watercourses are known as 'Main River'. On 'Main River' the NRA can control all activities on the protected bankside land and undertake improvement and maintenance works. On non 'Main River' watercourses the NRA only has powers to control activities affecting the flow of watercourses.

The NRA aims to provide effective protection for people and property from flooding. This is achieved by the construction and maintenance of flood defences and through the provision of effective and timely warnings.

Flood events are described in terms of the frequency at which, on average, a certain severity of flood is exceeded. This frequency is usually expressed as a return period in years eg 1 in 50 years. Different types of land-use require different levels of effectiveness from the defences, for example people and property have a higher standard of protection than agricultural land.

The five land-use bands and the proposed standards of service for the Region are as follows and are illustrated on map 7;

Land-Use Band	*Description*	*Return Period in years*
A	Contains residential and non-residential properties distributed over a significant proportion of its length. Amenity uses may be prominent.	1 in 50 - 1 in 100
B	Reaches containing residential and non-residential property over some or all of the reach length but at a lower density than band A. Intensive agriculture may be present.	1 in 25 - 1 in 100

C	Isolated rural communities at risk with limited numbers of residential and non-residential properties. Agricultural interests will be more apparent than in Bands A & B.	1 in 5 - 1 in 50
D	Isolated properties at risk. Agricultural use will probably be the main use with arable farming a feature.	1 in 1.25 - 1 in 10
E	Very few properties at risk. Agricultural use will predominate with extensive grassland the main feature.	< 1 in 2.5

The land-use band reflects all the interests in the floodplain as well as the riparian owner, and takes account of the wider community by including roads and amenity features such as riverside footpaths and recreation areas.

The decision as to whether or not works are needed starts from a comparison of the set target standards of service for a particular watercourse with the actual standards of protection being provided.

When carrying out flood defence works all reasonable opportunities are taken to enhance wildlife habitats and promote recreation where appropriate.

4.0 USES AND ISSUES

The purpose of this section is to identify the uses and activities and any associated issues within the catchment. Each section is divided in to General, Local Perspective and Proposals. The General section introduces the use and the Local Perspective describes the impact of the use and the issues this may present. The Proposals detail the actions the NRA plans to carry out to alleviate any problems identified. These Proposals are summarised in Section 5.0.

4.1 SURFACE WATER ABSTRACTION

GENERAL

One of the prime uses of the catchment is to support the abstraction of water from surface water sources, lakes and rivers for potable supply and other uses. All abstractions are controlled by licences which stipulate the total daily and annual quantities authorised for abstraction. Conditions are required to ensure a minimum flow in the river to protect downstream abstractions, other uses and the quality of the water environment.

LOCAL PERSPECTIVE

There are no impounding reservoirs within the catchment. Surface water abstractions in the upper Derwent are relatively small in comparison to the lower Derwent. The only major abstraction is a fish farm at Keld Head, where the majority of the water is returned to the watercourse.

There were 174 licensed surface water abstractions within the catchment in 1992 of which 62 were subject to environmental prescribed river flows. These flows are derived in accordance with the Howard Humphreys Report "Management of River Abstraction in North Yorkshire" and are set at river gauging stations throughout the catchment. When a river level falls to or below the environmental prescribed flow the abstractor is notified to stop abstracting by the NRA. Compliance by abstractors is then monitored by the NRA Licence Inspectors.

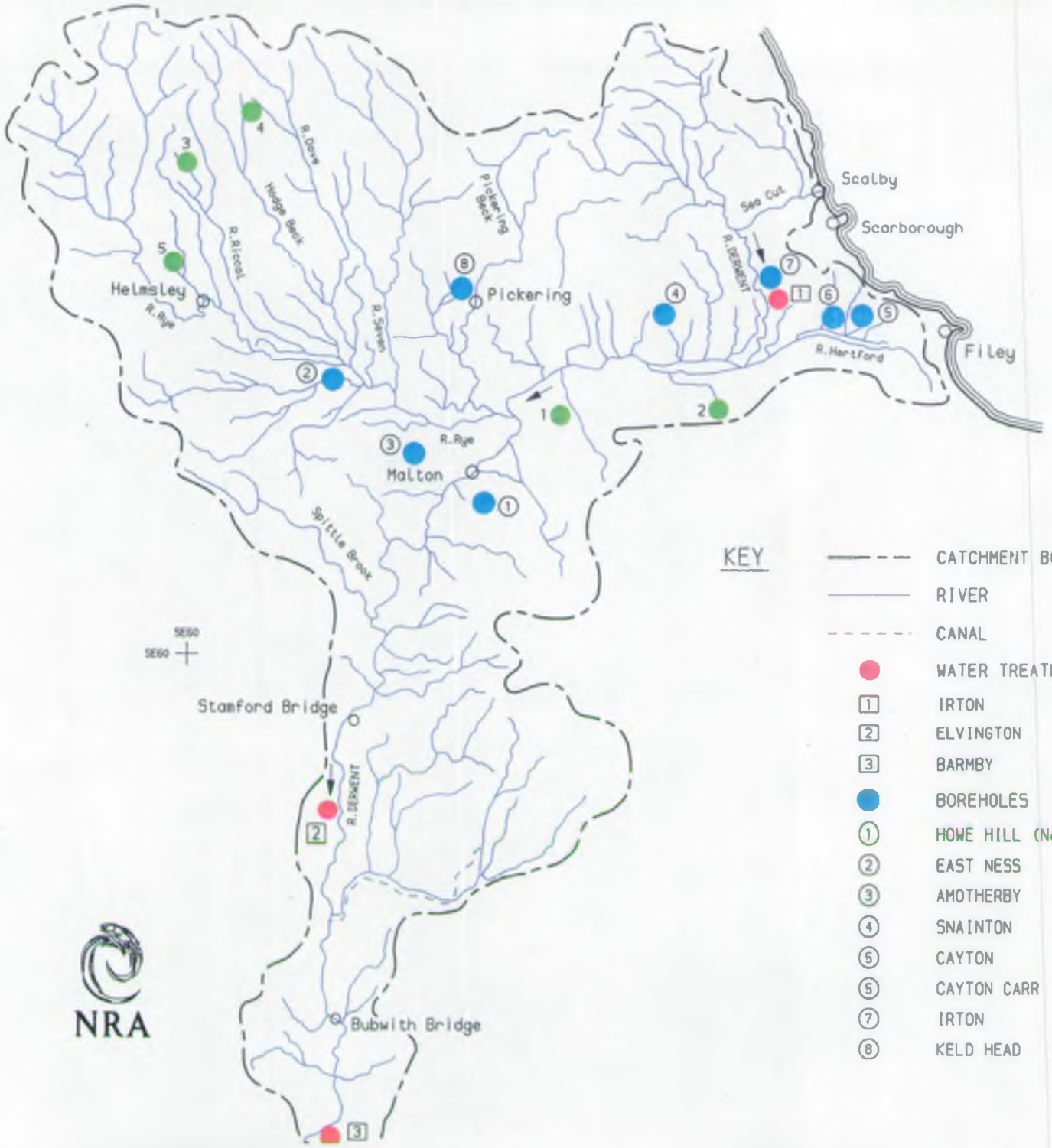
Licensed abstraction quantities within the catchments have remained fairly constant over the last 10 years. The variation within this period has been due to new licences for Fish Farms which involve no net loss to the system.

The major abstractions on the lower Derwent are by Yorkshire Water Services (YWS) Ltd., at Elvington and Barmby. The water from these treatment works is supplied into the Yorkshire Water Grid and can be used to meet demand from Leeds, Sheffield and Hull.

EFFECT OF DROUGHT ON THE RIVER

A flow investigation is being undertaken on the lower lengths of the river between the NRA gauging station at Buttercrambe and its confluence with the River Ouse at Barmby Tidal Barrage. It was considered necessary to instigate a review of available data and the condition of the catchment within the study boundaries to gain a better understanding of man's impact on the water environment since the construction of

RIVER DERWENT CATCHMENT
WATER TREATMENT WORKS
SPRINGS & BOREHOLES



NORTH SEA

KEY

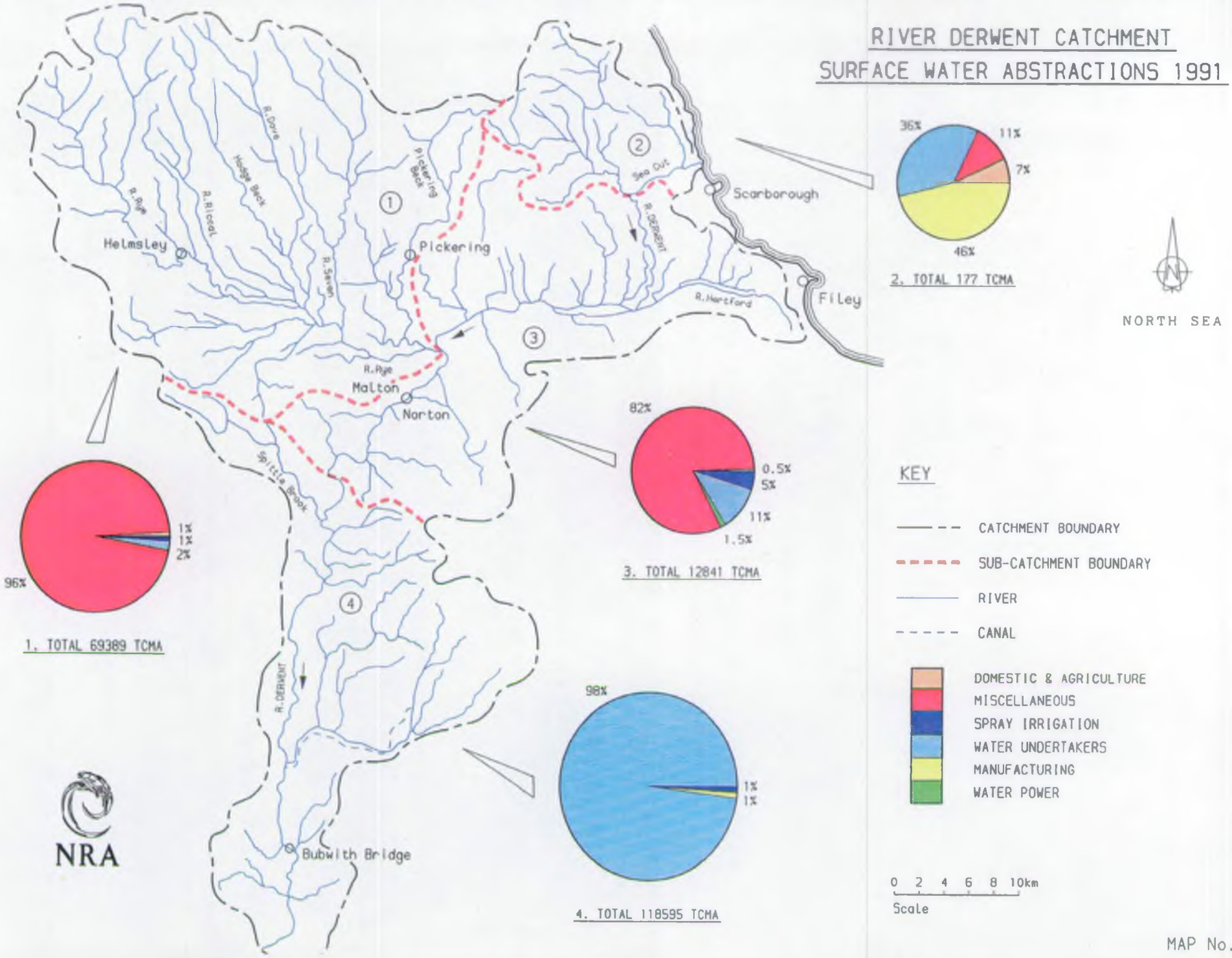
- CATCHMENT BOUNDARY
- RIVER
- CANAL
- WATER TREATMENT WORKS
- [1] IRTON
- [2] ELVINGTON
- [3] BARMBY
- BOREHOLES
- (1) HOWE HILL (Norton)
- (2) EAST NESS
- (3) AMOTHERBY
- (4) SNAINTON
- (5) CAYTON
- (5) CAYTON CARR
- (7) IRTON
- (8) KELD HEAD
- SPRINGS
- 1 WHARRAM
- 2 SHERBURN
- 3 PIETHORNE
- 4 BRANSDALE & RUDLAND
- 5 BECKDALE

0 2 4 6 8 10km
Scale

NRA

MAP No.8

RIVER DERWENT CATCHMENT
SURFACE WATER ABSTRACTIONS 1991



MAP No.9

the barrage. Comprehensive surveys were undertaken by Conservation, Biology, Fisheries and Resources Planning to identify and confirm data trends and to set out a programme of work and data collection for the next 12 months.

Yorkshire Water Services Ltd. were asked to provide daily abstraction details from the Elvington Treatment Works and daily and hourly abstraction details from the Barmby Treatment Works. This was to gain a better understanding of the effects of these abstractions on the river over a daily timescale. In addition, the water monitoring at Barmby Tidal Barrage was transferred to Personal Computer and developed to produce a flow sequence into the tideway. This was correlated with the NRA gauging stations at Blackfoss, Bielby and Buttercrambe and with YWS abstraction data. After satisfactory results had been obtained, an extended flow sequence to the tideway was produced in a daily format. It is intended that the flow data will be produced for all sites between Buttercrambe and Barmby Tidal Barrage for the period 1979 to 1992 in a daily format.

It was considered that the artificial river levels between Sutton Lock and the Barrage may be having an effect upon the flora and fauna. As a result it was decided to upgrade the level station in this section of the river to monthly data loggers. River level data is now available at 2 hourly frequency at:-

1) Sutton Lock

2) East Cottingworth

3) Bubwith Bridge

4) Loftsome Bridge

To date the Water Resources study has identified periods of very low flows to the tideway during 1989, 1990, 1991 and 1992. This has resulted in the production of a list of necessary and desired improvements for all the disciplines involved in the study, which will be followed up during the 93/94 financial year.

PROPOSALS

- To develop a water resources strategy for the River Derwent which safeguards the water environment.

  (To achieve this the NRA will:)

- Require improvements to demand management through leakage control etc to reduce the demand within the catchment.

- To monitor the usage of water within the YWS supply zones to meet the requirements set out in the Asset Management Plan.

- Promote the development of conjunctive use of resources within and outside the catchment to ensure optimum utilisation and reduce demand.

- Investigate the Operational Rules which could be implemented at Elvington and Barmby W.T.W to ensure the minimum effect upon the river between Buttercrambe and Barmby. This may require modifications to pumping patterns, an increase in bank side storage, higher winter abstractions or higher prescribed flows within the river system.

- Install higher quality monitoring equipment at Barmby and Elvington W.T.W. and Barmby Tidal Barrage.

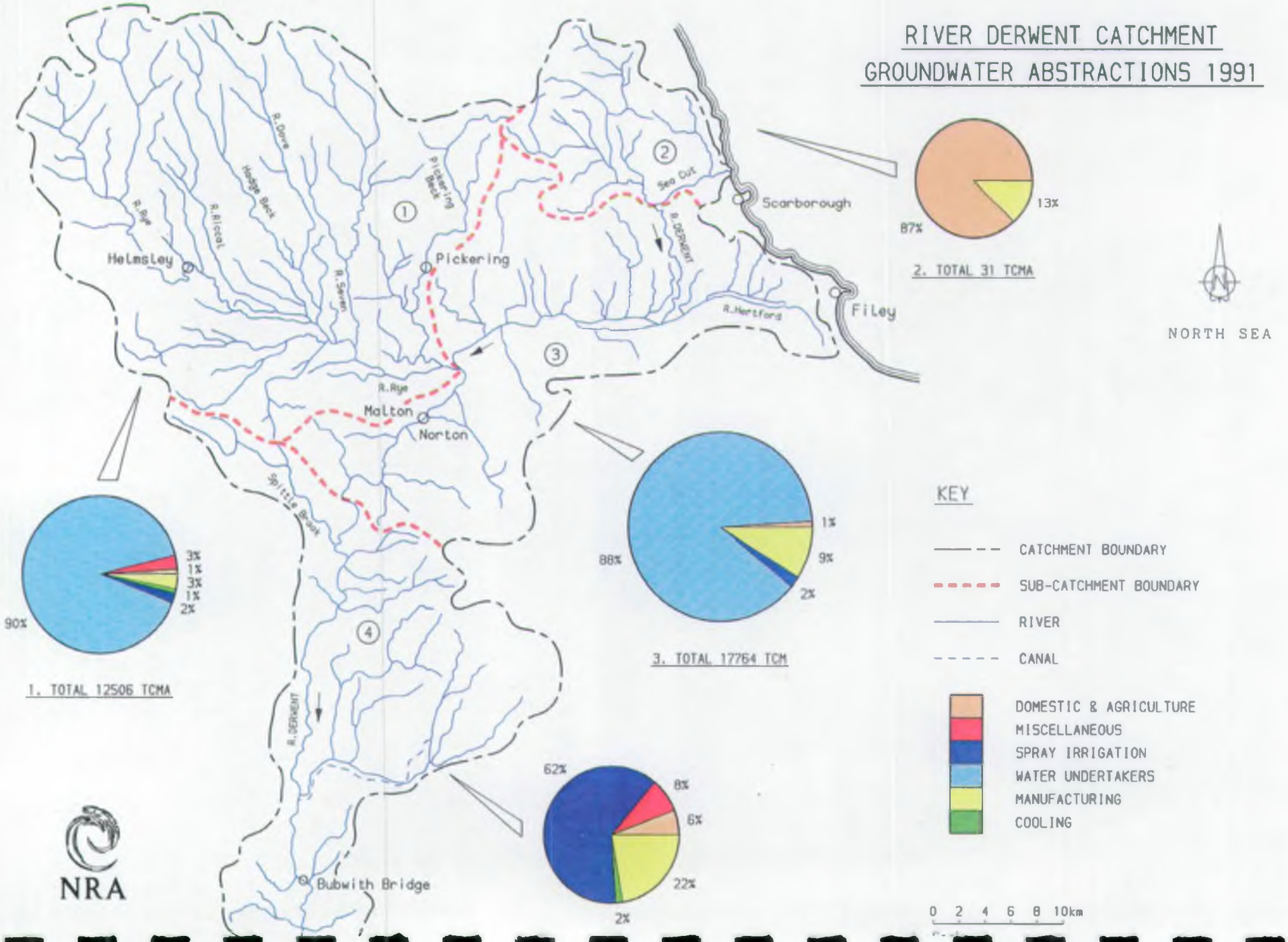
- Review all time-limited water abstraction licences. The river abstraction regime and environmental prescribed flows have already been reconsidered.

