

DERWENT AND CUMBRIA COAST CATCHMENT MANAGEMENT PLAN CONSULTATION REPORT



NRA

*National Rivers Authority
North West Region
October 1994*

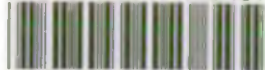
National Rivers Authority

Guildbourne House
Worthing

Please return this book on or before last date shown below.
Renewals can be obtained by contacting the library.

| | |
|--|--|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

ENVIRONMENT AGENCY



068637

THE N.R.A.'S VISION FOR THE DERWENT AND CUMBRIA COAST

Much of the catchment lies within the Lake District National Park where water is a vital part of this nationally important landscape. The area has a rich heritage and has historically attracted artists and poets. Today The Lakes draw in large numbers of tourists who together with local communities enjoy its exceptional qualities.

The waters of the catchment support an important ecology including significant fisheries for salmon and sea trout. The river Derwent is one of the premier salmon rivers in the country. Consequently the health of the catchments' waters is critical in maintaining the quality of the environment in this area and in supporting the local community and its economic well-being. The plentiful supply of clear water is an important resource for industry and drinking water supplies both on and off the catchment.

The N.R.A. will seek to work with all appropriate parties to maintain that which is already excellent and seek to achieve and maintain improvements where necessary.

Key objectives will be:-

- Prevent enrichment of the catchments lakes and rivers.
- Ensure coastal sewage discharges are improved to minimise aesthetic problems, reduce pollution, and comply with requirements of the E.C.
- Ensure sewerage systems and sewage treatment works in this predominantly rural area do not become overloaded.
- Protect the populations of rare fish (char and vendace) in the catchment.
- To gather high quality data on fish stocks and habitat and produce a fisheries management plan drawing together all parties on the catchment.
- Ensure abstractions of water are in balance with ecological needs of rivers, and where flows do not meet reasonable expectations seek sustainable solutions.
- Implement an emergency plan to protect Bassenthwaite Lake from any polluting spillages on the A66.
- Integrate flood defence works at Cockermouth with conservation and recreation initiatives.
- Encourage natural migration of otters onto the catchment as the ultimate sign of a healthy water environment.

The N.R.A. wishes to draw in the local community and other interested organisations and use this catchment plan as a stimulus to promote discussion about the future management of the catchments water environment.

We will work with all appropriate parties to achieve this vision and a naturally sustainable system of rivers at their full environmental potential.

DERWENT AND CUMBRIA COAST CATCHMENT MANAGEMENT PLAN

THE N.R.A.'S VISION FOR THE CATCHMENT

CONTENTS

| | <u>Page</u> |
|---|-------------|
| 1.0 CATCHMENT MANAGEMENT PLANS - CONCEPT AND PROCESS | 1 |
| 2.0 OVERVIEW OF DERWENT AND CUMBRIA COAST CATCHMENT | 4 |
| 2.1 General Description | 4 |
| 2.2 Geology and Hydrogeology | 5 |
| 3.0 CATCHMENT USES AND ACTIVITIES | 7 |
| 3.1 Sewage Effluent Disposal | 7 |
| 3.2 Industrial Effluent Disposal | 10 |
| 3.3 Fisheries | 12 |
| 3.4 Flooding and Flood Alleviation | 15 |
| 3.5 Licensed Water Abstractions | 19 |
| 3.6 Conservation - Ecology | 22 |
| 3.7 Conservation Landscape and Heritage | 25 |
| 3.8 Water Based Recreation and Amenity | 27 |
| 3.9 Development | 31 |
| 3.10 Agriculture | 33 |
| 3.11 Solid Waste Disposal | 35 |
| 3.12 Mining and Quarrying | 37 |
| 3.13 Forestry | 42 |
| 4.0 CATCHMENT OBJECTIVES | 43 |
| 4.1 Water Quantity | 43 |
| 4.2 Water Quality | 44 |
| 4.3 Physical Features | 50 |
| 5.0 CURRENT STATE OF THE CATCHMENT | 53 |
| 5.1 Water Quantity | 53 |
| 5.2 Water Quality | 55 |
| 5.3 Physical Features | 56 |

| | <u>Page</u> |
|---|-------------|
| 6.0 DESCRIPTION OF CATCHMENT ISSUES AND OPTIONS | 57 |
| 6.1 Introduction | 57 |
| 6.2 Catchment Wide Issues | 59 |
| 6.2.1 Water Quality Issues | 59 |
| a) Pollution by Farm Drainage | |
| b) Acid Stress in the Upper Tributaries of Some Rivers | |
| c) Lack of Rural Sewerage Systems | |
| d) Lack of Sewage Treatment Along the Cumbria Coast | |
| e) Impact of Combined Sewer Overflows | |
| f) Pollution Caused by Contaminated Surface Water Outfalls | |
| g) Development in Areas Where Sewers and/or Sewage Treatment Works are at or Near Design Capacity | |
| h) Impact of Opencast Coal Mining | |
| 6.2.2 Fisheries Issues | 65 |
| a) Fish Stocks Status and Management | |
| b) Problems with Degraded Fish Habitat and Lack of Comprehensive Information on Habitat Quality | |
| c) Impact of Gravel Extraction and Disposal on Fisheries and Conservation Interests | |
| d) Illegal Exploitation of Salmonids in Inland and Coastal Waters | |
| 6.2.3 Flood Defence Issues | 69 |
| a) Properties at Risk from Flooding | |
| 6.2.4 Conservation Issues | 70 |
| a) Incomplete Conservation Survey Information | |
| b) River Corridor Habitat Enhancement | |

| | <u>Page</u> |
|--|-------------|
| 6.3 Site Specific Issues | 71 |
| 6.3.1 Water Quality Issues | 71 |
| a) <i>Pollution from Oatlands Deep Mine Spoil Heap</i> | |
| b) <i>NIREX Project - Potential Threats to Water Quality</i> | |
| c) <i>Impact of Cleator Sewage Treatment Works</i> | |
| d) <i>Eutrophication and Algal Blooms in Bassenthwaite Lake and Loweswater</i> | |
| e) <i>Vulnerability of Bassenthwaite Lake to Spillages on the A66 Trunk Road</i> | |
| f) <i>Mine Drainage Pollution in Great Clifton Surface Water Drain</i> | |
| g) <i>Impact of Broughton Moor STW</i> | |
| 6.3.2 Fisheries Issues | 75 |
| a) <i>Canalisation of the Lower Calder</i> | |
| b) <i>Impact of Yearl Abstraction on River Flows and Migrating Salmonids</i> | |
| c) <i>Potential Impact of the Recent Introduction of Coarse Fish on the Vendace Population in Bassenthwaite Lake</i> | |
| d) <i>Restocking of the River Ellen with Salmonids Following Recent Pollution and Severe Fish Mortality</i> | |
| 6.3.3 Water Resources Issues | 77 |
| a) <i>Flood Risk and Low Flow Problems Caused by Eskdale Green Mill Pond</i> | |
| b) <i>Complaints of Low Flows in the River Irt Below Wastwater</i> | |
| c) <i>Impact on the River Derwent by Augmentation from Thirlmere</i> | |

| | <u>Page</u> |
|---|-------------|
| 6.3.4 Flood Defence Issues | 79 |
| a) <i>Perceived Loss of Agricultural Land to Waterlogging on the Low Lying Land Between Bassenthwaite Lake and Derwentwater</i> | |
| b) <i>Dumping of Supermarket Trolleys in the River Derwent at Workington</i> | |
| c) <i>Pressure on the N.R.A. to Deepen and Divert the River Annas as it Outfalls to the Sea</i> | |
| d) <i>Long Term Future of the Cumbria Coastal Rail Line as a Sea Defence Barrier</i> | |
| e) <i>Gravelling up of Coastal Outfalls in Allonby Bay</i> | |
| f) <i>Development Control and Land Drainage Consent Enforcement on Pow Beck, Whitehaven</i> | |
| g) <i>Flood risk at Cockermouth</i> | |
| h) <i>Flood Risk at Maryport Harbour</i> | |
| i) <i>Flood Risk at Braystones on the River Ehen</i> | |
| J) <i>Risk of Tidal Flooding at Parton</i> | |
| K) <i>Risk of Tidal Flooding at Ravenglass</i> | |
| 6.3.5 Conservation Issues | 84 |
| a) <i>Unknown Status of the Nationally Rare Freshwater Pearl Mussel</i> | |
| b) <i>The Return of Otter to the Catchment</i> | |
| 7.0 SUMMARY OF ISSUES AND OPTIONS FOR ACTION | 85 |
| APPENDICES | 131 |
| GLOSSARY OF TERMS AND ABBREVIATIONS | 147 |

LIST OF MAPS AND APPENDICES

Facing Page No's

| | | |
|---------------|---|-----------|
| MAP 1 | <i>Plan area boundary, river network, lakes and main towns</i> | 4 |
| MAP 2 | <i>Standard Annual Average Rainfall</i> | 4 |
| MAP 3 | <i>Simplified Geology</i> | 6 |
| MAP 4 | <i>Sewage Effluent Discharges</i> | 7 |
| MAP 5 | <i>Industrial Effluent Discharges</i> | 10 |
| MAP 6 | <i>Fisheries Information</i> | 12 |
| MAP 7 | <i>Flooding and Flood Defence</i> | 15 |
| MAP 8 | <i>Surface and Groundwater Abstractions</i> | 19 |
| MAP 9 | <i>Conservation - Ecology</i> | 22 |
| MAP 10 | <i>Conservation - Landscape and Heritage</i> | 25 |
| MAP 11 | <i>Recreation</i> | 27 |
| MAP 12 | <i>Solid Waste Disposal Sites</i> | 35 |
| MAP 13 | <i>Active Mines and Quarries</i> | 37 |
| MAP 14 | <i>Water Quality Objectives</i> | 45 |
| MAP 15 | <i>Water Quality - Derogations and Failures to Meet Objectives</i> | 46 |
| MAP 16 | <i>Current Water Quality</i> | 55 |
| MAP 17 | <i>Site Specific Issues</i> | 71 |

Page No

| | | |
|-------------------|---|------------|
| APPENDIX 1 | <i>Fish catch returns of the various rivers and commercial fishery</i> | 133 |
| APPENDIX 2 | <i>Farm pollution incidents 1988 - 1993</i> | 142 |
| APPENDIX 3 | <i>List of contaminated surface waters</i> | 145 |

1. CATCHMENT MANAGEMENT PLANS - CONCEPT AND PROCESS

1.1 The National Rivers Authority (N.R.A.) is the principal agency responsible for safeguarding and improving the water environment in England and Wales. It has statutory responsibilities for water resources, water quality and pollution control, flood defences, fisheries, recreation, conservation and navigation.

1.2 THE PURPOSE OF CATCHMENT MANAGEMENT

Catchment Management Planning (C.M.P.) is a procedure designed to create a consistent framework within which the various responsibilities of the N.R.A. can be applied within a catchment in a co-ordinated manner.

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

The preparation of Catchment Management Plans involves:

- Identification of physical attributes.
- Integration of the objectives of all N.R.A. functions within the Catchment.
- Identification of issues and cost effective options for addressing them.
- Consultation on the uses, targets, issues and options.
- A phased programme for implementation of the programme.
- Monitoring and reviewing the Plan on a regular basis.

1.3 WHAT IS A CATCHMENT?

A catchment is a discrete geographical unit with boundaries derived primarily from surface water considerations so that it combines linked aquatic and terrestrial system. The catchment should include the appropriate inland river system, associated groundwater (treated on the basis of input to or export from the surface catchment) and coastal waters. The size of a catchment should be sufficient to allow adequately for the impact of one use upon another.

The number of catchments in England and Wales requiring individual C.M.P.'s is in the order of 180.

1.4 FORM OF C.M.P. CONSULTATION REPORT

Two levels of report have been produced:

- Level 1** Summary for wide circulation to the general public. This consists of around 20 pages summarising in plain language the Plan in relation to uses and issues within the catchment.
- Level 2** The Catchment Management Plan Consultation Report (this document) for use by Consultees, N.R.A. staff, and N.R.A. Regional Committees. This summarises existing uses, identifies problems, explores conflicts and makes proposals for actions.

1.5 CONSULTATION

The primary need for liaison and consultation during the preparation of the C.M.P. is to endeavour to obtain consensus both internally and externally, to resolve conflicts of use fairly in a public forum and to obtain commitment for action. The N.R.A. wishes to consult all those organisations which are affected by the plans. Consultees cover a wide range, including planning authorities, conservation bodies, persons with fisheries and recreation interests, navigation authorities, water and sewerage undertakers, industry, agriculture, riparian owners, persons with land interests and local people.

Following the consultation process which ends on 20th January 1995 the N.R.A. will draw up a final plan by Spring 1995 concentrating on the issues and action for dealing with them. To comment on this consultation report write to:-

Mike Harrison,
Area Catchment Planning Officer,
National Rivers Authority,
Chertsey Hill,
London Road,
Carlisle, CA1 2QX.

In drawing up the final action plan C.M.P., the N.R.A. will endeavour to accommodate the reasonable requirements of all the parties concerned, having due regard to the relative importance of the issues and uses involved. Inevitably difficult decisions will have to be made but what is important is that the final plan is a consensus, seen as:

"An agreed strategy for realising the environmental potential of a catchment within prevailing economic and political constraints".

1.6 THE BENEFITS OF C.M.P.

Internally, C.M.P.'s will enable the N.R.A. to

- manage catchments pro-actively rather than reactively;
- secure and prioritise future resources;

Externally, C.M.P.'s will

- provide a means of communicating the N.R.A. vision and of obtaining commitment;
- ensure that the N.R.A. takes account of the actions of others;
- influence decision making;
- achieve improvements in the water environment;
- ensure that future programmes for action by the N.R.A. and others are defined, targeted, and costed.

2. CATCHMENT OVERVIEW

2.1 GENERAL DESCRIPTION

The catchment management plan area includes the rivers Annas, Mite, Esk, Irt, Ehen, Calder, Derwent and Ellen and all their tributaries as well as associated coastal waters (see map 1) and comprises 1575km².

The catchment contains 8 of the major Lake District lakes:- Bassenthwaite, Derwentwater, Loweswater, Crummock Water, Buttermere, Ennerdale, Wastwater and Thirlmere Reservoir.

All the rivers run for at least part of their length within the Lake District National Park, and form a vital element within this nationally important landscape.

All the major rivers rise on the high lakeland fells, with the River Esk and Lingmell Beck (a tributary of the River Irt) rising on Scafell Pike, England's highest mountain at 977m A.O.D. As a result hydraulic gradients are steep.

Rainfall is generally high, although it varies widely from the coast up to the high peaks (see map 2). For example in 1991 the rainfall at Styhead Tarn at the top of Borrowdale Valley was 4579mm whereas at Sunderland near Cockermouth it was 1061mm.

The catchment is largely rural with agriculture being the dominant land use and industry.

The bulk of the population is concentrated towards the coastal fringe with the biggest settlements being Whitehaven (population 26,136), Workington (25,000) and Maryport (10,000) other sizeable settlements include Egremont (7,788), Cleator Moor (7,275), Cockermouth (7,100) and Keswick (4,836).

The number of residents can increase dramatically in the Summer months because of the importance of tourism within the catchment, especially around Keswick.

**Derwent and Cumbria Coast
Catchment Management Plan**

Map 1

October 1994



NRA

*National Rivers Authority
North West Region*



Catchment Management Plan

KEY

- Catchment boundary
- Watercourse

Derwent and Cumbria Coast Catchment Management Plan

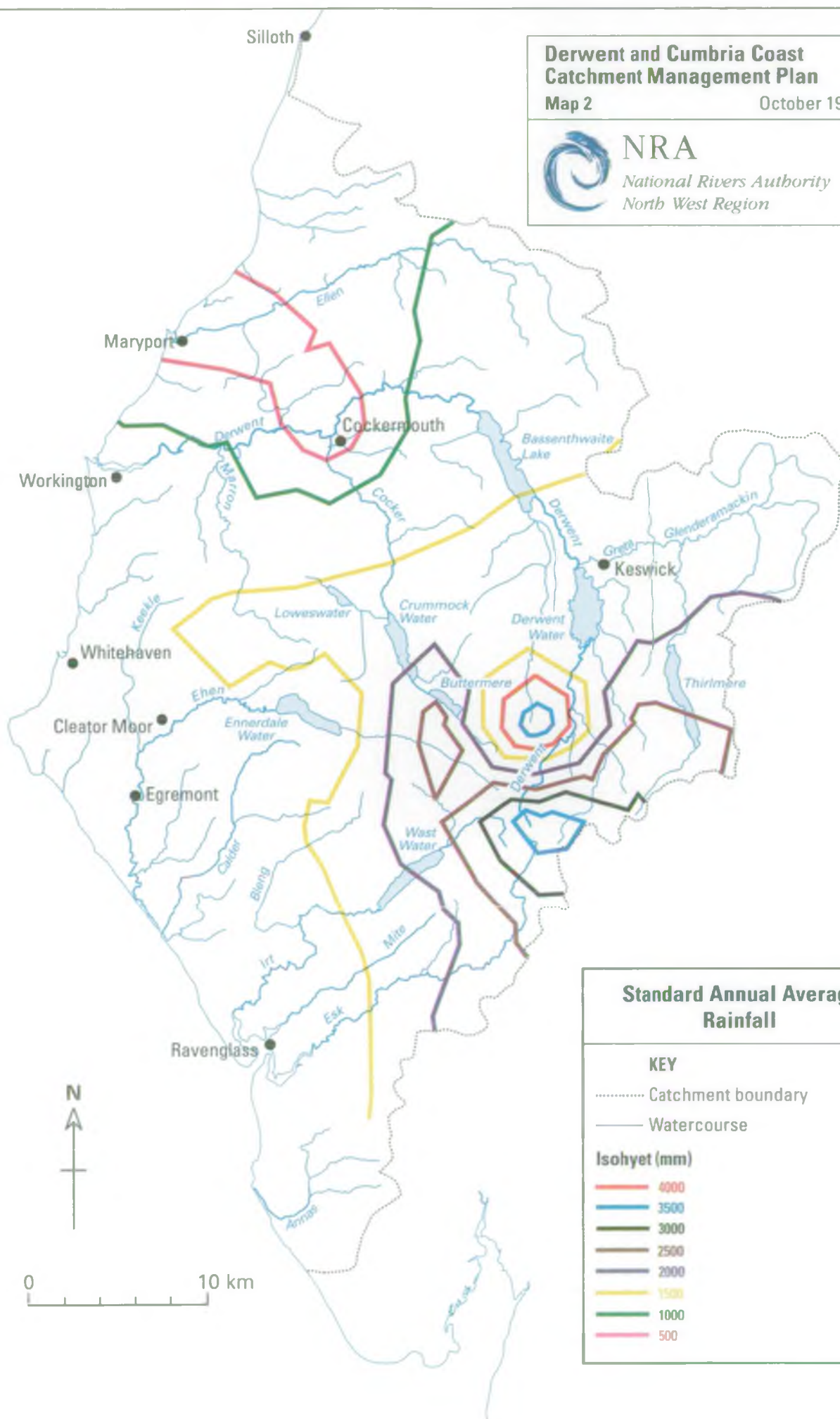
Map 2

October 1994



NRA

National Rivers Authority
North West Region



Standard Annual Average Rainfall

KEY

- Catchment boundary
- Watercourse

Isohyet (mm)

- 4000
- 3500
- 3000
- 2500
- 2000
- 1500
- 1000
- 500

2.2 GEOLOGY AND HYDROGEOLOGY

The catchment encompasses rocks of diverse age and type (see Map 3). In general terms, the rocks become younger with glacial drift cover increasing in thickness towards the coast.

The rivers Derwent, Cocker, Ehen, Calder, Irt and Esk all rise on strata of Ordovician age which form the core of the Lake District dome. These comprise slaty rocks to the north and volcanic deposits to the south, which have been intruded by granitic rocks in the Ennerdale and Eskdale areas. These pre-Carboniferous basement beds are generally hard, resistant to erosion and structurally tend to be intensely folded and faulted. In hydrogeological terms they may be considered to be effectively impermeable, except for some limited groundwater storage and movement in shallow fractures/weathered zones. Although classed as **non-aquifer**, they may be capable of supporting small scale private water supplies (springs).

These Ordovician strata are flanked by rocks of Carboniferous age to the north and Permo-Triassic age to the south of Egremont.

A narrow outcrop of Carboniferous Limestone Series extends from Egremont North and eastwards past Cockermouth. This outcrop is highly disturbed by faulting which in the area between Egremont and Frizington is frequently associated with the development of iron ore. Former mines and quarries, which are quite extensive within the limestones have a dominant effect on groundwater storage and flow in these rocks. Flow can be rapid and complex as a result, with groundwater providing significant contributions to rivers and tributaries. The limestones may be considered as **minor aquifer**. They are overlain by a narrow tract of younger Namurian (Millstone Grit Series) limestones, sandstones and mudstones. Although the sandstones and limestones may act as **minor aquifers**, they have been broken up into isolated units by faulting.

These in turn are overlain by a sequence of alternating shales/mudstones, siltstones, sandstones and coals of Westphalian age (Carboniferous Coal Measures), which occupy a broad block extending from Whitehaven to Maryport and then eastwards beyond Aspatria. Again, although the sandstone units will act as **minor aquifers**, these are separated by the lower permeability shales and mudstones. However, the extensive winning of coal by both underground and more recently by open cast methods will have completely altered the natural hydrogeology of the area. Groundwaters typically associated with the Coal Measures tend to be relatively high in iron and sulphate/sulphides.

The lower stretches of the Ehen, Calder, Irt and Esk cross onto the red Permian-Triassic sandstones which form a coastal strip (seen at St. Bees Head), extending southwards past Seascales down to Haverigg. The St. Bees Sandstone (which is part of the Sherwood Sandstone sequence) forms a **major aquifer** which is capable of yielding large quantities of high quality groundwater. It supports significant industrial abstraction in the Seascale area and also provides base flow to both the Calder and Ehen over certain stretches.

The Sherwood Sandstone also occurs to the north of Maryport and Aspatria, where it forms the western limit of the Carlisle Basin. Here they are overlain to the north by low permeability Mercia Mudstones. With the exception of the pre-Carboniferous uplands, where drift cover is limited to peat and alluvium, the majority of the catchment is covered by drift. This comprises predominantly glacial till (boulder clay), but may include relatively extensive pockets of sands and gravels which may support small scale abstractions in their own right, and also contribute to surface water base flows. As such, they would constitute **minor aquifers**.

Low permeability drift deposits are locally important in terms of providing protection to the deeper aquifers and can also effectively isolate them from some of the rivers and their tributaries.

Derwent and Cumbria Coast Catchment Management Plan

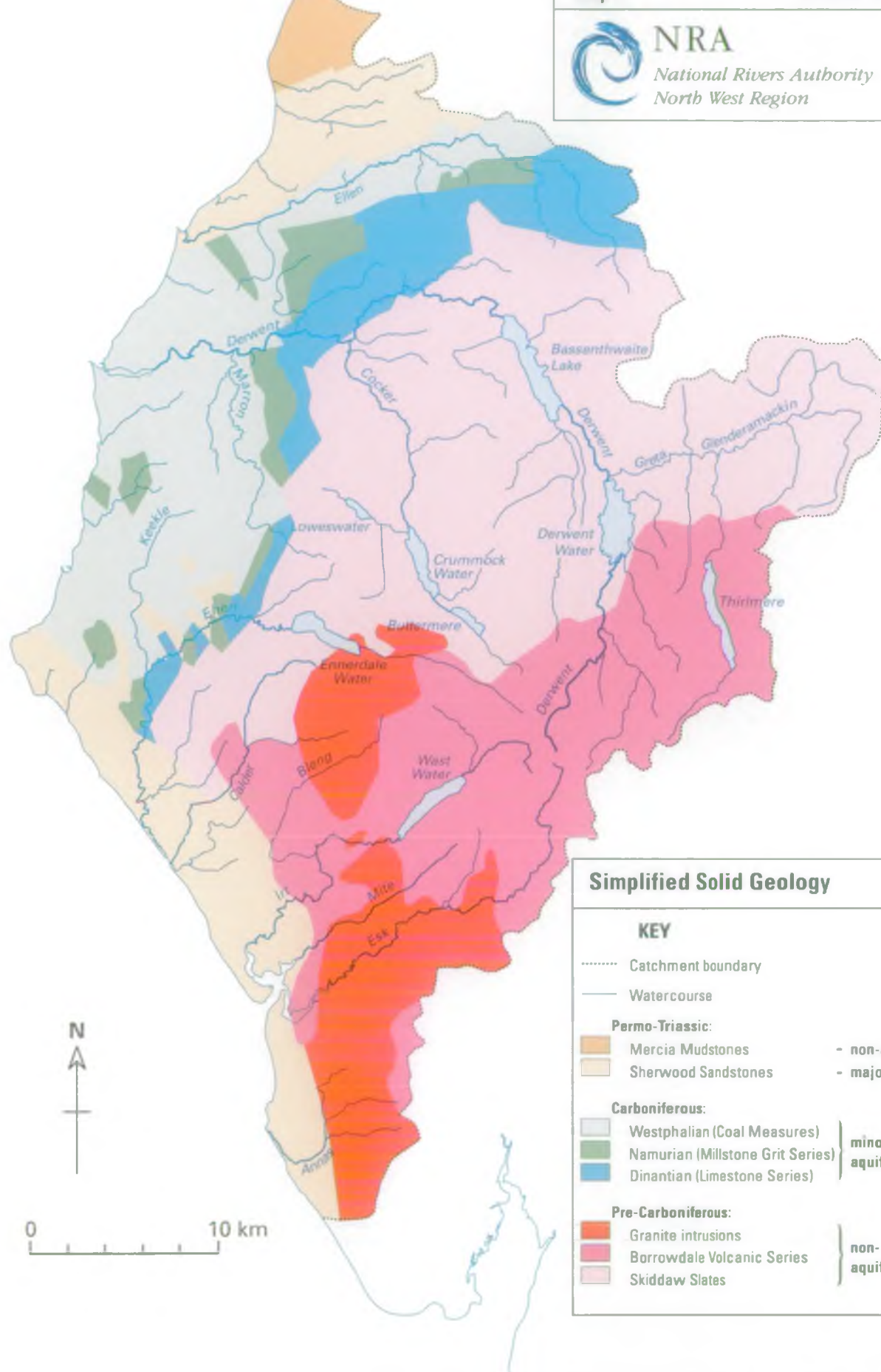
Map 3

October 1994



NRA

National Rivers Authority
North West Region



Simplified Solid Geology

KEY

..... Catchment boundary

— Watercourse

Permo-Triassic:

Mercia Mudstones
Sherwood Sandstones

- non-aquifer
- major aquifer

Carboniferous:

Westphalian (Coal Measures)
Namurian (Millstone Grit Series)
Dinantian (Limestone Series)

} minor
aquifer

Pre-Carboniferous:

Granite intrusions
Borrowdale Volcanic Series
Skiddaw Slates

} non-
aquifer

**Derwent and Cumbria Coast
Catchment Management Plan**

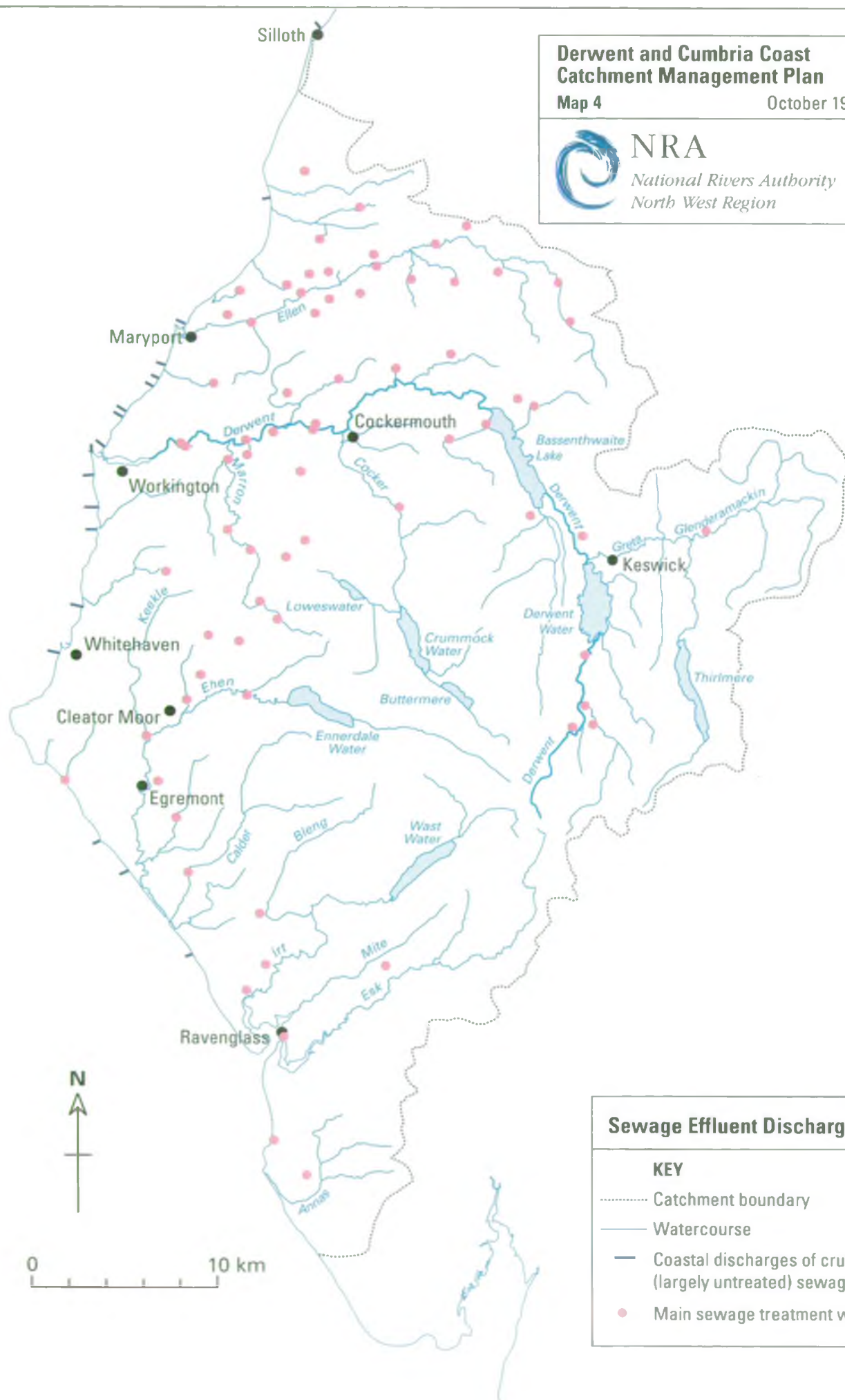
Map 4

October 1994



NRA

*National Rivers Authority
North West Region*



Sewage Effluent Discharges

KEY

- Catchment boundary
- Watercourse
- Coastal discharges of crude (largely untreated) sewage
- Main sewage treatment works

3. CATCHMENT USES AND ACTIVITIES

3.1 SEWAGE EFFLUENT DISPOSAL

3.1.1 General

Discharges of sewage effluent to controlled waters are illegal unless they take place with the formal written Consent of the N.R.A. acquired prior to the commencement of the discharge.

