local environment agency plan

EDEN, ESK & SOLWAY

ENVIRONMENTAL OVERVIEW

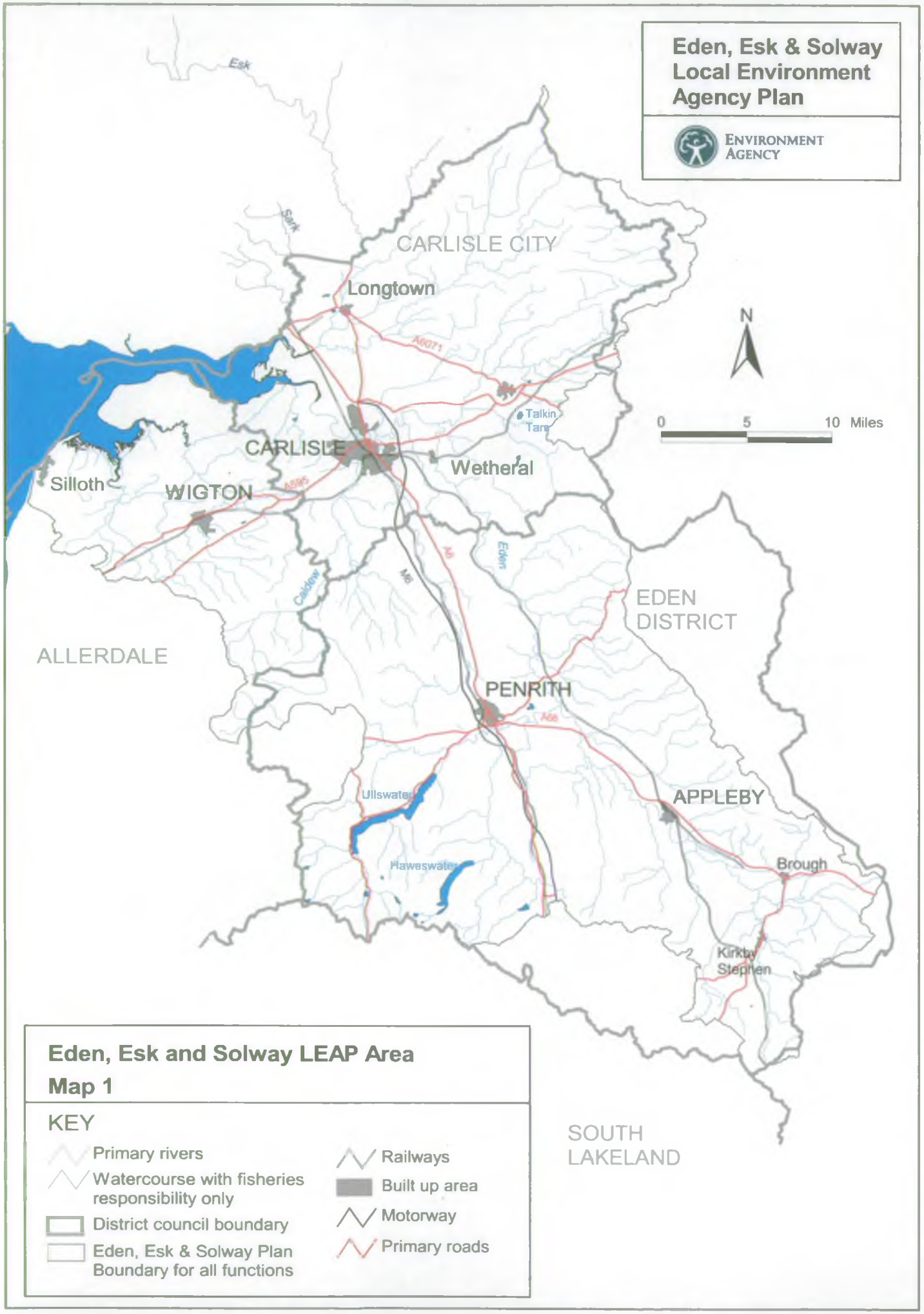
SEPTEMBER 1999

ENVIRONMENT AGENCY

Contents

List of Tables

List of Maps


Eden, Esk & Solway Local Environment Agency Plan
Environment Agency
Esk
Sark
CARLISLE CITY
Longtown
A6071
N
0 5 10 Miles
Talkin Tarn
CARLISLE
Wetheral
Silloth
WIGTON
A595
M6
Eden
Caldew
EDEN DISTRICT
ALLERDALE
PENRITH
A66
Ullswater
APPLEBY
Haweswater
Brough
Kirkby Stephen
SOUTH LAKELAND
Eden, Esk and Solway LEAP Area
Map 1
KEY
Primary rivers
Watercourse with fisheries responsibility only
District council boundary
Eden, Esk & Solway Plan Boundary for all functions
Railways
Built up area
Motorway
Primary roads

Summary

This Environmental Overview is a factual description and analysis of the Eden, Esk and Solway environment (see Map 1). It seeks to explain how the Environment Agency, with others, is working to improve and protect this area. It provides information for consideration by the Agency's partners and those individuals and organisations generally interested in the Eden, Esk and Solway area. From this analysis, the most significant issues, which have emerged, are taken forward in the Eden, Esk and Solway Local Environment Agency Plan (LEAP).

The Eden, Esk and Solway LEAP area covers approximately 2700km^2 and is situated between two of England's principal upland areas. To the west of the River Eden are the fells of the Lake District, and to the east are the Pennines, while to the north of the River Esk are the southern uplands of Scotland. The area is predominately rural with a population of approximately 167,000. Carlisle is the main centre with a population of 70,000. Other principal towns are Appleby, Penrith, Brampton and Wigton.

This is a diverse area including high mountains and moorland, lowland valleys, a large low lying coastal plain and estuary. The Solway Firth is one of the least developed, large estuaries in Europe. The area has many designated sites including two Areas of Outstanding Natural Beauty (AONBs), two National Parks, 7 candidate Special Areas for Conservation (cSACs), a World Heritage Site and another nominated. The main land-use of the area is agriculture with forestry and it has some of the most productive agricultural land in Cumbria. In the past, the drainage of some low lying areas has been modified to increase the agricultural output of the land.