- Investigate the Operational Rules which are currently used at Barmby Tidal Barrage. A multi-disciplinary approach will be taken to ensure best utilisation of the river's water, whilst ensuring that the prime function of the Barrage is maintained.

- Continue ecological studies to assess the factors, including flow, affecting plant, invertebrate and fish life in the lower river.

- Use the flow sequence of the tideway between Buttercrambe and Barmby Barrage to model the impacts on fringe habitats.

RIVER DERWENT CATCHMENT
GROUNDWATER ABSTRACTIONS 1991



4.2 GROUNDWATER SUPPLY AND PROTECTION

GENERAL

This use of the catchment relates to the abstraction of water from groundwater sources such as wells and boreholes from the underground rocks called aquifers for both potable and industrial supply. Management of groundwater resources is achieved through abstraction licences, which specify the quantities of water that may be abstracted. Licences may include conditions which are designed to protect aquifers from over-abstraction.

In general, groundwater has a high standard of quality both microbiologically and chemically and usually requires little treatment. Groundwater is vulnerable to many activities that can cause pollution through the underground seepage of polluting material. Once underground water is polluted it is extremely difficult and costly to alleviate the pollution. The slow movement of groundwater also means that it takes a long time for pollution to be manifested.

LOCAL PERSPECTIVE

In the Derwent catchment groundwater is abstracted for potable supply, spray irrigation, industrial, domestic and agricultural uses.

The major groundwater supplies are from the Corallian aquifers in the Vale of Pickering. Most of the supply is from boreholes, some of which are situated in spring heads. These waters supply the vale of Pickering with drinking water.

In the eastern part of the Vale of Pickering the Corallian Limestone aquifer is supplemented by recharge from swallow holes in the bed of the River Derwent above West Ayton. At times of low flow this results in the River Derwent becoming dry below West Ayton. The water reappears in the Yorkshire Water Irton public water supply borehole. The travel time from these swallow holes to the abstraction source, approximately 2km away, is less than 8 hours. This section of the river has been identified as one of the top 40 low flow sites in England and Wales by the NRA. Consultants are to be appointed to draw up an environmental impact assessment and suggest solutions to alleviate low flow problems and protect the aquifer from sudden pollution from the river.

Karstic flow also occurs in the western half of the Vale of Pickering but here most of the groundwater abstraction does not seem to be influenced by river flows.

Where the River Rye cuts through the Corallian Limestone aquifer at Duncombe Park, near Helmsley, water is lost through swallow holes and then reappears at Rye House Springs. As a result during low flows and drought periods certain sections of the River Rye through Helmsley dry up.

A brick wall approximately 0.2m high has been built on the bed of the river for a short distance to contain the water at low flows in a narrow channel. This was intended to reduce water loss through the swallow holes and preserve river flows. At present certain sections of this wall are broken and allow the water to leave the narrow channel during low flows. Southern Science Ltd have been appointed to carry out the investigation which will be completed by February 1994.

The "Policy and Practice for the Protection of Groundwater" has been published and is in the process of being implemented within the region. It provides the guidelines and measurements that the NRA will take to protect the quality and quantity of groundwater abstraction boreholes and aquifers..

The policy classifies aquifers into major aquifers such as the Cretaceous Chalk, Corallian Limestone and the Sherwood Sandstone and minor aquifers or non aquifers such as the Kimmeridge Clay. The vulnerability of the aquifer to pollution is assessed from the type and thickness of the soil and the drift cover. Groundwater protection zones will consist of inner, outer, and entire catchment zones and will be based on the travel time of a pollutant to an abstraction source. These zones will be published and most of the controls will be achieved through planning consultations. The document contains guidelines indicating the NRA's likely response to potentially polluting activities within the various protection zones. These activities include; waste disposal to land, application of sludges/slurries to land, discharges to underground strata and diffuse pollution etc. Due to the limited industrial base and widely dispersed population the quantity of waste disposal to land in the catchment is not vast. The imposition of full containment and positive leachate collection is practised to eliminate the risks to groundwater sources. Over recent years water samples from the Corallian Limestone shows evidence of rising nitrate levels. A groundwater quality monitoring network will be developed on the Corallian Limestone to monitor this situation. The NRA will seek to influence sewerage undertakers, farmers and planning authorities on the location, quantity and timing of applications of sludges/slurries and fertilizers to land in order to prevent pollution of groundwater resources.

There are two main domestic waste disposal sites, one at Seamer Carr and the other at Cauklands. These sites are monitored to ensure they do not have a detrimental impact on water quality.

PROPOSALS

- To develop further groundwater resources to meet the projected short-fall in supply within the Malton and Scarborough supply zone.

- To undertake an environmental impact assessment of the effect of the swallow holes on the River Derwent at West Ayton.

- To put forward proposals to alleviate the low flow problems on the River Derwent at West Ayton and protect the aquifer from pollution from the river.

- To gain a more detailed understanding of the hydrogeology of the Corallian Limestone aquifer in the Helmsley area.

- To assess the effect of repairing the broken wall and/or the sealing of the swallow holes on river flows and the discharge at Rye House Springs.

- To assess the effect of low flows and dilution of sewage effluent on fisheries, ecology including Duncombe Park SSSI and biology in the River Rye from Duncombe Park to downstream of Rye House Springs fish farm.

- To develop a groundwater quality monitoring network for the Corallian Limestone.

- To produce groundwater protection zones for major aquifers in the catchment.

4.3 EFFLUENT DISPOSAL

GENERAL

The disposal of foul effluent derived from industrial and domestic properties can have a significant impact on river systems. In cases where there is inadequate treatment or inadequate dilution, gross pollution may result. Every discharge requires a consent. New consent conditions are set taking into account the upstream quality, the dilution available and the quality required downstream. Many existing consents, however, were set on the basis of what the works could achieve and not the standard required to protect the environment and meet River Quality Objectives (RQO).

The improvements in river quality to date have been moving towards the achievement of the RQO set by the former Regional Water Authority. The Water Resources Act 1991 provides for the setting of Statutory Water Quality Objectives with timescales for improvement. The Department of the Environment have considered the NRA proposals and a number of pilot catchments have been nominated. In the Northumbria & Yorkshire Region the pilot catchments are the rivers Aire, Derwent, Tyne and Tees.

In the Yorkshire Water Services Ltd. area the emphasis has always been on connecting industrial discharges to the public foul sewerage system for treatment with all other effluents at sewage treatment works (STWs). Toxic chemicals can be present in rivers, usually at very low concentrations. It is therefore important to adequately control any direct sources. The risk of a pollution incident at any industrial site can be minimised by ensuring the correct pollution prevention measures are in place, especially where the receiving waters are used for public water supply.

LOCAL PERSPECTIVE

The main sources of sewage effluent are from sewage treatment works, combined sewer overflows and surface water sewers. Village drains and sewer dykes, almost all of which are owned and operated by Yorkshire Water Services (YWS) Ltd. are also sources of sewage effluent.

There are few direct industrial discharges within the catchment. The only significant ones relate to Pauls Maltings at Knapton and a sand and gravel works at Wykeham.

Pollution prevention measures are important at all industrial sites. The main

R.Dove
Hodge Beck
R.Riccal
R.Rye
Helmsley
R.Seven
Pickering Beck
R.Rye
Malton
Norton
Spittle Brook
R.DERWENT
NRA
KEY
CATCHMENT BOUNDARY
CLASS 1A - VERY GOOD
CLASS 1B - GOOD
CANAL
CLASS 2 - FAIR
CLASS 3 - POOR

RIVER DERWENT CATCHMENT SEWAGE TREATMENT WORKS AND INDUSTRIAL SITES

NORTH SEA

SEWAGE TREATMENT WORKS

1. AMPLEFORTH
2. HELMSLEY
3. SLINGSBY
4. HOVINGHAM
5. MALTON
6. WELBURN
7. FOSTON
8. ELVINGTON
9. NORTH DRIFFIELD
10. WHELDRAKE
11. BARMBY-ON-THE-MARSH
12. BISHOP WILTON
13. BUBWITH
14. MELBOURNE
15. POCKLINGTON
16. STAMFORD BRIDGE
17. WILBERFOSS
18. HARTON
19. LEAVENING
20. BUTTERCRAMBE
21. SWINTON
22. SETTRINGTON
23. KIRKBYMOORSIDE
24. PICKERING
25. THORNTON DALE
26. SINNINGTON
27. HAROME
28. EAST HESLERTON
29. SHERBURN
30. RILLINGTON
31. SEAMER
32. FOLKTON

INDUSTRIAL SITES

1. FULL SUTTON INDUSTRIAL ESTATE
2. POCKLINGTON INDUSTRIAL ESTATE

0 2 4 6 8 10km

Scale

area of local significance is the development of disused airfields and the exploration and development of gas within the catchment.

SEWAGE TREATMENT WORKS

There are 59 community sewage treatment works discharging to the Derwent catchment which vary in size from serving a population of 20 to over 20,000 people. The effects of these discharges are predominantly localised but do result in 20.1 kms of poor river water quality within the catchment.

The largest sewage treatment works in the catchment, namely Seamer, Hunmanby, Pocklington, Stamford Bridge, Pickering, and Malton are responsible for the most significant problems. The first three discharge into the headwaters of the catchment where dilution is inadequate, while Malton discharges effluent in to the Derwent with elevated ammonia levels. All these conditions have been aggravated by the prolonged drought since 1988.

Discussions are underway with YWS on schemes to resolve water quality problems on the River Hertford and upper Derwent, involving Hunmanby, Folkton and Seamer STWs. The problems occur due to the lack of dilution in the receiving River Hertford. One solution would be to transfer the flows from Hunmanby to Filey Pumping Station, and the flows from Folkton to the Seamer STW on completion of improvement schemes at Seamer STW.

Pickering STW was recommissioned in December 1992 following extensive refurbishment. Improvements to the location of the outfall of this sewage treatment works have resolved local problems in the Oxfolds Beck. It is too early to determine whether these improvements will enable the Beck to meet its RQO. The situation will continue to be monitored until improvements are evident.

The performance of Malton STW has recently deteriorated with elevated ammonia levels being discharged. The effects of this deterioration in discharge have been noticed at Elvington Water Treatment Works where the water abstracted for public supply was found to have higher levels of ammonia than normal. A scheme of improvements is underway at Malton, although the final completion date has been delayed to 1994 due to discussions with Malton Bacon Factory which discharges via foul sewer to Malton STW.

Improvement schemes have been completed at 9 sewage treatment works within the catchment. The most relevant were at Elvington STW, Harome STW and North Duffield STW where effluent quality adversely affected achievement of RQO. While

there have been significant local improvements, it is too early to determine whether these improvements will enable the river to achieve the RQO. The situation will continue to be monitored until improvements become apparent.

Residual toxic components can exist in sewage effluents which have received trade effluents. The principal traders whose effluents contain some residual toxic components within the Derwent catchment are printers, printed circuit board manufacturers and platers. Agricultural spray washwaters may also contain toxic components. Trade effluents derived from these activities drain to Seamer, Malton, Pocklington and Pickering STWs.

VILLAGE DRAINS AND SEWER DYKES

A large number of villages within the catchment have only rudimentary sewerage and sewage disposal facilities. This is causing a significant local nuisance which has worsened considerably over the past ten years due to development within the rural villages. The NRA is maintaining pressure on YWS to improve their unsatisfactory systems and is in close liaison with local authorities to contain development until infrastructure improvements have been carried out. These areas are shown on map 12.

COMBINED SEWER OVERFLOWS

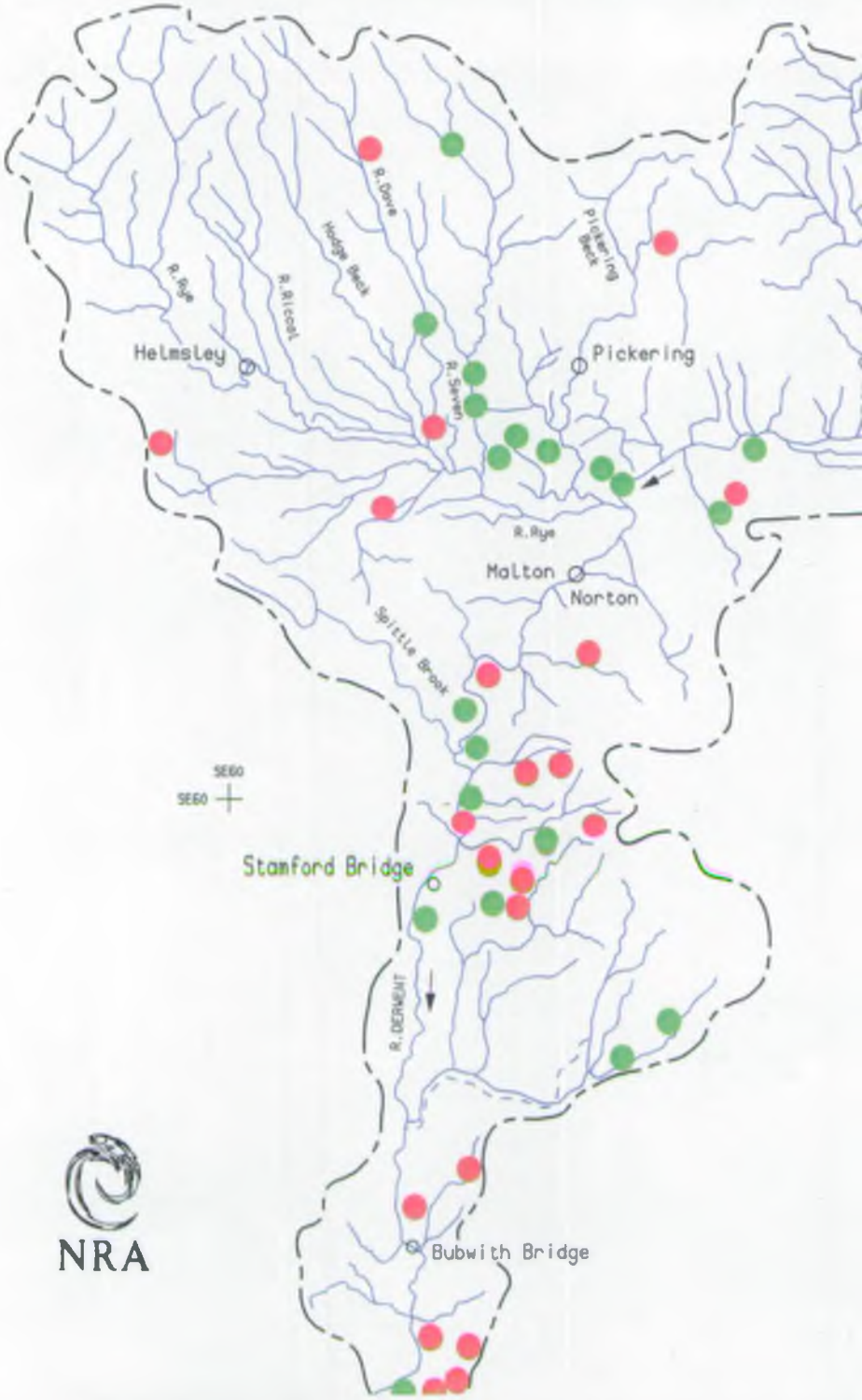
Pollution emanating from the premature operation of combined sewer overflows is limited to the main centres of population at Hunmanby, Seamer (Eastfield), Malton (Norton), Helmsley and Pocklington and Pickering. Drainage Area Plans are being prepared by YWS for all systems, these will be prioritised and dealt with in due course.

PUBLIC SURFACE WATER SEWERS

The number of public surface water sewers affected by wrong connections of domestic and industrial effluents are limited. They tend to be isolated cases which once identified are reported to YWS where action is taken in a reasonable timescale. However, the problem requires constant monitoring to avoid a major pollution incident.

GAS EXPLORATION AND DEVELOPMENT

A number of exploration boreholes have been sunk within the catchment to evaluate the potential gas field in Ryedale. This, together with coal resources in the lower Derwent, is a major risk to the river unless carried out with adequate safeguards. Those safeguards have been evolved over the years and work effectively to prevent contamination by drilling muds, brine, caustic and diesel oil.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Stamford Bridge
R.DERWENT
Bubwith Bridge

NRA

RIVER DERWENT CATCHMENT PLANNING CONTROL AREAS

NORTH SEA

KEY

CATCHMENT BOUNDARY

RIVER

CANAL

ZONE 4

EXISTING SEPTIC TANK PROBLEM
NO FURTHER SEPTIC TANKS ALLOWED, BUT TREATED EFFLUENT DISCHARGES (OR CESSPOOLS) MAY BE ACCEPTABLE ON LIMITED INFILL DEVELOPMENT SUBJECT TO NRA CONSENT

ZONE 5

EXISTING SEPTIC TANK PROBLEM
(OR GROUNDWATER RISK), THE NRA RECOMMEND NO FURTHER DEVELOPMENT UNTIL ADEQUATE PUBLIC FOUL SEWERAGE FACILITIES ARE AVAILABLE

0 2 4 6 8 10km

Scale

MAP No.12

WORLD WAR II AIRFIELDS AND INDUSTRIAL ESTATES

Since the end of World War II disused airfield sites at Full Sutton, Pocklington and Breighton have been utilised for industrial use. Part of the Pocklington Industrial Estate is served by a foul sewerage system, the other sites have no foul infrastructure or treatment facilities in place.

The NRA has highlighted sites where surface water pollution occurs or is likely to occur due to the lack of a foul sewer infrastructure on these sites. Liaison with local authority planners is enabling the NRA to obtain limits on industrial development where applicable. The NRA has stressed it is essential that adequate sewerage and sewage treatment facilities are incorporated on these industrial estates, before any further development takes place.

Pollution prevention and good housekeeping measures are of paramount importance at these locations as all of these sites are upstream of major potable water supply intakes on the River Derwent.

Investigations in the past have highlighted the lack of adequate bunding facilities around oil storage tanks. There have been numerous occasions where the contents of these tanks have been lost to adjacent surface water drains, resulting in severe contamination of the receiving watercourses. The costs of clean up operations have been recharged back to the offender and where appropriate legal action has been taken.

Ongoing investigations on these premises will ensure that all traders operating on these sites are made aware of the problems when storing large volumes of oil on site.

PROPOSALS

- To develop a strategy for effluent disposal in the catchment which recognises the special ecological value of the River Derwent and its tributaries.
- To continue the programme to review all discharge consents within the catchment to achieve RQO.
- To undertake further biological surveys and investigate any disparities between the chemistry and biology classes.
- To continue to maintain pressure on YWS to progress improvements to sewage treatment works, combined sewer overflows and surface water sewers.

- To continue to maintain pressure on YWS to improve their inadequate village drains and sewer dykes in rural areas in consultation with the local community and local authority.