In determining Consent applications the N.R.A. may set appropriate conditions to protect other uses of the receiving water.

Water company expenditure during the period 1995 - 2000 has been structured around an "Index of Obligations" jointly agreed by D.o.E., N.R.A., W.S.A. and O.F.W.A.T.

Priority has been given to meeting existing and new E.C. and domestic statutory obligations, principally Directives concerned with Bathing Water, Urban Waste Water Treatment and Freshwater Fish. Within the ten year period to 2005 the programme for dealing with associated combined sewer overflow problems has been set to remove 50% of known problems at a cost of £450 million in the North West. In addition some separately justified sewage treatment schemes (known collectively as the National Environment Programme or N.E.P.) have been allowed. The N.E.P. relates only to the five year period to 2000 and includes a sum of £130 million in the North West.

The targeting of the majority of water company expenditure is therefore dictated by Nationally agreed obligations and priorities. Local discussion between the N.R.A. and N.W.W. to determine which projects should be included within the N.E.P. and also to agree the order in which C.S.O. problems should be tackled are well advanced.

3.1.2 Local Perspective

All major sewage treatment facilities and coastal discharges are shown on map 4.

North West Water (N.W.W.) sewage discharges in the catchment fall into 3 broad categories:-

Inland sewage treatment works;
coastal (largely crude) discharge;
and combined sewer overflows.

Inland Sewage Treatment Works

Most N.W.W. inland sewage works do not make significant impacts on their receiving watercourse. There are three notable exceptions to this, the first is Keswick S.T.W. where agreement has been reached with N.W.W. to improve effluent quality and afford protection to Bassenthwaite Lake which is suffering from enrichment. The second is Cleator S.T.W. where the need for works extension has been highlighted to the Company. In addition Broughton Moor STW causes problems when there are low Summer flows in the receiving water.

Some of the smaller rural works are at or near their treatment capacity and significant development leading to extra loading on these works without commensurate improvements in treatment capacity would be of concern to the N.R.A.

N.W.W. has a strategy of abandoning some smaller rural works and directing flows to larger works. Where it can be demonstrated that this will lead to overall benefits to the water environment the N.R.A. will be supportive.

Coastal Discharges

Coastal discharges are largely of crude sewage and drain the large and small coastal settlements where the bulk of the population in the catchment area live.

A number of these discharges cause local bathing waters to fail the E.C. Bathing Water Directive, but investment by N.W.W. to improve treatment at these locations is intended to ensure compliance with the directive by the 1996 bathing season. The offending discharges are at St. Bees, Allonby, Silloth, Skinburness, Maryport and Seascale.

The remaining coastal discharges are at Braystones, Whitehaven, Lillyhall and Workington. These discharges do not cause breaches of the E.C. bathing water directive, but will need improvements under the provisions of the E.C. Urban Wastewater Treatment Directive.

Combined Sewer Overflows (C.S.O.'s)

Over much of the catchment foul sewage and excess rainwater, run-off from roads, etc. are carried in the same sewers terminating at sewage treatment works. Such combined sewerage systems incorporate overflows (C.S.O.'s) to watercourses which operate during heavy rainfall to prevent flooding.

There are 139 C.S.O.'s on the catchment 54 of which have been identified as being unsatisfactory by the N.R.A. with the worst problems occurring on Distington Beck and at various coastal locations.

A number of these problems should be addressed by N.W.W. during planned improvement works to comply with the E.C. Urban Wastewater Directive and E.C. Bathing Water Directive (see also 6.2.1e).

However the remainder will not be dealt with in the next 5 years, and consequently a number will remain into the next century.

Rural Sewerage Systems

Because of the rural nature of the catchment there are large areas which are not sewered, and properties rely on private sewage treatment arrangements such as septic tanks. A number of the larger private plants serving hotels, caravan parks, groups of dwellings, etc. are regularly monitored by the N.R.A. to ensure consent compliance and minimise environmental impact. However for practical reasons the plethora of smaller single dwelling septic tanks are not regularly visited and individually do not normally cause problems. Groups of septic tanks in a restricted area can in combination cause localised problems in parts of the catchment.

3.1.3 Objectives

To control the discharge of sewage effluents to watercourses in such a way as to ensure water quality objectives are met and other uses are not compromised.

To achieve compliance with the requirements of the E.C. Bathing Directive and E.C. Urban Wastewater Treatment Directive.

3.1.4 Environmental Requirements

- | | |
|---------------------|---|
| Water Quality - | No deterioration in water quality classification |
| Physical Features - | Outfalls to be sited so as to achieve an adequate mixing regime. To ensure outfall structures are designed so as to minimise aesthetic and ecological impact. |

3.2 INDUSTRIAL EFFLUENT DISPOSAL

3.2.1 General

As with sewage discharges, the discharge of industrial effluents to controlled waters can only take place with the formal written Consent of the N.R.A.

However, where an industrial site is subject to Integrated Pollution Control (I.P.C.) discharges will be authorised by Her Majesty's Inspectorate of Pollution (H.M.I.P.) in close consultation with the N.R.A. Within this framework the N.R.A. will seek to ensure that authorisations protect the uses of the receiving water and aim to reduce the discharge of dangerous substances in line with N.R.A. consenting policy.

3.2.2 Local Perspective

All industrial effluent discharges to watercourse are shown on map 5.

British Nuclear Fuels plc (B.N.F.), Sellafield Site, is the largest trade premises in the catchment with over 30 effluent discharges. They come from a broad range of sources such as cooling waters, water treatment plants and chemical processes.

The radioactive discharges which take place via long sea outfalls to the Irish Sea are subject to complex controls. H.M.I.P. and the Ministry of Agriculture, Fisheries and Food (M.A.F.F.) are responsible for all radiochemical (radioactive) constituents of discharges, which they control via a site Authorisation, but the chemical content itself is controlled by an N.R.A. Consent.

The Calder interceptor sewer was recently constructed by B.N.F. at the request of the N.R.A. to remove the majority of effluent discharges from the River Calder and discharge them to the Irish Sea. Previously the lower reaches of the river have failed to meet the Environmental Quality Standard (E.Q.S.) laid down in the E.C. Freshwater Fisheries and Dangerous Substances Directives, and this improvement will ensure that the River Calder complies with the directive in years to come.

Several effluent discharges to sea have been reviewed following the opening of the THORP plant and a further review is planned once operational experience of THORP and its associated plants has been gained.

Derwent and Cumbria Coast Catchment Management Plan

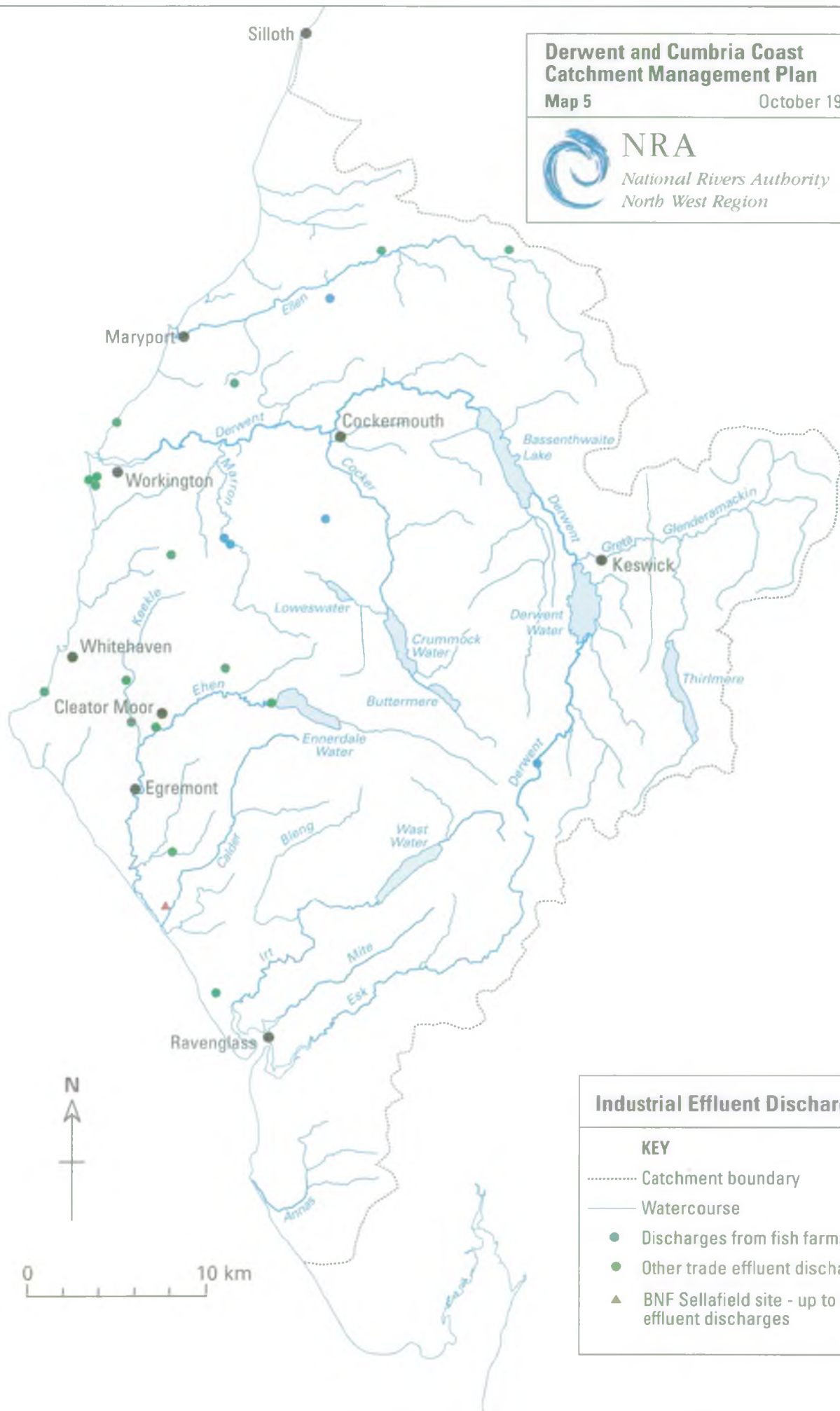
Map 5

October 1994



NRA

National Rivers Authority
North West Region



Industrial Effluent Discharges

KEY

- Catchment boundary
- Watercourse
- Discharges from fish farms
- Other trade effluent discharges
- ▲ BNF Sellafield site - up to 30 effluent discharges

The other most significant industrial discharge is Albright and Wilson's chemical works at Whitehaven where detergents are produced from phosphoric acid. The quality of the effluent from these premises has improved significantly in recent years with loadings of metals and other substances having been substantially reduced. Cadmium emissions are currently less than 6 Tonnes/annum, showing a reduction of 79%, and other metals are down to 166 Tonnes/annum a reduction of 76%. Further improvements are envisaged through on-going negotiation and company research into improving effluent quality by on site treatment.

Some industrial effluents are discharged to sewer for treatment at sewage treatment works. On the coast industrial effluents discharged to sewer are currently discharged with little or no treatment because of the limited sewage treatment facilities along the coast. Treatment and re-designed outfalls to be installed under the E.C. Urban Wastewater Treatment Directive (U.W.W.T.D) will bring about improvements to the present situation.

Surface water drainage from industrial estates/premises often discharge direct to a watercourse. These drains can be contaminated by spillages, cross connections and sloppy working practices leading to intermittent pollution.

3.2.3 Objectives

To control the discharge of industrial effluents to watercourses in such a way as to ensure water quality objectives are met and other uses are not compromised.

To prevent and/or control intermittent pollution so that no other use is compromised.

3.3 FISHERIES

3.3.1 General

This use relates to the conservation of wild populations of fish and their habitats, recreational fishing for game and coarse fish and commercial fishing for salmon and sea trout.

The N.R.A. has a duty under the Water Resources Act, 1991, to maintain, improve and develop salmon, trout, freshwater fish and eel fisheries under its jurisdiction.

3.3.2 Local Perspective

532km of salmonid river are designated under the E.C. Freshwater Fisheries Directive.

The Esk, Irt, Calder, Ehen and Ellen support significant fisheries for salmon and sea trout. The River Derwent is in the top handful of salmon rivers in the country. It is the only oligo-mesotrophic major river in England and as such is of national conservation and fisheries importance.

Declared catch returns for the various rivers are shown at Appendix 1. Resident brown trout occur throughout the catchment and in the higher reaches of most rivers are the main stay of the sport fishery.

Rare fish of national and international importance are present in the catchment. Char are found in Loweswater, Crummock Water, Buttermere, Ennerdale and Wastwater. Bassenthwaite Lake and Derwentwater are the only remaining sites in Britain where vendace are found.

Coarse fishing on the catchment is more limited, and is concentrated on some of the lakes and smaller tarns of the area.

Bassenthwaite Lake supports a mixed fishery that includes pike, perch, trout and has recently been found to contain roach and ruffe in sizeable numbers. Pike and perch are also present in Crummock Water and Loweswater.

A number of small tarns are managed commercially as put and take trout fisheries, and recreational coarse fisheries.

To assist the passage of migratory fish over obstacles there are fish passes at various locations throughout the catchment (see map 6). Natural obstacles to migratory fish remain on several rivers.

Derwent and Cumbria Coast Catchment Management Plan

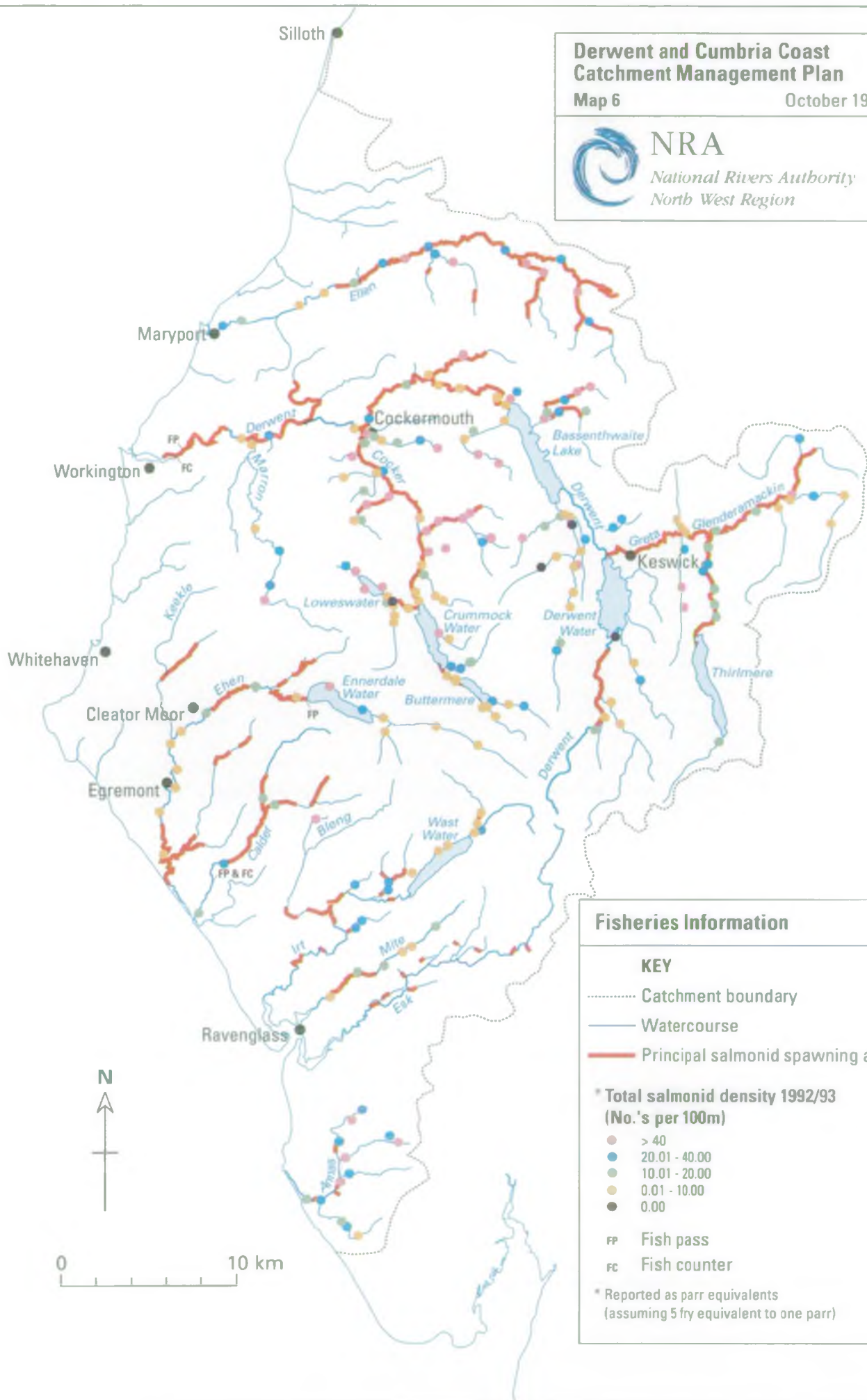
Map 6

October 1994



NRA

National Rivers Authority
North West Region



Fisheries Information

KEY

- Catchment boundary
- Watercourse
- Principal salmonid spawning areas

* Total salmonid density 1992/93
(No.'s per 100m)

- > 40
- 20.01 - 40.00
- 10.01 - 20.00
- 0.01 - 10.00
- 0.00

- FP Fish pass
- FC Fish counter

* Reported as parr equivalents
(assuming 5 fry equivalent to one parr)

There are automatic fish counters at Yearl weir on the Derwent, and at Calder Hall on the Calder (see map 6).

The N.R.A. undertakes extensive monitoring work such as electro-fishing surveys and echo sounding. Map 6 indicates juvenile total salmonid densities obtained from electro-fishing surveys in 1992 and 1993, and major spawning and nursery areas on each river.

Anglers and their associations report a decline in fish stocks over the whole catchment, while this is undoubtedly true for sea trout, the picture for salmon is much less clear. This issue is discussed in section 6.2.2a of this plan.

The N.R.A. has fisheries responsibility in coastal waters for a distance of six nautical miles. There is a small commercial drift net fishery for salmon and sea trout in these waters. The declared catches are shown in Appendix 1. Regulation of this fishery is the responsibility of the N.R.A. Drift netmen can operate anywhere from Grune Point to Haverigg Point except in certain restricted 3km "boxes" around river mouths and estuaries.

Liaison with anglers, riparian owners and associations occurs informally and formally. Informally, Fisheries staff are regularly in contact with anglers and other interested parties while going about their duties. On a more formal basis, liaison is maintained via the South West Cumberland Fisheries Association which has local angling association representatives.

Extensive commercial sea fishing takes place in these waters and is regulated by the Cumbria Sea Fisheries Committee (Cumbria S.F.C.). Regular liaison takes place between the N.R.A. and Cumbria S.F.C. on matters of joint interest.

The catchment contains 2 fixed fishing instruments authorised under legislation passed in the mid 1800's, and they can be used to catch salmon and sea trout. One is located on the beach at Ravenglass and one in the Derwent at Salmon Hall.

3.3.3. Objectives

To maintain, improve and develop fisheries consistent with Regional and National policies.

3.3.4 Environmental Requirements

Water Quality - Designated stretches not to deteriorate below the mandatory limits laid down in the E.C. Fisheries Directive for salmonid fisheries, and aim to meet the guideline limits within this directive.

Water Quantity - The N.R.A. will seek to protect the range of flows which reflect as natural a regime as possible. Where low flows are found to be affecting the fishery the N.R.A. will investigate possible remedies.

Physical Features - To maintain and improve fishery habitat where appropriate.

To ensure river maintenance work such as gravel removal is carried out in such a way as to minimise any impact on the fishery, and where possible should lead to enhancements.

To ensure abstractions are prevented from drawing in fish.

Derwent and Cumbria Coast Catchment Management Plan

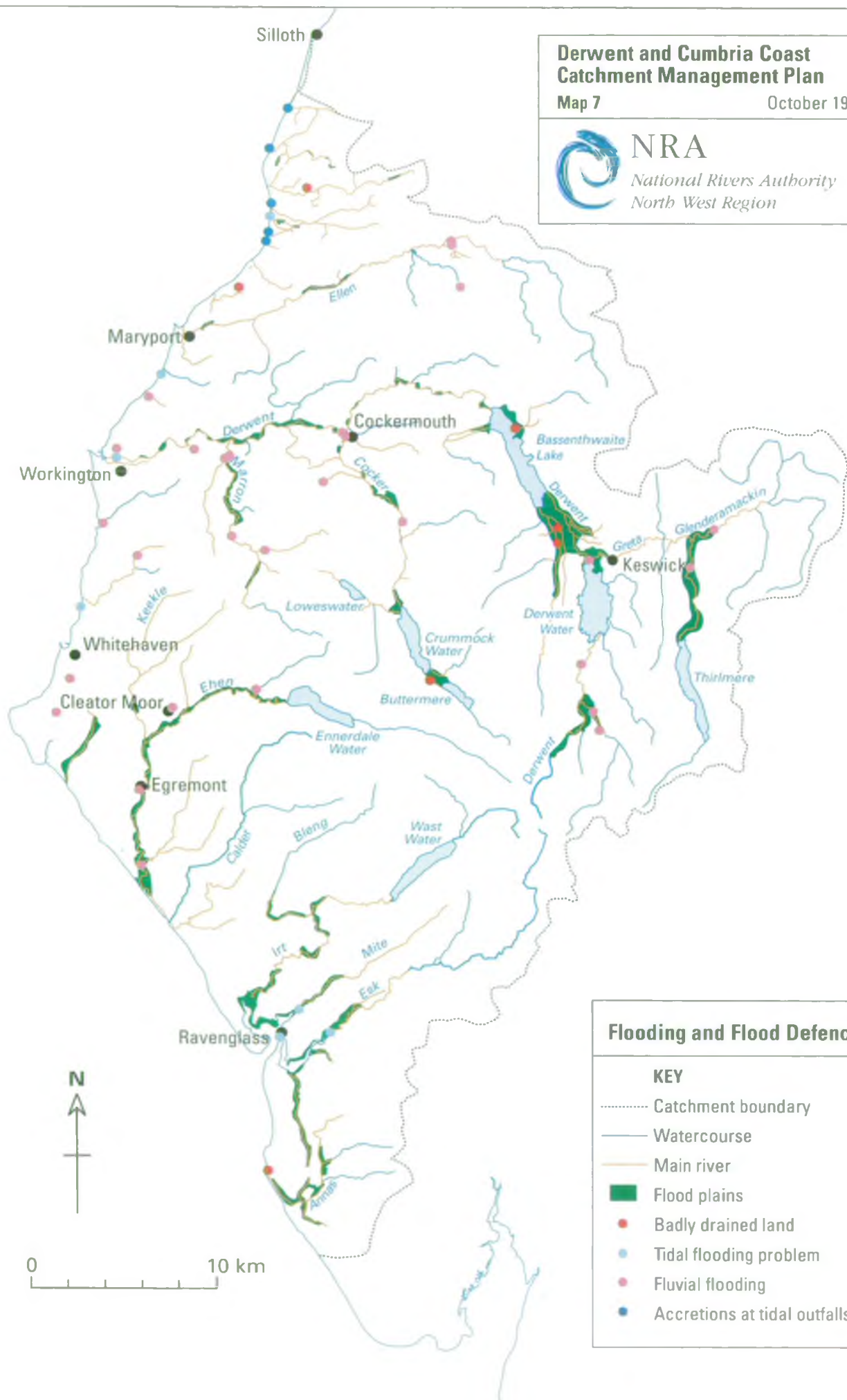
Map 7

October 1994



NRA

National Rivers Authority
North West Region



Flooding and Flood Defence

KEY

- Catchment boundary
- Watercourse
- Main river
- Flood plains
- Badly drained land
- Tidal flooding problem
- Fluvial flooding
- Accretions at tidal outfalls

3.4 CATCHMENT DRAINAGE - FLOODING AND FLOOD ALLEVIATION

3.4.1. General

This use relates to the protection of people and property against flooding from rivers and the sea. Normally flooding is a result of extreme weather conditions such as very heavy rainfall or storms combined with high tides. Flood events are described in terms of 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. The effectiveness of flood defences can be measured in terms of the return period up to which they prevent flooding. Different types of land use receive different levels of protection, with urban areas generally receiving the greatest protection. The Ministry of Agriculture, Fisheries and Food (M.A.F.F.) suggest levels of protection which range from 1 in 200 years for dense urban development to 1 in 5 years for poor agricultural land when considering tidal flooding. Equivalent figures for non tidal flooding are 1 in 100 years and 1 in 1 year.

The flood plain is an important element of the overall river system to convey flood flows. In a major flood event water is "stored" temporarily in the flood plain thereby attenuating flooding downstream.

Historic development on flood plain has led to the need for construction and maintenance of flood defences. The N.R.A. seek to control any activity on the flood plain likely to worsen flood conditions.

This is achieved through liaison with local planning authorities to influence the control of development in the flood plain, and through N.R.A. Byelaws.

The provision of new flood defences and the maintenance of existing schemes and channel capacity needs to be undertaken with care to ensure minimum impact on other river uses (notably Fisheries and Conservation). To this end extensive internal and external consultations are carried out with all interested parties.

In the river system, certain channels are designated as statutory "Main River". This designation allows the N.R.A. to take certain regulatory actions and also allows, where economically viable, money to be spent on the maintenance and control of the channel. At the same time various control powers are available on all other rivers and streams.

The responsibility for the maintenance of any watercourse normally rests with the riparian landowner, whose ownership as a general rule extends to the centre line of any such river. However, the N.R.A. does have control of the construction of any structure in or close to the statutory Main River. This and other activities likely to affect the bed or bank of the river requires the formal Consent of the N.R.A.

The N.R.A. has limited powers in respect of Consents for weirs, dams and culverts and similar obstructions on watercourses, which are not designated statutory river. District and County Councils have powers to carry out schemes on such watercourses, but no legal obligation to do so. They would require the N.R.A.'s Consent under its requirements for overall supervisory duty of drainage matters.

3.4.2 Sea Defences and Coastal Protection

Sea defence is the protection of any low lying land or assets by inundation from the sea.

Some sea defences are administered by marine local authorities. The boundaries of responsibility together with the definition of sea defence limits are given in the Coastal Protection Act, 1949.

Coastal protection is defined as the prevention of erosion by the sea of land. This is administered by local authorities.

3.4.3 Local Perspective

Areas of flood plain and badly drained land are shown on map 7 along with other flood risk areas.

The catchment is amongst the wettest and steepest sloped in England and Wales, with the highest annual average rainfall (4132mm/year) in England usually being recorded at Styhead Tarn near the source of the river Derwent.

Run-off following rainfall is generally rapid, due to the relatively impermeable underlying geology and sparse cover by drift material in the upland reaches.

Most of the river systems contain lakes which have the affect of attenuating the peak upstream flow and mitigating flooding downstream of the lake.

Extreme flood events are caused by constant heavy rainfall over the whole of a rivers catchment or by very intense (thunderstorm) rainfall for only a short period.

USES AND ACTIVITIES

Major fluvial flooding of large numbers of properties has been largely restricted to the towns of Keswick and Cockermouth on the Derwent system.

In 1938 substantial parts of Cockermouth suffered extensive inundation. After this event Goat Weir was removed and improvements made to the main road bridge in the same area to reduce future flood risk. In the 1950's, 60's and 70's significant flooding occurred in Cockermouth, Lorton and Keswick. In the mid 1960's there was significant flooding in Borrowdale with damage to properties in Rosthwaite and Stonethwaite. The situation was so serious that Army support was brought in to repair channels and structures.

In 1985 very serious flooding occurred in Keswick when up to 70 properties flooded from the River Greta. In 1987 and 1988 a flood alleviation scheme was implemented, work included the removal of an existing weir, wall heightening and the construction of embankments to a 1 in 50 year protection level.

A significant flood defence structure on the catchment is the Cumbria Coastal Railway Line embankment which forms a sea defence barrier for 12km from St. Bees to Seascale and also from Parton north to Maryport, this is maintained by British Rail.

A sea defence scheme was built in 1978 and extensively repaired in 1993 to protect the village of Ravenglass. Part of the scheme includes a tidal gate which is operated by the local Police and Parish Council. However there is presently an investigation being carried out to improve parts of the sea defences.

Flood Warning

The N.R.A. operates a flood warning scheme for the coast, and for warning zones at Keswick and Cockermouth. Constant monitoring of rainfall and river conditions is undertaken.

If flooding of property is likely to occur then the Regional Duty Officer issues a warning to the Police who then warn Local Authorities, Highway Authorities and local residents.

Main River and River Control Structures

The lengths of statutory Main River are shown on map 7 and total 416km. Within the catchment plan area there are 34 control structures on the Statutory Main River 6 of which are controlled by the N.R.A. These N.R.A. structures comprise weirs at flow gauging stations and fish counters and are not used for flow regulations or flood defence purposes.

The remaining non N.R.A. structures are for abstraction purposes and amenity or are relics of water power days. Regulation of these structures is controlled through the Authorities Flood Defence Byelaws.

3.4.4 Objectives

To provide effective flood defence for the protection of people and property to a standard appropriate to land use.

To provide adequate arrangements for flood forecasting and warning.

To control development and works in or adjacent to Statutory Main River in accordance with the Water Resources Act, 1991, the Land Drainage Act, 1991, and the N.R.A.'s Flood Defence Byelaws.

3.4.5 Environmental Requirements

Physical features:-

To control development and other works in rivers or the flood plain such that risks of flooding are not increased.

To minimise environmental and ecological damage during flood defence maintenance and improvement works, and take the opportunity to create enhancements wherever practical.