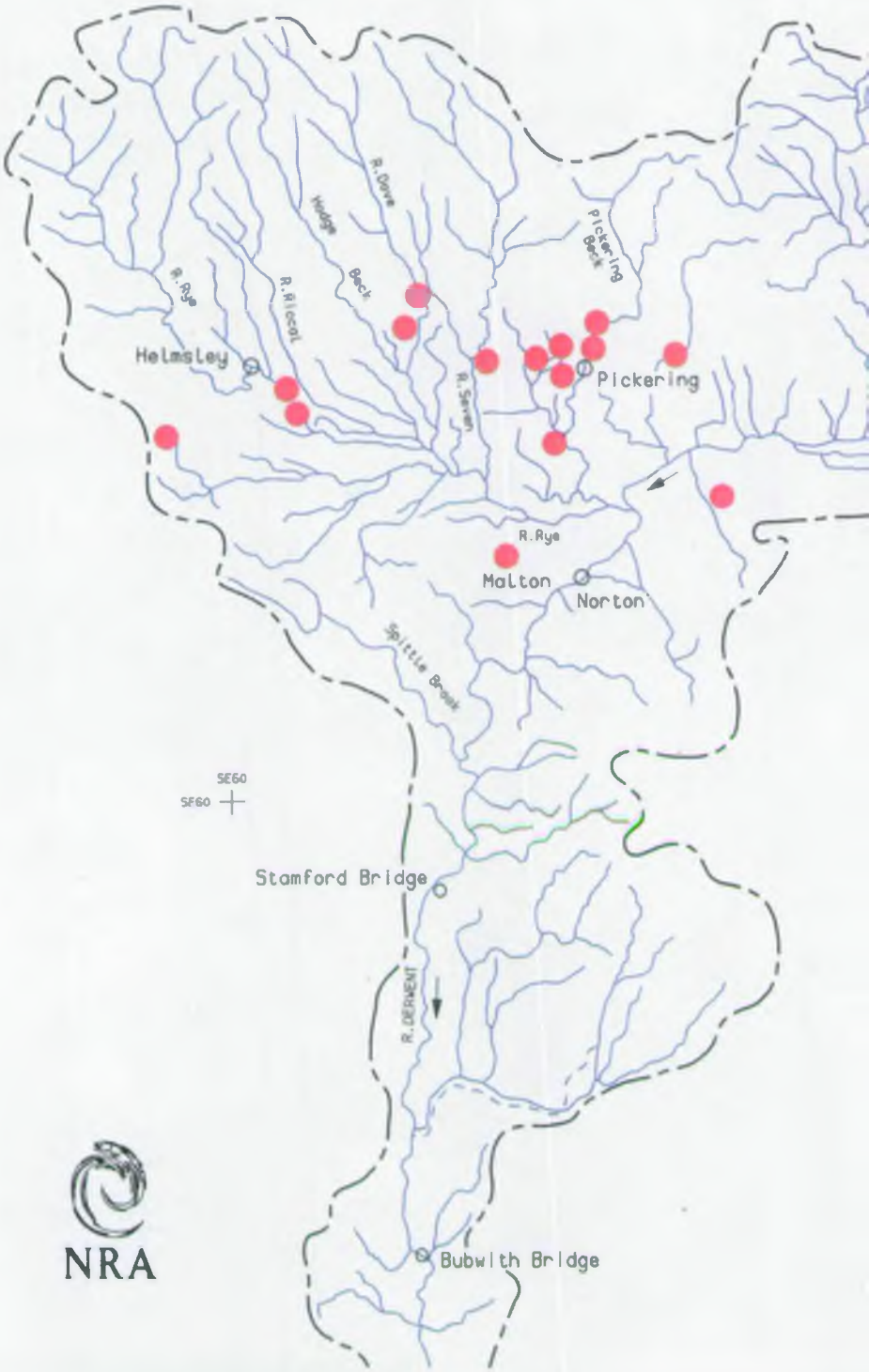
- To continue to oppose development in areas where inadequate sewage disposal facilities exist, unless a restriction on occupancy is imposed pending improvements to the facilities. This strategy will be developed in consultation with the local authorities.

- To rationalise the existing monitoring programmes for effluents and controlled waters to ensure the most appropriate distribution of sampling points and improve consistency and statistical validity of sampling.

- To continue to impose rigorous pollution prevention measures on all industrial developments.

- To encourage waste prevention and minimisation in industry.

- To ensure that the development of the gas fields within the catchment does not cause pollution.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SE60
Stamford Bridge
R.DERWENT
Bubwith Bridge

NRA

RIVER DERWENT CATCHMENT
FISH FARMS

NORTH SEA

KEY

CATCHMENT BOUNDARY

RIVER

CANAL

FISH FARM

0 2 4 6 8 10km

Scale

4.4 FISH FARMS

GENERAL

High quality rivers have historically been subject to development for fish farm purposes, especially spring-fed lowland systems. Fish farming has expanded rapidly to meet growing demand and in many instances has led to problems such as the accumulation of organic silts, increased nutrient loading, increased ammonia levels and the escape of non-native fish. Changes in feeding practices and better management of fish farms have reduced the decline in water quality to some extent in recent years.

LOCAL PERSPECTIVE

The NRA owns and runs a fish farm which is located at High Costa Mill on Costa Beck near Pickering. The fish farm rears predominantly brown trout which are used for restocking purposes throughout the Yorkshire area.

There are 12 fish farms within the catchment which utilise the good quality water to rear trout for restocking and for sale to retail outlets and the general public. The size of the farms varies considerably along with their potential to cause a pollution incident. The high density of sites rearing rainbow trout for retail purposes are of most concern with regard to escapes of non-native fish species and because the intensive nature of the farming results in high levels of ammonia.

In general, fish farms have not been responsible for a major deterioration in water quality or the quality of the fishery within the Derwent catchment. However, they have been responsible for a biological change in the watercourse due to the build up of organic silts. A comprehensive review is now underway of all fish farm consents within the catchment. This review will require fish farms to improve the method of removing solids from effluents by the provision of settlement facilities or an equivalent form of treatment.

There are few headwaters within the catchment which have not already been utilised for fish farming and with the move to diversify agricultural activities farmers are turning toward fish farming as an alternative. Whilst two fish farms have recently been granted a consent on Shallowdales Beck the NRA will resist further development. This is because many of the headwaters are of significant value in terms of their ecological quality and require protection.

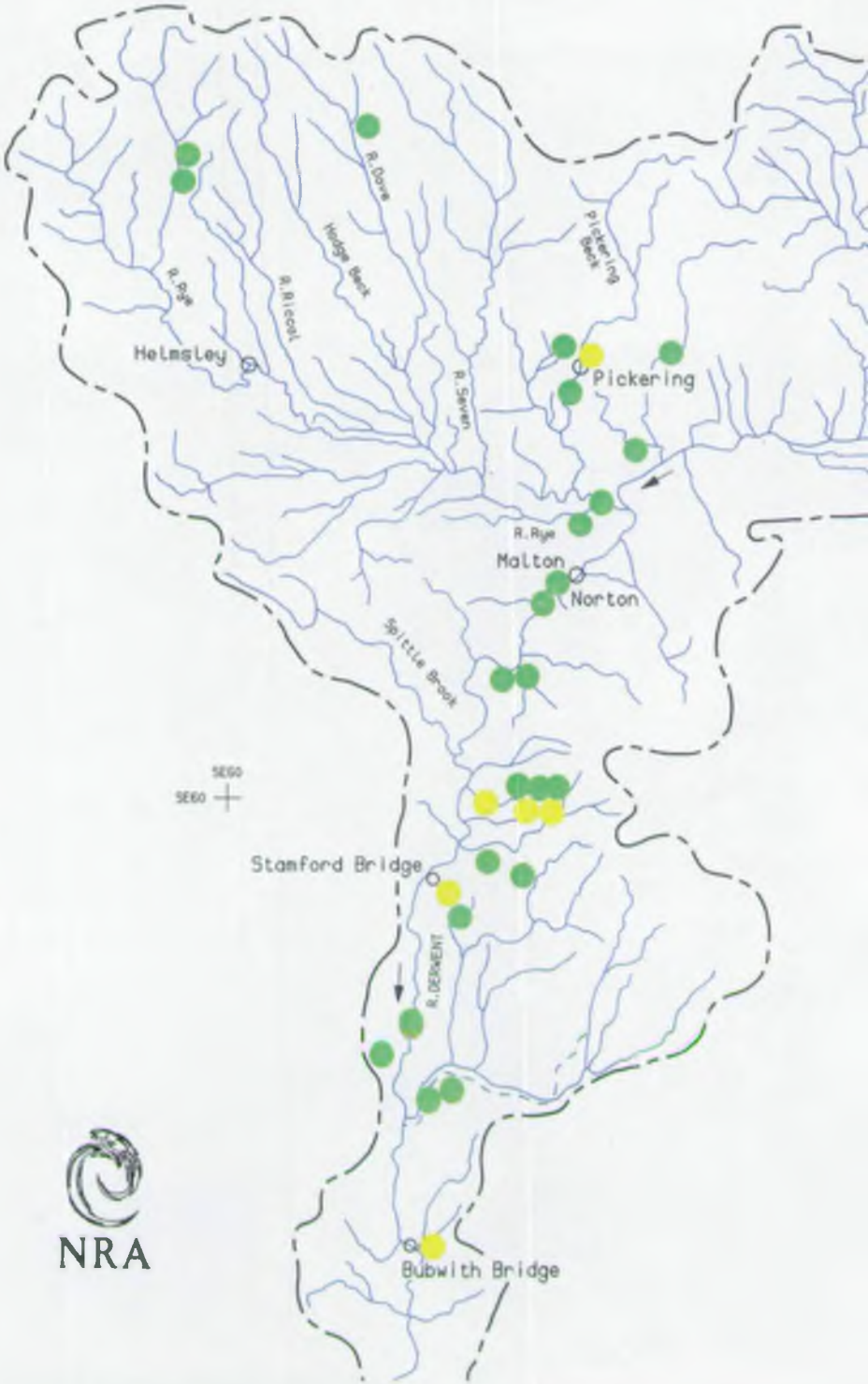
PROPOSALS

- To develop a fish farming strategy for the Derwent which recognises the special ecological value of the river and its headwaters.

- To continue the review of all fish farm discharge consents. To include a requirement on the consent for the fish farm to provide adequate means of settlement.

- To continue to assess the impact of fish farms on biological water quality and conservation value.

- To ensure that fish farming activity within the system is maintained at a level which is compatible with the maintenance of natural fish populations.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Spittle Brook
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SE60
Stamford Bridge
R.DERWENT
Bubwith Bridge

NRA

RIVER DERWENT CATCHMENT
AGRICULTURAL POLLUTION INCIDENTS

NORTH SEA

KEY

CATCHMENT BOUNDARY

RIVER

SEVERE POLLUTION (NON RECORDED)

SIGNIFICANT POLLUTION

MINOR POLLUTION

0 2 4 6 8 10km

Scale

MAP No. 14

4.5 LAND USE, AGRICULTURE & FORESTRY

GENERAL

Land-use and land cover can have a considerable impact on the physical and chemical condition and the aquatic life of surface waters. It can also impact on the quality of groundwaters. The way in which land is used, whether for forestry, agriculture or urbanisation may not only affect the adjacent watercourse but also waters downstream. Good land management within the Derwent catchment can play an important role in maintaining and improving the water environment.

Agriculture dominates the catchment of rural rivers and plays a major role in water quality issues. Discharges of silage liquor, slurry and other farm waste cause many serious pollution incidents. Diffuse pollution due to runoff from fertilisers, pesticide spraying and changes in agricultural land-use can cause pollution for longer periods because of the time taken for the pollutants to reach the watercourse. Ploughing up of permanent grassland, moorland stripping and afforestation play a significant role in this context.

Surface water acidification, associated with naturally acidic moorland and accentuated by acidic atmospheric deposition, can affect fish and other aquatic life. Evidence indicates that conifer forests significantly enhance the capture of atmospheric deposition.

LOCAL PERSPECTIVE

Land-use within the catchment is varied and almost all related to rural activities.

The land cover percentages given below are from unvalidated data from an Institute of Terrestrial Ecology Landsat survey of land cover for 1990. (1)

The dominant land-use within the catchment is estimated to be arable (40%) with 25% covered by agricultural pasture and meadow land and a further 5% associated with deciduous forest. Arable land is predominant in the lower catchment.

Heather/grass moorland, bracken and evergreen woodland are estimated to cover 9%, 6% and 5% of the catchment respectively and dominate the upper catchment within the North York Moors National Park.

Approximately 2000 hectares of bracken was sprayed with the herbicide asulam, in 1992 and 1993 to control and manage bracken as part of the ongoing moorland conservation programme by the North York Moors National Park.

The introduction of the Farm Waste (Silage, Slurry, and Agricultural Fuel Oil) Regulations 1991 has added impetus to the successful work already carried out in the catchment to prevent agricultural pollution. Proactive surveys using biological information are ongoing within the catchment to identify sources of farm pollution. Farms identified as a result of these surveys have implemented farm waste schemes, which are usually grant aided, to resolve the problem. In the past three years approximately 195 grant-aided farm waste schemes have been completed within the catchment. This has led to a reduction in the number and impact of agricultural pollution incidents.

The upper Derwent and some of its tributaries suffer from acidic flushes and associated fish kills, characteristically following heavy rainfall after a dry weather period. The acidification is believed to be due to natural moorland acidity enhanced by atmospheric deposition.

PROPOSALS

- To investigate through a national R&D project the impact of land use-related agricultural activities on the invertebrate fauna of headwater streams in the Derwent catchment.

- To continue to use biological information to identify catchments affected by agricultural pollution. To carry out surveys to identify the farms responsible and instigate programmes of remedial action.

- To undertake other land use-related studies with interested organisations to apply management strategies and develop the use of techniques such as buffer zones and farm management plans.

- To collaborate with forestry authorities to develop appropriate forest management practices to benefit the water environment and increase the conservation value of some watercourses within forest areas. Where appropriate this should utilise the findings of NRA R&D projects.

- To progress regional R&D proposals to evaluate the mechanisms, extent and significance of freshwater acidification in Yorkshire. This will include the Derwent catchment.

- To review the impact of aerial applications of asulam to control bracken on controlled waters, with the aid of water quality survey work undertaken on the North York Moors in the summers of 1992 and 1993.

(1). Brown, N. J., and Fuller, R. M. (1992). Mapping the land cover from space and its integration into geographical information systems. Proceedings of the Fourth National Conference of the Association for Geographical Information, November 1992, Birmingham, (AGI)

4.6 HABITAT AND SPECIES CONSERVATION

GENERAL

A healthy river and adjacent corridor environment are characterised by ecologically diverse and abundant plant and animal communities which enhance the overall quality of the landscape. These are sensitive to the quality and quantity of water, and to the availability of suitable physical habitats. The conservation duties of the NRA are set out in Sections 2 and 16 of the Water Resources Act 1991. These require the NRA to promote the conservation of flora, fauna, geological and physiographical features of special interest and the enhancement of natural beauty. These duties apply both to work carried out by the NRA and works carried out by other organisations which have been consented by the NRA.

LOCAL PERSPECTIVE

Detailed work has been undertaken to establish the conservation status of the lower River Derwent, particularly those areas which comprise the complex of designated sites. Elsewhere in the catchment, information is much less clearly defined and a major programme of surveys and data analysis is required.

The River Derwent between the confluence of the River Rye and Barmby is a Site of Special Scientific Interest (SSSI). This stretch of river represents one of the best examples of a lowland river system in Britain. The lowland section of the river is relatively rich in nutrients and supports diverse and abundant aquatic plants which in turn support an outstanding assemblage of invertebrates. Many of the plant species are at the northern limit of their range in Britain. The lower section of the river is also noted for the diverse populations of both birds and fish. The River Derwent was one of the last recorded sites in Britain for the Burbot, a species of fish which is now presumed to be extinct. There is evidence of ecological changes in the lower part of the river, particularly in aquatic plant and invertebrate communities, possibly linked to the abstraction regime, which require further investigation, as discussed under 4.1 Surface Water Abstraction.

The 'Derwent Ings' are a complex of seasonally flooded meadows around the lower part of the river. They are of international importance for wildfowl and support wetland habitats of national importance. The Derwent Ings along with the adjacent river and banks and most of the Pocklington Canal are designated under a number of conservation systems. The area includes SSSIs, a 400ha National Nature Reserve, 1000ha Special Protection Area for wild birds and a wetland of international importance under the Ramsar Convention. These designations impose a range of requirements for

N.Y.M.N.P.
Hodge Beck
Helmsley
R.Rye
R.Seven
Pickering
R.Rye
HOWARDIAN HILLS
Malton
Norton
Spittle Brook
SE60
SE60
Stamford Bridge
R.DERWENT
Bubwith Bridge

NRA

RIVER DERWENT CATCHMENT
NATURE CONSERVATION

NORTH SEA

KEY

CATCHMENT BOUNDARY

RIVER

SITES OF SPECIAL SCIENTIFIC INTEREST
(Main sites in the catchment)

NATIONAL NATURE RESERVES

SPECIAL PROTECTION AREAS (Under EC Directive 79/409)
AND UNDER THE RAMSAR CONVENTION

LOCAL NATURE RESERVES
(Designated by Local Planning Authorities under the
National Parks and Access to the Countryside Act 1949)

NORTH YORKS MOORS NATIONAL PARK BOUNDARY

HOWARDIAN HILLS - AREA OF OUTSTANDING NATURE BEAUTY BOUNDARY

0 2 4 6 8 10km
Scale

MAP No.15

the protection and management of the sites. The NRA owns considerable areas of land along the lower Derwent and is in the process of entering into a management agreement with English Nature in order to promote improved management.

The Pocklington Canal, an artificial watercourse connected to the River Derwent, falls within several SSSIs; the Pocklington Canal SSSI, Melbourne and Thornton SSSI and the Derwent Ings SSSI. The upper unrestored section of the canal lies in the Pocklington Canal SSSI, notified for the aquatic emergent and tall fen plant communities which it supports. An extremely rich invertebrate community is dependent on these aquatic plants. Otters have also been recorded along the canal. Land around the canal is of national significance and forms an integral part of the canal and river corridor. Proposals for the resumption of navigation could have major impacts on the conservation significance of the canal and could have a potential impact on the lower Derwent. Any proposals to restore the navigation within the SSSIs would require the prior consent of English Nature under the Wildlife and Countryside Act. There is extensive literature on the impacts of navigation and an NRA R&D project is underway to examine the impacts of all forms of recreation on wildlife.

Upper sections of the River Derwent are poorly known in terms of conservation status. There are however a number of particular problems associated with over-engineering, low flows and pollution inputs. Forestry on some of the tributaries may also be a major influence. The scale of the impact of these problems on the conservation status of the river is poorly understood at present and requires additional investigation.