Derwent and Cumbria Coast Catchment Management Plan

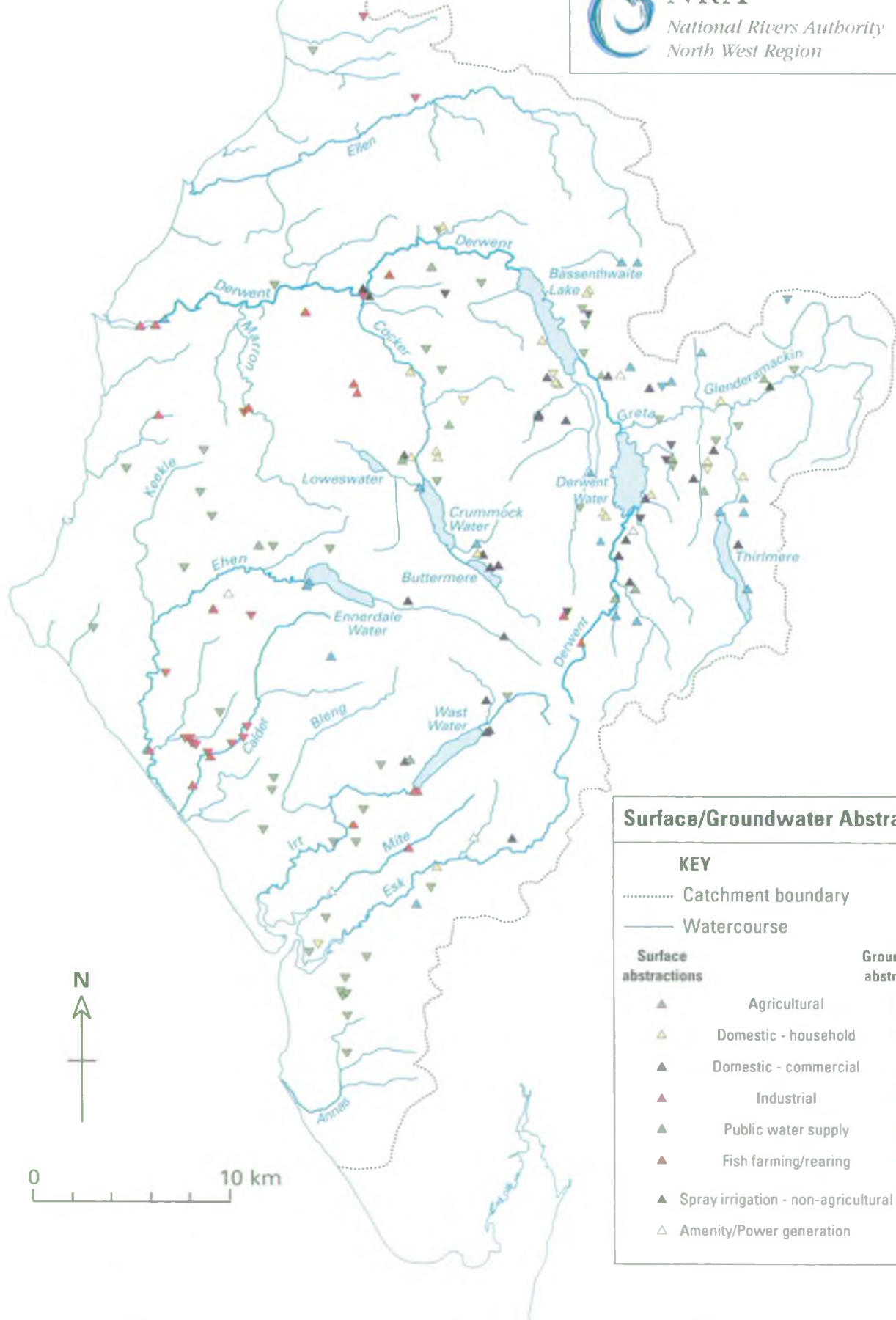
Map 8

October 1994



NRA

National Rivers Authority
North West Region



Surface/Groundwater Abstraction

KEY

..... Catchment boundary

— Watercourse

Surface abstractions

- ▲ Agricultural
- ▲ Domestic - household
- ▲ Domestic - commercial
- ▲ Industrial
- ▲ Public water supply
- ▲ Fish farming/rearing

Groundwater abstractions

- ▼ Agricultural
- ▼ Domestic - household
- ▼ Domestic - commercial
- ▼ Industrial
- ▼ Public water supply
- ▼ Fish farming/rearing
- ▲ Spray irrigation - non-agricultural
- △ Amenity/Power generation



0 10 km

3.5 LICENSED WATER ABSTRACTION

3.5.1 General

The N.R.A. has a duty to undertake measures to conserve, redistribute or augment water resources and to secure the proper use of water resources.

The N.R.A. has powers to apply to the DoE to issue Drought Orders to conserve water resources; designate areas as water protection zones and nitrate sensitive areas.

The N.R.A. controls abstraction and impoundments under a licensing system. Most abstractors are charged for the right to use water in accordance with a tariff based on factors such as licensed quantity, source and season of abstraction and category of use.

A number of licences were granted as "licences of right" upon the implementation of the Water Resources Act, 1963. Such licences were based upon evidence of established use and were not necessarily supported by technical appraisal of their impact.

The Region will maximise the use of water resource available, whilst avoiding derogation either to abstractive rights or environmental interests. The latter include wetland sites, ecological regime of rivers and the management of the flow regime for all purposes.

3.5.2 Local Perspective

Map 8 shows the distribution of the various surface and groundwater abstractions within the catchment and the purpose of use is indicated by colour coding.

There are 118 licensed abstractions from surface sources within the catchment, and these range from the very small 500 l/d for domestic use to the very large 243 Mld for water supply. The total daily volume licensed to be abstracted from all surface sources is 1150 Mld approximately.

The licences for surface abstractions are in the following categories, with percentages of the total daily licensed volume:-

| | | |
|----|------------------|---------------------------|
| 21 | Water Supply | 43% daily licenced volume |
| 12 | Industrial | 52% |
| 10 | Fish Farm | 3% |
| 3 | Power Generation | 2% |
| | Other | <1% |

USES AND ACTIVITIES

There are 73 licensed abstractions from groundwater sources within the catchment, which range from 500 l/d for general agricultural use to 15.9 Mld for industrial use.

The licences for groundwater abstractions are in the following categories, with percentages of the total daily licensed volume:-

| | |
|----------------|---------------------------|
| 5 Water Supply | 17% daily licensed volume |
| 8 Industrial | 82% |
| Others | 1% |

North West Water Limited (N.W.W.) Abstractions for Potable Water Supply

Of the total volume of some 560 Mld licensed to be abstracted for water supply approximately 43% is exported from the catchment via the Thirlmere Aqueduct. Thirlmere is operated conjunctively with other Lake District and Lancashire Schemes as part of a strategic supply system for N.W.W. Two other major abstraction licences allow N.W.W. to abstract from Crummock Water and from Ennerdale Lake for use in West Cumbria.

In the past there has been no set limit on the level to which Ennerdale lake could be drawn down. However, the operational agreement between N.R.A. and N.W.W. reached in 1992 restricted the abstraction below historic levels, and required that from 1st January 2000 maximum drawdown will be limited to 1.35m below the weir crest (110.96m A.O.D.).

At the western end of the River Derwent near Workington, North West Water are licensed to abstract 57 Mld for use in the Workington area.

Industrial Abstractions

British Steel are licensed to abstract approximately 43 Mld for industrial use in the Track Products Works from the River Derwent upstream of Yearl Weir near Workington.

British Nuclear Fuels have eight licences to abstract a maximum of 148Ml/d from a number of different sources. These include Wastwater, the rivers Ehen and Calder and from mines and boreholes.

3.5.3 Objectives

To ensure resources are managed to safeguard the environment, protect other groundwater and surface water users and existing licences. To protect groundwater by implementing the Authority's Policy and Practice for the Protection of Groundwater.

3.5.4 Environmental Requirements

| | |
|-----------------|---|
| Water Quality - | To ensure all surface water sources abstracted for public drinking water supply comply with the E.C. Directive on the quality of water abstracted for this use. |
|-----------------|---|

3.6 CONSERVATION, ECOLOGY

3.6.1 General

This section relates to the conservation and enhancement of natural beauty and wildlife, associated with the aquatic environment. This includes formally designated and protected sites, and the wider countryside associated with the aquatic environment.

The N.R.A. has a statutory duty to further the conservation and enhancement of natural beauty and protect sites of conservation interest.

3.6.2 Local Perspective

Map 9 shows all the Sites of Special Scientific Interest (S.S.S.I.'s) within the catchment. In addition County Wildlife Sites (CWS's) identified by Cumbria Wildlife Trust are shown.

A significant proportion of these sites are associated with the aquatic environment with several of the major lakes being designated S.S.S.I. (Bassenthwaite Lake, Wastwater, Ennerdale and Buttermere).

The catchment rivers rise among upland acid fells dominated by acid grasslands and heath vegetation with heather moor land at lower altitudes on some catchments. Some of these areas support good assemblages of upland breeding birds.

The rivers Derwent and Cocker are of National importance as the only remaining oligo-mesotrophic major river system in England.

The catchment is important for its populations of rare fish, with char living in Wastwater, Ennerdale, Loweswater, Crummock Water and Buttermere.

In addition Derwentwater and Bassenthwaite Lake provide the last sites in Britain for populations of vendace (protected under the Wildlife and Countryside Act 1981) which has survived from the last ice age.

Bassenthwaite Lake and its associated wetlands are S.S.S.I. and recently designated a National Nature Reserve. It is the shallowest of the major lakes in Cumbria, but has the largest catchment (238 km²). The combination of shallowness and moderate nutrient status has allowed the development of a habitat rich in aquatic plants including uncommon species. There is also considerable ornithological interest with over 70 recorded breeding species. In winter there may be over 2000 wintering wildfowl at any one time, and it is the second most important site for duck in the National Park.

Derwent and Cumbria Coast Catchment Management Plan

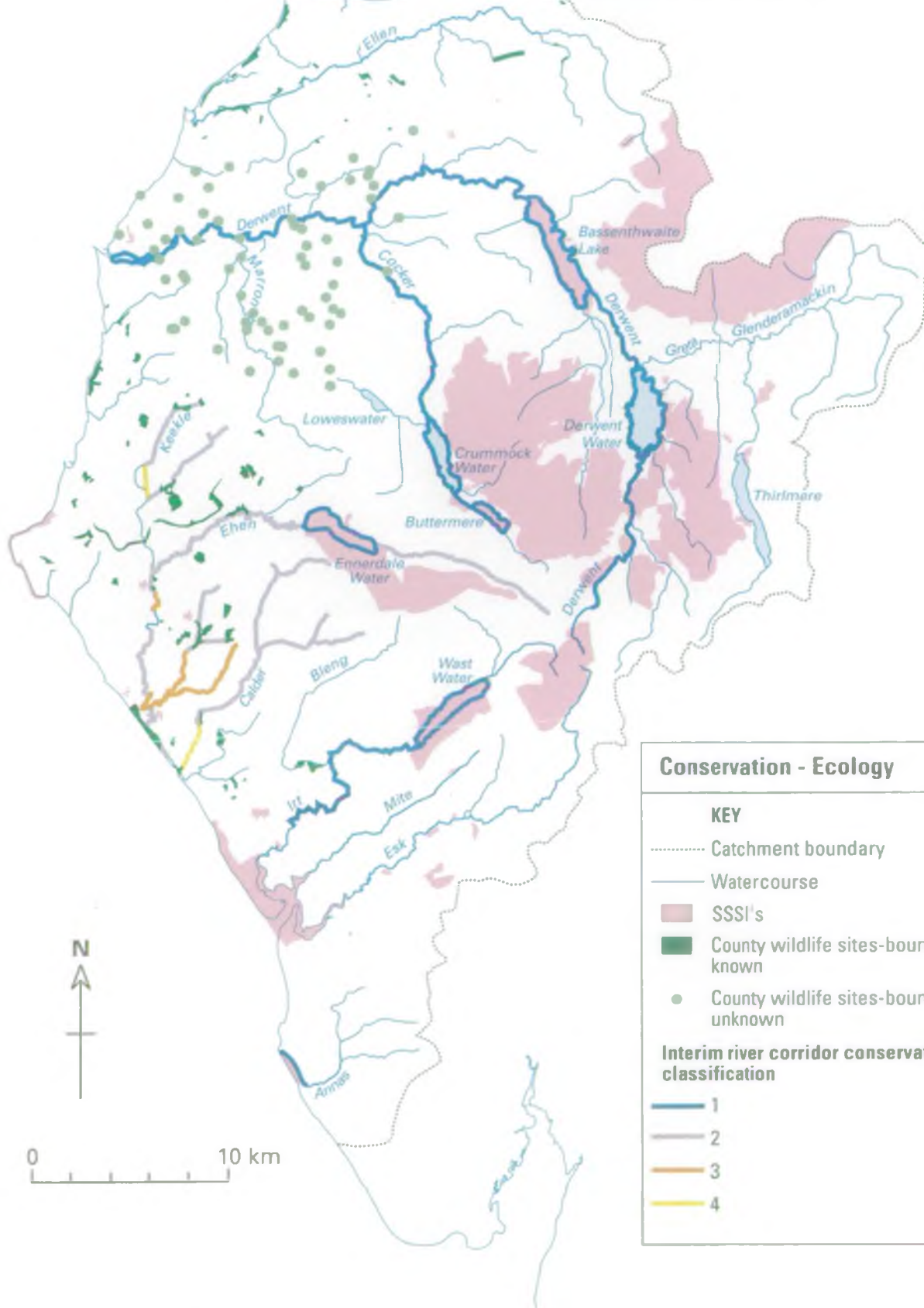
Map 9

October 1994



NRA

National Rivers Authority
North West Region



Conservation - Ecology

KEY

..... Catchment boundary

— Watercourse

SSSI's

County wildlife sites-boundary known

County wildlife sites-boundary unknown

Interim river corridor conservation classification

1

2

3

4

Wastwater and Ennerdale are the most oligotrophic (nutrient poor) lakes in the Lake District and support a characteristic freshwater flora and fauna of national importance.

The most significant ancient woodlands associated with river corridors occur in the Borrowdale Valley. On the Rivers Ehen, Calder, Irt, Mite, Esk and Annas the bulk of the broad-leaved woodlands on the catchments are associated with the river corridor mainly in the middle reaches.

The most degraded river habitats are on the lower reaches of the Ehen and Calder where the rivers flow through improved agricultural land, and typically have been subject to improvement works. This has led to limited corridor or specific species interest.

Notable species within the catchment include the presence of a significant proportion of the British natterjack toad population at a string of sites along the coast, and the presence of the endangered freshwater pearl mussel in the rivers Ehen and Irt. In addition recent evidence suggest that otters are present, but rare throughout the catchment area. All these species are protected under the Wildlife and Countryside Act, 1981.

3.6.3 *Conservation Classification*

The rivers and waters of the catchment are being formally classified as to their existing conservation interest on a scale of 1 to 5. This information is incomplete and is being gathered from a variety of sources including river corridor survey, walkover survey and documentary evidence from various sources. This is an interim system, which may be superseded, but the classification of those rivers which have been surveyed is shown on map 9. The classification is as follows:-

Class 1 Areas of National conservation importance by virtue of the presence of a nationally designated site (eg. S.S.S.I.) or an endangered species (Schedule 5 and 8 Wildlife and Countryside Act, 1981).

Class 2 Area of local conservation importance by virtue of the presence of a locally designated site (eg. C.W.S.) or locally rare species. In addition, those areas providing a wide variety of habitats and a natural river corridor will also be designated Class 2.

- Class 3 Areas with limited conservation interest (eg. previous unsympathetic river management), but do contain features of interest.
- Class 4 Areas with poor conservation interest.
- Class 5 Areas with effectively no conservation interest (eg. culverts).

3.6.4 *Environmental Objectives*

The N.R.A. takes its conservation duties seriously and will adopt the following policies in order to conserve, further and enhance the water environment, within all N.R.A. operations and third party proposals which the N.R.A. licence or are consultees to.

- Class 1 The N.R.A. will ensure the protection of those features which make the area of national conservation importance.
- Class 2 The N.R.A. will ensure sensitive river management to maintain the interest of these areas and prevent them from being degraded to Class 3.
- Class 3 The N.R.A. will encourage sensitive river management to elevate these areas to Class 2.
- Class 4 The N.R.A. will endeavour to improve the conservation value of these areas, though this may be in the medium term.
- Class 5 The rehabilitation of these areas is a long term objective.

Derwent and Cumbria Coast Catchment Management Plan

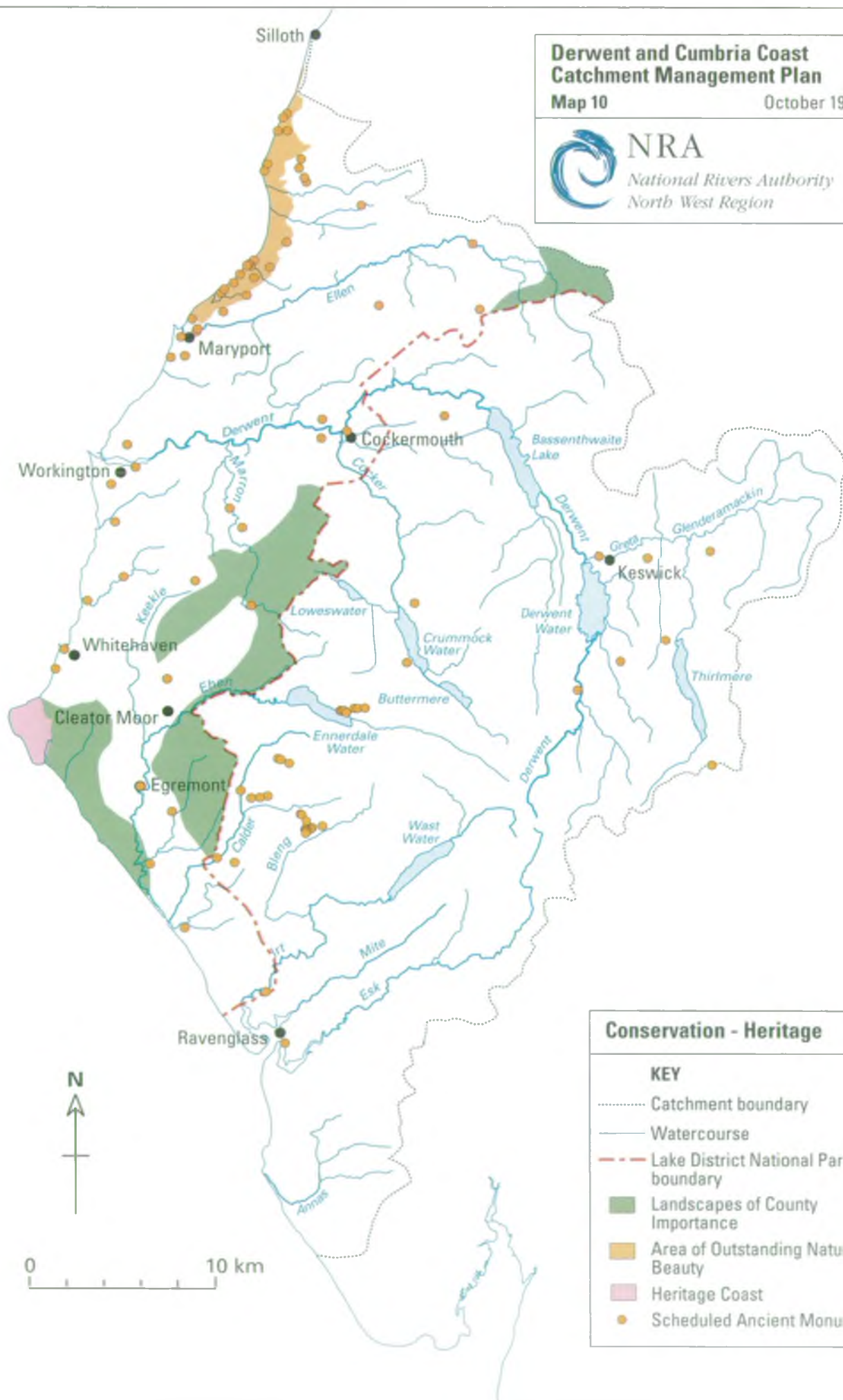
Map 10

October 1994



NRA

National Rivers Authority
North West Region



Conservation - Heritage

KEY

- Catchment boundary
- Watercourse
- Lake District National Park boundary
- Landscapes of County Importance
- Area of Outstanding Natural Beauty
- Heritage Coast
- Scheduled Ancient Monuments

3.7 CONSERVATION - LANDSCAPE AND HERITAGE

3.7.1 General

This relates to the conservation and protection of landscapes and archaeology, associated with the aquatic environment.

The N.R.A. has a statutory duty to further the conservation of landscapes, sites and objects of archaeological, architectural or historical interest.

3.7.2 Local Perspective

The main landscape and archaeological designations within the catchment are shown on map 10.

The catchment includes a significant part of the Lake District National Park, one of only ten such areas in England and Wales designated for their high landscape, conservation and amenity value.

The Park has recently been additionally designated as an Environmental Sensitive Area (E.S.A.) which provides grant aid for farmers to manage their land in ways sympathetic to wildlife and the landscape.

Outside the Park, the high fells give way to gently rolling hills down to a coast which contrasts spectacular cliffs, extensive sand dunes and salt marshes, with industrial and urban development.

Important coastal landscapes are recognised as the catchment contains part of the Solway Coast Area of Outstanding Natural Beauty (A.O.N.B.) and St. Bees Head is designated Heritage Coast for its dramatic sandstone cliffs.

The Catchment is rich in areas of archaeological interest, a number of which are Scheduled Ancient Monuments (S.A.M.S.), but the greater part of this heritage is not legally protected with many potential sites still undiscovered.

Thirty one of the catchments town and village centres are designated Conservation Areas for their special historic, archaeological or architectural interest. Trees within these areas effectively have Tree Preservation Order (T.P.O.) status.

3.7.3 Objectives

To ensure N.R.A. activities conserve and where possible enhance our important landscapes and protect the heritage associated with our rivers and coastal waters.

This is to be achieved by:

- i) Retention of high quality existing landscape character and features.
- ii) Seeking effective mitigation for any loss of landscape quality.
- iii) Ensuring that damaged landscapes are restored or enhanced where possible.
- iv) Ensuring that new works by N.R.A. and others blend into the existing landscape effectively in terms of design, scale, siting and choice of materials.
- v) Liaison with the County and National Park Archaeologists and relevant bodies for all N.R.A. capital and heavy maintenance schemes.

3.7.4 Environmental Requirements

Water Quality

To be aesthetically acceptable ie. water to be free from surface films, rubbish, discolouration and unpleasant odours.

Water Quantity

A flow regime which reflects the flow regime which does not adversely affect conservation interests in the river. The water table to be maintained so as not to damage sensitive heritage sites.

Physical Features

To be in-keeping with the local landscape character: generally to conserve and promote a diversity of natural features within the river valley and along the river corridor.

Derwent and Cumbria Coast Catchment Management Plan

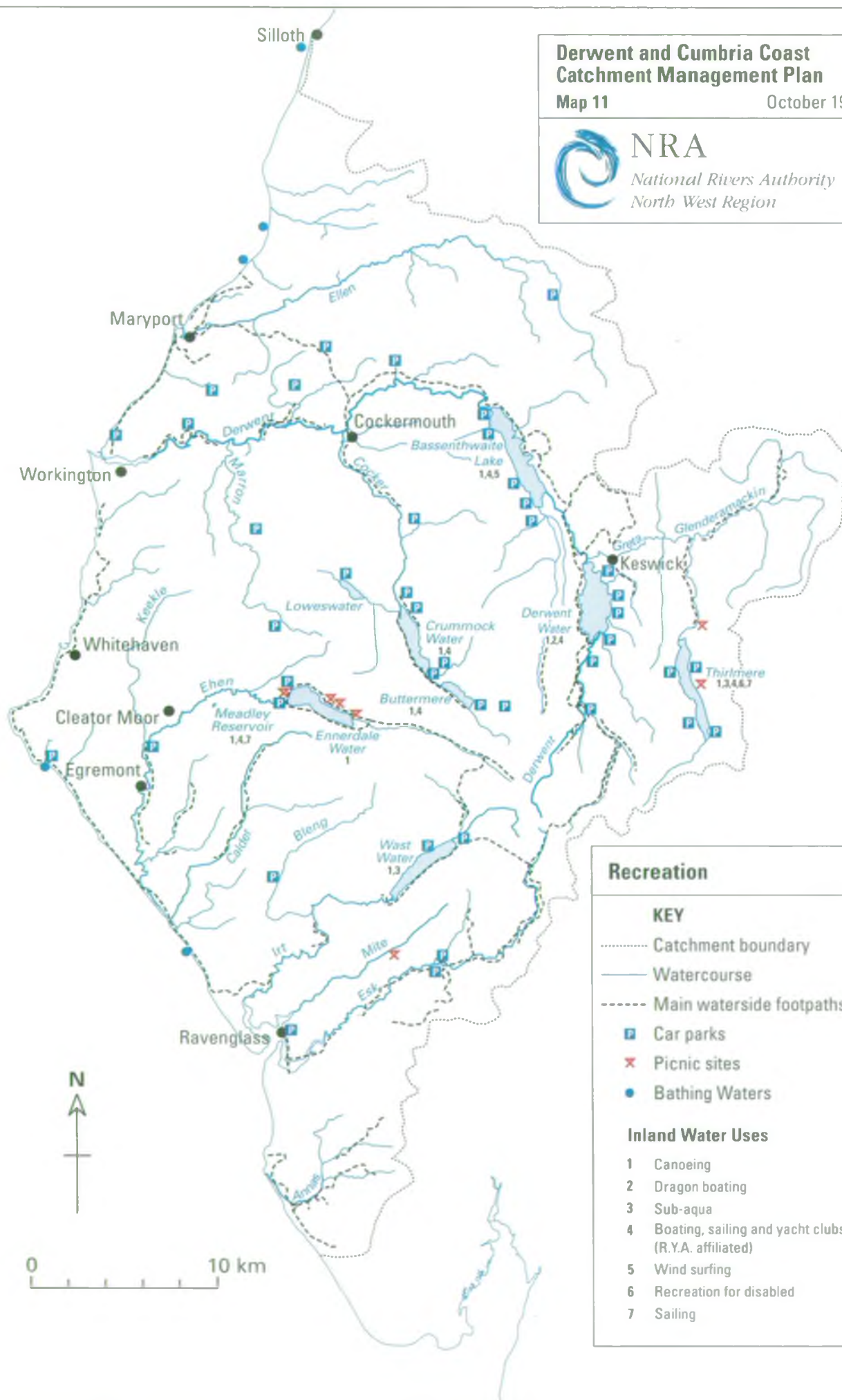
Map 11

October 1994



NRA

National Rivers Authority
North West Region



Recreation

KEY

- Catchment boundary
- Watercourse
- Main waterside footpaths
- P Car parks
- X Picnic sites
- Bathing Waters

Inland Water Uses

- 1 Canoeing
- 2 Dragon boating
- 3 Sub-aqua
- 4 Boating, sailing and yacht clubs (R.Y.A. affiliated)
- 5 Wind surfing
- 6 Recreation for disabled
- 7 Sailing

3.8 WATER BASED RECREATION AND AMENITY

3.8.1 General

The water environment is a particularly important area for leisure pursuits.

Many activities use the water itself eg. angling, windsurfing and boating. Other forms of recreation have a link with the water but do not actively use it eg. a picnic by the lake or a walk by the river.

Many studies have revealed that the presence of water at any site is an important factor in drawing people to that location for a whole range of recreational activities.

The N.R.A. will take recreation into account when it undertakes its core function activity and promote the use of inland and coastal waters and associated land for recreation.

With the exception of the public right of way network access to the banks of rivers and stillwaters is controlled by the owners of the surrounding land.

In tidal waters there is a public right of navigation and in some non-tidal waters public rights of navigation have become established. These sites however represent the exception rather than the rule.

The use of the water surface itself in the majority of non tidal waters is controlled by the riparian owners. Generally the owner of one bank controls up to the mid line of the watercourse. The consequence of this situation is that most recreational activity related to water is controlled through formal or informal agreements with landowners.

Angling is numerically the single most important active recreation which takes place on the waters in the plan and is dealt with in Section 3.3 Fisheries.

3.8.2 Local Perspective

Current Situation

The N.R.A. does not own any recreation assets within the plan area.

The area caters for the recreational demands of residents but also for day visitors and during the summer months a very sizeable influx of holidaymakers. This can lead to conflicting pressures for water bodies in the area.

Recreation and enjoyment of the countryside is therefore of considerable economic importance to many of the communities in the area.

Six of the Lake Districts major lakes lie within its boundaries namely Wastwater, Ennerdale, Buttermere, Crummock, Bassenthwaite and Derwentwater. In addition the catchment contains one of the regions major and scenically important reservoirs, Thirlmere.

That the views over these waterbodies are highly prized by the nation does not need debating here and the frequency with which countryside calendars contain views of Ashness Bridge above Derwentwater and the Wastwater screes serve to illustrate the point.

The locations of the main still and running waters are given on map 11 together with the major locations for sporting activities.

Canoeing

Canoeing occurs to a greater or lesser extent on most of the large stillwaters in the area and individual participants have their own view of the appeal of these different "lakes".

The rivers in the area are generally relatively shallow at least through much of their length. The consequence of this is that in addition to angling canoeing is often the only watersport which is feasible.

Most of the waters and all of the non tidal rivers in the area have no public rights of navigation on them. Consequently anyone wishing to "navigate" these waters can only do so with the permission of the owners.

Navigation rights are believed to exist on Derwentwater. The N.R.A. is not responsible for navigation on this or any other water in the catchment.

Limited canoe access agreements exist on some stretches of river and these arrangements have generally been brought into being by agreement between the British Canoe Union and the landowners in question.

Perhaps the greatest conflict between recreations which exist in the area is between anglers and canoeists. This is not a new phenomenon and work aimed at resolving the conflict presents major challenges.

Other Active Water Based Recreation

Sea bathing, sailing, wind-surfing (board sailing) and sub-aqua are the main additional activities which occur on the areas stillwaters.

The sailing sports are catered for mainly on Derwentwater and Bassenthwaite and private owners, activity centres and commercial operators all play a part in the "operation". The coastal waters of the area are also a significant asset for these sports and in particular the marina at Maryport provides a new facility.

There are five designated coastal bathing waters in the plan area, which are monitored by the N.R.A. for compliance with the E.C. Bathing Water Directive. These are at Seascale, St. Bee's, Allonby, and Allonby South and Silloth (see map 11). To varying degrees and frequencies all these bathing waters fail to comply with the requirements of the directive, due to inadequate sewage treatment and disposal facilities along the coast. This subject is dealt with in Section 3.1 and 6.2.1d.

Water Related Recreation and Amenity

The network of rights of way near or alongside water together with the opportunities that exist for vehicle parking are key features in allowing people the opportunity to maximise the "waterside" experience.

Map 11 gives the location of the main waterside rights of way and associated car parks in the area. Although the main network of public rights of way in this area caters for a considerable demand all year it is put under particular stress during peak Summer months.

The Cumbrian Coastal Way which is a recently established long distance regional footpath runs North to South through the area.

Future Situation

A major study on watersports in the North of England has been carried out on behalf of the Sports Council; the Northern Council for Sport and Recreation and the National Rivers Authority. This study was undertaken by ASH Consulting Group and involved contact with outside bodies and individuals.

The sponsoring organisations have undertaken further consultation and the N.R.A. will use this information in conjunction with that derived from other sources to refine its local policies on recreation.

Although it is not possible to predict the outcome precisely it is clear that the N.R.A. is only one of many bodies involved in the field of recreation and in furthering recreation it will try to use opportunities for collaborative activity whenever possible.

In particular the N.R.A. recognises that the main opportunity to provide features of material benefit for recreation will arise through the Flood Defence Capital and Maintenance programmes. In addition it seems likely that more can be achieved for those interested in facilities for informal countryside recreation associated with water than for those with a specific watersport in mind.

3.8.4 Objectives

To maintain water quality and quantity as well as maintain access arrangements for existing recreational activity where possible.