The River Hertford has been degraded by a combination of poor water quality and over-engineering. The section of the River Derwent between Ryemouth and Yedingham has suffered severe ecological damage as a result of past engineering work. Both sections stand out within the catchment as being in need of considerable habitat rehabilitation and proposed habitat restoration. (This is also considered under Fisheries 4.8 and Flood Alleviation 4.11).

Sections of the upper Derwent catchment and the River Rye system support populations of native crayfish, protected under Schedule 5 of the Wildlife and Countryside Act. The River Derwent also supports a rich invertebrate fauna including nationally notable beetle Gyrinus urinator, Hydraena rufipes, Riolus subviolaceus, mayfly Heptagenia fuscogrisea, caddis fly Tinodes waeneri and alder fly Sialis nigripes species as well as the saucer bug Aphelocheirus aestivalis.

Many of the headwater streams have a distinct and ecologically valuable fauna. Of particular note are the Corallian Limestone streams which support a diverse fauna,

including species with a preference for small calcareous headwater streams. These include two nationally notable caddis fly species Tinodes dives and Rhyacophila septentrionis. Small streams draining the chalk Wolds may also be of value, the occurrence of a rare caddis fly, Hydropsyche fulvipes (Red Data Book) in one of them is of particular note. The chalk and limestone streams require further investigation in order to ensure their conservation. This would be a suitable joint project for the NRA and English Nature.

A number of the rivers within the catchment are managed by Internal Drainage Boards. In some cases the management of these watercourses could be improved for conservation without compromising the effective drainage regimes. In other areas NRA staff have worked closely with the IDBs in order to assist with promoting more environmentally sensitive management practices.

The excavation of ponds and tapping of springs are particular problems in the National Park. These activities can lead to the loss of wetland habitats such as flushes and mires characteristic of upland vegetation communities as well as small stream habitats.

PROPOSALS

- To undertake a detailed survey to establish the conservation status of the river to form the basis for conservation management within the catchment. This will build on existing work by English Nature and North York Moors National Park and will involve a number of outside agencies and voluntary groups. Due to the scale of the work it is unlikely that the survey will be completed before April 1994.

- To undertake a study of the conservation value of the chalk and limestone streams and consider the effects of land use on habitats and water quality.

- To develop a strategy for the protection of the limestone stream habitat through partnership with outside organisations.

- To continue to take measures to protect populations of native crayfish in the catchment.

- To continue to collaborate with other bodies and individuals working to promote habitat conservation in the catchment. Projects to conserve particular species will also be supported.

- To review the results of the R&D project on the impact of navigation on aquatic systems and establish its relevance to the proposed changes to navigation in the river and canal.

- To undertake a national R&D project to look at the techniques available for the restoration of river lengths which have been damaged by low flows, poor water quality and over-engineering.

- To make resources available to assist IDBs in carrying out their work in a more environmentally sensitive manner.

- To encourage local planning authorities and the North York Moors National Park to adopt polices which will protect and promote ecological interest and maintain the integrity of river corridors.

4.7 RIVERSIDE AMENITY, ARCHAEOLOGY AND HERITAGE

GENERAL

The River Derwent reflects the changing aspects of North Yorkshire scenery as it passes from the uplands of the North York Moors National Park, along the Vale of Pickering, through the Howardian Hills and into the Vale of York to join the Ouse at Barmby. The remote and quiet nature of the countryside, the ruined castles, fine Abbeys and stately homes attract many people to the catchment. People enjoy a number of riverside pursuits within the catchment including walking, bird- and nature-watching, cycling, horse-riding, picnicking or sight-seeing. Due to the prime importance of conservation in the catchment no recreational development should prejudice areas of conservation interest.

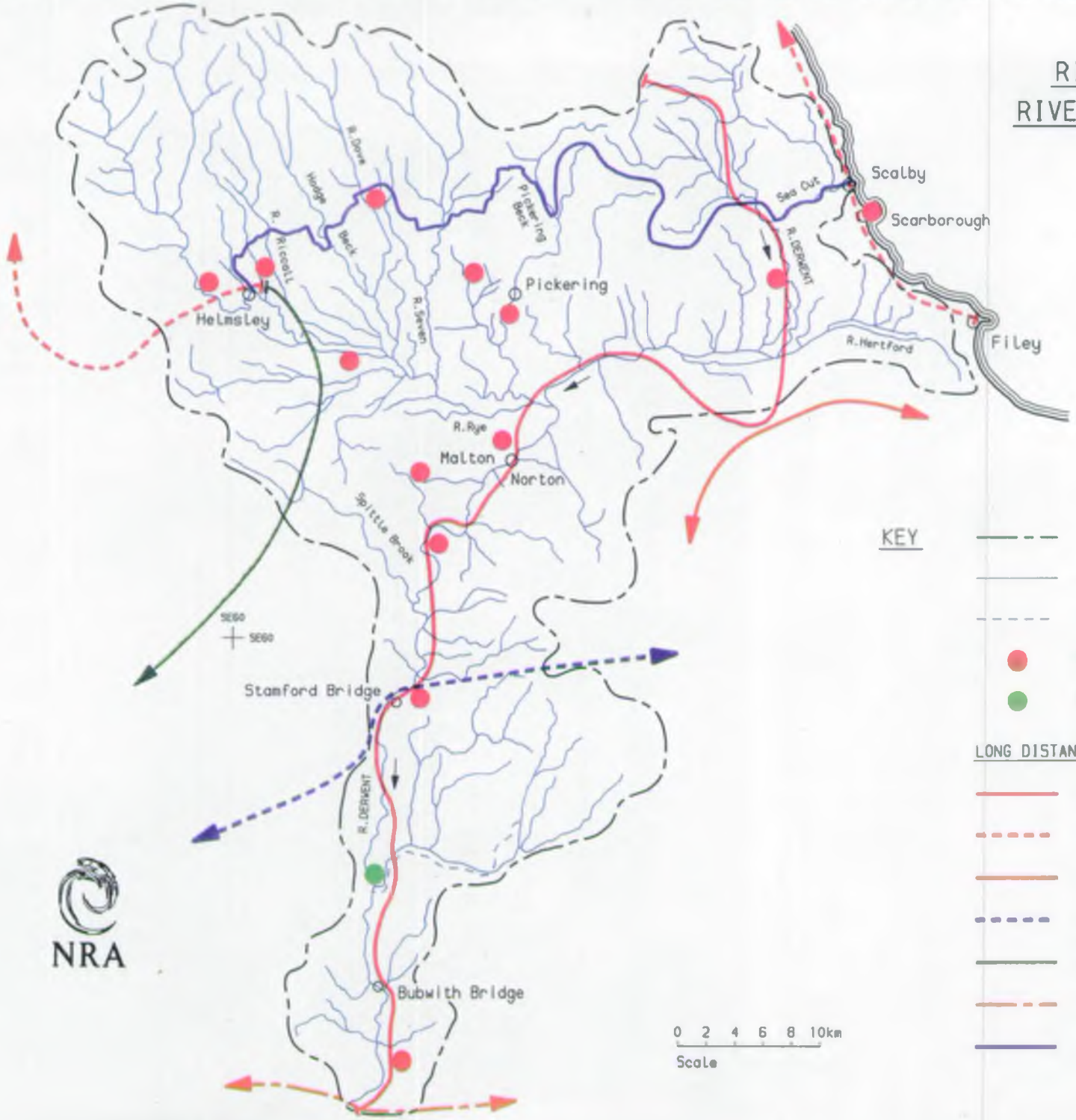
LOCAL PERSPECTIVE

Walking is, by far, the most popular activity in the river corridor. Whilst only one long-distance route, the Derwent Way, follows the general course of the river, a number of other long-distance paths either closely skirt or cross the catchment. These allow walkers access to countryside surrounding the Derwent's abundant tributaries.

The Derwent Way, an 80 mile route using only existing public rights of way, broadly follows the Derwent Valley, linking with the Minster Way, near Stamford Bridge, and the Wolds Way on the south bank of the River Derwent above Sherburn. A completed portion of the new Trans Pennine Trail, suitable for horseriders and cyclists as well as walkers, crosses NRA property at Barmby where it connects with the Derwent Way at its southern extremity. From its start by the Rye at Helmsley, the Cleveland Way sweeps round the north western flank of the catchment, beyond the watershed, then down the coastal margin from Saltburn to finish at Filey. The North York Moors National Park has developed a route, called the Link through the Tabular Hills Walk, which joins up the start and end points of the Cleveland Way from Helmsley through to Scarborough. The Ebor Way, which also starts at Helmsley, heads south towards York and finishes in Ilkley.

Whilst the development of routes beside the Derwent will not be encouraged, further riverside paths may be permitted within the catchment only where they will not have a detrimental impact on conservation interests. Such routes should not be considered without attention to the provision of associated facilities; car parking areas, waymarking, interpretation etc. These will need to be in sympathy with the surrounding countryside.

RIVER DERWENT CATCHMENT
RIVERSIDE AMENITY & HERITAGE



KEY

- CATCHMENT BOUNDARY
- RIVER
- CANAL
- FEATURE OF HERITAGE INTEREST
- WHELDRAKE INGS NATURE RESERVE

LONG DISTANCE FOOTPATHS

- DERWENT WAY
- CLEVELAND WAY
- WOLDS WAY
- MINSTER WAY
- EBOR WAY
- TRANS PENNINE TRAIL
- TABULAR HILLS WALK

MAP No.16

Many established walks in the Derwent catchment already include notable heritage features, often adjacent to or near the river. Castles, on the Rye at Helmsley and Pickering and by the Derwent itself at Ayton and Wressle, feature prominently in the district, along with Rievaulx and Kirkham Priory. There are Roman remains at Malton and evidence of prehistoric man can be found around the headwaters of the Derwent and its tributaries. The splendours of Castle Howard, at the head of Cram Beck, are renowned along with the 1066 battle site at Stamford Bridge.

The use of riverside paths for cycling is limited, although there has been a notable increase in the use of the Trans Pennine Trail as it crosses the river at Barmby. Similarly, horse riding, while popular within the catchment, is restricted to bridleways.

The Derwent catchment supports a variety of wildlife and is particularly important for birds. The complex of seasonally flooded meadows known as the Derwent Ings are a National Nature Reserve and have been designated a Special Protection Area (SPA) and a wetland of international importance under the Ramsar Convention. The principal centre of interest to birdwatchers is the wetland site adjacent to the River Derwent at Wheldrake Ings which is the responsibility of the Yorkshire Wildlife Trust. As much of the interest is in over-wintering species few difficulties arise in accommodating visitors to this site, although there may be a need for further interpretative facilities. Birdwatching activity elsewhere on the Derwent is more evenly distributed, with visitors using public footpaths and therefore requiring little from NRA property other than its maintenance and management in the best interest of the water environment. However, great care is needed to ensure that disturbance to the large numbers of feeding and roosting birds does not occur.

PROPOSALS

- To encourage and support bringing the public rights of way network throughout the catchment into good order by the turn of the century.

- To examine the possibility of linking the Derwent Way with features of interest in the river corridor through way marking/signing of existing public rights of way.

- To examine and improve existing facilities and access to NRA-owned land adjacent to the river for those with special needs.

- To investigate facilities which could be provided for users of the Trans Pennine Trail at Barmby-on-the-Marsh should demand prove evident. This may take the form of overnight camping facilities on NRA-owned land adjacent to the Tidal Barrage.

- To collaborate with other organisations in the provision of suitable river-associated amenity facilities whilst preserving the character of the river. This may involve provision for car parking, seating, viewing points, interpretive displays, planting, hides, visitor points, litter disposal etc.

- To collaborate with other organisations to ensure the integrity of heritage features and archaeological sites within the catchment.

R. Dove
Hodge Beck
Pickering Beck
R. Rye
R. Riccal
Helmsley
Pickering
R. Seven
R. Rye
Malton
Norton
Spittle Brook
6
5
4
3
Stamford Bridge
R. DERWENT
2
Bubwith Bridge
1

NRA

RIVER DERWENT CATCHMENT
LOCATION OF FISH SPECIES

NORTH SEA

KEY

- CATCHMENT BOUNDARY
- TROUT & GRAYLING ONLY
- MIXED COARSE FISH & TROUT
- COARSE FISH
- CANAL
- MAINLY MIGRATORY SALMON
- NO FISH PRESENT
- ● OBSTRUCTIONS TO FISH PASSAGE
- (1) BARMBY BARRAGE
- (2) SUTTON ON DERWENT WEIR
- (3) STAMFORD BRIDGE WEIR
- (4) BUTTERCRAMBE WEIR
- (5) HOWSHAM WEIR
- (6) KIRKHAM WEIR
- (7) GAUGING WEIR BROMPTON BECK

0 2 4 6 8 10km
Scale

MAP No.17

4.8 FISHERIES

GENERAL

The NRA has a duty to maintain, improve and develop fisheries and to further the conservation of the fish community. Fish communities are sensitive to the quality and quantity of water, and to the availability of suitable physical habitats.

LOCAL PERSPECTIVE

The distribution of fish species in the Derwent catchment is illustrated on map 16. The Derwent and Rye support good trout fisheries in their upper reaches where the river is characterised by pools, riffles and a gravel bed. In the lower reaches where the rivers are characterised by steadier, deeper flows with a more silty bed, coarse fish predominate. The main areas of concern within the catchment are the areas of poor fishery quality on the River Derwent between the River Hertford and the River Rye, the River Hertford itself, poor fish passage over weirs and impacts on the lower Derwent.

RIVER HERTFORD

In 1974 the Land Drainage Department of the Yorkshire Water Authority carried out works on the River Hertford under contract to the Muston and Yedingham IDB. The works resulted in the channelisation of the river and caused severe damage to the fishery and associated flora and fauna (also considered under sections 4.6 and 4.11). A full assessment of the extent of the damage caused by the land drainage works needs to be carried out, followed by the preparation of a plan for the restoration of the fishery.

RIVER HERTFORD TO RYE MOUTH

Between 1950 and 1970 the former River Ouse, Yorkshire Catchment Board carried out land drainage improvement work on the River Derwent between Rye mouth and Yedingham (also considered under sections 4.6 and 4.11). Many of the natural river features such as bends, pools and variations in depth, as well as bankside vegetation were lost. This work had a considerable impact on the fishery habitat and associated flora and fauna, the effects of which are still evident despite many attempts to mitigate them. Fish populations are poor in comparison with their former levels and the brown trout which co-existed alongside stocks of dace, chub and grayling have virtually disappeared.

Two spawning units in the form of off-river ponds have been created in the section between Yedingham and Low Marishes in an attempt to improve coarse fish

production. These sites also act as havens during periods of high flows. Whilst there is evidence that these have made some improvement, the fishery remains severely damaged.

As an environmentally conscious body, with a responsibility to maintain, improve and develop fisheries within its area, the NRA recognises that this section of the River Derwent has suffered severe environmental damage. The NRA will therefore undertake to carry out a full investigation into the feasibility of various options designed to help restore the fishery and its associated flora and fauna.

IMPOUNDING WEIRS AND FISH PASSAGE

Brompton Beck on the upper Derwent should provide spawning and nursery sites for both brown trout and grayling; however, survey results indicate that recruitment from this source is very limited. In the mid-1970's a weir was built at the bottom of Brompton Beck for flow gauging. This structure effectively blocked the ascent of fish for spawning and thereby deprived the Derwent of valuable recruitment. Intermittent poor water quality and increased siltation of gravels as a result of agricultural practices are also thought to be contributing factors. The provision of some means of access over or around this obstruction needs to be considered.

There are five impounding weirs at Kirkham Abbey, Howsham, Buttercrambe, Stamford Bridge and Sutton-on-Derwent on the central section of the Derwent between Malton and the original tidal limit at Sutton-on-Derwent. The effect of impoundment is to produce very deep, relatively slow flowing areas of water. These conditions promote the settlement of silt on the bed of the river. As a result the areas below these weirs are of vital importance to the maintenance of the barbel, dace, chub, and grayling as well as trout and the occasional salmon. These species require the areas of clean, well-oxygenated gravels, formed and maintained in the weir pools by the increased velocities, for the depositing and successful development of their eggs. The weirs, whilst providing this essential element, also have the effect of limiting fish movements within the system.

Of the five weirs, Sutton-on-Derwent is the only one fitted with a fish pass. However the entrance to the pass is badly positioned in relation to the main channel of the river. This results in fish failing to locate its presence. Repositioning of the entrance is required which may involve major structural changes to the pass.

Due to the lack of a fish pass the passage of salmon, trout and any coarse fish at Kirkham Weir, Buttercrambe Weir and Stamford Weir is limited to times of elevated flow. All three weirs require the installation of a fish pass to facilitate the movement of both salmonid and coarse fish.

MIGRATORY SEA TROUT

Scalby Beck, resulting from flows from the Sea Cut and Burniston Beck, is important for the maintenance of the north east coast salmonid fishery. It provides the only substantial area of suitable sea trout spawning gravels between the River Esk to the north and the Humber to the south. At present, the fish are only able to exploit the gravels in the lower 1,000m of the beck as their access is effectively blocked to areas upstream by a series of weirs. Provision for passage over these obstructions would open up considerable areas for sea trout reproduction including several kilometres of Burniston Beck.

ELVINGTON WTW

Approximately 800m upstream of the weir at Sutton-On-Derwent, Yorkshire Water Services Ltd. abstracts water for the Elvington Water Treatment Works. At present, no screening of the intake occurs to prevent the ingress of fish. A further study is required to identify the fry migration routes and timings under different flow regimes. This will enable entrainment and impingement losses into the Elvington abstraction to be quantified.

LOWER DERWENT

Until the construction of the Barmby Barrage in 1975 the lower Derwent, from Sutton-On-Derwent to its confluence with the River Ouse, was affected by tidal fluctuations. The barrage was designed to act as a flood defence mechanism and as a water resources facility to prevent the ingress of water from the River Ouse. It also had a considerable impact on the fishery of the lower Derwent. In general it led to a more ponded environment due to the significant reduction in flows. This is thought to have led to the decline in the roach and bream catches, whilst the populations of dace and bleak appeared to increase.

Recent surveys have identified important sites which act as over-wintering refuges for juvenile fish; these include Wheldrake Beck, the old course of the River Derwent at Wheldrake Ings, and Fleet Dyke. It is essential that these areas are protected and if possible improved. Further suitable sites for development as fish nursery and haven areas should be investigated.

The lower reaches of Bielby Beck, which joins the river at East Cottingwith contains a healthy coarse fish population. It is thought that the fall out of immature stock from this source helps to augment the Derwent fishery. The downstream

movement of brown trout in Bielby Beck is limited due to the effects of effluent discharge from Pocklington STW and intermittent pollution incidences.