To enhance recreational opportunities when the opportunity arises. To achieve consistent compliance with the E.C. Bathing Water Directive at designated bathing waters.

3.9 DEVELOPMENT

3.9.1 General

The N.R.A. has enhanced its input to the planning and development control process by the establishment of strong multi-functional areas and through the development of catchment plans. New residential, industrial and commercial development can have a detrimental effect on a river catchment and closer links with the land-use planning system is required to ensure an integrated approach to the management of the water environment.

Future development in the catchment is steered by Town and Country Planning legislation which sets a framework for the local planning authorities (L.P.A.'s) to use and comply with, when formulating policies for their respective areas.

Whilst the N.R.A. has statutory powers and responsibilities to protect the water environment these are complemented by the planning system effectively controlling the use and development of land so influencing decisions at an early stage.

The N.R.A. is a statutory consultee under planning and waste disposal legislation and advises LPA's on the policy content of Development Plans and planning applications which may have an impact on matters relevant to the N.R.A. Consequently an aim in the production of catchment management plans is to provide the L.P.A.'s with a clear picture of the N.R.A.'s responsibilities and policies towards development within the catchment.

The N.R.A. has produced Guidance Notes for L.P.A.'s on the methods of protecting the water environment through their Development Plans. The N.R.A. proposes that, where appropriate, the L.P.A.'s should apply these notes when producing their own plans.

3.9.2 Local Perspective

The catchment lies within the County of Cumbria and the majority of the catchment is administered by the Lake District National Park Board who are responsible for local planning activities within the Park area. The strategic planning basis for the catchment is set out in the Cumbria and Lake District Joint Structure Plan. This seeks to respect the long term quality of the County. Structure Plan policies can be divided into 2 sections. The first,

Managing the Environment, sets out ways to conserve and enhance the landscape, built environment and natural resources as well as preventing pollution and hazards. The second, Guiding Development, is concerned with housing and employment, the enhancement of rural communities, the enhancement of towns and town centres and controlling major projects such as waste disposal and minerals,

These general policies are translated into local planning policies by the District Councils who produce local plans which identify land for future development and policies against which, planning applications are considered. A summary is provided of the current situation with respect to development plan preparation in the table below.

The emphasis of policy aims within the catchment revolve around:-

- strong environmental protection
- clear priority for housing to meet local needs
- foster the local economy and maintaining the roles of the main settlements to accommodate growth.

New development is largely proposed within the main settlements. However there is a general policy of restraint especially within the National Park. Future population will depend on national and economic policy influencing future investment, and local employers decision especially at the British Nuclear Fuel's Sellafield plant, overall, a reduction in population is more likely than an increase.

Current status of Development Plans within the Derwent and Cumbrian Coast catchment.

| ADMINISTRATIVE COUNCIL | DEVELOPMENT PLAN |
|--|---|
| Cumbria County Council (((Lake District National Park Authority ((| Cumbria and Lake District Joint Structure Plan 1991 - 2006. Examination in Public completed. Modifications expected Autumn 1994. Adoption expected 1995. Lake District National Park Local Plan. Deposit Consultation ended 28th April 1994. |
| Copeland Borough Council | Copeland Borough local plan - Deposit consultation ends 8th September 1994. |
| Allerdale Borough Council | Allerdale Borough - local plan draft expected end 1994 |

3.10 AGRICULTURE

3.10.1 General

Agricultural activity has the potential to have significant impacts on the water environment through both chronic and acute effects. In the main problems arise from:-

- Pollution of ground and surface waters from inadequate storage and handling of animal waste, silage and other effluents.
- Pollution of ground and surface waters by diffuse discharges of fertilisers and other agro chemicals such as sheep dip.
- Ecological damage caused by intensive practices, infilling of ponds and land drainage.

3.10.2 Local Perspective

Agriculture is an extremely important industry in this predominantly rural catchment, and remains one of the most significant threats to water quality.

The upland areas support sheep farming with some beef. Dairy farming becomes increasingly important lower down the valleys and predominates in the low lying coastal areas.

Over recent years herd sizes have increased and methods intensified leading to an increasing volume of animal waste and enhanced silage production on many farms. To keep pace with this many farms have improved their effluent and silage storage facilities. Generally farmers apply for Ministry of Agriculture, Fisheries and Food (M.A.F.F.) grants for such work under the Farm and Conservation Grant Scheme.

Prior to grant being released by M.A.F.F., N.R.A. approval for the new system is required. This gives the N.R.A. opportunity to scrutinise new installations and enforce the Control of Pollution (Silage, Slurry and Agricultural Fuel Oils) Regulations 1991. These regulations set minimum standards for construction and sizing of installations.

Up until the introduction of these regulations there had been a steady rise in the number of farm pollution incidents on the catchment. However since their introduction the number of farm incidents has begun to fall despite a general trend of an increase in the total number of pollution incidents reported to the N.R.A. This is a hopeful sign of the efficiency of the regulations, as well as an indication of the work put in by the N.R.A. and farming community.

The number of farm pollution incidents dealt with by the N.R.A. for the period 1988 - 1993 is given at Appendix 2.

3.10.3 Objectives

To minimise the impact of agricultural activity on the water environment.

3.10.4 Environmental Requirements

- | | |
|---------------------|--|
| Water Quality - | Strict enforcement of the Control of Pollution (Silage, Slurry and Agricultural Fuel Oils) Regulations 1991 and encouragement to comply with the Code of Good Agricultural Practice for the protection of water. |
| Physical Features - | Land drainage activities should not adversely affect the fishery and conservation value of rivers or impact on the important landscapes of the area. Encourage maintenance and enhancement of important aquatic conservation features such as farm ponds, wetland areas and river corridor habitats. |

Derwent and Cumbria Coast Catchment Management Plan

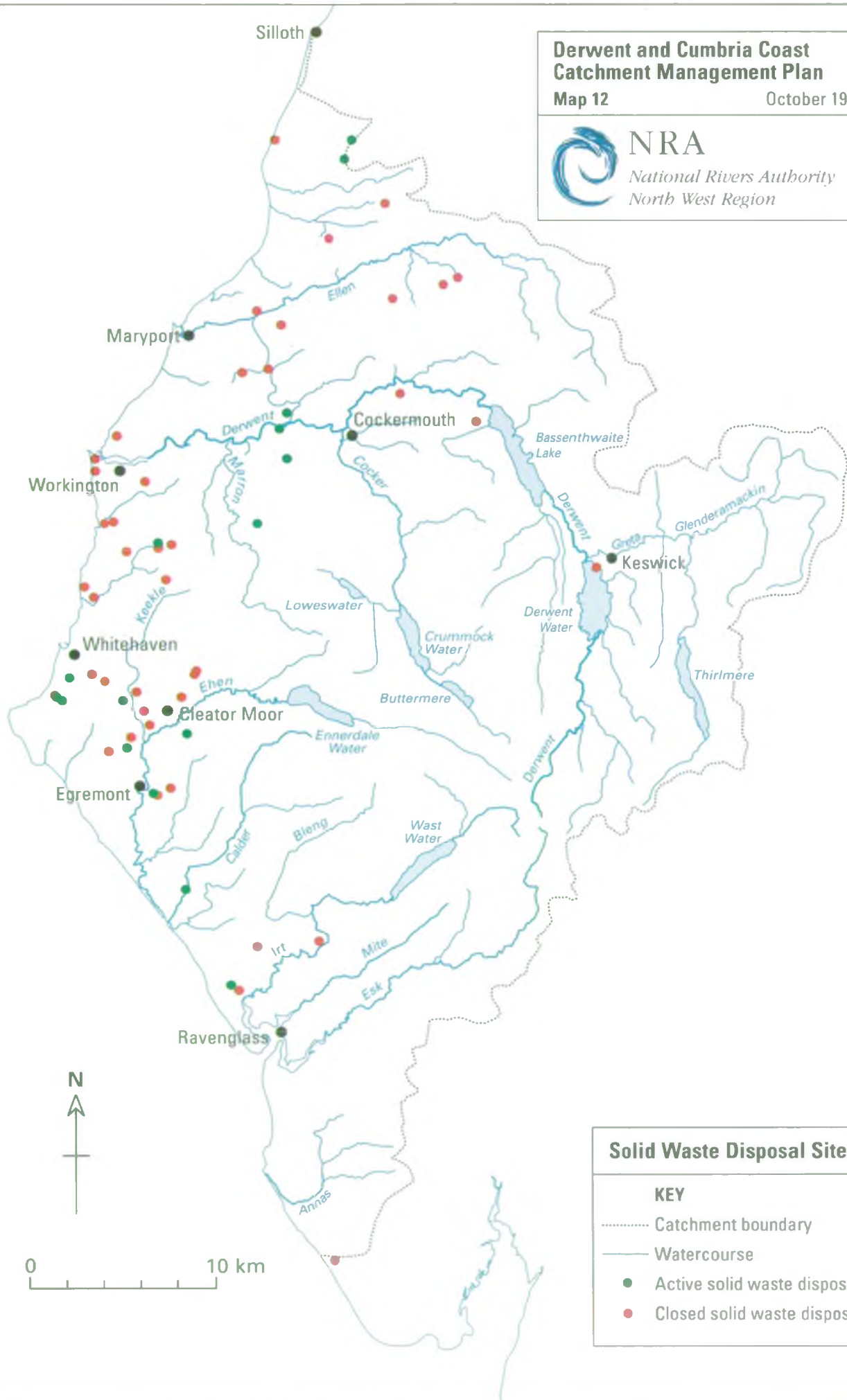
Map 12

October 1994



NRA

National Rivers Authority
North West Region



Solid Waste Disposal Sites

KEY

----- Catchment boundary

— Watercourse

● Active solid waste disposal

● Closed solid waste disposal

3.11 SOLID WASTE DISPOSAL AND CONTAMINATED LAND

3.11.1 General

The use of landfill sites remains the most important means for the disposal of solid waste in the UK and is likely to remain so for the foreseeable future.

All sites receiving non inert and putrescible wastes have the potential to produce leachate which is a polluting liquid effluent produced during biological and chemical degradation of the waste. The N.R.A. insists on engineered containment to prevent pollution of ground and surface waters and thus comply with regulatory requirements imposed by European and U.K. legislation and policy. Historically landfill sites were not engineered as containment sites and leachate did in some cases cause pollution.

Waste Regulation Authorities process and issue Waste Management licences, which are required for all operations involving handling, storage, treatment and disposal of controlled wastes. The N.R.A. is a statutory consultee on application for waste disposal site licences and will seek to ensure waste disposal development poses no unacceptable risk of pollution to controlled waters.

Contaminated land arises largely as the result of past industrial activities which have left behind a legacy of substances in or on the ground. Opencast and deep mine operations have resulted in some rural areas being affected. The N.R.A. has a specific interest in contaminated land because it may represent a source of water pollution.

3.11.2 Local Perspective

A number of waste disposal sites are active on the catchment with an even larger number of closed sites (see map 12). The N.R.A. inspects sites as part of its pollution control monitoring programme.

In the main these sites do not now cause significant problems. The catchments most difficult problem is that of a former deep mine spoil heap at Oatlands which affects the River Keekle for several miles.

The site at Drigg receives low level radioactive waste. Leachate is collected and audited before being discharged through a long sea outfall to the Irish Sea. The radioactive content of this leachate is not the responsibility of the N.R.A., but other contents of the leachate are consented and monitored by N.R.A.

3.11.3 Objectives

To ensure waste disposal activity does not adversely affect water quality and other uses of surface and groundwater.

Derwent and Cumbria Coast Catchment Management Plan

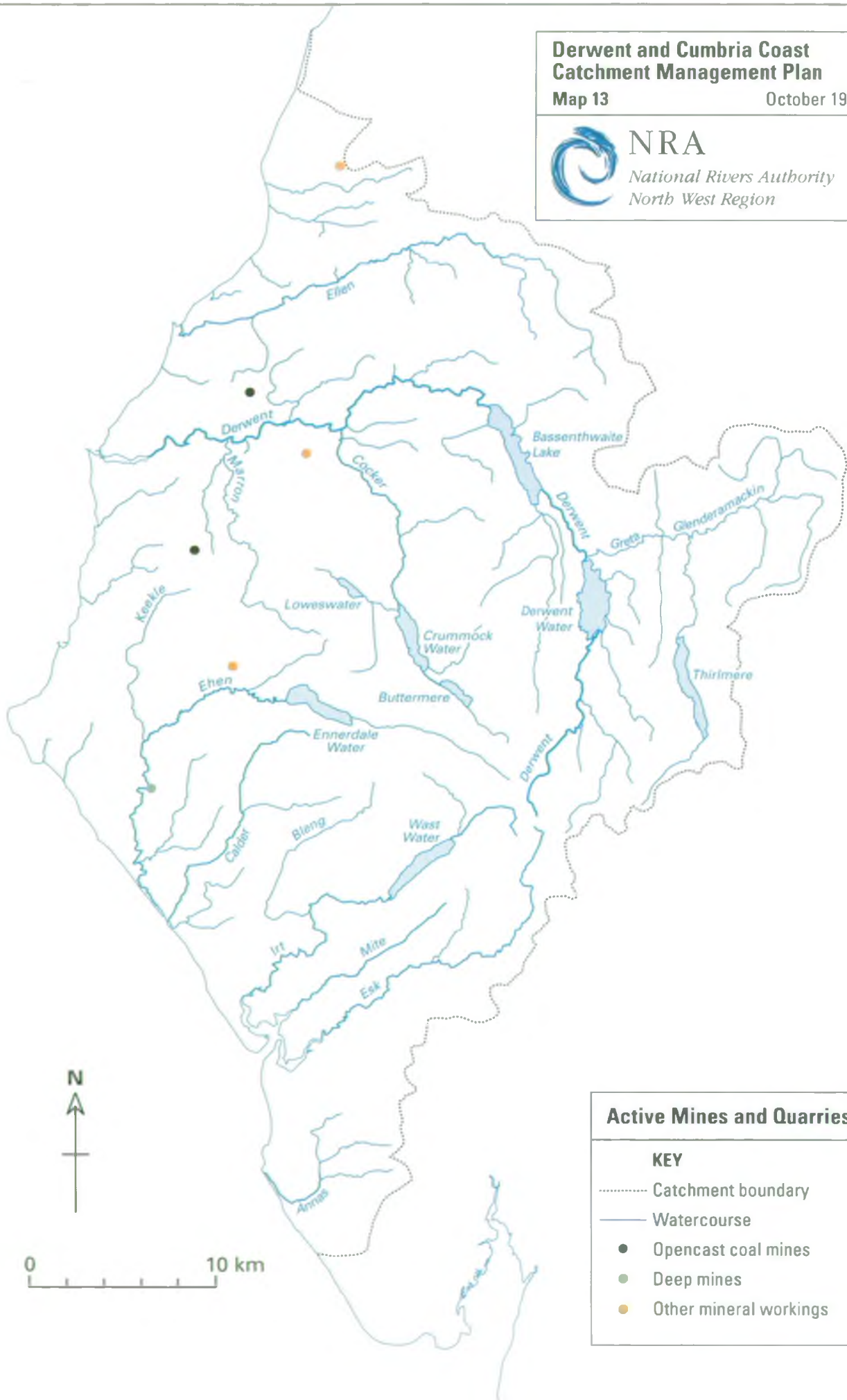
Map 13

October 1994



NRA

*National Rivers Authority
North West Region*



Active Mines and Quarries

KEY

----- Catchment boundary

— Watercourse

● Opencast coal mines

● Deep mines

● Other mineral workings

3.12 MINING AND QUARRYING

3.12.1 General

This use relates to the winning of minerals by either underground workings or surface excavations.

Both these activities can have significant impacts on the water environment both during and after operations.

Quarrying and opencast mining can affect groundwaters by interfering with groundwater flows and removing layers of rock and soil which may otherwise provide protection by limiting or filtering infiltration.

Closed and abandoned mines can impact on water quality by releasing acidic waters rich in metals from the former workings and associated spoil heaps. Such discharges are legally exempt from N.R.A. control.

Working mines and quarries may have a requirement to discharge effluent. Such discharges are controlled through N.R.A. consenting procedures.

3.12.2 Local Perspective

There is a long history of mining and quarrying in this part of Cumbria including metal mining, deep and opencast coal mining and quarrying for stone.

Coal mining was the industrial foundation of West Cumbria, with coal being exported through the ports of Whitehaven, Workington and Maryport. High grade iron ore was found in proximity with the coal and this combination led to a large iron industry in the 19th Century. Since then there has been a decline and the last deep coal mine was closed in 1986.

However, a number of pollution problems remain such as run-off from spoil and discharges from old underground workings. Florence mine near Egremont is the only remaining iron mine. The pumped discharge from this mine is of high quality and is a source of water for B.N.F. to abstract further downstream in the River Ehen.

Opencast coaling has expanded from the early 1960's and 2 working sites remain, although British Coal have no plans to open any new sites. Effluents arise from surface water run-off and are treated before discharge to watercourse.

Historically damage to fisheries habitat has occurred in some tributaries.

The Keekle extension opencast site is currently being reinstated including reinstating the natural river channel which had to be diverted around the periphery of the site during working. The situation was carefully assessed by the N.R.A.'s predecessors and agreed with British Coal Opencast before work commenced so that reinstatement of the channel could return the river to its original course and condition.

The opencast void has also been used to bury the Walkmill former deep mine spoil heap which has previously reduced water quality in the River Keekle.

Other than the problems with ferruginous discharges in the upper Keekle from the Oatlands deep mine spoil heap there are currently no serious problems from metal contamination. There are slightly elevated levels of some metals in upper tributaries notably of the river Derwent due to the presence of old metals mines on the fells.

A number of working quarries remain, some of which have discharges to watercourse which are controlled by N.R.A. consents. Working mines and quarries are shown on Map 13.

3.12.3 Objectives

To ensure no detriment to groundwater and surface water quality and quantity, and to gain water quality improvements where possible.

3.12.4 Environmental Requirements

| | |
|-----------------|---|
| Water Quality - | Compliance by operators with the N.R.A.'s Policy and Practice for the Protection of Groundwater. No detriment to water quality classification, and improvements in quality of downgraded stretches where practical. |
|-----------------|---|

| | |
|------------------|---|
| Water Quantity - | To ensure that any hydrological changes caused by reinstatement of opencast sites or abandoned quarries does not cause increased flood risk, or affect water resources. |
|------------------|---|

USES AND ACTIVITIES

Physical Features - To ensure a policy of no detriment to N.R.A. interests and pursue enhancements to amenity and conservation where possible. To pursue improvements to previously damaged fisheries habitat where appropriate.

3.13 FORESTRY

3.13.1 General

Coniferous forestry can have a number of impacts on the water environment, including:-

- Increased sediment load, particularly during planting, maintenance and felling operations.
- Increased run-off rate during the establishment period.
- Reduced river base flows due to increased evapotranspiration and water storage as the trees mature.
- Concentrate acid deposition leading to ecological damage.
- Loss of wetland habitats and river corridor conservation interest.

Forestry practice in relation to environmental concerns has improved over recent years, and has culminated in the production of "Forests and Water Guidelines" aimed at minimising the impact of forestry on the water environment. The N.R.A. has worked closely with the Forestry Authority to produce these guidelines.

3.13.2 Local Perspective

The largest single tract of commercially managed coniferous forest is Ennerdale Forest, although other significant forests occur across the catchment plan area. Many of the upland streams in the plan area are naturally acidic and have little buffering capacity to deal with any anthropogenically enhanced acidity. Acid deposition from acid rain and locally from forests has increased the level of acidity in some catchments.

Local contact between the N.R.A. and the Forestry Authority is established and the N.R.A. will use this forum to influence the impact of forestry practice on the water environment.

3.13.3 Objectives

To protect the water environment from the potential adverse effects of forestry by adoption of the Forest and Water Guidelines and maintain a continuing dialogue with the Forestry Authority

3.13.4 Environmental Requirements

That the provision of the Forest and Water Guidelines be complied with to minimise the impact of forestry on water quality, water quantity and the physical environment.

4. CATCHMENT OBJECTIVES

4.1 WATER QUANTITY OBJECTIVES

4.1.1 General

The primary objective of the N.R.A. will be to conserve and to ensure the proper use of water resources within the catchment.

4.1.2 River Low Flows

It is the aim of the N.R.A. to determine a range of seasonal river flows appropriate to the maintenance of the characteristic habitat and river ecosystem. The N.R.A. will determine the proper balance of water resource usage and cost-benefit justified management strategies for alleviating problems.

4.1.3 Further Demands for Water Use

The N.R.A. is analysing data on water use and will be reviewing forecasts of future demand for the purpose of anticipating needs for water resources developments. All opportunities will be taken to encourage cost effective demand management, particularly in the context of leakage control, prior to the licensing of additional supplies.

4.1.4 New Abstractions

The impacts of new abstractions will be carefully considered on their own merits and viewed in the light of the sensitive issues and problems specific to the catchment. Small low loss abstractions will generally be acceptable. However any proposed abstraction other than those in small low loss category will need to be supported by an environmental statement which adequately demonstrates that material adverse environmental impacts will not arise. The N.R.A. will seek to improve controls on existing licences whenever the opportunity arises.

4.2 WATER QUALITY OBJECTIVES

4.2.1 River Quality Measurement

The N.R.A. uses two major schemes. The General Quality Assessment (GQA) scheme, which is used to make periodic assessments of water quality irrespective of the uses applying to a river stretch. The water quality objectives (WQO's) scheme, which is used for the setting of water quality targets to protect specific river uses. These new schemes have replaced the National Water Council (NWC) scheme, upon which previous references to water quality have been based.

The WQO scheme establishes clear quality targets in Controlled Waters, to provide a commonly-agreed planning framework for regulatory bodies and dischargers alike. The proposed WQO scheme is based upon the recognised uses to which a river stretch may be put. These uses include: River Ecosystem; special Ecosystem; Abstractions for Potable Supply; Agricultural/Industrial Abstraction; and Watersports. The first phase of WQO implementation will be restricted to the River Ecosystem Use only. (Standards for the River Ecosystem Use were introduced by *The Surface Waters (River Ecosystem) (Classification) Regulations 1994*; standards for further uses are still under development.) For each stretch, a target River Ecosystem (RE) use class will be proposed including a date by which this level of water quality should be achieved. There are five classes within the RE scheme, one of which will be applicable to almost every stretch of classified river. The term 'Ecosystem' is used in recognition of the need to protect the ecosystem that is sustained in a healthy river. The proposed standards for River Ecosystem use classes are based on the chemical water quality requirements of different types of ecosystem. Until WQO's are formally established by legal Notice, they will be applied on a non-statutory basis by translation of River Quality Objectives (RQO's) from NWC grades to appropriate River Ecosystem classes and target dates.

4.2.2 N.R.A. Strategy for Water Quality

These schemes are new and in the preliminary stages of implementation, however the N.R.A.'s principal aims in relation to water quality remains the same, that is to achieve a continuing overall improvement in the quality of rivers, estuaries and coastal waters, maintaining waters that are already of high quality, improving waters of poorer quality, and ensuring that all waters are of an appropriate quality for their agreed use.

Although the water uses have been largely identified throughout this plan, the standards relevant to each use have not been determined yet and therefore the water quality requirements quoted do not incorporate these aspects.

Derwent and Cumbria Coast Catchment Management Plan

Map 14

October 1994



NRA

National Rivers Authority
North West Region



Water Quality Objectives

KEY

- Catchment boundary
- Watercourse
- Rivers ecosystem 1
- Rivers ecosystem 2
- Rivers ecosystem 3
- Rivers ecosystem 4
- Rivers ecosystem 5
- Rivers ecosystem unclassified
- Bathing waters

OBJECTIVES

However the plan will be updated annually and will therefore take account of uses other than the present Ecosystem, as further use standards are introduced.

Existing legislation allows the Secretaries of State for the Environment and for Wales to set Statutory Water Quality Objectives (S.W.Q.O.'s) acting on N.R.A. advice. They will begin with rivers. These will build upon the present system of informal River Quality Objectives. Once S.W.Q.O.'s are set, the N.R.A. will have a statutory obligation to take all measures to ensure compliance with these standards and will be accountable for non-compliance.

4.2.3 River Ecosystem Class Targets

Proposed target classes for the Rivers Ecosystem (RE) are shown on map 14.

The River Ecosystem classification comprises five classes, in order of decreasing quality; RE1, RE2, RE3, RE4 and RE5. The criteria which waters are required to meet are set out for ease of reference in the table below.

It is encouraging to find that over 97% of the stretches of watercourse in the catchment are of RE1 and RE2" ie. high water quality.

RIVER ECOSYSTEM CLASSIFICATION: WATER QUALITY CRITERIA

| Class | Dissolved Oxygen % saturation 10 Percentile | BOD (ATU) mg/l 90 Percentile | Total Ammonia mg N/l 90 Percentile | Un-ionised Ammonia mg N/l 95 percentile | pH Lower limit as 5 percentile, upper limit as 95 percentile | Hardness mg/l CaCO ₃ | Dissolved Copper ug/l 7213 95 Percentile | Total Zinc ug/l 7245 95 percentile |
|-------|---|------------------------------------|--|---|--|--|---|---|
| RE1 | 80 | 2.5 | 0.25 | 0.021 | 6.0-9.0 | ≥10 >10 and ≤50 >50 and ≤100 >100 | 5 22 40 112 | 30 200 300 500 |
| RE2 | 70 | 4.0 | 0.6 | 0.021 | 6.0-9.0 | ≥10 >10 and ≤50 >50 and ≤100 >100 | 5 22 40 112 | 30 200 300 500 |
| RE3 | 60 | 6.0 | 1.3 | 0.021 | 6.0-9.0 | ≥10 >10 and ≤50 >50 and ≤100 >100 | 5 22 40 112 | 30 200 300 500 |
| RE4 | 50 | 8.0 | 2.5 | - | 6.0-9.0 | ≥10 >10 and ≤50 >50 and ≤100 >100 | 5 22 40 112 | 30 200 300 500 |
| RE5 | 20 | 15.0 | 9.0 | - | - | - | - | - |

4.2.4 Failures to Meet R.E. Targets

(a) Failures due to causes beyond N.R.A. control

Natural enrichment of certain substances can occur due to the process whereby without human interference a given body of water receives from the soil certain substances contained therein.

A list of these is given in the table below and they are shown on map 15 in green.

| Number (see map 15) | River Affected | Details |
|---------------------------|--|--|
| 1. | Dub (Park) Beck | Natural acid stress |
| 2. | Mosedale Beck | Natural acid stress |
| 3. | Sail Beck | Natural acid stress |
| 4. | Warnscale Beck | Natural acid stress |
| 5. | Newlands Beck | High zinc |
| 6. | Coledale Beck | Natural acid stress and high zinc from disused mine workings |
| 7. | Coledale Beck | Natural acid stress |
| 8. | Glenderaterra Beck QSL Burnt Horse to Glenderamackin | Zinc from disused quarry |
| 9. | River Esk | Natural acid stress |
| 10. | River Liza | Natural acid stress |

(b) Failures due to industry/agriculture

Stretches with water quality problems resulting in failure to comply with the Rivers Ecosystem Targets are shown on map 15 in red.

Derwent and Cumbria Coast Catchment Management Plan

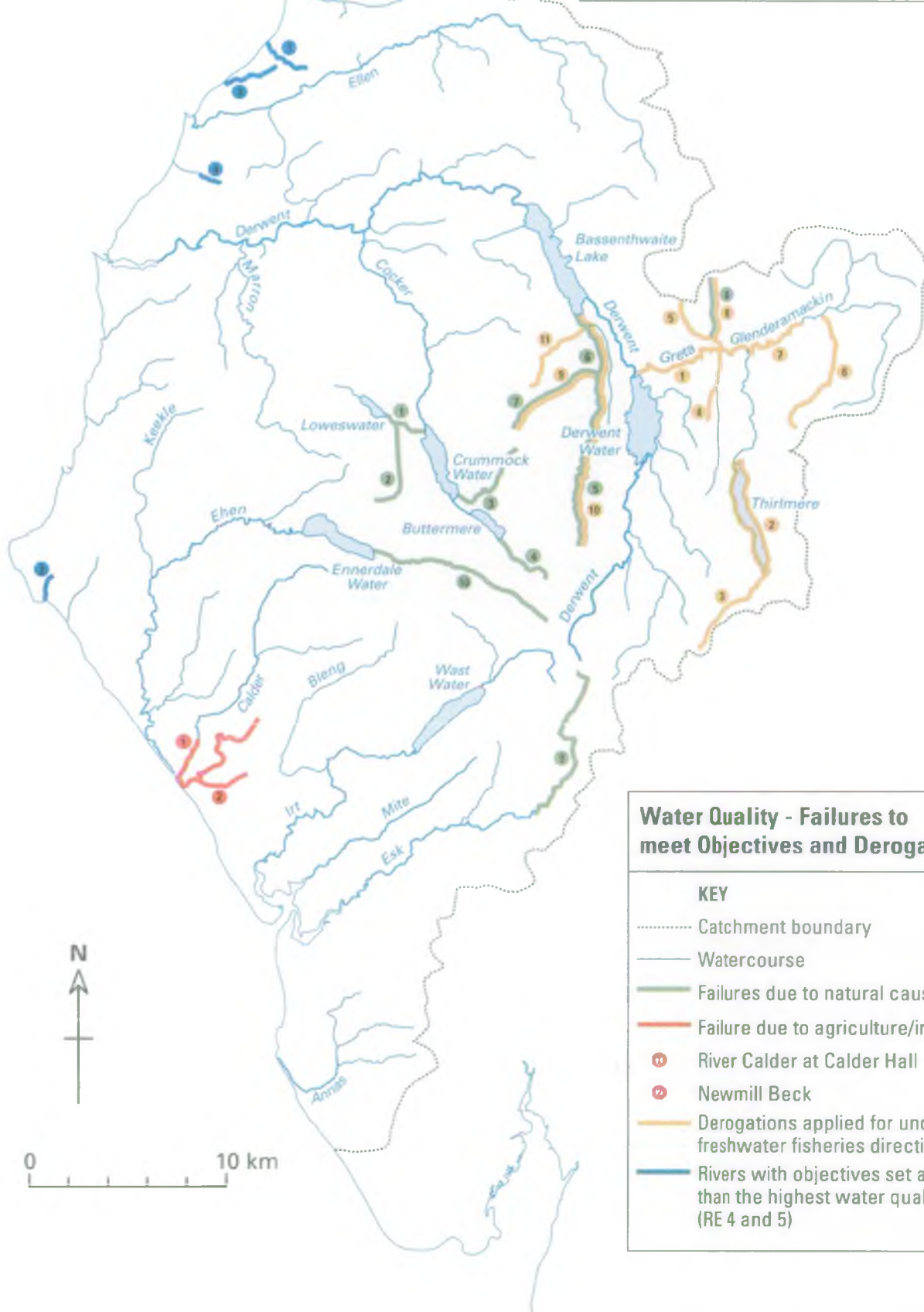
Map 15

October 1994



NRA

National Rivers Authority
North West Region



Water Quality - Failures to meet Objectives and Derogations

KEY

- Catchment boundary
- Watercourse
- Failures due to natural causes
- Failure due to agriculture/industry
- ⑪ River Calder at Calder Hall
- ⑫ Newmill Beck
- Derogations applied for under EC freshwater fisheries directive
- Rivers with objectives set at less than the highest water quality (RE 4 and 5)

(1) *River Calder at Calder Hall*

Target Class RE1

Failure to meet the target is due to contaminated cooling water, where the packing material in the cooling towers is a source of copper and the timber frames are coated with a wood preserving chemical. An interceptor sewer has recently been installed which has resulted in the discharge to the River Calder being diverted to a long sea outfall. The Company is now required to use plastic packing material in all new cooling towers.

Although the quality of the River Calder at this site has improved immediately due to the above measures, we will need to obtain sufficient data to formally reclassify and this will not be before December 1995.

(2) *Newnull Beck and its Tributary*

Target Class RE3

Failure to meet the target class is due to farm sources. An Agricultural Improvement scheme has been completed and for similar reasons as in (1) we cannot reclassify until December 1995.

4.2.5 Rivers with Class 4 or 5 Objectives

These river stretches represent less than 1% of the total length of watercourses in the catchment and are notably small coastal tributaries. The N.R.A. wishes to see improvements in these stretches, but cannot set higher objectives for the short term, unless committed investment is in place to achieve an improvement.

The table below identifies these stretches and gives reasons for the poor water quality and possible long term actions by the N.R.A. These stretches are identified on map 15 in blue.

| Watercourse (see map 15) | Current Target Class | Cause |
|-----------------------------|----------------------|---|
| 1. Brunswow Beck | RE4/unclassified | Crosby Villa STW and possible diffuse farm drainage |
| 2. Rottington Beck | RE5 | Sandwith STW - recently abandoned in favour of pumping sewage to Whitehaven. Data gathered to date has been insufficient to re-classify |
| 3. Scad Beck | RE4 | Crosby STW |
| 4. Furnace Gill | RE4 | Broughton Moor STW. Due for improvement before December 2005 |

4.2.6 Water Quality Designated Under Freshwater Fish Directive 78/659/EEC - Derogations

There are several upland stretches within the catchment that intermittently fail to comply with the mandatory standards for Zinc as specified in the above Directive.

Article 11b of the same Directive makes provision for derogations in situations where natural conditions are a cause of non-compliance.

Applications for derogations have been made for the following stretches under the above provision (shown on map 15 in orange):-

- (1) River Greta: from River Glenderaterra at St. John's Beck to River Derwent.
- (2) Thirlmere: from the head of the reservoir to the dam.
- (3) Wyth Burn: High rise to Thirlmere.
- (4) Naddle Beck: Eddy Grave State to the River Greta.
- (5) Whit Beck from Jenkin Hill to Glenderamackin.
- (6) Mosedale Beck from Great Dodd to River Glenderamackin.
- (7) River Glenderamackin from Guardhouse to River Greta.
- (8) Glenderaterra Beck: from Burnt Horse to River Greta.
- (9) Coledale Beck from Cragg Hill to Newlands Beck.
- (10) Newlands Beck from Seatoller Fell to Bass Lake.
- (11) Coombe Beck from Grisedale Pike to Newlands Beck.

The source of the zinc in every case is believed to be due to past mining activities.

Exceptions are applied to ensure that where poor quality is found for one determinand (over which the N.R.A. has little control) this does not provide an excuse for the deterioration of quality in other determinands.

4.2.7 Bathing Water Directive (76/160/EEC)

The catchment has several designated bathing beaches which are monitored as requirements under the above Directive.

The two main objectives of the Directive are to improve or maintain the quality of bathing water for amenity reasons, and to protect public health. Although the N.R.A. implement the sampling and analysis pursuant to the Directive, it does not have any responsibilities for public health.

Bathing waters so designated are at Silloth, Allonby, Allonby South, St. Bees and Seascale.

These bathing waters do not consistently pass the requirements of the Directive as a result of local sewage discharges. However the N.R.A. has agreed schemes with North West Water to bring about compliance by the 1996 bathing season and this work is well under way.

The identified bathing waters are shown on map 14.

4.3 PHYSICAL FEATURES OBJECTIVES

4.3.1 General

The physical state of the catchment has an impact on many of the identified uses of the catchment. It will therefore generally be the aim to maintain and improve the physical state of the catchment to further the overall objectives of the N.R.A.

4.3.2 Conservation

In addition to the objectives laid out in 3.6.4 the N.R.A. will aim to promote the following:-

Presence of uncultivated vegetation along the river to provide habitats, shade and cover for wildlife, a buffer against diffuse pollution and to enhance the quality of the river corridor landscape.

Presence of natural features such as aquatic vegetation, meanders, cliffs, shoals, pools and riffle for conservation of the river corridors and to enhance the landscape.

Promote initiatives through routine and non-routine maintenance that would increase the conservation value of the river corridor.

Seek maintenance regimes which encourage (and not destroy) ecological diversity, whilst maintaining flood defence levels of service.

No development that would reduce the conservation value of the river corridor.

Where water levels play a significant role in maintaining the conservation interest of important sites, the N.R.A. will initiate production of site specific Water Level Management Plans in conjunction with landowners and other third parties.

4.3.3 Flood defence

A system is under development by the N.R.A. to determine the present standard of service, being achieved for Flood Defence maintenance.

OBJECTIVES

The system determines whether present levels of river maintenance have produced a level of protection to the target standard. The river system is divided into reaches between 4-7km in length. An assessment is made of the "Land Use" by considering for each the agricultural or urban content within the flood plain and for each element (eg. road, house, intensive grazing) a score is given. The score is measured by a single unit called a "House Equivalent" and by the score achieved, the reach is placed into one of several Land Use Bands. The typical land use relating to each bank is shown below.

| Land Use Band | Description of Typical Land Use |
|---------------|---|
| A | <p>A reach containing the urban elements of residential and non-residential property distributed over a significant proportion of its length, or densely populated areas over some of its length. Any agricultural influence is likely to be over-ridden by urban interests. amenity uses such as parks and sports fields may be prominent in view of the flood plain's proximity to areas of population density.</p> <p>Band A = 50 or more house equivalents/km</p> |
| B | <p>Reaches containing residential and/or non-residential property either distributed over the full length of the reach or concentrated in parts but characterised by lower densities than Band A.</p> <p>Band B = 25 to 49.99 house equivalent/km.</p> |
| C | <p>Limited numbers of isolated rural communities or urban fringe at risk from flooding, including both residential and commercial interests.</p> <p>Band C = 5 to 24.99 house equivalents/km.</p> |
| D | <p>Isolated, but limited number of residential and commercial properties at risk from flooding. Agricultural use will probably be the main customer interest with arable farming being a feature. In undeveloped pockets of largely urban use, amenity interests may be prominent.</p> <p>Band D = 1.25 to 4.99 house equivalents/km.</p> |
| E | <p>There are likely to be very few properties and major roads at risk from flooding in these reaches. Agricultural use will be the main customer interest with either extensive grassland or, where the flood plain extent is small, arable cropping being the most common land uses. Amenity interests are likely to be limited to public footpaths along or across the river.</p> <p>Band E = 0.01 to 1.24 house equivalents/km.</p> |

Capital Works

The target standard for urban flood defence schemes is a return period of 1 in 100 years, although lower standard can be accepted if this is all that can be justified by a cost/benefit analysis.

The N.R.A. also aims to:-

Ensure provision of access for maintenance of the river channel and flood defence structures.

Ensure adequate channel capacity by removing any major obstructions to river flow.

4.3.4 Fisheries

To ensure all fish passes operate satisfactorily and that there are no artificial obstruction to those parts of the river systems used by migratory salmonids.

To improve known areas of degraded fisheries habitat, and undertake a habitat survey to identify further suitable areas for improvement.

4.3.5 Water Resources

To ensure that the physical arrangements associated with new abstractions are in keeping with the requirements of conservation and fisheries interests.

5. CURRENT STATE OF THE CATCHMENT

5.1 WATER QUANTITY

5.1.1 Water Resources

At any given time the availability of water resources will be dependent on previous rainfall, natural and man made storage of that rainfall and the manner in which it is being exploited.

There is a great contrast between parts of the catchment with high rainfall at Styhead near Borrowdale with an average of some 4080mm per year and low rainfall at Stainburn near Workington with an average of some 1030mm per year.

Run-off from the catchment is rapid due to the steep gradients and underlying geology. Surface sources are abundant but flows vary considerably depending on rainfall.

A number of lakes are used as major water resources with smaller natural lakes having had their capacity increased by the construction of weirs at Ennerdale and Crummock Water and a dam at Thirlmere.

The sandstones associated with the coastal plain form a major aquifer from which there are a number of significant abstractions, mainly for industrial purposes.

5.1.2 Abstraction Licences

Exploitation of water resources by abstractions for various uses is dominated by two classes of abstractor: public water supply undertakings and industrial users. A large amount of water is exported from the catchment each day via North West Water's Thirlmere Aqueduct. The industrial users are mainly at Sellafield, taking water from various sources and locations, or in the Workington area.

To protect the environment and other abstractors, licences may contain conditions requiring a reduction or cessation of abstraction once specific lower river flows occur. Larger abstractions, particularly for public water supply, have conditions requiring compensation flow releases to be made to maintain downstream river flows.

Because of the reliance on rainfall to maintain base flows in some of the upper reaches of the rivers there can be natural low flows during prolonged dry periods. This can have an adverse effect on small scale abstractions resulting in Drought Orders being sought in the past.

CURRENT STATE

At times of dry weather low flows in the River Irt downstream of Wastwater have caused concern and comment. Investigations confirm the main abstractor (B.N.F. plc) complies with their licence conditions and make compensation releases when required (see also issue 6.3.3b).

There has been some concern over the level of drawdown in Ennerdale Lake during drought conditions. The N.R.A. will monitor the new operating agreement negotiated with N.W.W. to limit drawdown and reduce abstraction from this important lake (see also 3.5.2).

Derwent and Cumbria Coast Catchment Management Plan

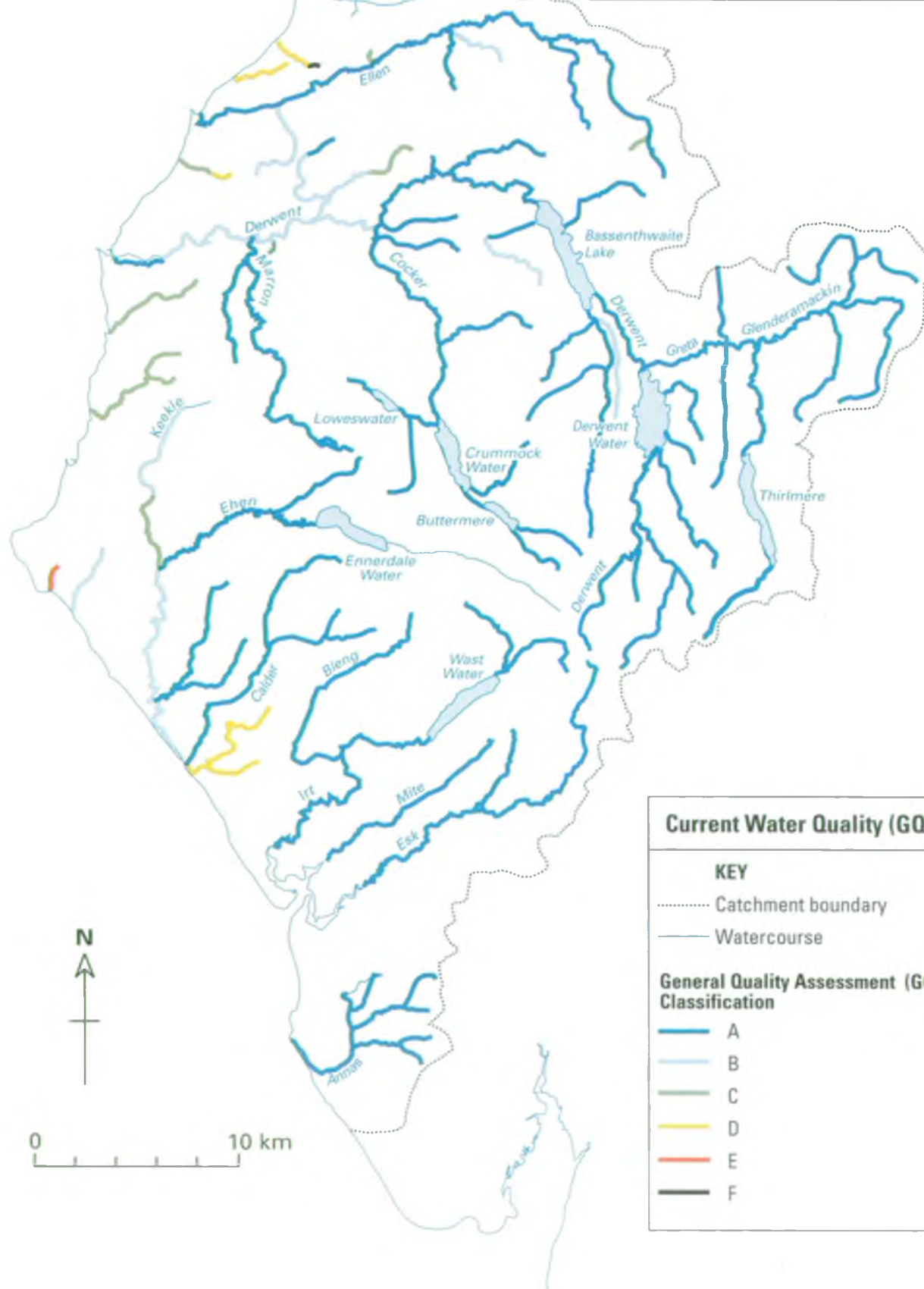
Map 16

October 1994



NRA

National Rivers Authority
North West Region



5.2 WATER QUALITY

5.2.1 General Quality Assessment Scheme (G.Q.A.)

At present the G.Q.A. classification provides a means of assessing and reporting on general chemical water quality of rivers in a nationally consistent manner.

The G.Q.A. scheme as currently envisaged may well have four components, general chemistry, nutrients, aesthetics and biology - each providing a discrete "window" upon the quality of river stretches.

Only the general chemistry component has been fully developed at present.

A detailed representation of the Water Quality in terms of G.Q.A. is given in map 16.

The criteria used for the G.Q.A. scheme is given in the table below.

CHEMICAL COMPONENT OF THE GENERAL QUALITY ASSESSMENT SCHEME FOR RIVER AND CANALS

| Grade | Dissolved Oxygen % SATN | BOD (ATU) mg/l | Total Ammonia AS N mg/l |
|-------|----------------------------|-------------------|----------------------------|
| | 10 Percentile | 90 Percentile | 90 Percentile |
| A | 80 | 2.5 | 0.25 |
| B | 70 | 4 | 0.6 |
| C | 60 | 6 | 1.3 |
| D | 50 | 8 | 2.5 |
| E | 20 | 15 | 9.0 |
| F | <20 | - | - |

5.3 *PHYSICAL FEATURES*

5.3.1 *General*

This section identifies some shortfalls from the objectives set in Section 4.3.

In addition it has been possible to identify where some extra survey work is required to enable assessment of where physical improvements are needed.

5.3.2 *Conservation*

The major concern is a lack of habitat survey information to enable assessment to be undertaken. The N.R.A. nationally is currently developing a comprehensive river habitat survey methodology due for implementation in 1995. Until then no further strategic survey work is planned.

Current policy is to ensure no detriment and to pursue enhancements where possible.

5.3.3 *Flood Defence*

Standards of service maps have been established for Flood Alleviation Standards, and standards for land drainage are being determined.

The establishment of these standards will influence future maintenance programmes.

It is not practical in such a rural area to protect every isolated property from a risk of flooding. As a result some properties are known to flood on occasions. Where possible such problems will be alleviated by ongoing channel maintenance and again, where possible flood warnings will be issued to property that is likely to flood. Where a cost benefit can be demonstrated capital schemes will be included in the long term programme.

5.3.4 *Fisheries*

Habitat for fisheries is generally good, but there are exceptions to this rule. Areas of the Keekle have been damaged by pollution from abandoned spoil heaps, and Lostrigg Beck has been lost as a spawning beck due to previous opencast coaling. Other tributaries are thought to be suffering from siltation and compaction. All these sites will be included in N.R.A. investigations into sites deemed potentially suitable for habitat modifications.

6. DESCRIPTION OF CATCHMENT ISSUES

6.1 INTRODUCTION

The catchment management planning process has involved a detailed consideration of the catchment, and from this work the following issues have been identified.

Resolution of these issues will allow the N.R.A. to achieve its objectives for the catchment and ultimately the vision.

These issues and the various options presented for resolving them now require the consideration of all those with an interest in the water environment of the catchment area. Comments on the identified issues and options and suggestions for new ones are therefore invited.

For ease of reference the issues are grouped under headings to indicate the major area of interest which the issues address.

These divisions are somewhat arbitrary and are not meant to indicate work for particular functions within the N.R.A. The N.R.A. will approach all issues in an holistic way to find a balanced and integrated way forward.

6.2 CATCHMENT WIDE ISSUES

6.2.1 Water Quality Issues

6.2.1a Pollution by Farm Drainage

Agriculture is the largest industry in the catchment area and poses a significant risk to the water environment from the production, storage and transport of a number of highly polluting effluents and agrochemicals.

The number of farm pollution incidents has declined in recent years, and the N.R.A. will continue to work with the farming community and seek further improvements.

The N.R.A. acknowledges and welcomes the farming communities efforts to improve farm effluent control. The N.R.A. is however concerned that the reduction in M.A.F.F. grant for pollution prevention work from 50% to 25% could jeopardise this trend.

In limestone areas pollution of springs by silage liquor occurs. Biological tracers (bacteriophages) have been successfully used to locate the silage installations causing the problem. Appropriate actions have been and will continue to be taken to prevent future pollution.

Where chronic problems of farm pollution occur the N.R.A. will mount campaigns to visit every farm in that catchment. To prevent acute incidents and future chronic problems the N.R.A. will continue to enforce The Control of Pollution (Silage, Slurry and Agricultural Fuel Oils) Regulations 1991.

The Authority have a strong enforcement policy with regard to farm pollution, and prosecutions will be taken against polluters in appropriate cases.

6.2.1b Acid Stress in the Upper Tributaries of Some Rivers

This problem is restricted to the upper catchments of streams rising on hard rock such as the Borrowdale volcanics. Such streams are naturally acidic and cannot buffer the increased acidity caused by the burning of fossil fuels.

The most extreme manifestations of this problem were the mortalities of salmon and sea trout in the river Esk in 1980 and again in 1983. There have been no similar mortalities recorded since.

In the 1980's North West Water Authority, and later the National Rivers Authority, undertook a European Community funded project to investigate whether agricultural liming could neutralise the acidification of rivers. It was concluded in this study and others, undertaken elsewhere, that liming is only effective when it is applied to water source areas such as boggy uplands and wet flushes. Unfortunately, liming destroys the ecology of such areas and is therefore unsustainable.

Forestry has been shown to exacerbate the problem of acidification by "scavenging" acid particles from the atmosphere as well as creating acidity through metabolism and thus increases the acidity of the run-off. The Department of the Environment has identified areas sensitive to acidification. The Forestry Authority has agreed not to promote planting in such areas.

The effective way to reduce the extent of this problem is to reduce the emissions of acidic gases into the atmosphere.

6.2.1c Lack of Rural Sewerage Systems

In some areas, for example Drigg, Bootle Station and Eskdale Green there is little or no communal sewerage or sewage treatment. This has led to reliance on a plethora of private septic tanks and treatment plants. This makes the situation difficult to control and has led to localised problems of pollution.

The only way to satisfactorily control the situation in the long term is to influence development in critical areas by working with local planning authorities, and promote the adoption of first time rural sewerage by North West Water, the local authority or other body.

North West Water's investment programme outlined in AMP2 does not address this need in the medium term, so sewerage the areas is likely to remain a long term scenario.

6.2.1d Lack of Sewage Treatment Along the Cumbria Coast

A large proportion of the population within the catchment live along the coastal strip, principally in the towns of Maryport, Workington, Whitehaven and Egremont.

The bulk of this sewage is discharged into the sea with minimal treatment. Some of these discharges include trade effluent discharged to sewer by factories, but domestic sewage forms the bulk of the flows.

The discharges from Seascale, St. Bee's, Allonby, Silloth, Skinburness, and Maryport cause designated bathing waters to fail the mandatory limits laid down in the E.C. Bathing Water Directive.

Overflows from combined sewers also contribute to failure in some areas (see 6.2.1e).

After lengthy negotiation with the N.R.A. North West Water will be installing schemes at these sites to treat the sewage and/or discharge along long sea outfalls. These schemes are designed to ensure all identified bathing waters in the catchment comply with the E.C. directive by the 1996 bathing season. The Seascale scheme incorporating primary treatment and a long sea outfall is already under construction, as are the beginnings of other sewerage improvements along the coast.

Remaining significant coastal discharges will be improved under the requirements of the E.C. Urban Wastewater Treatment Directive (U.W.W.T.).

This will include schemes at Braystones, Whitehaven, Lillyhall and Workington. All this work is included in North West Water investment strategy although the precise timing of the work is not yet finalised. Some of the work required to achieve compliance with the U.W.W.T. Directive need not be completed until 2005.

The Secretary of State for the Environment has recently announced that the waters of the Cumbria Coast at Braystones, Workington and Whitehaven have been designated as "high natural dispersion areas" under the terms of the U.W.W.T. Directive.

Any discharges of sewage effluent not covered by the requirements of either of the above directives is unlikely to be included in North West Water's investment programme up to 2000.

6.2.1e Impact of Combined Sewer Overflows (CSO's)

Sewers on the catchment are largely combined with both foul and surface waters in the same sewer. Such systems incorporate overflows to watercourses which operate during heavy rainfall to prevent flooding.

54 of the 139 C.S.O.'s on the catchment have been identified as unsatisfactory by the N.R.A. and highlighted to North West Water. Only a proportion of these unsatisfactory C.S.O.'s will be dealt with in the next ten years as there is no statutory requirement to address all these problems. The N.R.A. and N.W.W. have prioritised the list of unsatisfactory C.S.O.'s to assess which will be addressed on a cost benefit basis.

The bulk of the C.S.O.'s on the catchment do not cause significant water quality problems, although there is a need to assess the level of solids retention which, can give rise to aesthetic concerns, and frequency of operation of some overflows.

Work to rectify a number of long standing problems has been confirmed. This includes, for example, dealing with 9 overflows to the River Ellen at Maryport, and 7 overflows in the Workington area. These will be picked up as part of the North West Water scheme to deal with sewage discharge problems along the Cumbria Coast outlined under 6.1.10 above.

Overflows at Allonby, Seascale and St. Bee's will be dealt with as part of the E.C. Bathing Water Directive compliance work in these areas.

Storm sewage from Keswick STW discharges to Wath Beck, a small tributary of the River Derwent, causing stock watering problems to local farmers.

Plans are in hand to divert this discharge to the River Derwent where there is significantly greater dilution and speed of flow. When there is a significant storm and the outfall capacity is exceeded some treated effluent will be discharge to Wath Beck. This will lead to a significant improvement in Wath Beck with no overall change in discharges to the River Derwent.

In the long term the N.R.A. would like to see a cessation of all discharges to Wath Beck.

6.2.1f Pollution caused by Contaminated Surface Water Outfalls

Surface water drainage from industrial estates and other development may discharge direct to a watercourse and can be contaminated by cross connections, spillages, etc.

There are 7 such significant discharges on the catchment, and these are identified in Appendix 3.

North West Water committed themselves to rectifying these problems at privatisation of the water industry, and progress is being made.

The N.R.A. will continue to visit premises and mount pollution prevention campaigns as and when appropriate.

Surface water outfalls which are currently relatively uncontaminated may become contaminated during alterations and developments. The N.R.A. will seek to prevent such contamination at the development stage.

6.2.1g Development in Areas where Sewers and/or Sewage Treatment Works are at or near to Design Capacity

In some areas old sewerage systems and their associated sewage treatment works are at or approaching their design capacity. In such areas any significant development leading to further loading on the system has the potential to overload the system, and cause water quality problems from premature storm discharge and reduced final effluent quality.

The situation is being discussed with North West Water to quantify the position more clearly, and look at long term solutions. Influence over development in critical areas will be exerted by liaison with local planning authorities.

6.2.1h Impact of Opencast Coal Mining

There is a long history of opencast coaling in West Cumbria, some of which has caused environmental problems. British Coal has no plans to develop new opencast sites in Cumbria in the foreseeable future but 2 sites are still active.

These discharge settled effluents and coal is also stored at times which tends to leach acid run-off and can produce iron staining.

During restoration the N.R.A. will press for measures to ensure the increased run-off which can occur does not cause a flood risk.

Previous opencast activity has altered habitat and flow regimes in Lostrigg Beck to the point where it is effectively lost as a spawning and nursery area for salmonids. This area will be included during N.R.A. investigations into sites deemed potentially suitable for habitat modifications.

Close liaison will be maintained with British Coal to ensure that wherever possible problems are anticipated and dealt with.

Of concern to the N.R.A. is the possibility of private companies whose operations are previously unknown to the N.R.A. setting up opencast operations if the coal industry is privatised.

The N.R.A. is currently liaising closely with British Coal regarding the reinstatement of the channel of the River Keekle which was diverted around the Keekle opencast site during coaling operations. The situation before work started was agreed between the N.R.A.'s predecessor and British Coal prior to coaling. This agreement will form the blueprint for channel reinstatement works on the basis of no detriment and enhancements where possible.

In addition, the opportunity has been taken to bury the former deep mine spoil heap at Walkmill into the excavation at the Keekle site. Drainage from this spoil had severely polluted the river for several decades.

Burial of this spoil should lead to considerable improvements to water quality and fisheries interests.

There will be a need to monitor groundwater quality and movement in the vicinity to ensure the buried spoil heap has been effectively sealed, although it will be some time before the efficacy of this operation is known.

6.2.2 Fisheries Issues

6.2.2a Fish Stocks Status and Management

A good knowledge of fish stocks and the factors that affect them is essential for the N.R.A. to maintain, improve and develop fisheries effectively.

The major fisheries issue on the catchment concerns a reported decline in rod and line catches of salmon and sea trout. A number of anglers and interested parties have expressed concern about the status of salmon and sea trout stocks. Particular concerns are the reduced catches in the Upper Derwent, above Bassenthwaite Lake and the rivers Marron, Ehen and Irt.

These concerns are often based upon poor individual catches and/or the absence of visible fish.

Currently, little is known about the exact relationship between catch, stock, fishing effort, fishing methods and environmental variables. In many cases the assumption is made that reduced catches are due to smaller stocks of fish being available.

The N.R.A. utilises a variety of techniques to assess stocks, which include:-

Rod and Line Catch Returns

Anglers who fish for salmon and sea trout are required to submit catch returns detailing numbers and sizes caught. In recent years a record of effort is also asked for. It is vitally important that a representative and accurate picture of catches is obtained in order to monitor trends effectively.

Log Books

Detailed information concerning catch and effort can be obtained from log books. A log book scheme has been in operation in the area since 1992.

Fish Counters

The N.R.A. has been extensively involved in the construction and development of electronic fish counters. Such counters can provide quantitative information of the flow requirements of migratory fish as well as information on their size and timing of runs.

Survey Data

Prior to 1992 surveys were carried out usually in response to a problems that had been highlighted. Since 1992 there has been a programme of planned, strategic surveys designed to obtain baseline information on juvenile fish stocks.

Where appropriate, surveys designed to address specific issues will still be undertaken.

Additionally, little is currently known about the population and breeding sites of Char in Ennerdale and Wastwater. The fish of Ennerdale are currently the subject of extensive research the results of which will be used in formulating policy particularly with regard to the Char.

In Wastwater a baseline survey utilising echo sounding techniques will be undertaken.

Redd Counts

Every year, where possible (allowing for weather conditions) a record is made of spawning activity throughout the catchment.

Stocking Activity

Some parties in the area are calling for greater stocking effort by the N.R.A. There is a need for greater awareness of the possible consequences of stocking both in terms of its effect on the wild fish populations and the likelihood of improvement to stocks.

Following completion of strategic surveys of juvenile stocks comparison between different sites, river systems and years will provide a picture of those areas that are performing well and those that are not.

Nursery streams are being assessed to determine their suitability for restocking, including the numbers of fish to be stocked. The N.R.A. is also reviewing its current stocking practice. The aim of this work is to ensure that restocking is carried out where and when appropriate utilising the optimum number of juvenile salmonids. This will result in a river by river statement of stocking requirements.

Fisheries Management Plan

Concern has been expressed that much of the work undertaken by the N.R.A. on behalf of the areas fisheries is not known about or understood by the users or owners of these fisheries.

To improve the flow of information, exchange views and to create a structured overall approach to the fisheries in the area a West and South West Cumbria Fisheries Management Plan is to be produced. The plan will be the subject of substantial consultation and will establish and agree actions.

6.2.2b Problems with Degraded Fish Habitat and Lack of Comprehensive Information on Habitat Quality

No fisheries habitat improvements have been carried out on the catchment since in the main habitat for fish was thought to be in a reasonable condition.

However a number of localised problems are known to exist and the N.R.A. intends to undertake a survey to identify areas where physical habitat rehabilitation may be appropriate.

Where spawning beds are found to be suffering from siltation and compaction action may be taken in the short term. This work generally requires careful hand clearance of weeds and manual raking. Mechanical methods create too much disturbance and benefits to fish spawning can be lost.

This work could be done in-house, or possibly by riparian owners.

6.2.2c Impact of Gravel Extraction and Disposal on Fisheries and Conservation Interest

The N.R.A. removes gravel from various locations on rivers throughout the catchment, to reduce the risk of flooding to properties. Historically the gravel was then taken by construction companies but this route for disposal has been declining. The N.R.A. must now find ways of disposing of this gravel without detriment to the National Park. To avoid conflict with fisheries and other nature conservation interests the work must be done within strict time constraints to an agreed method statement. This can create problems if gravel removal is urgent but not within the agreed time slot.

The N.R.A. will explore the possibility of removing gravel on a little and often basis in an attempt to minimise the environmental impact of these operations.

The disposal of gravel is a more difficult problem, and the N.R.A. will explore various options for disposal including the possibility of using the gravel for fisheries habitat improvements in other areas.

Riparian owners in some instances are wishing to remove gravel to improve angling success on their beat. There is concern among other riparian owners that this is detracting from their fishery by holding fish in "improved" areas. The N.R.A. is concerned to protect the overall fishery interest of the rivers and would be opposed to widespread gravel extraction. The N.R.A. will therefore monitor this situation to ensure there is no negative impact on the overall fishery or the water environment.

6.2.2d Illegal Exploitation of Salmonids in Inland and Coastal Waters

Illegal fishing in rivers and lakes can be a highly organised and commercially motivated activity.

Methods include the use of nets, gaffs, snares and hands as well as the occasional use of poisons and even explosives.