At the time of its construction, only limited consideration was given to the effects of Barmby Barrage on the upward movement of migratory salmonids and eels. Access to the Derwent from the Ouse was felt to be adequately served by the regular operation of the gates which were opened at certain states of the tide to maintain levels inside the structure. The inadequacy of this regime in maintaining free access for fish became apparent during the recent drought when the barrage remained closed for several weeks to conserve water supplies. Passage to migrating fish was effectively denied and the continual flow of water required for salmonids to locate the entrance to the river was lost.

As part of the flow investigation on the lower Derwent (see section 4.1) further work is required to identify the factors which regulate the fish populations in the lower river and in particular investigations are required into the effects of low flows due to abstraction. The investigations will also need to quantify the effects of entrainment and impingement losses to the intake at Barmby Water Treatment Works.

Investigations are also urgently required to identify the minimum requirements for the maintenance of fish passage through the barrage. This will be incorporated into the work identified under section 4.1.

PROPOSALS

- To ensure that river management practices, for example weed control, dredging and bank maintenance, do not detrimentally affect the fishery environment or the ability of fish to reproduce.

- To seek to provide and maintain fish ascent structures on all obstructions inhibiting fish movements. All obstructions should be passable at a full range of flows.

- To undertake a study to identify the fry migration routes and timings under different flow regimes at Elvington and Barmby WTW.

- To protect and improve existing areas which act as over-wintering refuges for juvenile fish and investigate suitable sites for development as fish nursery and haven areas.

- To carry out a full investigation into the feasibility of various options designed to help restore the fishery and its associated flora and fauna on the Derwent between the River Hertford and Rye Mouth. A report on the investigation will be produced within a two year period.

- To carry out a full assessment of the extent of the damage to the fishery on the River Hertford caused by the previous land drainage works. A plan will then be prepared to restore the fishery.

4.9 ANGLING

GENERAL

The Derwent is popular for angling throughout much of its course between Barns Cliff, above Langdale End, and its confluence with the Ouse at Barmby. The River Derwent and its major tributaries the Rye, Dove, Seven, and the Pickering and Costa Becks offer a variety of fishing in attractive surroundings.

LOCAL PERSPECTIVE

Fly fishing, for brown trout and winter grayling, takes place on the River Derwent as far downstream as West Ayton. Whilst part of the trout stream is retained exclusively for members of Derwent Anglers' Club, day tickets are available to the public on much of the river from Hackness through Forge Valley. Although trout and mixed coarse fishing are permitted on some of the larger tributaries of the River Derwent, a considerable proportion of the fishing rights on smaller tributaries remain in club or private hands.

Salmon and sea-trout fishing, mainly for non-migratory fish, occurs on Scalby Beck and the Sea Cut. This is one of the few stretches of the upper Derwent river system where the NRA owns fishing rights.

Although the fishery on the Derwent remains mixed for much of its length, coarse species gradually predominate downstream of Ayton. Between West Ayton and the River Rye the Derwent becomes less appealing to anglers with many preferring the more natural stretches of the river. Day permits are available on this stretch and catches are reported to have improved.

Downstream of Malton, the Derwent attracts mainly coarse fishermen, either as individuals or match anglers. Use of the river for weekend competition is mainly controlled by amalgamations of angling clubs. The York & District and the Leeds Amalgamated Society of Anglers have secured rights on the principal match fishing lengths, however, facilities for individual anglers are generally available on a day ticket basis.

With the exclusion of the tide at Barmby Barrage, and consequential improvements in coarse fishery development, angling activities now extend almost the full length of the former tideway downstream from Elvington Weir at Sutton-upon-Derwent. Some migratory fish do ascend the river, but catches are often not formally reported.

R.Dove
Hodge Beck
R.Riccal
R.Rye
R.Seven
Pickering Beck
R.Rye
Malton
Spittle Brook
SE60
SE60
R.DERWENT

NRA

RIVER DERWENT CATCHMENT
ANGLING ACTIVITY

NORTH SEA

KEY

- SALMON/SEA-TROUT
- TROUT FISHING
- FISHING NOT CONTINUOUS (SWALLOW HOLES)
- MIXED FISHING
- COARSE FISHING
- CANAL
- PRICIPAL MATCH FISHING LENGTHS

0 2 4 6 8 10km
Scale

MAP No.18

Despite the relatively remote nature of the Derwent, access for able- bodied anglers is generally satisfactory. The provision of access for disabled anglers however, is limited due to the nature of the river corridor and the river's proximity to roads. Car parking facilities, some of which are secured by the clubs themselves, accommodate all but the most popular matches. A recent survey by the NRA indicated that there are few difficulties with club-organised activities or associated facilities.

The potential for conflict between anglers and boat users increases below Stamford Bridge. Small craft, canoes and some larger boats have used the river upstream in isolated sections although this has been fairly limited. Whilst serious conflicts between boat users and anglers are rarely reported, a clear interpretation of the respective rights of all users of the Derwent would improve relations between user groups. (See Navigation and Water-Based Recreation 4.10).

The NRA owns some of the river bank along the former tideway downstream of Elvington Weir. Arrangements for access to the fishing associated with these stretches are made by the NRA under an agreement with an umbrella organisation, the Lower Derwent Fishery Committee, which represents a number of local angling clubs. The allocated lengths of bank are managed by the individual clubs for use by members, although some day tickets are available to non-members.

PROPOSALS

- To improve access and facilities for disabled anglers and those with special needs through collaboration with angling organisations owning rights on the river.

- To support improvements to angling associated amenity facilities at established fisheries within the catchment. This may involve improvements to car parks, access, toilets etc. Care will be taken to ensure this does not over-popularise the fishery.

- To encourage angling clubs to set aside lengths of existing match fishery for use by non-competing individual anglers. Ideally these should be available at weekends as well as through the week.

- To encourage angling clubs who have reserved the fishing rights on stretches of river bank exclusively for club members, to allow use by non club members on the purchase of a day ticket.

- To support angling clubs in clearing litter from match fisheries and the river banks where appropriate.

4.10 NAVIGATION AND WATER BASED ACTIVITIES

GENERAL

There are two types of navigable waterway within the Derwent catchment, navigable river and canal. There is no navigation authority responsible for the general control of boating activities, craft speed regulation or safety for the publicly navigable parts of the lower River Derwent. The lower Derwent is considered a significant recreational resource by boat owners, although in practice the level of boat use is low. British Waterways is responsible for the Pocklington Canal, a remainder waterway.

LOCAL PERSPECTIVE

RIVER DERWENT

For the purpose of describing the situation relating to the rights of navigation on the Derwent, the river may be considered in two sections, above and below Sutton-on-Derwent.

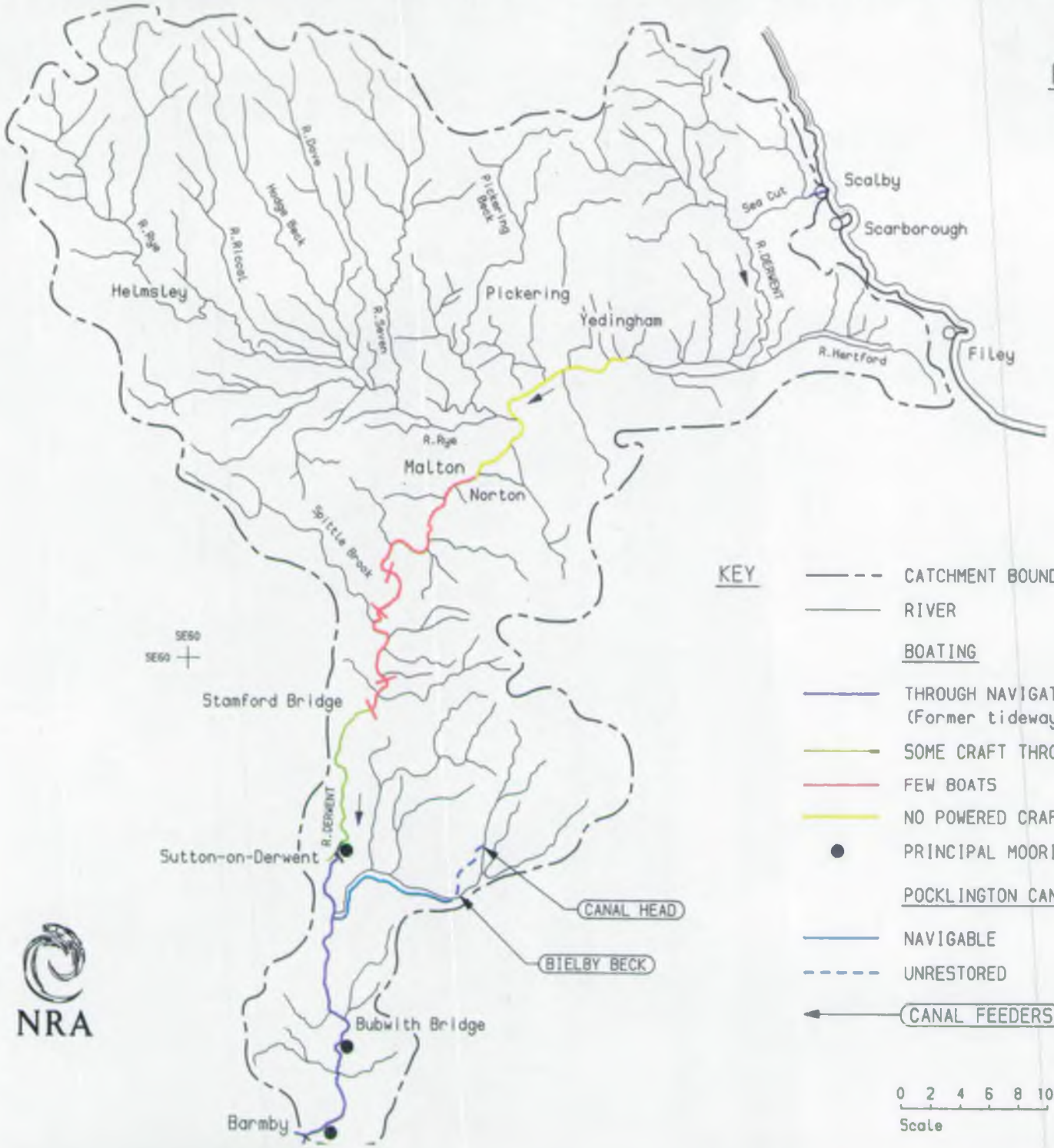
Because of its tidal nature, a public right of navigation has existed on the Derwent between its confluence with the Ouse and Sutton-on-Derwent since before 1702. In that year an Act of Parliament created a statutory private right of navigation upstream to Yedingham, and permitted the construction of locks to enable through navigation past existing weirs on the river.

The 1702 Act was revoked by the River Derwent Navigation Act Revocation Order 1935 and subsequent litigation recently established that no statutory public right to navigate the Derwent or its tributaries above Sutton-on-Derwent existed under the 1702 Act or the Highways Act 1980. However, Common Law claims to such rights may yet be raised. Unless otherwise shown, any rights to use of the river upstream of Sutton-on-Derwent for navigation are vested solely in the riparian owners, the individuals to whom the bed and banks of the river belong.

Despite the exclusion of the incoming tide from the reach of the lower river to Sutton-on-Derwent, due to the construction of the barrage at Barmby, a public right of navigation remains on this stretch of river.

Ownership and control of the old locks on the Derwent transfered from the undertakers of the Navigation to the River Ouse (Yorks) Catchment Board by the virtue of the 1935 Revocation Order and now rests with the NRA.

RIVER DERWENT CATCHMENT
WATER BASED ACTIVITY



MAP No.19

Although there is little known water-based activity in the upper Derwent catchment, canoeing is physically possible when conditions permit. However, growth of aquatic vegetation in summer restricts use of the Derwent itself between Yedingham and Malton.

A small number of craft are moored by arrangement with the riparian owners on the River Derwent at Malton. Owners of these boats, together with some canoeists, use the river between here and Kirkham Weir. Formerly, Kirkham was the site of the uppermost lock on the river. Weirs at Howsham, Buttercrambe and Stamford Bridge also cross the river.

At Howsham Weir, use is made by canoeists of fast water through the slot in its crest, which allows the passage of fish. Although this use is permitted, unauthorised access to property adjacent is not.

No competition rowing has been known on the Derwent, but rowing boats are available for hire from the caravan site at Stamford Bridge.

Pleasure craft at permanent moorings to the bank immediately upstream of Sutton-on-Derwent road bridge are by arrangement with the landowner. Passage through the NRA's lock at Sutton-on-Derwent cannot be guaranteed, and is strictly conditional when permitted.

The majority of small powered craft on the Derwent moor in the vicinity of Loftsome Bridge and Breighton. The NRA-owned bank at Breighton is let to the local boat club, who are responsible for its management as moorings.

Consents for the development of moorings within the catchment to allow increased numbers of craft, either on a temporary basis or otherwise, have not been given in recent years and would not be supported by the NRA. The existing moorings and other boating facilities are in various ownerships and are not maintained to any consistent standard.

The Derwent is not suitable for dinghy sailing, windsurfing or jet skiing and there has been no reported sub-aqua use. Historically, local people have used the Derwent for swimming during the summer. Whilst this activity is not encouraged there are thought to be fewer risks from waterborne disease on the Derwent than on most other rivers in the region.

POCKLINGTON CANAL

The lower Derwent gives river access to the Pocklington Canal connecting the River Derwent at East Cottingwith to Canal Head near Pocklington. It has a maximum lock width of 4.29m (14'-1") and a maximum length of 17.30m (5'-9"). At present only the lower end of the Canal is navigable from East Cottingwith to Thornton Lock. For British Waterways and other canal users it is important that the navigable condition of the lower Derwent between Barmby and Cottingwith is maintained.

The water supply to the Canal is from the Pocklington Beck at Canal Head, and Bielby Beck below Thornton Lock. In dry weather conditions these watercourses have limited resources. This limits the amount of traffic able to use the locks on the Canal.

The Pocklington Canal SSSI supports one of the most important aquatic plant communities in the Region. Much research has been undertaken into the effects of navigation on aquatic ecosystems. The results of the research indicate that renewed navigation on the upper sections of the canal could lead to severe ecological damage. Any proposal to restore the navigation within the SSSI would require prior consent from English Nature under the Wildlife and Countryside Act 1981.

CONTROL OF POLLUTION FROM BOATS

Under the Yorkshire Water Authority (River Derwent) Act 1976, the NRA administers a certification scheme for certain types of vessel on the river. Boat Certificates are issued, in the interests of pollution control, to the owners of craft with inboard engines, outboard motors of 5 hp or more, and vessels with "sea" toilets (those capable of being discharged directly through the hull into the water.)

These Certificates are to ensure that potentially polluting craft conform to specifications that are unlikely to allow significant spillage or discharge of oil/fuel etc. in to the River Derwent, a vital drinking water resource. All sea toilets on craft using the Derwent are sealed by the NRA. Toilet waste disposal facilities are provided and maintained by the NRA at Barmby, Sutton and Stamford Bridge. Portable/chemical type toilets from vessels can be emptied at these points.

The River Derwent Boat Certificate issued by the NRA is not a licence to navigate any part of the river.

The current level of water-based activity on the river permits its enjoyment without serious conflict between users. The following proposals aim to maintain this relative balance, and hence the exceptional character of the Derwent and its

environment. This sustainable future will rely on careful management, co-operation and moderation in use of the resource by all.

PROPOSALS

- To co-ordinate the preparation and promotion of a general 'Code of Good Conduct', with supporting literature as appropriate. This will concisely describe the individual's rights and responsibilities relevant to leisure use of the Derwent.

- To support and advise on the improvement or better management of amenity facilities associated with established boat moorings. Support will only be given where there is no overall increase in the number of moorings. Some financial assistance may be available where appropriate.

- To examine the demand for and feasibility of establishing a 'Derwent Information Line', and to consider what effect that might have on use of the river corridor. The telephone line may provide information on rights, responsibilities and proper enjoyment of the river.

- Review the abstraction regime at Canal Head and Thornton Lock to ensure that the base flows within the system of Pocklington Canal and its feeder watercourses Pocklington Beck and Bielby Beck are protected.

- To resist any development which may lead to increased, unsympathetic or ill-regulated activities associated with the navigation.

- The results of previous work and the outputs from current R&D projects into the effects of navigation on wildlife will be made available to ensure that any proposal to restore navigation on the upper part of the Pocklington Canal does not cause significant ecological damage.

4.11 FLOOD ALLEVIATION AND WASHLANDS

GENERAL

A major function of the NRA is to provide effective defence for people and property against flooding from rivers and the sea, and the provision of land drainage to maintain soil conditions suitable for agriculture. Normally flooding is a result of extreme climatic conditions, such as high winds or very heavy rainfall and snow melt. Flood events are described in terms of the frequency at which, on average, a certain severity of flood is exceeded. This frequency is usually expressed as a return period in years, e.g. 1 in 50 years.

Under the Water Resources and Land Drainage Acts 1991 the NRA has a duty to oversee and has powers to control significantly obstructive works on watercourses. Internal Drainage Boards (IDBs), have similar powers for watercourses within their districts.