Enforcement of fisheries legislation on the rivers will continue to be given a high profile. A substantial number of people have been apprehended and convicted for fisheries offences. Information received from anglers about illegal activities has been very helpful in recent years.

There is concern that some sea fishermen are illegally exploiting migratory salmonids in Cumbria Coastal waters.

A legal sea fishery exists in coastal waters using drift nets and beach nets mainly to catch mullet, cod, flatfish and bass. This fishery is regulated primarily by Cumbria Sea Fisheries Committee, although the N.R.A. has prosecuted sea fishermen for taking migratory salmon illegally.

Under the Sea Fisheries Regulation Act 1966 and the Salmon Act 1986 it became possible to introduce byelaws to try to prevent the illegal exploitation of migratory salmonids in coastal waters. In this instance the byelaws were made by the Cumbria Sea Fisheries Committee and agreed jointly with N.R.A.

These byelaws have recently been introduced and regulate the placing and use of drift and fixed nets (for sea fish) throughout the year.

6.2.3 Flood Defence Issues

6.2.3a Properties at Risk from Flooding

There are still a number of areas on the catchment where dwellings and other properties are at risk from flooding.

Where areas are not being protected to target levels of service, the N.R.A. will look at the options for increasing the levels of protection. Where the N.R.A. can justify investment since benefits exceed cost flood defence schemes will be incorporated into the capital projects programme in priority order.

The N.R.A. will encourage local authorities to promote schemes on non main river.

6.2.4 Conservation Issues

6.2.4a Requirement for Conservation Survey of River Corridors

Information on the conservation status of the rivers in the Derwent and Cumbria Coast Catchment Plan area is far from complete. Only the main River Derwent and Cocker have received full river corridor survey. Those watercourses within designated sites can also be classified, but the N.R.A. has only scanty knowledge of the remaining majority.

Strategic river corridor survey has proved to be an incomplete method for classifying a rivers conservation value. To remedy this an R & D project on a classification system, called the River Habitat Survey is underway with initial trials carried out on the Derwent in 1993. Further trials are to be carried out within the region in 1994, with the new methodology ready for use by 1995.

No further strategic river corridor survey is therefore programmed in the Derwent catchment plan area pending the implementation of the River Habitat Survey Methodology.

6.2.4b River Corridor Habitat Enhancement

Once the River Habitat Survey Methodology is in place and a comprehensive survey is underway the N.R.A. will look carefully at where habitat improvements for wildlife can be made.

Where possible this will be done in conjunction with our conservation partners and with landowners.

Derwent and Cumbria Coast Catchment Management Plan

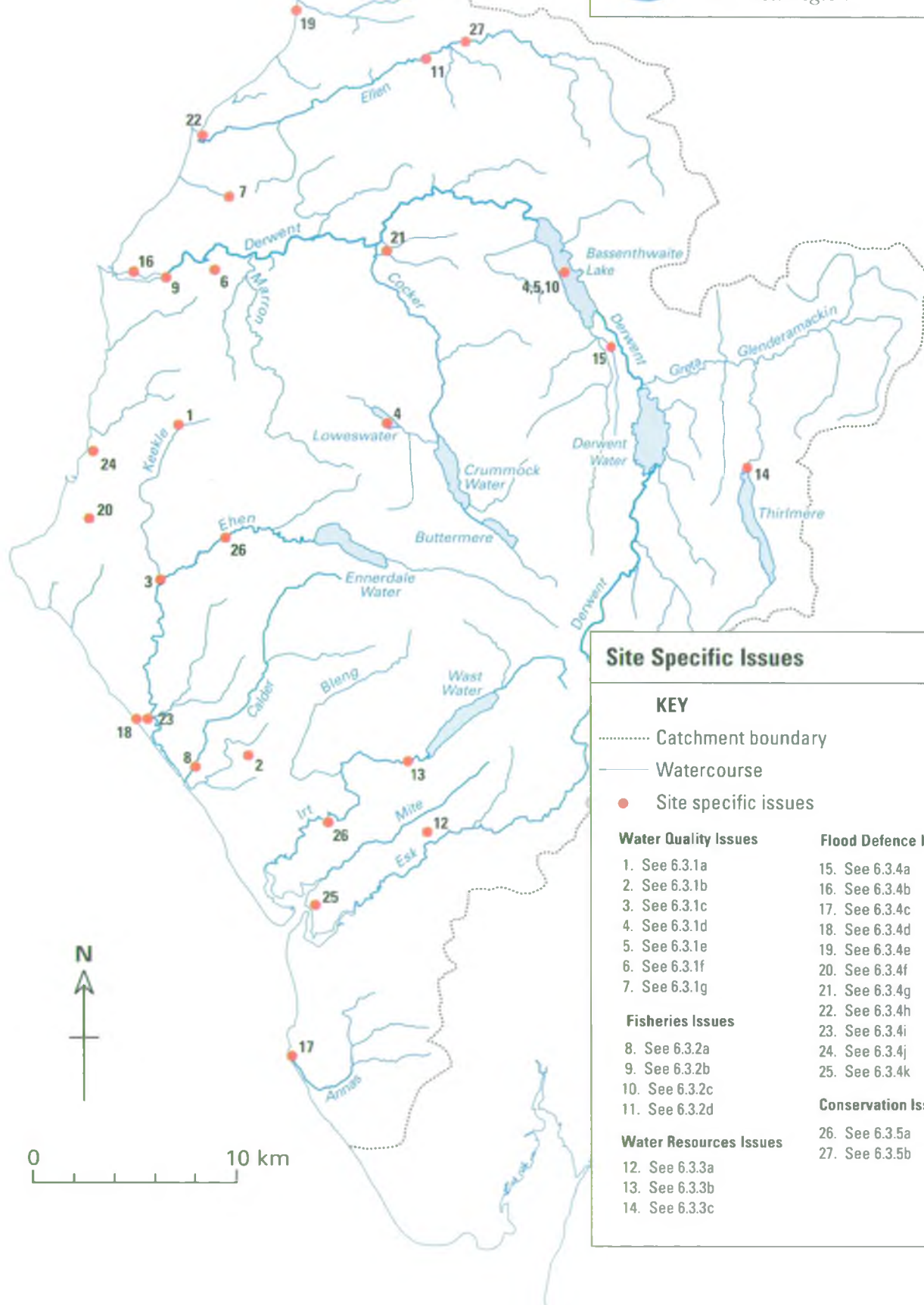
Map 17

October 1994



NRA

National Rivers Authority
North West Region



Site Specific Issues

KEY

- Catchment boundary
- Watercourse
- Site specific issues

Water Quality Issues

1. See 6.3.1a
2. See 6.3.1b
3. See 6.3.1c
4. See 6.3.1d
5. See 6.3.1e
6. See 6.3.1f
7. See 6.3.1g

Fisheries Issues

8. See 6.3.2a
9. See 6.3.2b
10. See 6.3.2c
11. See 6.3.2d

Water Resources Issues

12. See 6.3.3a
13. See 6.3.3b
14. See 6.3.3c

Flood Defence Issues

15. See 6.3.4a
16. See 6.3.4b
17. See 6.3.4c
18. See 6.3.4d
19. See 6.3.4e
20. See 6.3.4f
21. See 6.3.4g
22. See 6.3.4h
23. See 6.3.4i
24. See 6.3.4j
25. See 6.3.4k

Conservation Issues

26. See 6.3.5a
27. See 6.3.5b

6.3 SITE SPECIFIC ISSUES (IDENTIFIED ON MAP 17)

6.3.1 Water Quality Issues

6.3.1a Pollution from Oatlands Deep Mine Spoil Heap

Acid conditions and leaching of iron has resulted in ochreous deposits in the River Keekle for several miles downstream of this spoil heap. A reclamation scheme undertaken in the early 1970's has not solved the problem.

The visual impact is extreme, although the classification scheme suggests the stretch is not grossly polluted, and the river is unlikely to reach its full potential in water quality, fisheries and conservation terms until this problem is addressed.

6.3.1b NIREX Project - Potential Threats to Water Quality

This project is aimed at investigating the suitability of basement rocks around Sellafield for the construction of a deep repository for radioactive waste.

Both surface and groundwater interests will occur throughout the exploratory phase. Protection of the Permian sandstone aquifer is of paramount importance.

The N.R.A. will also ensure that the discharge of site drainage and saline waters from depth during exploration will not cause adverse impact on receiving waters.

The N.R.A. will comment on the proposals for further developments by NIREX, and monitor any development which goes ahead to ensure the water environment is protected.

6.3.1c Impact of Cleator Sewage Treatment Works

This works represents the largest single discharge of treated sewage on the River Ehen system dealing with flows from the Cleator/Frizington areas.

Other smaller works in the vicinity such as Arlecdon, Parkside and Windergate may be abandoned in the future and flows diverted to Cleator, thus increasing the loading further.

Issues which the N.R.A. is currently addressing include:-

- i) The quality of the effluent produced, and the impact on the River Keekle.
- ii) The impact of increased flows to the works as a result of re-sewerage and the abandonment of smaller works.
- iii) The colour of the effluent due to the presence of dye stuffs.
- iv) The location of the outfall in relation to its close proximity to the Ehen/Keekle confluence.

6.3.1d Eutrophication and Algal Blooms in Bassenthwaite Lake and Loweswater

In recent years Bassenthwaite has shown significant incidences of algal blooms. Local opinion is that Loweswater has suffered such blooms for many years.

The problem in Bassenthwaite Lake is of special concern because of the vendace population and high nature conservation value of the lake.

Extensive work has been done on Bassenthwaite Lake to identify and quantify the sources of nutrient input. This data has been processed by the Institute of Freshwater Ecology who have determined that 72% of phosphorous most readily used by algae comes from Keswick sewage treatment works. Of the remainder 6% comes from other sewage treatment works and 22% from other sources such as natural leaching, agriculture, etc.

North West Water have agreed to install a phosphate removal plant at Keswick S.T.W. and work should start in October 1994. The Lake has been designated a sensitive water under the provisions of the E.C. Urban Wastewater Treatment Directive. This gives the N.R.A. additional powers over qualifying discharges of sewage and trade effluents, but in practical terms will make little difference as North West Water are already taking the appropriate action to remove nutrient inputs.

In addition 2 hotels have upgraded their private sewage treatment plants and 2 others are terminating discharges to stream and installing soakaway system to deal with effluent.

In combination this work should lead to a gradual improvement in the water quality of Bassenthwaite Lake and contribute to the protection of the vendace and the overall ecology of this important lake.

There should also be a knock on improvement in water clarity in the River Derwent downstream of Ouse Bridge.

The N.R.A. will continue to monitor sediments and water and effluent quality, including the use of automatic water quality monitors, which will help to ascertain the rate of recovery of lake water quality.

6.3.1e Vulnerability of Bassenthwaite Lake to Spillages on the A66 Trunk Road

The A66 trunk road runs adjacent to Bassenthwaite Lake and carries a substantial amount of industrial and commercial as well as private vehicles. A survey by the N.R.A. has indicated that a wide variety of potentially harmful chemicals are regularly transported in bulk along this road. Bassenthwaite Lake is now a National Nature Reserve and has a population of rare vendace and has been identified as being vulnerable to pollution which may be caused by accidents on the A66.

An emergency plan is being drawn up to ensure that any spillages are contained as far as possible on the roadside and that any pollution which does occur is mitigated by a rapid response of N.R.A. personnel and equipment.

Close liaison with the emergency services is essential, as they are likely to be first on site to any major accident/spillage. The N.R.A. has already bought specialised equipment which could be used for re-oxygenating localised areas of the lake, and containing spillages.

6.3.1f Mine Drainage Pollution in Great Clifton Surface Water Drain

The village of Great Clifton sits atop old mine workings, and drainage to the Derwent carries ochre.

Local opinion is that the problem has got worse in recent times as drains have collapsed and been replaced causing a larger volume of water to discharge to the river. Anglers are concerned over the potential impact on their interests.

Biological surveys are being carried out and samples taken for chemical analysis to assess the toxic metal loading in the discharge. At present the effect on the River Derwent is localised but should there prove to be a significant problem the question of responsibility for the problem and who pays for the solution will arise.

6.3.1g Impact of Broughton Moor Sewage Treatment Works

Effluent from this plant discharges to a small watercourse which can dry up in the Summer. The receiving water, Furnace Gill, flows through a woodland where there is considerable public access.

The water quality is poor and can cause offence and nuisance at times.

It is envisaged that this works will be abandoned by North West Water in favour of pumping to the improved sewage treatment facilities proposed for the Cumbria Coast.

Work to alleviate this problem is included in North West Water's spending plans for the period 2000 - 2005.

6.3.2 Fisheries Issues

6.3.2a Canalisation of the Lower River Calder

The canalisation of the river Calder through the B.N.F. Sellafield site has seriously reduced the conservation interest of the river corridor. There has also been a significant reduction in fisheries habitat diversity, particularly pool and riffle stretches. Much of the lower river channel consists of bedrock constrained by gabions and blockstone preventing the establishment of a healthy flora and fauna and with limited holding areas for migratory fish.

Further assessment of the significance of canalisation is required and identification of remedial measures.

6.3.2b Impact of the Yearl Abstraction on River Flows and Migrating Salmonids

This abstraction for British Steel flows down the Workington Hall mill stream before re-abstraction for pumping to the plant. 2Mld is used to maintain flows in Soapery Beck and any remaining flow returns to the Derwent approximately ½ mile downstream of the abstraction point.

This residual flow to the Derwent is generally a small proportion of the original abstraction and represent approximately 3M/d more than is required by British Steel.

Angling interests have expressed concern that the flow in the mill stream is excessive and is impacting on the quality of the fishing in the derogated section of the River Derwent. However there is no evidence to suggest that the abstraction is affecting the fishery in this way.

Of concern to the N.R.A. is the potential for damage to juvenile salmonids migrating downstream that get caught in the British Steel screen at their point of abstraction from the mill stream. Additionally the mill stream is used by a large proportion of salmonids migrating downstream and they require the extra water abstracted which returns to the Derwent to prevent them getting trapped. Therefore reducing the flow in the mill stream would have a negative overall effect on the fishery.

Work is underway to evaluate the effectiveness of the drum screen at the British Steel intake.

6.3.2c *The Potential Impact of Recent Introduction of Coarse Fish on the Vendace Population in Bassenthwaite Lake*

In 1990 the N.R.A. commissioned a national research project into the status of rare fish. this study undertaken by the Institute of Freshwater Ecology made recommendations on further study and management action with regard to the vendace population.

There is evidence of a sizeable roach population in Bassenthwaite Lake and also the presence of ruffe. These species could put considerable pressure on the vendace through competition, and predation, and the N.R.A. is commissioning an investigation in conjunction with the Institute of Freshwater Ecology (I.F.E.) to examine the likely impact of these species on the vendace.

6.3.2d *Re-Stocking of the River Ellen with Salmonids Following Recent Pollution and Severe Fish Mortality*

The N.R.A. is currently assessing the best way to restock the River Ellen so as to gain maximum benefit to the fishery.

Nursery streams will be assessed so that the optimum number of juvenile fish can be placed to take advantage of the available habitat.

The N.R.A. will ensure the most appropriate age class of fish are restocked to replace the fish that were killed.

6.3.3 Water Resources Issues

6.3.3a Flood Risk and Low Flow Problems Caused by Eskdale Green Mill Pond

The mill pond embankment is structurally unstable, and leaks profusely. The affect of a catastrophic failure of the dam and the subsequent downstream rush of water could have serious implications for the safety of people in the vicinity. The subsequent downstream rush of water could also have flood defence implications.

The N.R.A. has made the owner aware of the dangerous state of the dam and his responsibilities. He has also been advised to empty the mill pond until a permanent solution is found.

The owner holds a licence to abstract 0.67 MI/d from the river up to 60 days a year for power generation purposes. Use of the abstraction requires filling the mill pond.

The N.R.A. is concerned that this abstraction when operated can lead to derogation of flow in the river, until the water is returned to the channel by the mill race further downstream. This derogation could interfere with the movement of migratory fish during particularly dry periods.

The power generation equipment on the site is understood to be inoperable at present, so the abstraction is unlikely to be used in the foreseeable future.

In the meantime the N.R.A. will discuss with the licence holder the possibility of altering the licence conditions.

6.3.3b Complaints of Low Flows in the River Irt Below Wastwater

British Nuclear Fuels are licensed to abstract 18.2 MI/d from Wastwater but must maintain a compensation flow of 20.5MI/d in the River Irt below the lake. Members of the public have, from time to time, expressed concern over the flow in the river at this location. There is no evidence of licence breaches by British Nuclear Fuels so it is assumed the complaints are based on the current minimum flow in the river of 20.5MI/d.

The N.R.A. will attempt to quantify the concerns of complainants and review flow data from the Galesyke gauging station on the River Irt. Flows in the River Bleng will be quantified to ascertain its contribution to flows in the River Irt. The N.R.A. will review the requirements of other river users to see if there is a need to set a minimum acceptable flow.

Should the flow in the River Irt at this location prove to be unacceptably low the N.R.A. will discuss the abstraction arrangements with British Nuclear Fuels.

6.3.3c *Impact on the River Derwent by Augmentation from Thirlmere Reservoir*

Currently North West Water have the requisite licence to abstract water from the River Derwent at Barepot (Workington). In order to maintain their abstraction N.W.W. are required to release water from scour valves at the base of Thirlmere Reservoir to augment flows in the River Derwent at times of low flow.

The release of water has potential to cause erosion and scour. St. John's Beck is an important salmonid spawning ground, and there is potential for serious impact on redds and juveniles from the increased flow and uncertain quality of this reservoir bottom water. Also there is potential for inundation of fields adjoining the watercourse.

The augmentation is rarely used since North West Water limit their abstraction to times of low flow. The existing licence will need to be reviewed to ensure it incorporates appropriate measures to satisfy in river requirements and protect the environment of St. John's Beck.

6.3.4 Flood Defence Issues

6.3.4a Perceived Loss of Agricultural Land to Waterlogging on the Low Lying Land Between Bassenthwaite Lake and Derwentwater

Local farmers comment that marginal fields which could formerly be used for agricultural purposes have become more waterlogged in recent years. Examination of the past 20 years of level records for Bassenthwaite Lake do not indicate any significant change in water levels. A research project has been initiated to investigate the problem. However any proposal to alter drainage arrangements over and above the status quo must be balanced in line with the N.R.A.'s duty to conserve and enhance the conservation interest of the water environment. This "badly drained land" is an integral part of the Bassenthwaite wetlands site of conservation interest and part of S.S.S.I.

6.3.4b Dumping of Supermarket Trolleys in the River Derwent at Workington

This is a relatively recent phenomena, and despite warnings to the local supermarkets the problem appears to be on the increase.

As well as being aesthetically unsatisfactory large numbers of trolleys in the river could restrict flow and pose a potential for causing flooding.

The trolleys are the responsibility of the supermarkets, and the N.R.A. will continue to exert pressure on them to manage the situation better. When necessary the N.R.A. will consider removing trolleys from the river in conjunction with the local council.

Other options including exploration of the legal position will be looked at.

6.3.4c Pressure on the N.R.A. to Deepen and Divert the River Annas as it Outfalls to the Sea

Due to shingle build up along the coast, the River Annas flows parallel to the beach for over 1km. The river outfalls across the shingle, causing backing up and occasional localised flooding of agricultural land. Local farming interests are therefore keen to see the river outfall dredged on a regular basis, to improve the land drainage.

The shallow diffuse outfall may also restrict the passage of migratory fish up the Annas during drier years, and regular dredging may lead to long term improvement in the salmonid fishery.

However, this occasional flooding is essential to maintain the breeding sites of the natterjack toad colony. This species is protected under the Wildlife and Countryside Act, 1981, and as a result this coastal strip was designated as an S.S.S.I. in 1989, and is closely monitored by English Nature.

The N.R.A. has a duty to further the conservation and enhancement of natural beauty, flora and fauna and this duty will be compromised by deepening the river channel.

In addition, deepening the channel by dredging will increase the erosion of the existing cliffs at Selker point and threaten 4 properties in this vicinity.

Copeland Borough Council have engaged engineering consultants to investigate the options for a coastal protection scheme to save these properties and a parcel of agricultural land. The final report is awaited.

6.3.4d Long Term Future of Cumbria Coastal Rail Line Acting as Sea Defence Structure

The railway line embankment forms the sea defence barrier from St. Bee's to Seascale, and also from Parton to Maryport. Without this structure significant areas of land and property would be at risk from flooding. The embankment is maintained by British Rail. There is no guarantee of the long term viability of the rail line. Should the rail line close the question of the maintenance of the embankment will arise.

6.3.4e Gravelling up of Coastal Outfalls in Allonby Bay

There has been a continual problem with beach gravel being thrown up across coastal outfalls in the Allonby Bay area. These deposits which occur particularly during tidal surge storms impede the discharge of the fluvial flow following the tidal retreat.

This causes land drainage and flooding problems immediately upstream of the outfall.

The worst affected outfalls are Black Dub, Mealo Beck, Crookhurst Beck and St. Helen's Beck. The N.R.A. have in the past responded by employing suitable plant to excavate the outfall to restore the normal fluvial flow. On some of the outfalls the blockages occur 3 or 4 times a year.

6.3.4f Development Control and Land Drainage Consent Enforcement on Pow Beck, Whitehaven

Over a number of years there has been extensive development of the Pow Beck, Whitehaven catchment. Pow Beck is 'non-main' river and is culverted from Coach Road to Whitehaven Harbour.

The development of housing and industry within the catchment had led to extensive monitoring and enforcement of culverting and surface water discharges into the catchment.

Pow Beck is known to cause fluvial flooding of the lower parts of Mirehouse. Also the area around Whitehaven Harbour floods during extreme tidal events; which can affect the downstream discharge of Pow Beck. However the construction of tidal gates on Whitehaven Harbour for leisure and sea defences purposes will help to alleviate the tide lock situation. Currently the N.R.A. is in discussion with the developers of the Harbour regarding the reduction of flood risks in the area.

6.3.4g Flood risk at Cockermouth

Cockermouth suffered severe flooding in 1938 and up to 300 properties remain at risk making the town one of the largest remaining urban areas susceptible to river flooding in Cumbria.

The present flood defence structures do not meet NRA standards of service.

Cost benefit analysis has indicated that flood defence capital works are justifiable, and the NRA is in the process of designing a suitable scheme.

Works are likely to include the provision of flood walls to raise the low spots in the current defences.

The NRA will ensure conservation measures are incorporated in the scheme including the retention of existing trees where possible, and the use of appropriate facing stone on newly constructed walls.

6.3.4h Flood Risk at Maryport Harbour

Existing properties adjacent to Maryport Harbour are at risk from tidal flooding during storm events. The harbour structures and breakwaters protecting the properties provide limited flood protection at present. However, these harbour structures are in a dilapidated condition and are of limited asset life.

As part of the development of Maryport Harbour for leisure purposes, there is opportunity to strengthen the existing flood protection structures and also bring defence levels up to National Rivers Authority standards of service.

An investigation carried out by Consulting Engineers for Allerdale Borough Council indicate that sufficient cost benefits for a flood defence capital works scheme are available.

The National Rivers Authority will consider participating in the part of the Harbour Development project which would provide increased flood protection to existing properties and will ensure this aspect of the work does not damage the archaeological interest in the harbour area.

6.3.4i *Flood Risk at Braystones on the River Ehen*

At Braystones on the River Ehen seventeen residential properties are at risk from fluvial flooding. The river flows through a 180° bend with an existing flood bank protecting the village. The defence was overtopped and outflanked in serious flooding in 1975 and again in 1977 and 1979.

Investigations indicate that a cost beneficial solution can be found to significantly increase the current protection level of approximately 1 in 12 years.

A scheme is included within the Flood Defence Medium Term Plan for construction in 1997/98.

6.3.4j *Tidal Flooding at Parton*

Up to 40 properties are at risk from tidal flooding when wave action forces water through the railway access arches on Parton beach.

A simple solution incorporating tidal gates on the railway arches could be installed, but this would not protect the assets on the seaward side of the embankment.

Copeland Borough Council are responsible for coastal protection on the seaward side of the embankment, and have engaged consultants to investigate a combined solution to both problems. It is proposed that the N.R.A. will make a contribution equal to the cost of the original tidal gates scheme from the Flood Defence Capital Budget in 1994/95.

6.3.4k Risk of Tidal Flooding at Ravenglass

Up to 30 properties in Main Street which backs onto the beach have been threatened by tidal flooding.

An original scheme constructed in 1979 is only partially successful in protecting the village from storm tidal events.

The N.R.A. has engaged a consultant to investigate possible solutions to the problem with any site works being programmed for 1995/96.

6.3.5 Conservation Issues

6.3.5a Unknown Status of the Nationally Rare Freshwater Pearl Mussel (Margaritifera, margaritifera)

This nationally rare species receives special protection under the Wildlife and Countryside Act, 1981. It is known to be present in the rivers Ehen and Irt though its exact distribution and status remains a mystery.

The presence of this species in a river warrants class 1 status under our Conservation classification together with the full protection that this status infers.

It is, therefore, a conservation priority to find these sites so that the species can be fully protected in this catchment.

The possibility of a joint study with English Nature in order to assess the distribution and population of the species is being investigated and will be undertaken as soon as practicable.

6.3.5b The Return of Otters to the Catchment

The otter is protected under of the Wildlife and Countryside Act, 1981. After the devastation of this species in the 1950's and 1960's there is good evidence of a recovery in Cumbria. Their stronghold is on rivers such as the Border Esk, Irthing and Eden, but there is evidence of a recent spread around the Solway, through to the Wampool, Waver and Ellen. These rivers provide an important link between the otter strongholds and the River Derwent, on which otters are rare, despite excellent otter habitat.

It is proposed to carry out some otter habitat improvement works, but this will probably be centred on the Waver/Wampool catchments which are far more impoverished than the Ellen in terms of available habitat, due to previous unsympathetic river management. Establishing a thriving population here would provide the otter with access to other rivers in West Cumbria.

7. SUMMARY OF ISSUES AND OPTIONS

| ISSUE POLLUTION BY FARM DRAINAGE See 6.2.1a | | | |
|--|-------------------------------------|---|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Continue to have input to M.A.F.F. and N.F.U. publications | N.R.A. | Maintain high profile | Message becomes too familiar and risks being ignored |
| Encourage adoption of Code of Good Agricultural Practice and Farm Waste Management Plans | N.R.A., M.A.F.F., Farming community | Prevention of pollution | |
| Continue to enforce farm drainage regulations | N.R.A. | Prevention of pollution | |
| Continue liaison with farming community, N.F.U./M.A.F.F./A.D.A.S. | N.R.A. | Maintenance of good relations, open discussion and continuance of real improvements | |

| ISSUE Pollution by Farm Drainage (Cont'd) | | | |
|--|----------------|--|---|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Continue to press for improvements to M.A.F.F. grant scheme | N.R.A. | Farmer identifies N.R.A. as ally | |
| Use bacteriophage tracers to locate silage clamps which pollute springs in limestone areas | N.R.A. | Trace polluters who were previously very difficult to detect | Not guaranteed to effectively trace the problem installations |
| Prosecute polluters where appropriate | N.R.A. | Deterrent effect costs of N.R.A. action recovered | Makes farmers more wary of talking to N.R.A. |
| Campaigns in affected catchments | N.R.A. | Trace polluters and improve water quality | Can be labour intensive and take staff away from other work |

| ISSUE Acid Stress in the Upper Tributaries See 6.2.1b | | | |
|---|-------------------------------|--|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Develop strategy for long term management and identify full range of options | N.R.A. | Strategic approach to the problem is established | |
| Continue monitoring to pick up any changes | N.R.A. | Improvements or deteriorations will be picked up. | |
| Continue liaison with the Forestry Authority and examine the potential for broadleaved planting | N.R.A. and forestry Authority | Forestry does not make the problem any worse | |
| Active liming of the affected catchment | N.R.A. | Some short term benefits | Short term and not cost beneficial. Impact on fragile ecology of important acid habitats |
| Continuing reduction in acid enhancing aerial emissions | DoE/Industry | Main cause of enhanced acidity is dealt with. Polluter pays. Principal upheld. | Not likely to be significant progress in the short term |

| ISSUE Lack of Rural Sewerage Leading to localised Pollution See 6.2.1c | | | |
|--|-------------------------------------|---|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Seek to influence local development through liaison with local Planning Authorities | N.R.A. and local authorities | Stems the problem and prevents a deterioration | Long standing problems will remain |
| Pursue all opportunities to promote adoption of first time rural sewerage by North West Water, local authorities or other bodies | N.R.A./N.W.W. and local authorities | Reduction in pollution | Unlikely to be possible in short to medium term. |
| Further investigate and quantify the problem | N.R.A./N.W.W. | Allows targeting of limited resources to areas of greatest need | |

| ISSUE Lack of Sewage Treatment along the Cumbria Coast See 6.2.1d | | | |
|--|-----------------------|---|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Ensure provisions of E.C. Bathing Water Directive and Urban Wastewater Directive are complied with | N.R.A./N.W.W. | compliance with legal requirements | Investment outside these requirements is unlikely to be undertaken this century, so long standing problems identified elsewhere may not be addressed |
| Seek solutions to problems not covered by the provisions of these directives | N.R.A./N.W.W. | Areas of need outside the requirements of the directives may be addressed | Areas of need outside the requirements of the directives may not be addressed until after 2000 |

| ISSUE Impact of Combined Sewer Overflows See 6.2.1e | | | |
|---|-----------------------|---|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Prioritise list of unsatisfactory CSO's on a cost benefit basis ensuring statutory requirements are dealt with | N.R.A./N.W.W. | Limited work that is achievable will be targeted effectively | Outstanding problems will remain unsolved |
| Continue discussions with N.W.W. to find best solution to unsatisfactory CSO's not covered by current agreed investment plans | N.R.A./N.W.W. | Solution ready if funding becomes available | |
| Continue monitoring frequency of operation against design criteria and assess level of solids retention | N.R.A./N.W.W. | Establish performance and any impacts | |
| Divert Keswick STW storm discharge to River Derwent | N.W.W. | Increased dilution. Reduced threat to stock watering in Wath Beck | Occasional discharge of treated sewage to Wath Beck. Anglers and others may see storm discharge to Derwent as allowing a deterioration |
| Extend works, with new enlarged outfall to Derwent | N.W.W. | Terminate all discharges to Wath Beck | Unlikely to go ahead due to spending restriction imposed on water companies |

| ISSUE Pollution Caused by Contaminated Surface Water Outfalls See 6.2.1f | | | |
|--|-----------------------|--|---|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Rectify cross connections | N.W.W. | Reduce threat of N.R.A. prosecution | |
| Monitor outfalls | N.R.A. | Establish any improvement | On-cost to N.R.A. |
| Inspect premises and educate owners/tenants and mount "campaign" on industrial estates | N.R.A. | Reduce pollution and potential for future pollution. Increase awareness of industrialists | Long term cost/commitment. Labour intensive |
| Consent outfalls | N.R.A. | Standards are a legal requirement | Consent would be to a third party, ie Estate Owners and not to those causing pollution. N.R.A. seen to be accepting pollution |

| ISSUE Development in Areas Where Sewers/Sewerage Treatment See 6.2.1g Works are at or Near their Design Capacity | | | |
|--|-----------------------------------|---|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Discuss with N.W.W. to quantify the problem and look at long term solutions | N.R.A./N.W.W. | Prevention of pollution | Significant investment unlikely because of spending restrictions imposed on Water Industry |
| Seek to influence development plans in critical areas by liaison with planning authorities | N.R.A./local planning authorities | Short term solution | Pressure to develop cannot be restrained indefinitely |
| Monitor strategic locations downstream of affected works | N.R.A. | Early warning of problems and prioritisation of existing ones | |
| Ensure developers meet the cost of extra treatment required | Developers | Prevention of pollution | |

| ISSUE Impact of Open Cast Coal Mining See 6.2.1h | | | |
|--|-----------------------|---|----------------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Continue close liaison at both district and regional level with British Coal | N.R.A. | Ensures good input at all stages from planning to final reinstatement | |
| Reinstatement of previously damaged fish spawning areas | N.R.A. | Increase area available for salmonid spawning | |
| Ensure appropriate reinstatement of River Keekle channel | N.R.A./British Coal | Removal of man made channel | |
| Monitor ground and surface water quality in the area where the Walkmill Deep mine spoil heap is buried | N.R.A. | Early warning of potential problems due to leachate | |

| ISSUE See 6.2.2a | | | |
|---|---------------------------------|---|----------------------|
| Fish Stocks - Status and Management | | | |
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Continue strategic survey of juvenile fish stocks | N.R.A. | Provides detailed data on status of juvenile stocks. Will provide a picture of areas that are performing well and those that are not. | |
| Continue anti-poaching/enforcement activity. Ensure prosecutions are taken as necessary | N.R.A./Sea Fisheries Committee | Provides protection of fish stocks in marine and freshwater environments. Acts as a significant deterrent to potential illegal activity | |
| Continue National R and D project into use of catch statistics to determine fish stock size | N.R.A. | Evaluates catch statistics in relation to management of fish stocks and determines how they can be used to estimate stock size | |
| Continue operation of anglers log book scheme | N.R.A./Anglers and Associations | Provides management information on catch related to fishing effort, methods and flows | |

| ISSUE Fish Stocks - Status and Management (Cont) | | | |
|--|----------------|--|---------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Continue to operate automatic fish counters | N.R.A. | Provides information on size and timing of fish runs and quantitative information on flow requirement of migratory fish. | |
| Asses nursery streams for suitability for restocking | | Enables optimum number of juvenile salmonids to be planted out where restocking takes place | |
| Review current stocking practice | | Provide management information on most appropriate life history stage of fish to be utilised for restocking | |
| Continue National R and D project to examine effectiveness of salmonid stocking strategy | | Aims to identify most cost effective strategies for stocking migratory salmonids in order or maximise returns of adult fish to fisheries | |

| ISSUE Fish Stocks - Status and Management (cont) | | | |
|---|----------------|---|---------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Produce a fisheries management plan to create a structured overall approach to fisheries management in the area. Relate plan to both local issues and National R and D investigations. Consult and publicise widely | N.R.A. | Will establish a comprehensive and cohesive strategy for fisheries management in the area involving the South and West Cumberland Fisheries Association and other interested parties. | |
| Continue investigation to obtain baseline information on char populations in Ennerdale and Wastwater | N.R.A. | Information will allow informed decision making | |

| ISSUE Problems with Degraded Fish Habitat and Lack of See 6.2.2b Comprehensive Information on Habitat Quality | | | |
|--|----------------------------|---|----------------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Programme of weed clearance and manual gravel raking in spawning areas suffering from siltation and compaction | N.R.A. and riparian owners | Increase availability of suitable spawning areas. Should lead to enhanced fish stocks | |
| Undertake comprehensive survey to identify areas where habitat rehabilitation may be appropriate | N.R.A. | Work can be targeted in logical way | |

| ISSUE Impact of Gravel Extraction and Disposal on Fisheries and See 6.2.2c Conservation Interest | | | |
|--|-----------------------|--|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| 1. <u>N.R.A. Gravel Removal for Flood Defence Purposes</u> | | | |
| Stop gravel removal | N.R.A. | Save money. No damage to conservation or fisheries interests | Potential for flooding of land and property |
| Continue removing gravel as at present | N.R.A. | Reduction in flood risk | Access problems, and potential conflict with fisheries/conservation Cost of disposal of gravel. |
| Remove gravel little and often | N.R.A. | Reduced impact on fisheries and conservation | More frequent disturbance to local residents. Loss of economies of scale. Possibly less effective flood defence |
| Create gravel traps at convenient locations | N.R.A. | May reduce impact on fisheries and conservation | Cost of construction. Possible impact on visual amenity in the National Park. May create obstruction to fish migration |

| ISSUE Impact of Gravel Extraction/Disposal (Cont) | | | |
|---|--------------------------------------|--|---|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| <u>Gravel Removal by Riparian Owners to Improve Angling Interest</u> Continue consenting gravel removal on an ad hoc basis Better control of bulk removal of gravel by landowners based on holistic approach to the catchment | N.R.A./Riparian owners N.R.A. | Better fisheries and conservation management. Reduced threat of erosion | Benefit to overall fishery uncertain. Physical enforcement in remote areas |

| ISSUE Illegal Exploitation of Migratory Salmonids Inland and Coastal See 6.2.2d Waters | | | |
|--|--|---|----------------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Continue with anti poaching enforcement action. Liaise with anglers. Take prosecution as appropriate | N.R.A. | Provides protection of fish stocks. Acts as deterrent to potential illegal activity | |
| Monitor effectiveness of new Sea Fisheries Byelaws in protecting migratory fish. Liaise with Cumbria Sea Fisheries Committee | N.R.A. and Cumbria Sea Fisheries Committee | Protect fish stocks in coastal waters | |

| ISSUE Properties at Risk from Flooding See 6.2.3a | | | |
|--|-----------------------|--|----------------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Do nothing | | No cost | Flood risk remains |
| Assess flood risk areas for compliance with standards of service for flood defence | N.R.A. | Expenditure can be targeted where most appropriate | |
| Where cost beneficial include schemes within N.R.A.'s capital programme | N.R.A. | Prevention/reduction of flood risk | Cost |

| ISSUE See 6.2.4a | | | |
|---|-----------------------|--|--|
| Requirement for Conservation Survey of River Corridors | | | |
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Await results of national R and D project into river habitat survey methodology | N.R.A. | Tailor made system available for high quality surveys to be done | Waiting until the system, is available in 1995. |
| Undertake surveys using current river corridor survey | N.R.A. | Some data would be made available | Incomplete information would necessitate re-doing the work when the new system becomes available |

| ISSUE River Corridor - Habitat Enhancement See 6.2.4b | | | |
|---|-----------------------|---|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Await habitat survey methodology to assess where improvements can be made | N.R.A. | Proposed improvements will be based on hard information | |
| Pursue ad hoc improvements | N.R.A. | Some improvements will occur | Resource implications. Work may not be targeted where there is greatest need |

| ISSUE Pollution from Oatlands Deep Mine Spoil Heap See 6.3.1a | | | |
|---|------------------------------|---|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Land reclamation scheme | British Coal and site owners | Information available on previous scheme. One off expenditure | Previous scheme failed |
| Drainage interception and treatment | Not yet known | New treatments now available and effective | On-going cost to responsible party. Appropriateness of any treatment will require thorough investigation |
| Diversion of River Keekle away from the spoil | N.R.A. | Removes pollution | Cost. Potential disturbance to other river uses |

| ISSUE NIREX Project - Potential Threats to Water Quality See 6.3.1b | | | |
|--|-----------------------|--|----------------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Complete protection of the aquifer during exploratory drilling | NIREX | Compliance with N.R.A. groundwater protection policy avoids contamination of aquifer | |
| Monitor drilling works and associated consented discharges to ensure no deterioration in water quality | N.R.A. | Maintain surface water quality and quantity | |

| ISSUE Impact of Cleator Sewage Treatment Works See 6.3.1c | | | |
|---|-----------------------|--|---|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Increase volume treated | N.W.W. | Abandonment of smaller works and storm overflows | Greater volume discharged at point source |
| Increase standards of treatment | N.W.W. | Greater security of water quality target class | Not a statutory requirement so funds may not be available due to restrictions on spending imposed on water industry |
| Move outfall | N.W.W. | Secure water quality at Keekle/Ehen confluence | |
| Remove colour problem from effluent | N.W.W. | Reduce aesthetic impact. | |

| ISSUE Eutrophication and Algal Blooms in Bassenthwaite Lake See 6.3.1d and Loweswater | | | |
|--|-----------------------|---|----------------------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| <u>Bassenthwaite</u> | | | |
| Phosphate removal from Keswick STW effluent | N.W.W. | Reduce main P loading on the lake | Presence of chemical plant |
| On-going monitoring of all significant inputs to the lake | N.R.A. | Situation kept under constant review | |
| R and D project into the status of rare fish | N.R.A./N.W.W. | Production of recommendations for further study and management action | |
| <u>Loweswater</u> | | | |
| On-going monitoring to assess situation | N.R.A. | Will help define way forward | |

| ISSUE Vulnerability of Bassenthwaite Lake to Spillages on the Main See 6.3.1e A66 Trunk Road | | | |
|---|---|---|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Installation of interceptors along part of the A66 to hold chemical spills | Cumbria C.C. N.R.A. Dept of Transport | Contain spills. Intercept general run-off | Initial cost. Maintenance. Vandalism |
| Close liaison with emergency services | N.R.A. | Will ensure all services are aware of Bassenthwaite Lake importance | |
| Co-ordinated internal N.R.A. emergency plan | N.R.A. | Rapid response and best use of all possible internal resources | |

| ISSUE Mine Drainage Pollution in Great Clifton Surface Water Drain See 6.3.1f Discharging to the River Derwent | | | |
|---|----------------------------|--|---|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Initially to maintain chemical and biological monitoring | N.R.A. | Build up data base on volumes and constituents | Not resolving the problem |
| Request treatment of discharge if necessary | British Coal North Housing | Reduce levels of contamination | Trying to prove who has responsibility. Chemical treatment plant required. |
| Accept that there has "always been" a mine water discharge and do nothing | | None | Possible localised deterioration in the Derwent. Anglers complain about loss of fishing |

| ISSUE Impact of Broughton Moor STW on Furnace Gill See 6.3.1g | | | |
|---|-----------------------|------------------------------------|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Convey sewage to new sewage treatment facilities planned for Cumbria Coast | N.W.W. | Remove discharge from Furnace Gill | Funds only available post 2000. Until then the problem will remain |

| ISSUE Canalisation of the Lower River Calder See 6.3.2a | | | |
|---|----------------|---|---------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Assess the significance to fisheries | N.R.A. | Identify possible improvements to the fishery | |

| ISSUE Impact of the Yearl Abstraction on River Flows and Migrating See 6.3.2b Salmonids During Times of Low Flow | | | |
|---|-----------------------|---|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Reduce abstraction to only that needed by British Steel and Soapery Beck | N.R.A. | Slightly enhanced flow in the River Derwent | Salmonids migrating downstream cannot return to the River Derwent due to lack of flow in the mill stream leading to increased fish mortality |
| Install fish screen at intake to mill stream | N.R.A. | fish cannot enter mill stream and get stranded and/or caught in British Steel abstraction screen | Practical difficulties may mean such a screen would be impossible to install effectively |
| Maintain current position and make further investigations | N.R.A. | Probably only a minor impact on fishery from current arrangements mainly at the screen on the British Steel abstraction. A more informed decision is likely to be a better decision | |
| Investigate effectiveness of current screening arrangements of British Steel intake | N.R.A./British Steel | Information on effectiveness of screening facility. Allows informed decision making. | |

| ISSUE The Potential Impact of Recent Introduction of Coarse Fish on See 6.3.2c the Vendace Population in Bassenthwaite Lake | | | |
|--|-----------------------|---|---|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Undertake R and D project to examine likely impact of coarse fish (especially ruffe) on the vendace | N.R.A. | Provision of information on ecology of coarse fish in relation to potential impact on vendace. Production of recommendations for appropriate management of fishery | Cost Limited Fisheries capital programme |

| ISSUE Re-Stocking the River Ellen with Salmonids Following Recent See 6.3.2d Pollution and Severe Fish Mortality | | | |
|---|-----------------------|--|----------------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Determine numbers and life history stages for restocking based upon assessment of kill and survey work previously carried out | N.R.A. | Enables optimum number of salmonids to be planted where restocking takes place | |

| ISSUE Flood Risk and Low Flow Problems Caused by Eskdale Green See 6.3.3a Mill Pond | | | |
|--|-----------------------|--|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Advise the owner of the condition of the dam, the consequences of dam failure and his responsibilities | N.R.A. | Responsible party fully aware of the situation | Situation status quo |
| Advise owner to continue keeping the mill pond empty until structural integrity is restored | N.R.A./Owner | Potential for flooding alleviated | Private water supply lost. Interesting pond of conservation value will be lost temporarily |
| Encourage owner to revoke abstraction licence or alter conditions to alleviate potential for low flows in the river. | N.R.A./Owner | Low flows alleviated | Private water supply lost. Interesting pond of conservation value will be lost if pond not maintained. |
| Ensure strict enforcement of current licence should abstraction be recommenced | N.R.A. | firm licensing management approach | Dam may remain in present state of repair |

| ISSUE Complaints of Low Flows in the River Irt Below See 6.3.3b Wastewater | | | |
|--|-------------------------|--|----------------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Ensure all licence conditions are complied with by British Nuclear Fuels | N.R.A. | Ensure legal abstraction only | |
| Quantify concern of complainants | N.R.A. and complainants | Clearer understanding of nature and level of people's concerns | |
| Review flow information for the River Irt, and measure flows in River Bleng | N.R.A. | Gives fuller picture of the flow conditions in the river | |
| Consider setting a minimum acceptable flow for the Upper Irt and discuss abstraction arrangements with B.N.F. if current minimum flow is too low | N.R.A. | Setting of environmentally appropriate figures for flows in the Upper Irt, should the current flow prove to be too low | |

| ISSUE Impact on the River Derwent by Augmentation from Thirlmere See 6.3.3c Reservoir | | | |
|--|-----------------------|--|----------------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Modify the arrangement if resources are likely to be required on a regular basis | N.R.A./N.W.W. | Incorporates measures to protect the environment. N.R.A. have control of potential impact on water quality, fisheries, conservation and water resources interests. | |

| ISSUE Perceived waterlogging of Agricultural Land on Low Lying Land See 6.3.4a Between Bassenthwaite and Derwentwater | | | |
|--|-----------------------|---|----------------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Initiate research project identify the causes and extent of the issue | N.R.A. | Clarify the position and allow rational decision making | Cost |

| ISSUE Dumping of Shopping Trolleys in the River Derwent at See 6.3.4b Workington | | | |
|---|-----------------------|--|--------------------------------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Continue to pressurise the supermarkets to manage the trolleys better | Trolley owners | Encourage 'deposit paid' trolleys and better security during closure hours | On-going cost and problem not solved |
| Continue removing trolleys | Council /N.R.A. | Short term relief from the problem | |
| Explore other options including legal action as a last resort | N.R.A. | Possibly stop problem penalise the responsible party | |

| ISSUE Pressure on the N.R.A. to Deepen and Divert the River Annas as See 6.3.4c it Outfalls to the Sea | | | |
|---|--------------------------|---|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Divert and deepen the channel | N.R.A. | Alleviate flooding of farm land. Potential for improvements to the fishery. Easy maintenance of proposed pedestrian bridge in this area | Damage to S.S.S.I. and Natterjack Toad population. Benefits are only short term, and dredging would need to be undertaken regularly. Cost Dredging will cause increased erosion of the cliffs at Selker Bay and threaten 4 properties with early abandonment |
| Do nothing | N.R.A. | Maintenance of S.S.S.I. and nationally important Natterjack Toad population. Fulfils N.R.A. duty to conserve. No cost. | Some continued flooding of farmland. coastal erosion will continue and the 4 properties may eventually have to be abandoned. No potential for improvement to the fishery. |
| Await results of consultants report to Copeland Borough Council on possible coastal protection scheme | Copeland Borough Council | More informed decision making | Compromise which satisfies all interests will be difficult to find |
| Maintain status quo by dredging and gravel deposition at toe of cliff | N.R.A. | No worsening of present land drainage situation or erosion | cost |

| ISSUE Long Term Future of the Cumbria Coastal Rail Line Acting as See 6.3.4d Sea Defence Structure | | | |
|---|-----------------------|--|---|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| British Rail maintain as an operational line | British Rail | Maintenance of the embankment is guaranteed. No cost to N.R.A. | |
| British Rail close as an operational line | British Rail | | Question of maintenance of the embankment as a sea defence structure arises |

| ISSUE Gravelling up of Coastal Outfalls in Allonby Bay See 6.3.4e | | | |
|---|---------------------------|---|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Continue to respond to tidal events and remove gravel as required | N.R.A. | Minimal cost. Flexibility | Response time to attend all sites. Repeated work may stretch resources |
| Lengthen outfalls and install flap valves | N.R.A. | Outfall should remain free if pipe extended beyond normal gravel build up | Costly option. Outfall pipe may act as a gravel trap and compound the situation. Gravel may block the flap valve in extreme circumstances and worsen the problem |
| Do nothing | Leave to others | No cost | N.R.A. may be criticised for not responding. Wider flooding may result |
| Establish protocol on access, to mitigate ecological damage during emergency work | N.R.A. and English Nature | Ecological damage minimised/prevented | |

| ISSUE Development Control and Land Drainage Consent See 6.3.4f Enforcement on Pow Beck, Whitehaven | | | |
|---|-------------------------------------|---|---|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Encourage Whitehaven harbour development to proceed | Whitehaven Development company | Resolves major land drainage problem in vicinity of harbour | Financial contribution will be sought from N.R.A. |
| Do nothing and leave to appropriate local authority | Copeland Borough Council | No cost to N.R.A. | Problems may remain |
| Consider making Pow Beck statutory "main river" by reviewing under as yet unpublished main river guidelines | N.R.A. | Further investigation into culverting problems and possible solutions | Extra cost to N.R.A. |
| Restrict further development and culverting | N.R.A. and local planning authority | Strict enforcement would stop the problem worsening | Existing problems remain. Complete block on development |

| ISSUE Flood Risk at Cockermouth See 63.4g | | | |
|--|-----------------------|-------------------------|----------------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Design and implement new flood defence capital scheme to improve level of flood protection | N.R.A. | Reduction in flood risk | |

| ISSUE Flood Risk at Maryport Harbour See 6.3.4h | | | |
|--|--|---|---|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Participate in port of Maryport Harbour development which improves flood alleviation | Jointly with Allerdale Borough Council | A scheme which provides reduced flood risks would result. Example of co-operation with the District Council. | Financial contribution will be sought from N.R.A. |
| Do nothing and leave to appropriate local authority. | Allerdale Borough Council | No cost to N.R.A. | Problems may remain if no scheme is implemented. |

| ISSUE Flood Risk at Braystones on the River Ehen See 6.3.4i | | | |
|--|-----------------------|-------------------------|----------------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Design and implement new flood defence capital scheme to improve level of flood protection | N.R.A. | Reduction in flood risk | |

| ISSUE Risk of Tidal Flooding at Parton See 6.3.4j | | | |
|--|---------------------------------|---|---|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Do nothing | N.R.A. | No cost | Flood risk remains during tidal surge events |
| Install tidal gates to alleviate against wave action and flooding through railway access | N.R.A. | Good cost benefits | Does not protect assets on seaward side of embankment |
| Get involved in Copeland Borough Council project for coastal protection | N.R.A./Copeland Borough Council | Demonstrates co-operation on coastal problems. Protects more property on seaward side. Less maintenance costs in the long term. No design costs to N.R.A. | Delay in installing the protection works so properties remain at risk in the short term |

| ISSUE Risk of Tidal Flooding at Ravenglass See 6.3.4k | | | |
|---|-----------------------|---|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Do nothing | N.R.A. | No cost | Flooding risk remains |
| Maintain the scheme works constructed in 1979 | N.R.A. | Flood risk reduced | Will cost money from the revenue budget. Repairs carried out in 1992/93 proved expensive |
| Build new sea wall | N.R.A. | Least disturbance of S.S.S.I. Provides good defence standards. Flood risk further reduced. | Has big impact on existing property owners affected. Affects leisure use on the beach ie. boat owners. |
| Other options further offshore | N.R.A. | Less impact on local residents of Main Street and leisure uses of beach. Flood risk further reduced | Big impact on S.S.S.I. May affect coastal processes particularly in the Selker Bay area. |

| ISSUE Unknown Status of the Nationally Rare Freshwater Pearl Mussel See 6.3.5a | | | |
|--|---------------------------|--|----------------------|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Undertake a joint study with English Nature to assess distribution and population size | N.R.A. and English Nature | Ascertain status to allow rational management decision | |

| ISSUE The return of Otter to the Catchment See 6.3.5b | | | |
|--|-----------------------|---|--|
| OPTIONS | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
| Monitor for otter signs during other routine activities | N.R.A. | Continuation of monitoring begun by otters and rivers project | |
| Train other N.R.A. river bank staff to recognise otters and otter signs | N.R.A. | More eyes on the river bank | |
| Undertake limited habitat improvement on the Ellen | N.R.A. | Greater chance of maintaining a good otter population | Other areas with more impoverished habitat need prior attention from limited resources |
| Undertake limited habitat improvement on River Waver and Wampool immediately to North of Catchment | N.R.A. | Evidence of recent colonisation. Securing population here will provide bridgehead into catchment plan area. | Capital cost |

APPENDICES

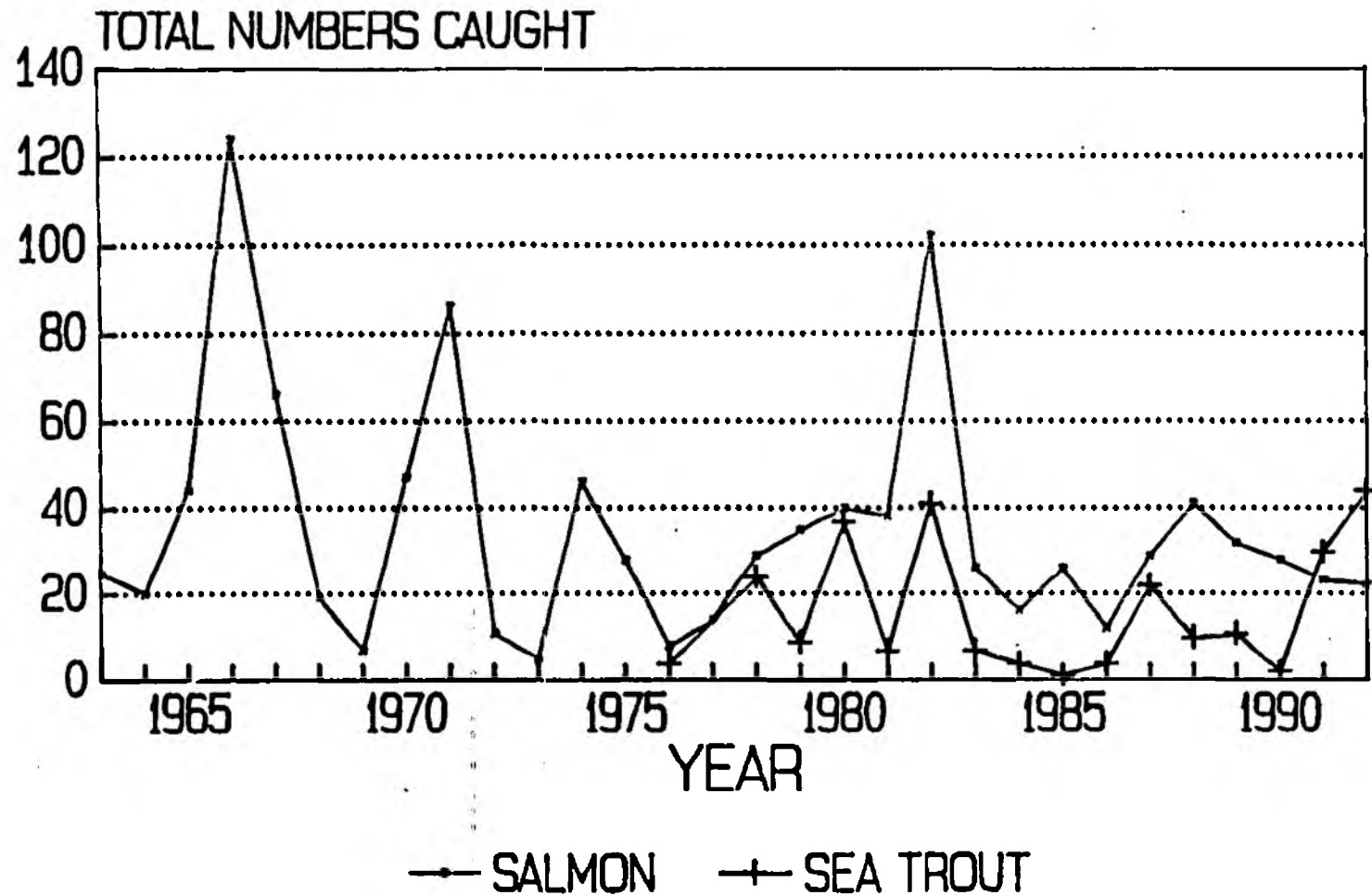
APPENDICES

APPENDICES

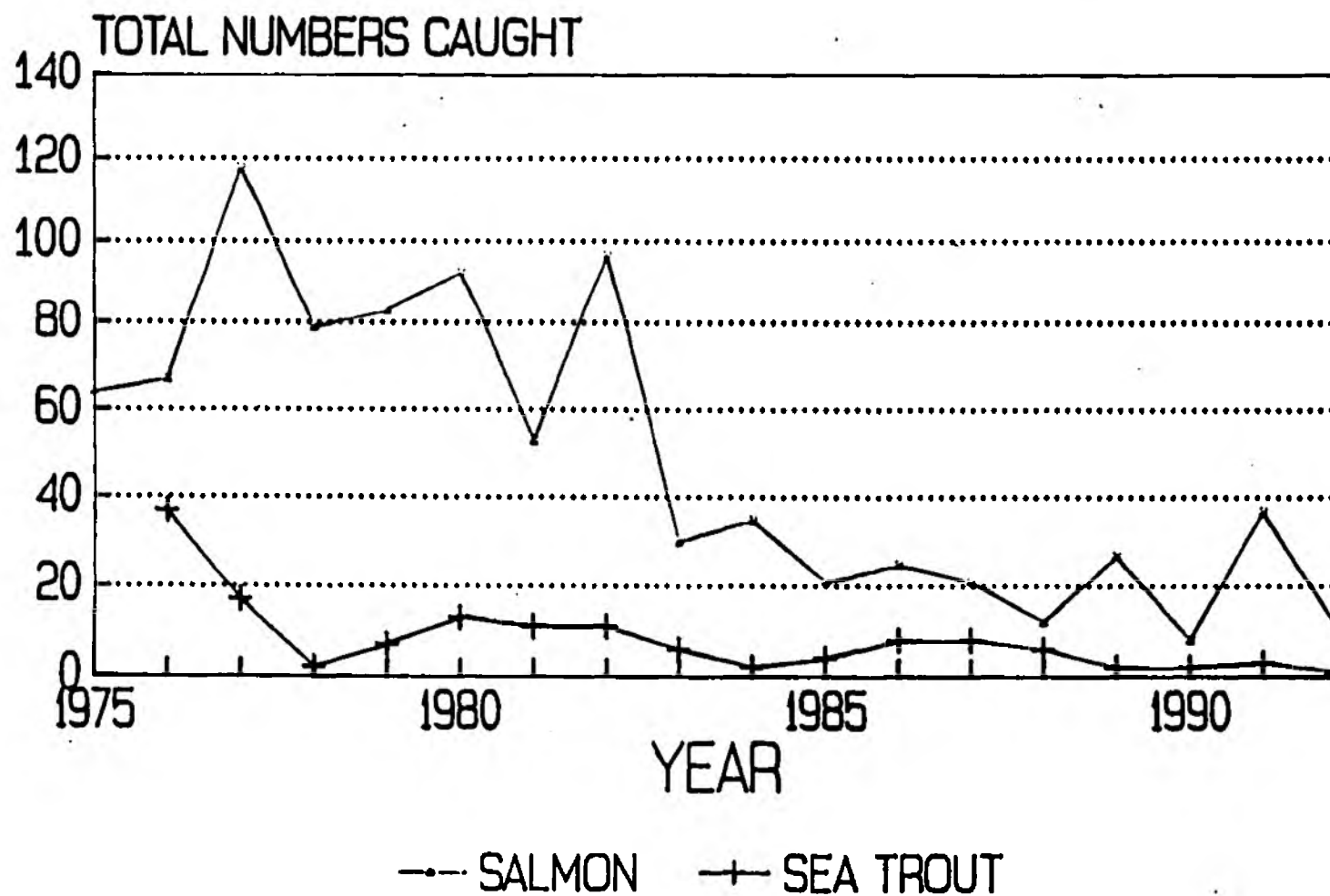
APPENDIX 1

FISH CATCH RETURNS (SALMON AND SEA TROUT)