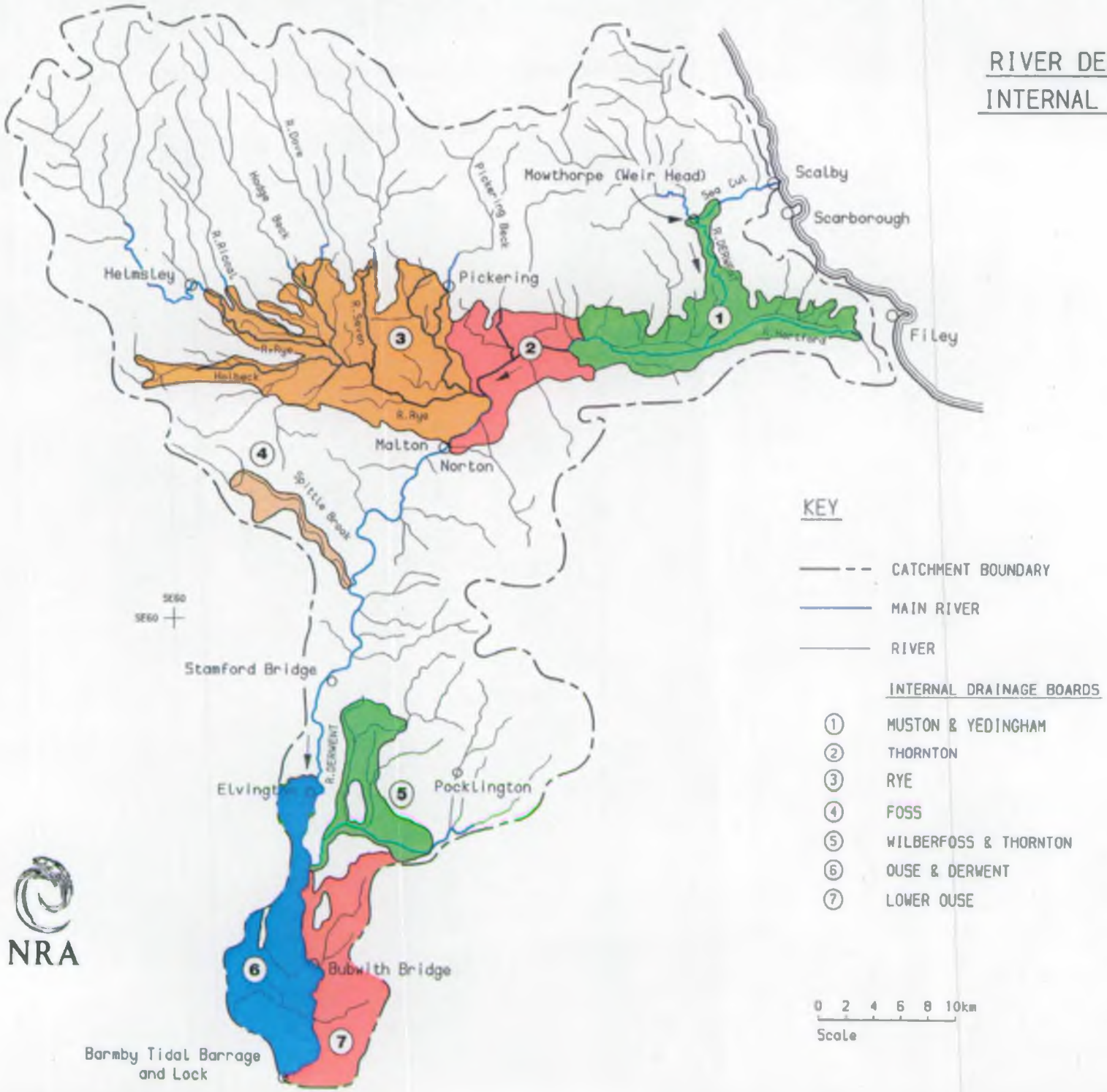
Certain reaches of the river are formally designated as "Statutory Main River". On Main River, the NRA has special powers to carry out works or control the actions of others. Any proposal that could interfere with the river bed or banks or obstruct the flow in the river requires a formal consent from the NRA.

The nature of the works carried out for flood defence on the river channel and banks means that care must be taken to minimise any conflict with other river uses especially fisheries and conservation. Consultations are carried out concerning all proposed works. Wherever possible, methods are devised to enable the river to achieve the required level of flood protection and provide significant plant and animal habitat enhancements.

Within the River Derwent catchment there are seven Internal Drainage Boards, illustrated on map 20, most of which were established under the Land Drainage Act 1930. They were set up to deal with specific drainage problems in relatively low-lying agricultural areas and still carry out this work today.

The powers of the IDBs and the NRA are clearly defined by relevant legislation. Within an Internal Drainage District the IDB supervises all matters relating to land drainage. These powers do not extend to any main river within an Internal Drainage District. NRA staff work closely with the IDBs to assist them with promoting more environmentally sensitive management practices.

RIVER DERWENT CATCHMENT
INTERNAL DRAINAGE BOARDS



NORTH SEA

KEY

CATCHMENT BOUNDARY

MAIN RIVER

RIVER

INTERNAL DRAINAGE BOARDS

1. MUSTON & YEDINGHAM
2. THORNTON
3. RYE
4. FOSS
5. WILBERFOSS & THORNTON
6. OUSE & DERWENT
7. LOWER OUSE

0 2 4 6 8 10km
Scale

NRA

MAP No.20

LOCAL PERSPECTIVE

The upper River Derwent and its tributaries drain approximately two thirds of the catchment which mainly consists of the North York Moors.

These tributaries consist of the Rivers Rye, Hertford, Riccal, Dove, Seven, Hodge Beck, Pickering Beck, Wath Beck and Holbeck which meet the River Derwent just to the north of Malton. Most of the main rivers have flood embankments on one or both banks which provide flood protection to the adjacent arable farmland. These flood banks can be over-topped in major flood conditions and as a result extensive flood plains exist on these tributaries.

An unusual feature on the River Derwent is the Sea Cut, a man-made channel constructed in the 19th Century that runs eastward from the Derwent at Mowthorpe to Scalby north of Scarborough. A sluice has been constructed at the western end of the Sea Cut which allows normal flows to pass down the River Derwent. During flood conditions the flood waters are restricted by the sluice which only allows a limited quantity of water to pass into the Derwent. The majority of the flood water from the North York Moors is diverted down the Sea Cut and into the North Sea. The NRA owns the Sea Cut and its associated structures.

In the middle reaches downstream of Malton the river flows through a very steep-sided valley in which there are no flood defences. Below Stamford Bridge the river flows into the Vale of York; here the river has a much wider natural flood plain which has been embanked over many years. This has resulted in numerous washland areas being formed which have helped to reduce the flood levels downstream.

Downstream of Elvington the river has been contained within flood banks which have been constructed on both sides of the river. These banks provide protection to the land within the river valley.

Between Wheldrake Ings and Bubwith Bridge large areas of land adjacent to the river on both banks are subject to flooding especially during the winter months. This has resulted in the areas being used by a variety of winter migrating birds and it has become such a valuable site with its diversity of flora and fauna that it has been designated as an SSSI, National Nature Reserve and Ramsar Site.

The flood embankment on this stretch of river is owned by the NRA and is let for grazing on an annual basis to local farmers. The method of grazing has been of some concern to English Nature because the area falls within the Lower Derwent SSSI. English

Nature have proposed a management agreement which will allow them to direct the way the embankments are grazed. Preliminary discussions have already taken place and a formal agreement is expected shortly.

The Barmby Tidal Barrage and lock at the confluence of the Derwent and Ouse operate in part as a flood control structure and as a Water Resources facility to maintain a constant water level on the Derwent for water abstraction purposes. This constant water level provides a source for potable water abstraction at Yorkshire Water's Barmby Water Treatment Works and allows boats to navigate the lower reach of the river at all times and states of the tide. During exceptionally high tides and tidal surge conditions it may be necessary to open the barrier to let the tide enter the lower reaches of the Derwent. This action reduces the peak surge tide levels which could be expected at Selby, thereby giving flood protection to the town.

MAJOR FLOOD DEFENCE WORKS

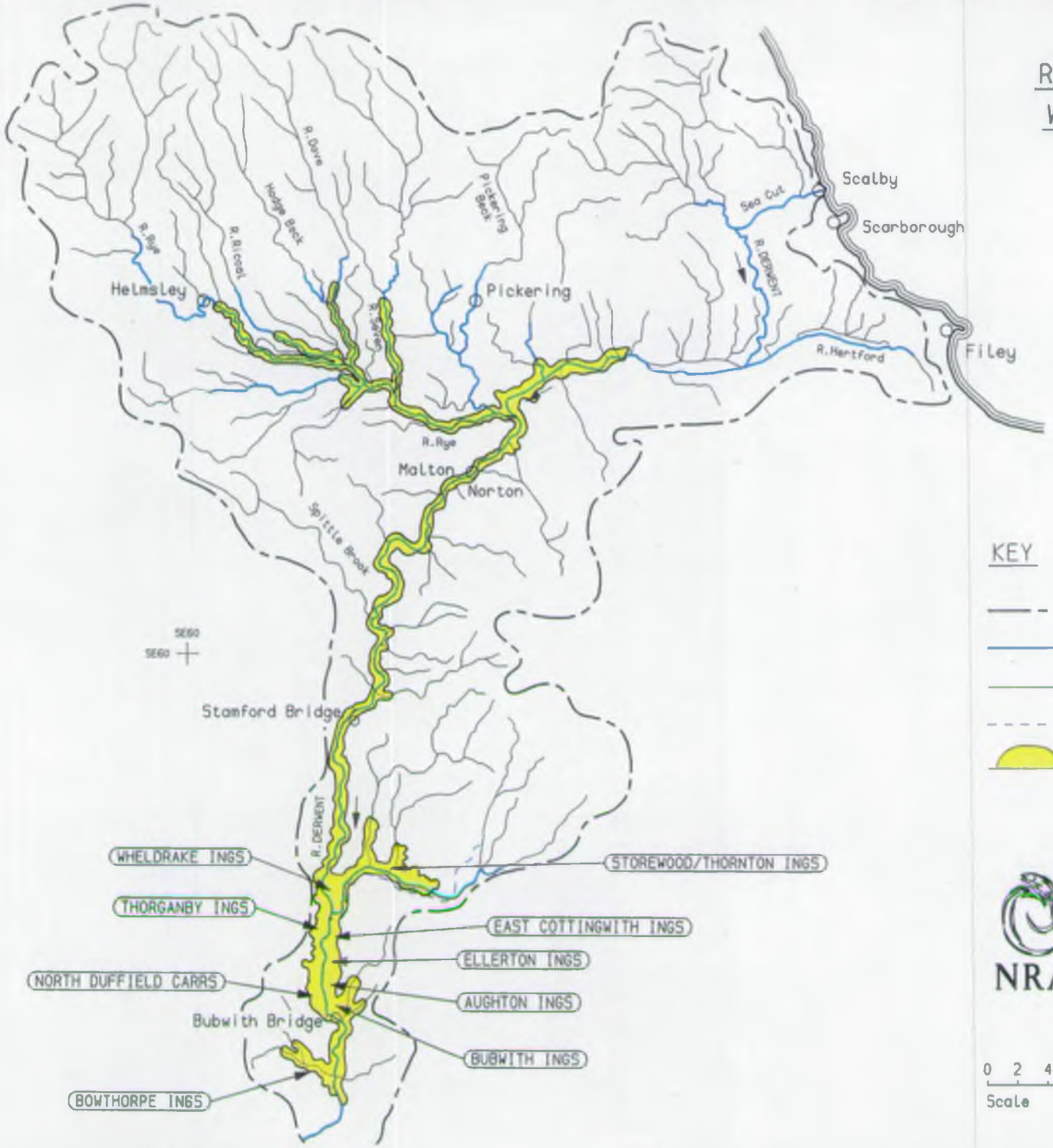
To improve the standards of flood protection a number of initiatives and schemes have been investigated. Flood protection schemes at Pickering, Malton/Norton and at Stamford Bridge have been considered. After careful assessment from a value-for-money exercise these schemes proved uneconomical. No other new flood defence work is planned within the catchment except to raise the flood bank to counteract mining subsidence from the Selby Coal Field development. The majority of this work will be confined to the stretch of river between Elvington and Barmby and will depend upon British Coal's mining programme. Since the area of subsidence is within the Lower Derwent SSSI any scheme will require agreement from English Nature from a conservation perspective.

The NRA is in the process of improving the river level control structures at High Mowthorpe Weir Head, Kirkham and Stamford Bridge Sluices. The aim is to provide power at each site to enable the NRA's Regional Telemetry System to control the sluices remotely from an office environment. This will reduce resources currently required to manually operate the system manually. In addition, it will enable a much faster response time in operating the sluices, especially during floods and pollution incidents.

MAINTENANCE AND OPERATIONS

Maintenance programmes ensure that the flood defences are kept in good order. Regular maintenance is carried out on all structures owned by the NRA. These include; mowing flood banks, inspecting them for damage from vermin, control of weed growth in the river channel, dredging of channels, removal of debris, and stabilization of channel

RIVER DERWENT CATCHMENT
WASHLANDS & MAIN RIVER



NORTH SEA

KEY

- CATCHMENT BOUNDARY
- MAIN RIVER
- RIVER
- CANAL
- WASHLAND

NRA

0 2 4 6 8 10km
Scale

MAP No.21

erosion. All maintenance operations are carried out in ways that are sensitive to the environment with every opportunity taken to further conservation.

A length of the River Derwent between Rye Mouth and Yedingham Bridge was canalised in the 1950's by the former River Ouse (Yorks) Catchment Board to improve land drainage and flood alleviation in the area. As a result of this past work the fishery and general flora and fauna have suffered (See section 4.6 and 4.8). Similar works were also carried out on the River Hertford in the 1970's. It is now possible to redress the situation by carrying out work which will improve the fishery and re-establish the flora and fauna in the area without reducing the land drainage function of the river. A detailed survey of these sections of the river will be undertaken and an investigation will be carried out to ascertain the feasibility and costs of such improvement works (included in section 4.8 proposals). Close liaison will take place with the appropriate Internal Drainage Boards and other interested parties.

PROPOSALS

- To implement a system to operate flood defence structures remotely utilising the Region's Telemetry System.

- To ensure there is no risk of flooding, or damage caused to habitats, flora, fauna and fisheries when determining proposals to culvert, divert, alter a watercourse and its banks or change the use of the flood plain.

- To investigate the current status and viability of floodbanks owned by the NRA with a view to improving their management from a conservation and amenity aspect without reducing their operational performance.

- To continue the dialogue with English Nature to confirm the management agreement for the future grazing policy on NRA owned banks.

- To investigate and record the condition of Flood Defence assets and to prepare a priority-based programme of repair, renewal and maintenance. In preparing this programme the NRA will consider the implications of 'doing nothing' and implementing changes to current methods of operation.

4.12 FLOOD WARNING

GENERAL

Under the Water Resources Act 1991 the NRA has powers to provide, operate and maintain flood warning systems. There is a national system of colour coded flood warning statements issued to the Police, who notify local authorities and the public.

The ascending level of warning statements, yellow, amber and red indicate the anticipated severity of flooding. The Police are the prime recipients of these warnings and will implement regional and local emergency procedures involving the local authorities and other emergency services.

LOCAL PERSPECTIVE

The NRA's role during a flood event is to monitor fluvial and tidal conditions in the main river, updating forecasts and issuing further statements as the situation worsens or improves. The emergency work force are deployed to inspect and ensure the integrity of the flood defences and operate essential equipment.

There are several operations undertaken by the NRA during flood conditions. The headwaters of the Derwent can be diverted down the Sea Cut. This can also be used to isolate the lower Derwent and the Swallow holes at East Ayton from pollution events in the upper reaches of the River. At Kirkham Abbey automatic gates maintain normal water levels, however during flood flows the gates are fully opened to increase the rate the river flows through Malton. This has the effect of lowering the flood level. A system of automatic water level alarms alert operations staff to send NRA emergency staff to operate both these gates and the sluices at Weir Head High Mowthorpe, Kirkham Abbey and Stamford Bridge.

Within the limits of NRA resources assistance is given to the emergency services to alleviate actual flooding problems by sandbagging or small scale pumping operations. During severe tidal flooding events the Barmby Barrier may be operated to help reduce flooding in the tidal reaches of the Ouse, particularly when Selby is at risk.

The NRA will continue to refine and improve the Flood Warning System. The emphasis will be to focus warnings to high risk areas and to closely define the extent of potential flooding. Localities protected by flood alleviation works, but at risk from an exceptional flood over- topping the defences will also be incorporated in to the flood warning procedures.

The region uses a network of telemetry stations providing data on river levels and rainfall. These stations are used to monitor high levels in the Derwent and to alert staff to operational requirements. The network is in the process of being updated to develop a Regional Telemetry System (RTS) to serve the needs of the different functions within the NRA. The RTS forms an integral part of the River Flow Forecasting System (RFFS) which will provide additional data for improving the prediction of flood events. In addition, the use of real time data will increase the accuracy of our forecasting.

Prepared flood warning statements are at present available for the following localities in the Derwent catchment;

Malton and Old Malton

Norton

Stamford Bridge

British Rail for the York – Scarborough line

Nunnington

Butterwick

Elvington

Roads in the valleys of the Seven, Costa Beck and Rye

An additional warning will need to be prepared for Stamford Bridge.

The NRA supplies warnings to two Police forces, British Rail and North Yorkshire County Council Highways Department.

PROPOSALS

- To continue to refine and improve the flood warning system through incorporation of the Regional Telemetry System and the River Flow Forecasting System.
- To improve the operation of sluice gates at High Mowthorpe (Weir Head), Kirkham Abbey and Stamford Bridge.
- To prepare additional flood warnings for areas at risk.
- To check that the Police and Local Authorities have procedures in place to respond to NRA warnings. To ensure the provision of a timely, reliable and accurate flood warning service to the public in areas at risk covered by the scheme.

4.13 FUTURE DEVELOPMENTS OF HOUSING COMMERCE AND INDUSTRY

GENERAL

Future residential, commercial and industrial development is identified in County Structure Plans, District Local Plans and Unitary Development Plans. These plans identify policies against which the planning authorities consider development proposals and define land uses.

The NRA is a statutory consultee for some types of development under planning legislation and advises county and local authorities on proposals which may have an impact on matters relevant to the NRA, although the final decision on planning matters rests with the planning authority. However, if the development requires an abstraction or impoundment, a discharge or entails work on or near a watercourse then a consent or licence is required from the NRA.

The NRA's purpose in participating in the planning process is to provide guidance to the relevant authorities so as to protect the public and the environment from any adverse effects associated with development in relation to surface water and groundwater.

The NRA will oppose any specific development that it considers will damage the environment and will seek to persuade the local authorities to adopt policies for protecting both the public and the environment. In providing advice to planning authorities the NRA will respond within 28 days, if consulted, and where necessary will support objections on appeal at public enquiries.

LOCAL PERSPECTIVE

The NRA has a full and active dialogue with all the local planning authorities, including the North York Moors National Park, within the River Derwent catchment at all levels of development control. This extends from making comments on individual applications to providing policy inputs to structure and local plans.

Developers are required to provide facilities to minimise pollution risk and any new discharges to controlled waters require the specific consent of the NRA. Conditions are imposed on new discharges which ensure the achievement of river quality objectives.

To prevent development which could endanger property or lead to wasteful expenditure of public resources on remedial works the NRA will oppose any new developments that will flood or cause flooding or cause damage to flood defences.

In addition to the advice provided to planning authorities the NRA has its own powers:

1. Under the Water Resources Act 1991 and Bye-laws.

2. Under the Land Drainage Act 1991 to control any works which could affect the flow in an ordinary watercourse.

In considering proposals under both Acts consideration will be given to conservation and fisheries interests and, if necessary, consent will be refused if the proposals will have an adverse effect.

MINERAL EXTRACTION AND MINING

The extraction of minerals and mining can affect surface water and groundwater by changing the quantity and quality of the flow in the river or aquifer. It can also result in potential damage to areas of high conservation value, by direct damage, drainage of wetlands or damage due to spoil disposal. However, there is considerable scope in the restoration phase of these sites for the creation of valuable conservation areas, particularly new open waterbodies.

Over the years the NRA has commented on several proposals for sand and gravel extraction throughout the catchment, including sites at Seamer, Bielby, Ganton, Glaisdale, Cawton and Newton upon Derwent. Comments have also been made on proposals to extend chalk abstraction at Burnby as well as the application by British Coal to extract Barnsley Seam coal by the extension of underground workings east of the River Derwent near Bubwith.

In dealing with these proposals the NRA will ensure that there is no loss of flood plain storage either temporarily or permanently and that there is no increase in flood risk.

Where restoration proposals allow, the NRA will seek to ensure environmental enhancement to aquatic habitats through active participation in the planning process.

PROPOSALS

- The NRA will continue to participate fully in the planning process and where necessary to oppose any proposal that it considers will damage the water environment.

- The NRA will seek to persuade local authorities to adopt policies for protection of the water environment and any opportunities to strengthen the protection afforded to the water environment will be encouraged.

- To liaise with minerals planning authorities and potential developers of new sites to;

  1. ensure protection is given to existing areas of conservation value and that opportunities for habitat creation are identified and encouraged;

  2. ensure opportunities for recreational development are identified following the completion of schemes;

  3. ensure activities do not pose an increased flood risk and to maximise the benefits for flood alleviation;

  4. protect and maintain water quality and water resources.

- To continue to monitor British Coal's mining programme and promote schemes at British Coal's expense to offset the adverse effects of mining subsidence. These schemes will be designed to NRA standards and will include a full environmental impact assessment.

- The NRA will prepare Catchment Management Plans for the Northumbria & Yorkshire Region over the next two years.

5.0 SUMMARY OF PROPOSALS

ISSUES	PROPOSALS	RESPONSIBILITY	START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
SURFACE WATER ABSTRACTION						
Water Resources strategy	To develop a water resources strategy which safeguards the water environment through the following proposals:	NRA	Ongoing		Protect the water environment.	Existing NRA commitment.
	To improve demand management through leakage control etc.	NRA/YWS	To be determined		Reduce demand for water within the catchment.	
	To monitor the usage of water within the Yorkshire Water Services Ltd supply zones	NRA	1994	Ongoing	To meet the requirements set out in the Asset Management Plan.	
	To promote the conjunctive use of resources within and outside the catchment. This will be achieved by auditing river and reservoir abstractions to maximum conjunctive use of these resources.	NRA/YWS	Ongoing		Ensure optimum utilisation of water resources and reduce demand.	
Impact of Elvington & Barmby W.T.W. on the R. Derwent between Buttercrambe & Barmby Barrage.	To investigate through modelling the operational rules which could be implemented at Elvington & Barmby W.T.W. This may entail modifications to pumping patterns, an increase in bank side storage, higher Winter abstractions or higher prescribed flows within the river system.	YWS/NRA	Ongoing	1994	To improve water resource management and protect the water environment.	In-house work has started. Awaiting confirmation of YWS participation.
Low flows in the lower Derwent.	To install higher quality monitoring equipment at Barmby and Elvington W.T.W. and Barmby Tidal Barrage.	NRA/YWS	Ongoing	1995	Improve data collection.	Estimated Cost £50,000. Awaiting confirmation of YWS participation.

ISSUES	PROPOSALS	RESPONSIBILITY
	To continue ecological studies to assess the factors, including flow, affecting plant, invertebrate and fish life in the lower river.	NRA/YWS
Barmby Tidal Barrage.	To investigate the operational rules at Barmby Tidal Barrage. A multi-disciplinary approach will be taken to ensure the best utilisation of the river's water whilst ensuring the prime function of the Barrage is maintained.	NRA
Time-limited abstractions.	To review all time-limited water abstraction licences.	NRA
Protect fringe habitats	To model the impact of the flow sequence between Barmby Barrage and Buttercrambe on fringe habitats.	NRA
GROUNDWATER SUPPLY AND PROTECTION		
Future groundwater requirements.	To develop further groundwater resources to meet the projected short fall in supply within the Malton and Scarborough supply zones.	NRA/YWS
The effect of the swallow holes at West Ayton on the River Derwent.	To undertake an environmental Impact Assessment of the effect of the swallow holes.	NRA

START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
Ongoing		Provide better information and protect flora and fauna.	Existing NRA commitment. In-house work has started. Awaiting confirmation of YWS participation.
Ongoing	1995	Improve management of water environment. This will include a fish pass.	Estimated cost £50,000+
Ongoing		Improve management of water resources.	Existing NRA commitment.
1994	1995	Provide information of impact on fringe habitats.	
1994	1998	Ensure an adequate supply of water.	External consultants employed by YWS.
July 93	1995	Improve information.	External consultants employed.

ISSUES	PROPOSALS	RESPONSIBILITY	START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
	To undertake a study to alleviate the low flow problems on the River Derwent at West Ayton and protect the aquifer from pollution from the river.	NRA	1993	1995	Protect the Corallian Limestones aquifer from pollution and improve low river flows.	External consultants employed.
The effect of the swallow holes near Helmsley.	To undertake a study of the hydrogeology of the Corallian Limestone in the Helmsley area.	NRA	June 93	Jan 94	Improve information.	External consultants employed.
	To assess the effect of repairing the broken wall and/ or the sealing of the swallow holes on river flows and the discharge at Rye House Springs.	NRA	June 93	Jan 94	Reduce the problem of low river flows. Protect flora and fauna. Reduce the impact of effluent discharge from Helmsley STW by providing more dilution water.	External consultants employed.
	To assess the effect of low flows and dilution of sewage effluent on fisheries, ecology including Duncombe Park SSSI and biology in the River Rye from Duncombe Park to downstream of Rye House Springs fish farm.	NRA	June 93	Jan 94	Improve water manage-mant and protect flora and fauna.	Existing NRA commitment.
Groundwater Protection Policy	To produce Groundwater Protection Zones for the major aquifers.	NRA	1994	1995	To protect groundwater quality.	Existing NRA commitment.
Groundwater quality	To develop a groundwater quality monitoring network for the Corallian Limestone to monitor nitrate levels.	NRA	1994	Ongoing	To protect the quality of the Corallian Limestone Aquifer.	Existing NRA commitment.

ISSUES	PROPOSALS	RESPONSIBILITY
EFFLUENT DISPOSAL Effluent strategy.	To develop a strategy for effluent disposal in the catchment which recognises the special ecological value of the River Derwent and its tributaries through the following proposals:	NRA
Impact of Malton STW on the River Derwent.	To improve the quality of the discharge from Malton STW by carrying out work to improve nitrification of the final effluent.	YWS
Impact of Seamer STW on the River Hertford. Impact of Hunmanby STW on the River Hertford. Impact of Folkton STW on the River Hertford.	To improve the treatment process at Seamer STW. Initial proposals are to transfer the flows from Hunmanby to Filey Pumping Station, and Folkton to Seamer STW on completion of improvement schemes at Seamer STW.	YWS
Impact of Harome STW on Walmouth and Ellerker Beck.	Review Consent.	NRA
	Improve the treatment process at Harome STW.	YWS
Failure to achieve RQO on Eastfield Drain.	Improve surface water drainage system on the Eastfield Industrial Estate.	Industrial Estate Owners

START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
Ongoing		Protect and improve the water environment.	Existing NRA commitment
Ongoing	1994	To maintain and improve river quality and ensure compliance with the fisheries directive.	Existing NRA commitment.
1994	1996	Improve water quality to achieve RQO class 2. Compliance with the Urban Waste Water Treatment Directive.	Cost of new works to YWS.
Ongoing	1994	Improve fishery downstream. Attain RQO class 2.	Existing NRA commitment.
Ongoing	1994		Cost of works to YWS.
Ongoing	1997	Improve water quality to achieve RQO class 2.	Cost of remedial action to the estate owners.

ISSUES	PROPOSALS	RESPONSIBILITY	START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
Local effect of an industrial estate on East Drain.	Improve site drainage from the industrial estate.	Industrial Estate Owners	Ongoing		Improve water quality.	Cost of remedial action to the estate owners.
Pollution from CSOs in Hunmanby, Seamer (Eastfield), Malton (Norton) and Pickering.	Review consents.	NRA	Ongoing		Improve water quality.	Existing NRA commitment.
	Prepare Drainage Area Plans. Prioritise CSOs and take remedial action.	YWS	Ongoing			Cost of improvement works to YWS.
Village drains and sewer dykes.	To oppose development in areas with inadequate sewage disposal facilities.	NRA	Ongoing		Improve water quality.	Existing NRA commitment.
Potential pollution from industrial activities within the catchment.	To ensure correct pollution prevention measures are in place.	NRA/ Industry	Ongoing		Protect the water environment.	Existing NRA commitment.
	To encourage waste minimisation in industry.	NRA/ Industry	Ongoing		Improve water quality through cleaner technology and good house-keeping.	
Development of the gas fields.	To ensure development of the gas field does not cause pollution.	Scottish Power/ Kelt UK.	Ongoing	1995	Protect the environment.	Existing NRA commitment.
Protect & improve water quality.	Continue to investigate the causes of fair & poor biological quality & disparities in biology & chemistry classes.	NRA	Ongoing		Improve biological quality.	Existing NRA commitment.

ISSUES	PROPOSALS	RESPONSIBILITY
Impact of sewage works discharges on biological water quality.	Undertake further biological survey information to protect the environment.	NRA
Sampling and monitoring programme.	Review existing chemical monitoring programmes of effluents and controlled waters.	NRA
FISH FARMS		
Impact of fish farms on biological water quality and ecological value of the River Derwent.	Undertake biological surveys to assess the biological effect of fish farm abstractions and discharges.	NRA
	To develop a fish farm strategy which recognises the special ecological value of the River Derwent.	NRA
Build up of organic silt in the river due to fish farm discharges.	To review and require all fish farm discharge consents to provide adequate means of settlement.	NRA/Fish Farmers
Protection of natural fish populations.	To ensure that fish farming activity is maintained at a level which is compatible with the maintenance of natural fish populations.	NRA/Fish Farmers

START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
Ongoing		Provide management information to improve biological quality.	Existing NRA commitment.
Ongoing		To ensure the most appropriate distribution of sampling points and improve the consistency and statistical validity of sampling.	Existing NRA commitment.
Ongoing		Provide management information to protect the environment.	Existing NRA commitment.
Ongoing		Protect Flora and Fauna.	Existing NRA commitment.
Ongoing		Improve water quality.	Cost of new works to fish farmers.
Ongoing		Protect fisheries.	Existing NRA commitment.

ISSUES	PROPOSALS	RESPONSIBILITY	START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
LAND USE, AGRICULTURE AND FORESTRY						
Impact of agriculture on water quality, fauna and flora of the Derwent catchment.	Continue with an R&D project to consider the impact of agricultural activities on the invertebrate fauna of the headwater streams.	NRA	Ongoing		Protect valuable fauna and flora species and communities. Improve biological quality.	Part of £250,000. R&D national project on the faunal richness of headwater streams.
	To continue to use biological information to identify rivers affected by agricultural pollution. To carry out surveys to identify the farms responsible and instigate programmes of remedial action.	NRA	Ongoing		Improve water quality and protect flora and fauna.	Existing NRA commitment.
Impact of land use on water quality & flora /fauna	Undertake risk assessment studies on land use. Develop management plans & techniques eg. buffer zones.	NRA/Other Organisations /Landowners	Apr 94	Oct 94	Improve water quality & conservation value.	The NRA would seek to develop some of these techniques through 'Permanent Set Aside' funded by MAFF and the 'Countryside Stewardship Scheme' funded by Countryside Commission.
Impact of forestry on the water environment.	To collaborate with the Forestry Authority to develop appropriate forest management practices to benefit the water environment and improve conservation value. Where appropriate this should utilise the findings of NRA R&D projects.	NRA/Forestry Authority	To be determined		Improve management and enhance the water environment.	

ISSUES	PROPOSALS	RESPONSIBILITY
Impact of acidification on freshwater quality, flora and fauna.	To progress an R&D project to evaluate the mechanisms, extent & significance of freshwater acidification in the region. This will include the Derwent catchment. To identify possible remedial measures.	NRA
Use of asulam within the catchment.	To review the impact of aerial applications of asulam to control bracken on controlled waters with the aid of water quality survey work undertaken on the North York Moors in 1993.	NRA
HABITAT AND SPECIES CONSERVATION		
Protect the populations of native crayfish.	Continue to monitor their distribution. Continue to educate the public and object to developments which involve the farming or keeping of imported species of crayfish. Identify sources of alien crayfish in the catchment and discuss remedial action.	NRA
Protect other notable invertebrate species.	Target watercourses concerned for protection/ improvement.	NRA
Lack of information on the conservation value of the river Derwent catchment.	To undertake a detailed survey to establish the conservation status of the river. This will build on existing work by English Nature and the North York Moors National Park.	NRA/Other Organisations

START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
Ongoing	Sept 94	Provide management information. Improve fishery and conservation value.	Allocated budget for the R&D project is £10,000.
1993	1994	Provide management information.	Existing NRA commitment.
Ongoing		Protection of Schedule 5 species.	Existing NRA commitment.
Ongoing		Protect species of national note.	Existing NRA commitment.
Ongoing	Apr 94	Form the basis for conservation management within the catchment.	Staff time and liaison with other organisations.

ISSUES	PROPOSALS	RESPONSIBILITY
Protect the Corallian Limestone stream habitat.	To undertake a fuller study of the conservation value of the limestone streams and consider the effects of land use on habitats and water quality.	NRA/Other Organisations /North York Moors National Park.
	Utilise the conservation study and project information to develop a strategy and identify areas to be protected.	NRA/Other Organisations
Lack of information on land use, water and habitat quality and conservation value for the chalk streams.	Compile existing information & undertake studies.	NRA/Other Organisations
Impact of any changes to navigation in the river and the canal.	To review the results of an R&D project on the impact of navigation on aquatic systems & establish its relevance to any changes in navigation.	NRA
Modified watercourses.	To undertake a national R&D project to consider the techniques available for the restoration of river lengths which have been damaged by low flows, poor water quality and over engineering.	NRA
IDBs.	To make resources available to assist IDBS in carrying out their work in a more environmentally sensitive manner.	NRA/IDBs

START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
Ongoing	To be determined	Protect valued habitats, flora and fauna.	Existing NRA commitment.
Ongoing -	To be determined	Protect valued habitat flora and fauna.	
Apr 94	Oct 94	Improve water quality & conservation value.	Staff time and liaison with other organisations. May involve studentship.
1993	1994	Provide management information and protect the water environment.	Existing NRA commitment.
Ongoing	1994	Provide management information and protect the water environment.	Existing NRA commitment.
Ongoing		Protect flora and fauna, and the water environment.	NRA Staff time and implications to the IDBs.

ISSUES	PROPOSALS	RESPONSIBILITY
RIVERSIDE AMENITY, ARCHAEOLOGY AND HERITAGE		
Riverside access.	To encourage and support bringing the public rights of way network throughout the catchment in to good order by the turn of the century.	NRA/Other Organisations /L.A
	To examine the possibility of linking the Derwent Way with features of interest in the river corridor through way-marking/signing of existing public rights of way.	NRA/Other Organisations
Facilities and access for those with special needs.	To examine and improve existing facilities and access to NRA-owned land adjacent to the river for those with special needs.	NRA/Other Organisations /L.A
Improve facilities.	To investigate facilities which could be provided to users of the Trans Pennine Trail at Barmby-on-the-Marsh. This may take the form of overnight camping facilities on NRA owned land adjacent to the Tidal Barrage.	NRA/Other Organisations

START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
1993	2000	Improve riverside access.	Existing NRA commitment.
1994	Ongoing	Improve riverside access.	Advice and small financial assistance from the NRA.
1994	1995	Improve access and facilities for those with special needs.	Existing NRA commitment.
1995	1996	Improve riverside recreation facilities at Barmby-on-the-Marsh.	Existing NRA commitment.

ISSUES	PROPOSALS	RESPONSIBILITY	START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
	To collaborate with other organisations to provide suitable riverside amenity facilities whilst preserving the character of the river. This may involve provision for car parking, seating, viewing points, planting, hides, visitor points or litter disposal etc.	NRA/Other Organisations /Landowners /L.A.	1994	Ongoing	Improve riverside recreation facilities.	Advice from NRA staff and some financial assistance. Manpower and financial commitment from other organisations.
Protect archaeological and heritage sites.	To collaborate with other organisations to ensure the integrity of archaeological sites and heritage features within the catchment.	NRA/Other Organisations L.A.	Ongoing		Protect riverside archaeological and heritage sites.	NRA and L.A. recreation and conservation staff visits and advice. Small amounts of NRA funding may be available for individual projects.
FISHERIES						
Impact of river management practices on fisheries, and water ecology.	To ensure that river management practices eg. weed control, dredging and bank maintenance, do not have a detrimental effect on the fishery environment or the ability of the fish to reproduce.	NRA	Ongoing		Protect the fishery and riverside habitats.	Advice on site by NRA fisheries staff. Manpower and financial commitment from landowners, fishery interests and NRA.
Obstructions to fish passage.	To seek to provide and maintain ascent structures on all obstructions inhibiting fish movements. In particular weirs on Brompton Beck, and Scalby Beck, weirs at Kirkham Abbey, Howsham, Buttercrambe, Stamford Bridge, Sutton-on-Derwent on the River Derwent, and fish passage at Barmby Barrage.	NRA	1993	Ongoing dependent on funding.	Improve fish passage.	Investigation into requirements by NRA staff and consultants, financial commitments from NRA, owners of structures, angling interests and YWS. £10,000 has been allocated for the fish pass on barrage as part of Water Resources work.

ISSUES	PROPOSALS	RESPONSIBILITY
Ingress of fish at Elvington WTW and Barmby WTW.	Undertake a study to identify the fry migration routes and timings under different flow regimes.	NRA/YWS
Over-wintering of juvenile fish.	To protect and improve existing areas which act as over-wintering refuges for juvenile fish and investigate suitable sites for development as fish nursery and haven areas.	NRA
Fishery on the River Hertford.	To carry out a full assessment of the extent of the damage to the fishery caused by land drainage works. This will be followed by the preparation of a plan to restore the fishery.	NRA
Derwent Fishery between the River Hertford and the River Rye.	To carry out a full investigation into the feasibility of various options to help restore the fishery and its associated flora and fauna on the Derwent.	NRA
	To implements the proposals identified in the above investigation.	NRA

START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
1993	1994	This will enable entrainment and impingement losses into Elvington and Barmby abstractions to be quantified.	Investigation to be funded by YWS.
Ongoing		Provide over-wintering and nursery sites for juvenile fish.	Identification of sites and planning of improvements by NRA fisheries staff. Financial commitments, angling interests and NRA.
Subject to transfer of ownership from IDB . to NRA.		Improve the fishery and riverside habitat of the River Hertford.	Multi-disciplinary investigation into requirements. Financial commitment from the NRA.
1993	1995	Improve the fishery, flora and fauna of the River Derwent.	A multi-disciplinary investigation into the feasibility of options followed by restoration work. Financial commitment from the NRA.
1995	1998	" "	Existing NRA commitment.