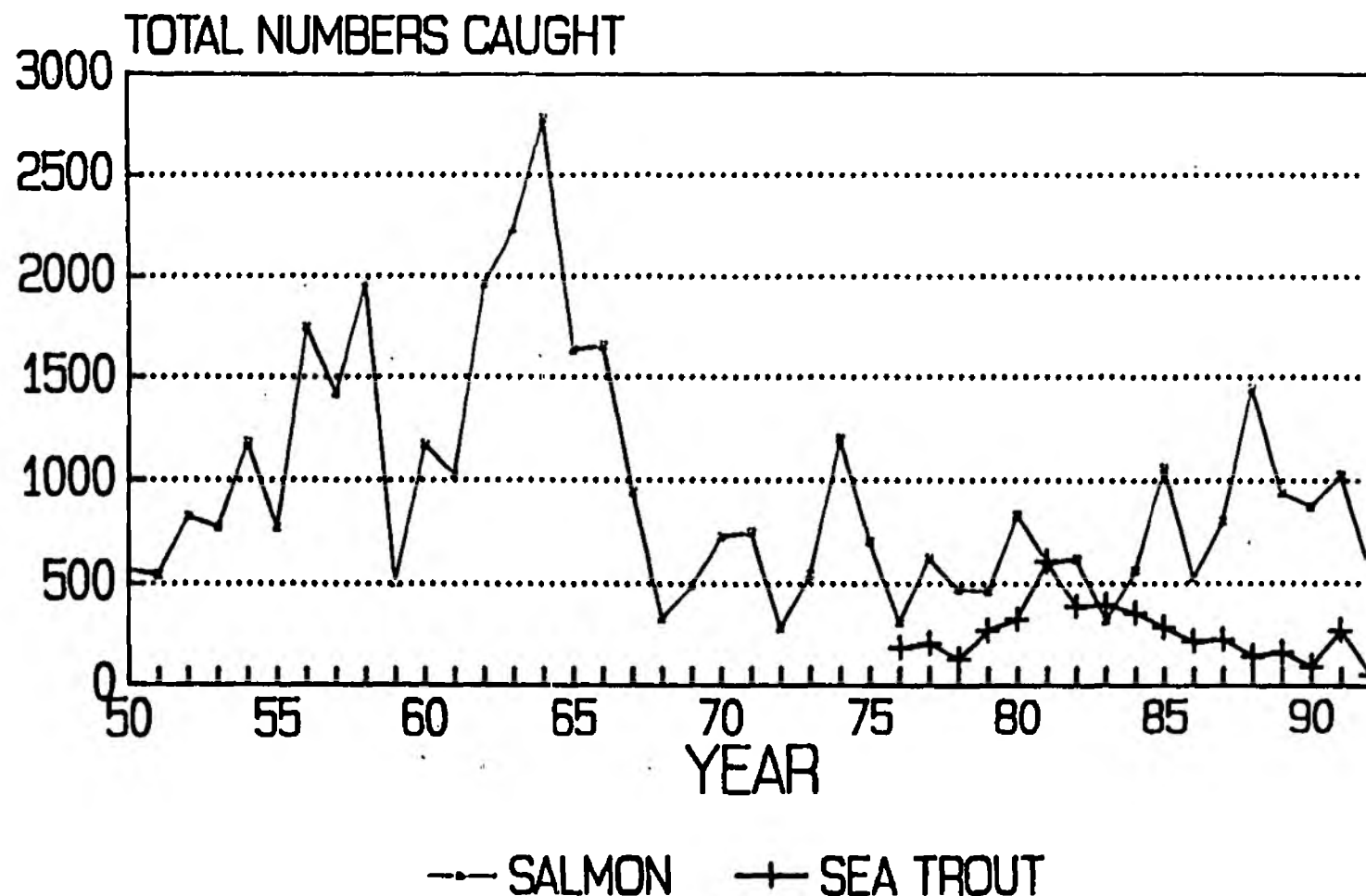
SALMON AND SEA TROUT CATCH RETURNS RIVER ELLEN DISTRICT- ROD AND LINE



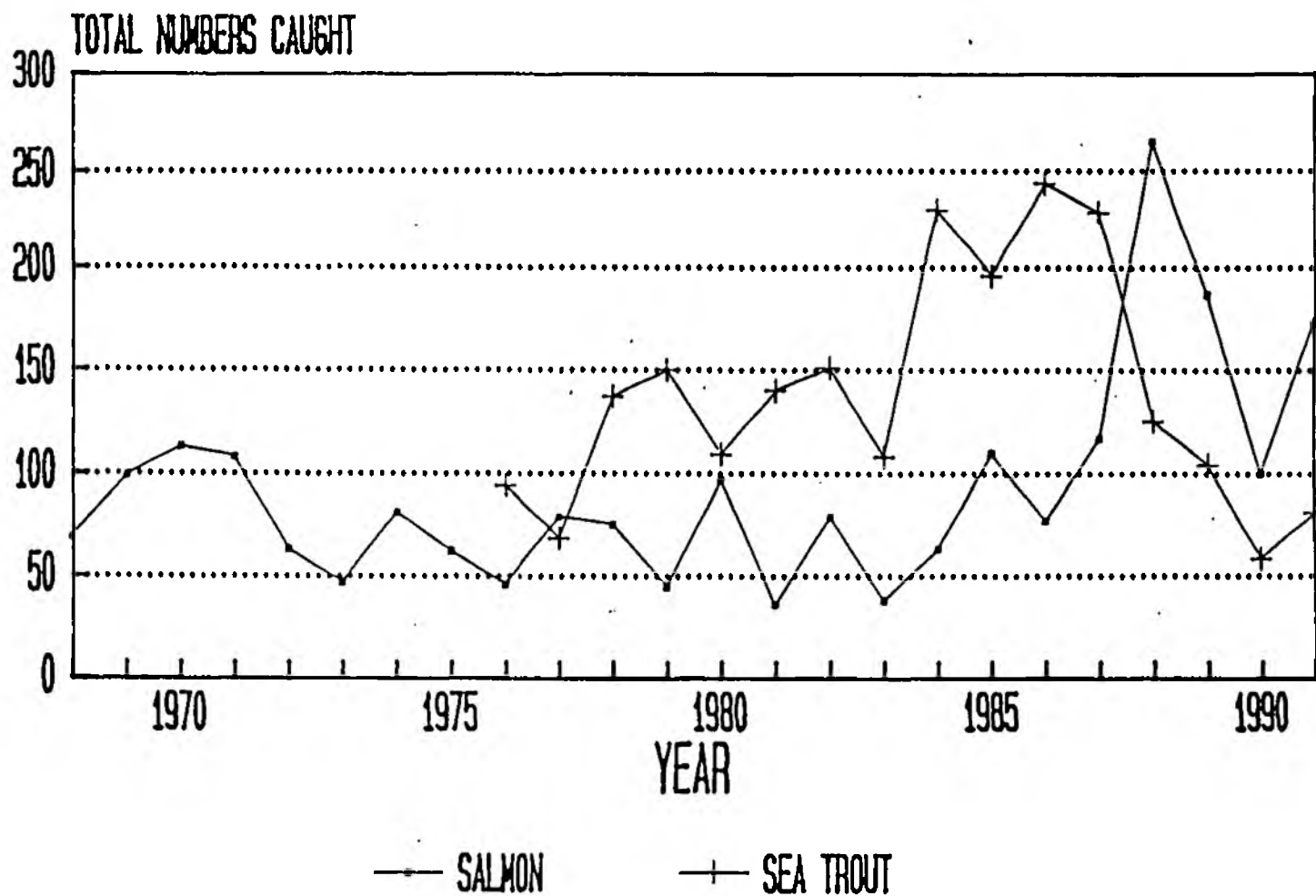
SALMON AND SEA TROUT CATCH RETURNS. RIVER COCKER DISTRICT- ROD & LINE



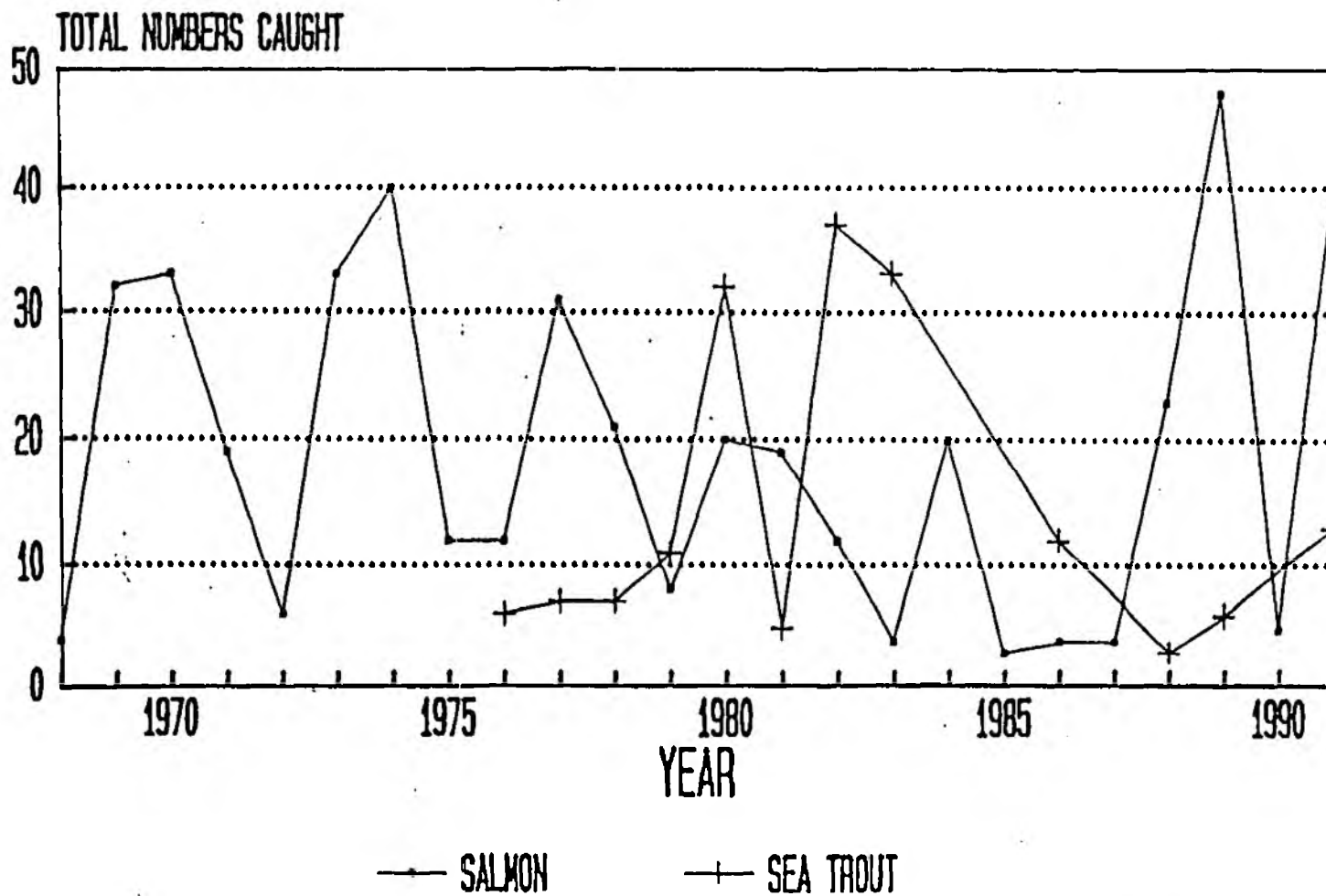
SALMON AND SEA TROUT CATCH RETURNS RIVER DERWENT DISTRICT- ROD & LINE



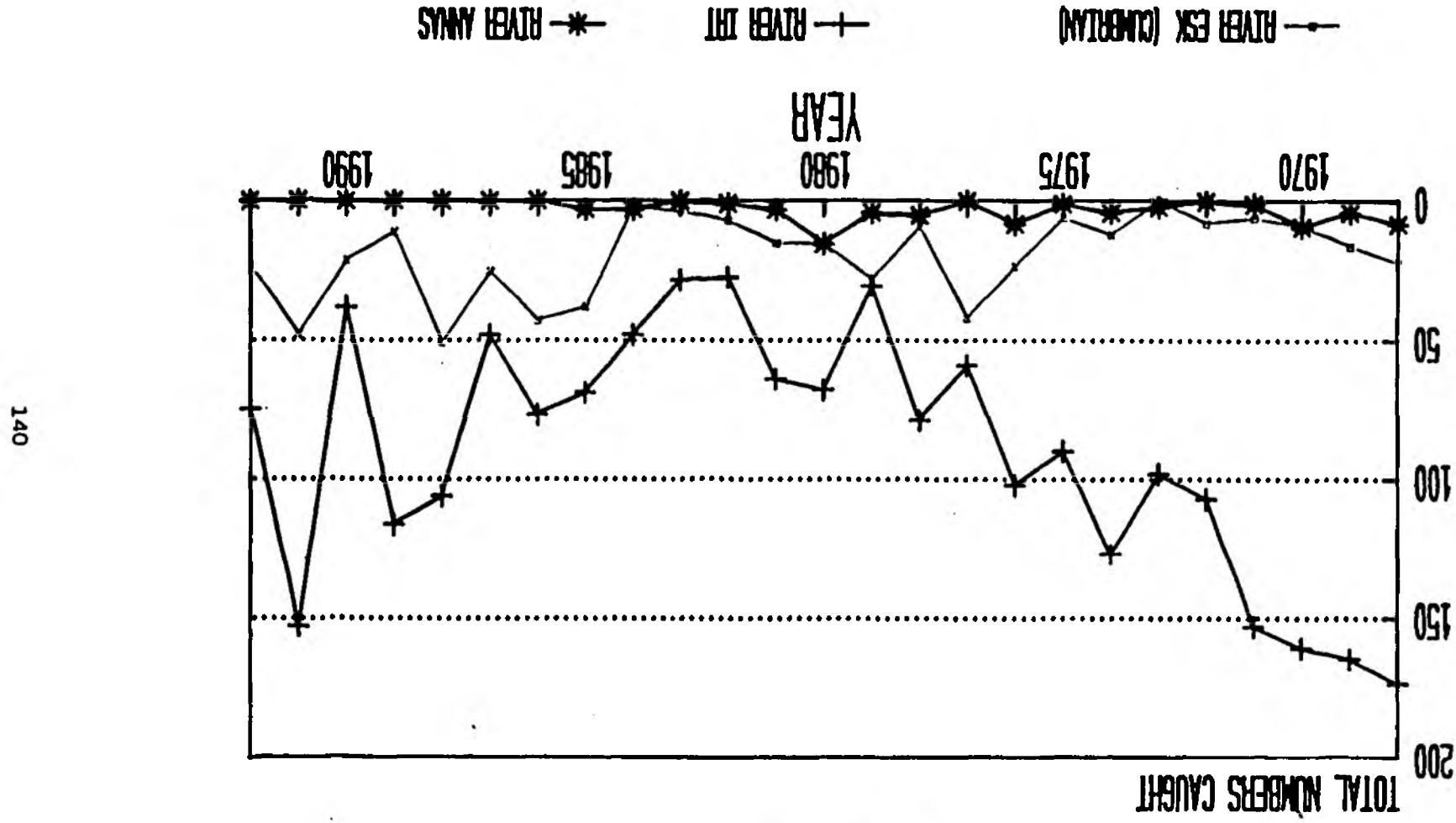
SALMON AND SEA TROUT CATCH RETURNS. RIVER EHEN - ROD AND LINE.



SALMON AND SEA TROUT CATCH RETURNS.
RIVER CALDER - ROD AND LINE.

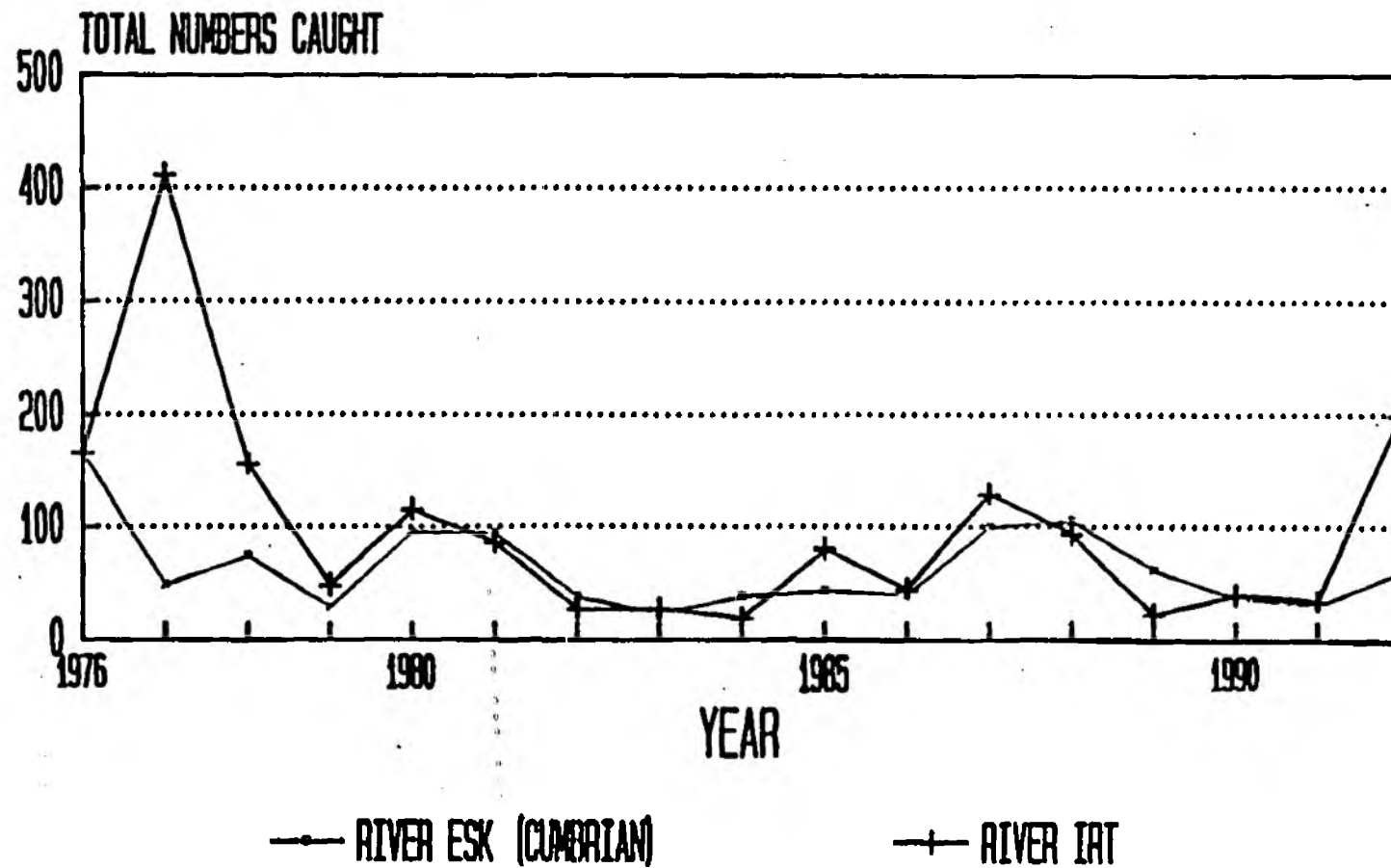


SALMON CATCH RETURNS RIVERS ESK, IRT AND ANNAS

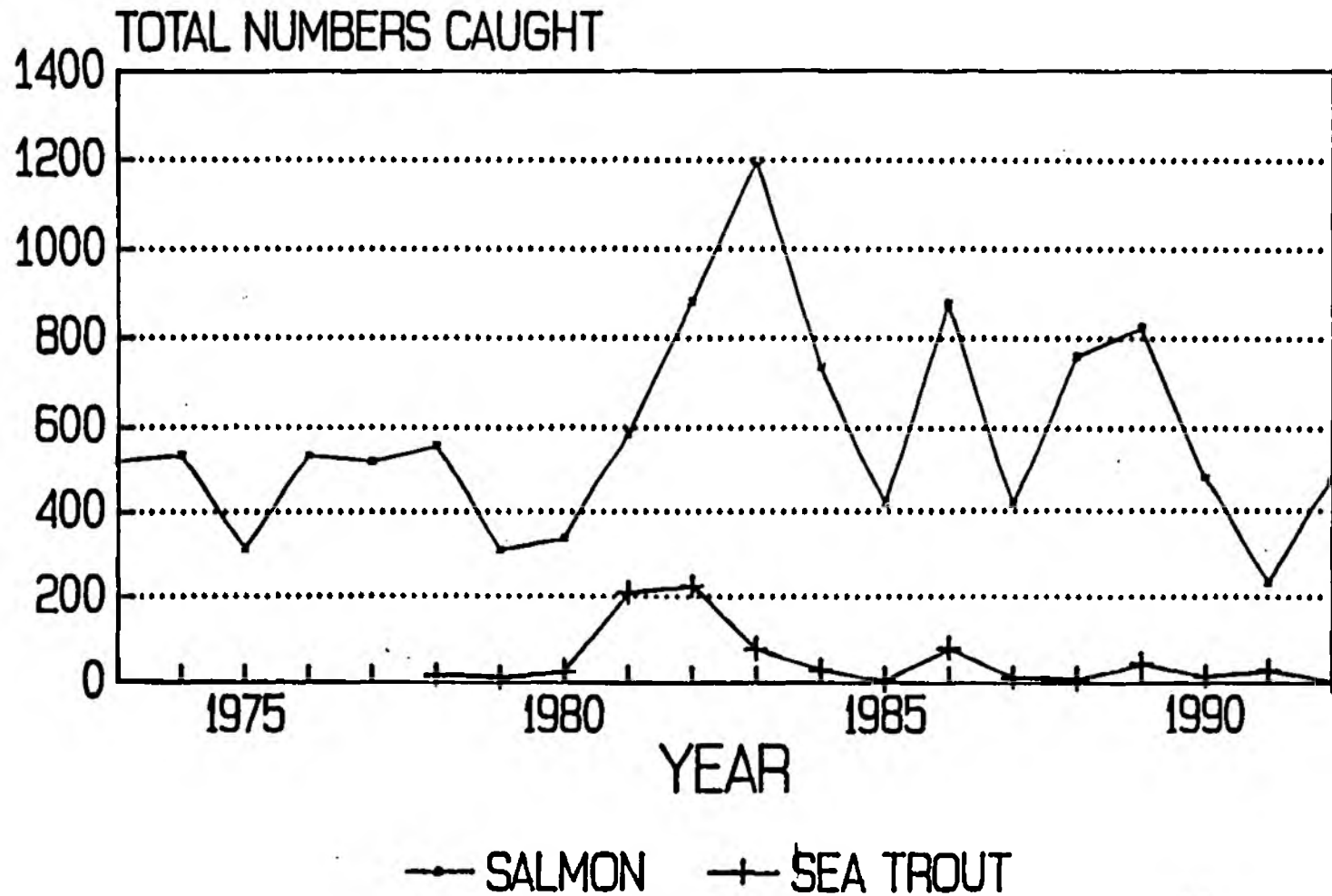


SEA TROUT CATCH RETURNS

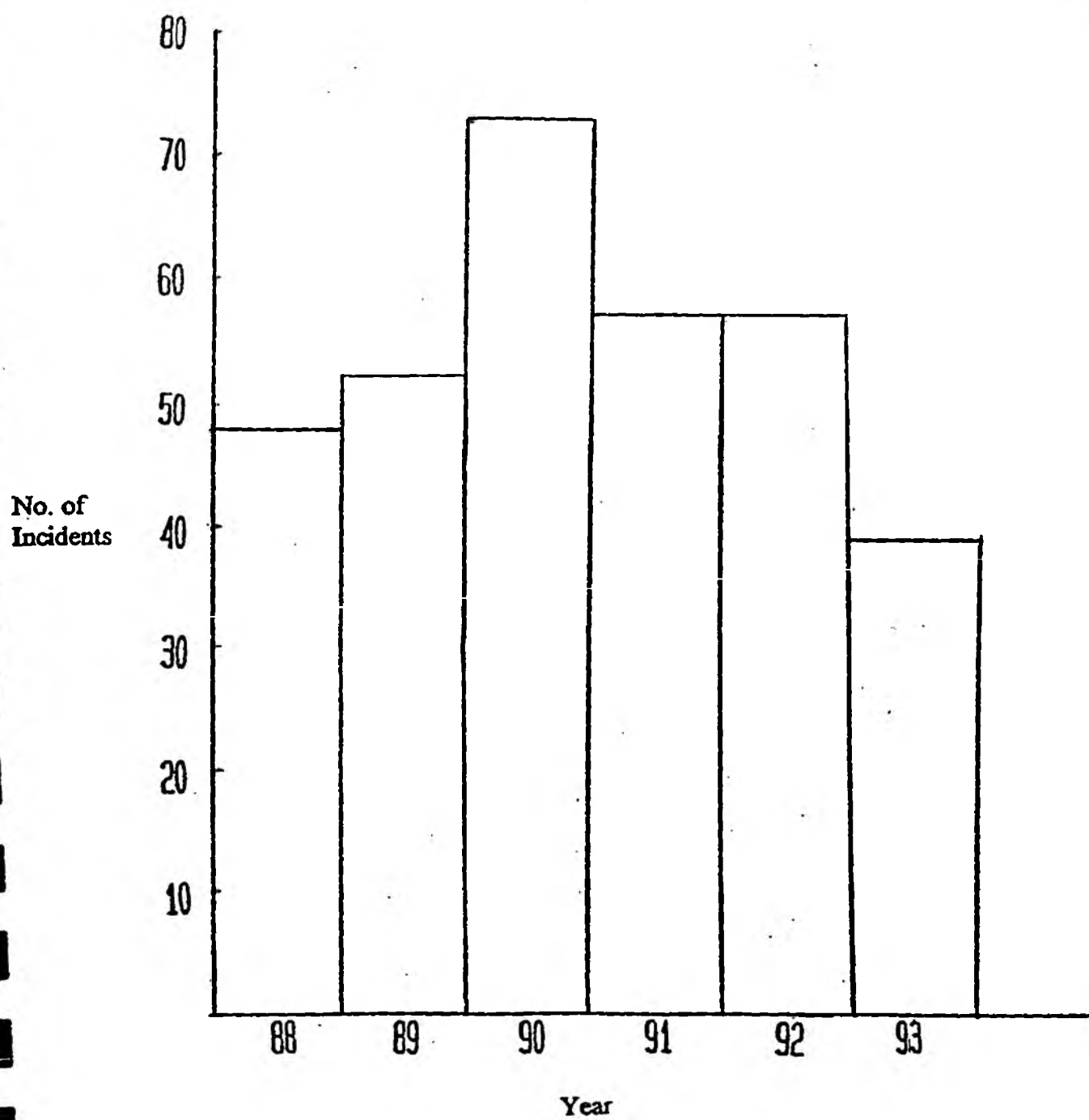
RIVERS ESK AND IRT



COMMERCIAL SALMON AND SEA TROUT CATCHES W & SW CUMBRIA NETS & FIXED ENGINES



Appendix 2

*Number of Farm Pollution Incidents in
River Derwent and West Cumbria*

Appendix 3 Contaminated Surface Water Outfalls

| <u>Site</u> | <u>Watercourse</u> | <u>Problem</u> |
|--|-----------------------------------|------------------------------------|
| Cleator Moor Industrial Estate | Nor Beck | Cross connections |
| Moresby Park Industrial Estate | Blackwood Beck | Cross connections (spillages) |
| Thornhill surface water drain | River Ehen | Cross connections |
| Lillyhall Industrial Estate (4 outfalls) | Distington Beck and River Wyre | Cross connections and spillages |
| Salterbeck Industrial Estate (3 outfalls) | River Wyre | Cross connections and spillages |
| *Seaburn Sewer at B.N.F. Sellafield | River Ehen Estuary | Spillages |
| Risehow Industrial Estate | Risehow Beck | Cross connections and spillages |

* Not covered by commitments from North West Water Limited

GLOSSARY OF TERMS AND ABBREVIATIONS

| | |
|--|---|
| Abstraction - | Removal of water from surface or groundwater |
| Acidification - | The increase in the acidity of surface water brought about by human activity |
| Algae - | Simple plants lacking true stems. In freshwaters they are generally free floating and microscopic. An algae bloom is a super abundance of algae in a particular location. |
| A.O.D. (Above Ordnance - Datum) | Height above average sea level at Newlyn in Cornwall. Contours on Ordnance Survey maps show height above Ordnance Datum |
| Aquifer - | Rocks which contain groundwater |
| B.O.D. - | Biochemical oxygen demand. A measure of organic pollution |
| Borehole - | Hole drilled in aquifer to abstract groundwater |
| BNF plc - | British Nuclear Fuels plc |
| Coarse Fish - | Freshwater fish other than salmon and trout |
| Consent - | <p>A discharge consent is a statutory document issued by the N.R.A. to control discharges of effluent to controlled waters.</p> <p>A Flood Defence Consent is a statutory document issued by the N.R.A. to authorise and control works to the bed or banks of a river</p> |
| Controlled Waters - | Rivers, lakes, groundwaters, estuaries and coastal waters to 3 nautical miles. Precisely defined in the Water Resources Act, 1991, Part III, Section 104 |

| | |
|-----------------------------------|--|
| County Wildlife Site - | A site recognised by Cumbria Wildlife Trust and local authorities to be of County importance for wildlife |
| Crude Sewage - | Untreated sewage |
| Culvert - | Man made underground channel for a river or drain - usually in the form of pipes |
| Derogation - | The permitted relaxation of water quality standards where the target class is not achievable because of natural conditions |
| DoE - | Department of the Environment |
| Drift Net - | A single sheet of net suspended by floats which is allowed to drift in the wind and tide |
| E. C. Directive - | European Community legislation which is binding on member states |
| Eutrophication - | The process of enrichment of water with nutrients |
| Flora - | Plants |
| Fauna - | Animals |
| Gauging Station - | Site where flow of a river is measured |
| Groundwater - | Water lying under the surface of the ground excluding underground streams |
| Landfill - | The practise of disposing of waste onto or into specially designated landfill sites |
| Leachate - | Liquid effluent produced by landfill sites |
| Main River - | On Main River the N.R.A. has permissive powers to construct and maintain flood defences and to control the action of others through byelaws and Flood Defence Consents. Main river is a legal definition and lengths of main river are shown on official maps. |
| Mld (Megalitres per day) - | International unit of measurement. One megalitre = one million litres |

| | |
|---|--|
| National Nature Reserve (N.N.R.) - | Land designated by English Nature under Section 35 of the Wildlife and Countryside Act 1981. Owned and or managed by English Nature for wildlife conservation purposes |
| NIREX - | Nuclear Industries Radioactive Waste Executive |
| North West Water (N.W.W.) - | Water utility company covering the catchment |
| N.R.A. - | National Rivers Authority |
| OFWAT - | The Office of Water Services. The price regulator for the private water companies |
| Oligo-mesotrophic - | Nutrient poor |
| Pools - | A distinct deeper area of slower flowing water often found between "riffles". |
| Putrescible Waste - | Solid waste which will produce leachate when chemically and or biologically degraded |
| Riffle - | Fast flowing shallow water with a distinctly disturbed surface |
| Riparian Owner - | Owner of land abutting a river or lake. Normally riparian owners own the bed of the river to the mid point of the channel |
| River Corridor - | A stretch of river, its banks and any adjacent land affected by the river |
| Salmonid - | Game fish - usually trout and salmon |
| Septic Tank - | A tank used for settling and partially biologically degrading sewage solids before discharging the treated effluent |
| Sewage Treatment Works STW - | Site where sewage is treated to varying degrees, before discharge |

| | |
|---|---|
| Sewerage - | System of sewers usually used to transport sewage to a sewage treatment works |
| Silage - | Winter feed for cattle. Produced by storing freshly cut grass in clamps or silos during the Summer |
| Site of Special Scientific Interest (S.S.S.I.) - | Site of national conservation importance designated by English Nature under the Wildlife and Countryside Act 1981 |
| Slurry - | Animal waste in liquid form |
| Spring - | Place where water wells up from the earth |
| Surface Waters - | Term to describe waters on the surface of the earth eg. rivers, lakes, springs, canals and ponds |
| T.H.O.R.P. - | Thermal Oxide Reprocessing Plant - sited at BNF plc, Sellafield |
| W.S.A. - | Water Services Association |



NRA

*National Rivers Authority
North West Region*

Regional Headquarters: P.O. Box 12, Richard Fairclough House, Knutsford Road, Warrington WA4 1HG. Tel: 01925 653999 Fax: 01925 415961

All enquiries to: North Area Office, Chertsey Hill, London Road, Carlisle CA1 2QX. Tel: 01228 25151 Fax: 01228 49734