ISSUES	PROPOSALS	RESPONSIBILITY	START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
ANGLING Access and facilities.	To improve access and facilities for disabled anglers and those with special needs through collaboration with angling organisations owning rights on the river.	NRA/Angling Clubs	Ongoing		To improve access and facilities for anglers with special needs.	NRA advice and staff visits if required. Small amounts of funding may be available.
	To support improvements to angling associated amenity facilities at established fisheries within the catchment. This may involve improvements to car parks, access, toilets etc. Care will be taken to ensure this does not over-popularise or stress the fishery.	Angling Clubs/NRA	Ongoing		Improve angling facilities.	" "
	To encourage angling clubs to set aside lengths of match fishery for use by non-competing individual anglers. Ideally these should be available at weekends as well as through the week.	Angling Clubs/NRA	Ongoing		Improve access for non-competing anglers.	Existing NRA commitment.
	To encourage angling clubs with reserved fishing rights on the river let exclusively for club members, to allow use by non club members on the purchase of a day ticket.	Angling Clubs/NRA	Ongoing		Improve access for non club members.	Existing NRA commitment.
Litter.	To support angling clubs in clearing litter from match fisheries and river banks where appropriate.	Angling Clubs/NRA	Ongoing as required		Maintain tidy river banks and improve the aesthetic value of the waterside environment.	NRA staff and equipment. Manpower from other organisations.

ISSUES	PROPOSALS	RESPONSIBILITY
NAVIGATION AND WATER-BASED RECREATION		
User Conflicts	To invite interested organisations and individuals to contribute to the preparation of a 'Code of Good Conduct' and supporting literature. This will concisely describe the individuals rights and responsibilities related to the Derwent. Co-ordination of comments, production and promotion of the code will be undertaken by the NRA.	NRA/Other Organisations
Derwent information line.	To examine the demand and feasibility of establishing a 'Derwent Information Line'. The information line could advise prospective users on the extent of their rights and how they may responsibly exercise them while considering other interests on the river.	NRA
Improve mooring facilities.	To support and advise on the improvement or better management of amenity facilities associated with established boat moorings on the navigation. Support will only be given where there is no overall increase in the number of moorings. Some financial assistance may be available where appropriate.	NRA

START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
1994	1995	Provide a clear interpretation of the rights of users.	NRA staff time. Cost of printing and publication.
1994 Dependent on demand.		Provide up to date information for users of the River Derwent.	Existing NRA commitment.
Ongoing		Improve mooring facilities.	NRA advice and sites visits. Some financial assistance may be available where appropriate.

ISSUES	PROPOSALS	RESPONSIBILITY
Canal abstractions.	To review the abstraction regime at Canal Head and Thornton Lock to ensure that the Pocklington Canal and its feeder watercourses Pocklington Beck and Bielby Beck are protected.	NRA\BW
Further development of the navigation.	To resist any development which may lead to increased, unsympathetic or ill-regulated activities associated with the navigation.	NRA
	The results of previous work and the outputs from the current R&D projects into the effects of navigation on wildlife will be made available to interested organisations to ensure that any proposal to restore navigation on the upper part of the Pocklington Canal does not cause ecological damage.	NRA
FLOOD ALLEVIATION AND WASHLANDS		
Improve flood defence operations	To implement a system to remotely operate flood defence structures at High Mowthorpe Weir Head, Kirkham and Stamford Bridge, utilising the Regional Telemetry System.	NRA

START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
Ongoing	1995	Protect the water environment.	Resource implications for BW.
Ongoing		Protect the water environment.	Existing NRA commitment.
Ongoing	1994	Protect flora and fauna of the upper part of the Pocklington Canal.	Implications for BW.
1993	1996	Improve protection of people and property.	Cost to the NRA C. £20,000.

ISSUES	PROPOSALS	RESPONSIBILITY
Culverting.	To ensure there is no risk of flooding, or damage caused to habitats, flora, fauna and fisheries when determining proposals to culvert, divert, alter a watercourse or change the use of the flood plain.	NRA
Improve habitats.	To investigate the current status and viability of flood banks owned by the NRA with a view to improving their management from a conservation and amenity aspect without reducing their operational performance.	NRA
Flood bank grazing.	To continue the dialogue with English Nature to confirm the management agreement for the future grazing policy on NRA owned banks.	NRA/English Nature
Assess flood defence structures.	To investigate and record the condition of flood defence assets and prepare a priority based programme of repair, renewal and maintenance including a 'do nothing' option and changes to the current methods of operation.	NRA

START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
Ongoing		Protect people and property and the water environment.	Existing NRA commitment.
1994	1998	Improve management and enhance habitats.	Cost to the NRA c. £200,000.
Ongoing		Improve management and enhance habitats.	Reduced costs to the NRA.
1993	1995	Provide information to improve managment of the water environment.	Estimated cost to the NRA £70,000.

ISSUES	PROPOSALS	RESPONSIBILITY
FLOOD WARNINGS		
Improvement of existing warning system.	To continue to refine and improve the flood warning system through incorporation of the Regional Telemetry System and the River Flow Forecasting System.	NRA
	To improve the operation of sluice gates at High Mowthorpe (Weir Head), Kirkham and Stamford Bridge.	NRA
Provision of flood warnings.	To prepare additional warnings for areas at risk.	NRA
Dissemination of warnings.	To check the Police and local authorities have procedures in place to respond to NRA warnings.	NRA
FUTURE DEVELOPMENT OF HOUSING, COMMERCE & INDUSTRY		
Development control.	To participate fully in the development control process and where necessary oppose any proposals that will damage the water environment.	NRA/Local Councils/ NYMNP/ Others.

START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
Ongoing		Protect people and property.	Cost to the NRA c. £50,000.
Ongoing		Ease of operation. Prevent bank slips due to instability when the river is drawn down by slow closure of the gate.	Cost to the NRA c. £18,000.
1993	1995	Protect people and property from flooding.	Existing NRA commitment.
Ongoing		To ensure the provision of a timely, reliable and accurate flood warning service to the public in areas at risk covered by the scheme.	Existing NRA commitment.
Ongoing		Protect all aspects of the water environment.	Existing NRA commitment.

ISSUES	PROPOSALS	RESPONSIBILITY
Strategic planning	To participate fully in the strategic planning process and provide guidance to local councils on methods of protecting the water environment through their development plans.	NRA/Local Councils/ Others.
Impact of mining & subsidence on flood protection and conservation	Investigate the likely changes caused by reduction in mining activities.	NRA
	To monitor British Coal's mining programme & promote schemes at British Coal's expense to off-set any adverse effects.	NRA
The Catchment Management Plan.	To produce the Derwent CMP following 3 months external consultation.	NRA
Monitor the plan.	To monitor and review the CMP annually.	NRA

START DATE	FINISH DATE	BENEFITS	RESOURCE IMPLICATIONS
Ongoing		Protect all aspects of the water environment.	Existing NRA commitment.
Ongoing		Maintain standard of flood defences & protect areas of conservation interest.	Existing NRA commitment.
Ongoing		" "	Costs to British Coal.
1993	1994	The final plan will define a strategy for the future management of the catchment.	Existing NRA commitment.
1995	Annual	To ensure the actions are carried out and assessed.	Additional resources are currently under consideration by the NRA.

6.0 GLOSSARY OF TERMS

Abstraction	Removal of water from surface water or groundwater, usually by pumping.
Abstraction Licence	Licence issued by the NRA under s.38 of the Water Resources Act 1991 to permit water to be abstracted.
Ammonia	A chemical found in water often as the result of discharge of sewage effluents. High levels of ammonia affect fisheries and abstractions for potable water supply.
AMP (Asset Management Plans)	For the purposes of this document Asset Management Plans can be considered as the means by which the water undertakers (e.g. Yorkshire Water Services Ltd.) plan the work required and the capital expenditure neccessary, for improvements and maintenance of the water supply, sewage treatment works and sewerage systems. These are drawn up through consultations with the NRA and other bodies to cover a five year period. The Asset Management Plans have to be agreed by the Department of the Environment and OFWAT.
Aquifer	A layer of underground porous rock which contains water and allows water to flow through it.
AOD	Above Ordnance Datum. Equivalent to mean sea level.
Area of Outstanding Natural Beauty (AONB)	Areas of Outstanding Natural Beauty are designated under the National Parks and Access to the Countryside Act 1949 by the Countryside Commission. Their primary purpose is to conserve natural beauty.
Asulam	Asulam is a herbicide used to control bracken.
Biochemical Oxygen Demand (BOD)	A measure of the amount of oxygen consumed in water usually as a result of organic pollution.
BW	British Waterways. A navigation authority.
Catchment	This refers to the total area of land which contributes surface water to a specified watercourse or water body.
CMP	Catchment Management Planning

Combined Sewer Overflow (CSO)	An overflow structure which permits a discharge from the sewerage system during wet weather conditions.
Confluence	The point at which two rivers meet.
Controlled Waste	Defined by Control of Pollution Act 1974, Part I Section 30. It includes household, industrial and commercial waste.
Controlled Waters	Defined by the Water Resources Act 1991 Part III Section 104. They include groundwaters, inland waters and estuaries.
C.O.P.A.	Control of Pollution Act 1974
Cumecs	Cubic metres per second
Culvert	For the purposes of this document a culvert is an enclosed watercourse.
Dangerous Substances	Substances defined by the European Commission as in need of special control because of their toxicity, bioaccumulation and persistence. The substances are classified as List I or List II according to the Dangerous Substances Directive.
Diffuse Pollution	Pollution from widespread activities with no one discrete source.
Discharge Consent	A statutory document issued by NRA under Schedule 10 of the Water Resources Act 1991 to indicate any limits and conditions on the discharge of an effluent to a controlled water.
Dissolved Oxygen	The amount of oxygen dissolved in water. Oxygen is vital for life so this measurement is an important, but highly variable, indicator of the 'health' of a water. It is used to classify waters.
DoE.	Department of the Environment.
Drift Deposits	Term used to include all unconsolidated superficial deposits (eg fluvial, glacial, alluvial etc.) overlying solid rock.
DWF	Dry Weather Flow
Environmental Prescribed Flow	That flow which should not be artifically reduced if the riverine environment is to be protected.

Environmental Quality Standard (EQS)	The quantity of a substance found in a body of water which should not be exceeded in order to protect a given use of the water body. An EQS is set by the European Community through EC Directives and the government.
Evapotranspiration	The loss of moisture from the Earth's surface by means of direct evaporation together with transpiration from vegetation. (Transpiration - the process by which plants lose water vapour through the stomata (pores) on their leaves, thereby extracting soil moisture and returning it to the atmosphere.) Potential Evapotranspiration - assumes an unrestricted supply of water to the Earth's surface and refers to thetheoretical maximum loss of moisture. Actual Evapotranspiration - is the observed or true loss of moisture.
Fissure Flow	Groundwaters flow through an aquifer by a combination of fissure flow through the cracks in the rocks and intergranular flow through the pore spaces of the rock matrix.
Flood Plain	This includes all land adjacent to a watercourse over which water flows or would flow but for flood defences in times of flood.
Headwater	Streams close to their source (in the context of the R&D project defined as being either first or second order, within 2.5 kilometres of the stream source or with a mean annual flow of no more than 0.31 cumecs)
House Equivalents (HE)	The average cost of damage to the average house when flooded.
hp	Horse power
IDB	Internal Drainage Board. An organisation with powers to carry out flood defence works independently of the NRA.
Impounding Reservoir	A manmade water-retaining structure.
Intergranular Flow	See Fissure Flow

Karstic Flow	Karstic topography is characterised by swallow holes, caverns and disappearing streams generally on limestone. Karstic flow is the passage of water through these rock features to reappear downstream or percolate through to the aquifer.
L.A	Local authority
L.P.A.	Local planning authority
Leachate	Liquor formed by the process of leaching.
Leaching	Removal of soluble substances by action of water percolating through soil, waste or rock.
M.A.F.F.	Ministry of Agriculture, Fisheries and Food
Main River	Some but not all, watercourses are designated as 'Main River'. 'Main River' status of a watercourse must first be approved by MAFF. Statutory (legally binding) maps showing the exact length of 'Main River' are held by MAFF in London and the NRA in Regional Offices. The NRA has the power to carry out works to improve drainage or protect land and property against flooding on watercourses designated as 'Main River'. The NRA does not have the legal power to spend public funds on drainage or flood protection works on watercourses not designated as 'Main River'.
mg/l	Milligrammes per litre
National Nature Reserve (NNR)	National Nature Reserves are designated by English Nature under Section 35 of the Wildlife and Countryside Act 1981. They are managed by or on behalf of English Nature specifically for wildlife conservation purposes.
NRA	National Rivers Authority
NWC	National Water Council
NYMNP	North York Moors National Park
OFWAT	Office of Water Trading

Potable Water	Water of suitable quality for drinking.
Public Surface Water Sewer (SWS)	Sewers which transmit surface water run-off to a watercourse. The water should be uncontaminated and is the responsibility of the sewerage undertaker (in this case Yorkshire Water Services Ltd.) to maintain and control.
Ramsar Sites	Internationally important wetland sites adopted from the Convention on Wetlands of International importance especially as water fowl habitats (1971) and ratified by the U.K. government in 1976.
Recharge	Water which percolates downward from the surface into groundwater.
Residual Flow	The flow remaining in the watercourse after abstractions have taken place.
Return Period	Refers to the return period of a flood. Flood events are described in terms of the frequency at which, on average a certain severity of flood is exceeded. This frequency is usually expressed as a return period in years, eg. 1 in 50 years.
RFFS	Regional Flow Forecasting System
Riparian Owner	A person/ organisation with property rights on a river bank.
River Corridor	Land which has visual, physical or ecological links to a watercourse and which is dependent on the quality or level of the water within the channel.
River Quality Objective (RQO)	The level of water quality that a river should achieve in order to be suitable for its agreed uses.
RSPB	Royal Society for the Protection of Birds.
RTS	Regional Telemetry System. The Regional Telemetry System allows up-to-the-minute information to be gathered by computers at an NRA office from outstations within the catchment. These outstations monitor river water level, flow and quality.

Septic Tank	A small tank receiving and treating sewage by bacteria where effluent overflows.
Sewer Dyke	Open ditches used to transmit the contents of septic tanks to a watercourse.
Silage	A winter feed for cattle. Silage is produced in the summer by bacterial action on freshly cut grass and is stored in a clamp or silo. Silage production results in the formation of a highly polluting effluent.
Site of Special Scientific Interest (SSSI)	A site given a statutory designation by English Nature or the Countryside Council for Wales because it is particularly important, on account of its conservation value.
Sludge	The accumulation of solids from the sewage treatment process. Sludge is usually incinerated or spread on farm land.
Slurry	Animal waste in liquid form. Slurry is usually collected and stored in tanks or lagoons and is spread on farm land at a later date.
SPA	Special Protection Areas are internationally important sites designated under the EEC Wild Birds Directive.
Springs	Natural emergence of groundwater at the surface.
STW	Sewage Treatment Works.
SWQOs - Statutory Water Quality Objectives	Water quality objectives set by the Secretary of State for the Environment, in relation to controlled waters.
Strata	Layers of rock, including unconsolidated materials such as sands and gravel.
Sustainable (development)	Capable of being maintained at a steady level without exhausting natural resources or causing ecological damage.
TCMD	Thousand cubic metres per day. equivalent to mega litres per day (Mld)

Tideway	The tidal section of a watercourse where the river banks are exposed between high and low tides.
Trade Effluent	Effluent derived from a commercial process/premises.
Washlands	The area of the flood plain where water is stored in times of flood. Structures can be added to control the amount of water stored in the washland and time its release to alleviate peak flood flows in areas downstream.
WRA	Waste Regulation Authority
WTW	Water Treatment Works
YWS	Yorkshire Water Services Ltd.

7.0 APPENDIX

NRA PLANNING POLICIES

The following NRA policies are put forward to be adopted by Councils for inclusion in Unitary Development Plans, District Plans and Local Plans.

Fisheries, Recreation and Conservation.

The Council will resist culverting which is likely to have an adverseeffect on nature conservation, landscape and recreation.

The Council will encourage the re-opening of culverts and support initiatives which seek to enhance the natural elements of the watercourses.

The Council will use all its available powers and influence to protect and enhance the river corridor.

The Council will use all its available powers and influence to protect still waters and wetlands. The creation of new ponds and wetlands will be encouraged.

Environmental Biology

The Council will resist any form of culverting or alteration to a water channel which could adversely affect the aquatic flora and fauna.

The Council will encourage the reopening of closed culverts and the reinstatement of natural river bed profiles in areas of concrete or brick lined open culverts, to recreate natural habitat diversity for the establishment of an aquatic flora and fauna.

The Council will use its powers to prevent pollution of and improve the quality of all water bodies within its boundaries.

Flood Defence

Developments will not be permitted in designated washlands except where:

1. The proposed development would not significantly affect the function of the washland; and

2. There would be no serious risk to the development from flood debris or pollution.

The Council will adopt the procedures in circular 30/92 and resist new development in the river corridor except where:

1. There is no detrimental effect on the watercourse;

2. There would be no serious risk of flooding to the proposed or existing properties.

Pollution Control

The Council will use all its available powers and influence to prevent pollution of and improve the quality of all watercourses within its boundaries to the highest achievable standard, and support the NRA in order to:

1. Improve watercourses in their area to the currently published NWC classification objectives;

2. Maintain the existing quality of all other existing watercourses and achieve improvements where possible;

3. Ensure compliance with future SWQOs.

Water Resources

The Council will have regard to the NRA Groundwater Protection Policy.

Developments will not be permitted which, in the opinion of the Council, after consultation with the NRA, pose an unacceptable risk to the quality of groundwater.

Minerals

The Council will resist proposals for new mineral extraction where, after consultation with the NRA, it considers that there would be adverse effects on groundwater, rivers, other water bodies or natural habitats.

The Council will generally support initiatives, including site restoration proposals, which result in benefits relating to the water environment, and improvements in the standard of flood protection.

Waste Disposal

The Council will resist proposals for waste disposal where, after consultation with the NRA it considers that there would be adverse effects on groundwater, rivers, other water bodies or natural habitats.

Disposal of waste within the floodplain will be restricted to inert waste only. Elsewhere the disposal of waste will not be permitted where it is likely to lead to the pollution of ground- or surface-water. There will be a presumption against waste disposal which results in a raising of ground levels within the floodplain.