The area includes two major lakes, Ullswater and Haweswater Reservoir, the River Eden and its tributaries, Rivers Waver and Wampool and the Border Esk and its tributaries in England. In addition, the Environment Agency has fisheries responsibilities for the Border Esk and its tributaries in Scotland.

A major flood occurred in 1968 when the River Eden was unable to cope with severe storm conditions. Appleby, Langwathby, Warwick Bridge and Carlisle suffered particularly badly. In response to this event, the Carlisle floodbank system was constructed. In January 1995 and 1997, floods up to a 1 in 35 year severity caused flooding in the Eden Valley, but the Carlisle floodbanks prevented significant flooding of properties in the city. The area has five formal river flood warning zones and existing flood alleviation schemes at Carlisle and Appleby. In addition, there is a tidal flood warning zone for the Solway.

The area supports a superb variety of wildlife, amongst which are some notable species such as the cold water fish species known locally as schelly. The inner Solway is designated a Site of Special Scientific Interest (SSSI), a Special Protection Area (SPA) and a candidate Special Area for Conservation (cSAC). In addition, it is a European Marine Site. The large tidal range and shifting channels of the Solway have restrained opportunities for development, maintaining its wildlife value. The River Eden and its tributaries are also designated a cSAC and SSSI. It is particularly important for salmon, lamprey, bullhead, aquatic plants and crayfish.

The River Eden and Border Esk support first class salmon and sea trout fisheries. Brown trout are also found throughout, with the Eden and its tributaries having some of the finest brown trout fishing in the country. Dace, Chub and Grayling are also present.

Water quality is generally good with 86% of water courses classified as good quality, 96% classified as water of a good to fair quality and 4% classified as water of poorer quality. In the area 91% of the coastal waters are classified as good. There are no EU designated Bathing Waters within the LEAP area.

The water environment in this part of Cumbria is an extremely important recreational resource. Ullswater and Talkin Tarn are major sites for water based recreation including sailing, boating and canoeing. Canoeing, through agreements, also takes place on a number of rivers including the Eden and the Eamont. Angling is a major recreational activity throughout the area. The traditional fishing practice of Haaf Netting takes place in the Solway Firth.

The water resources of the area are used to supply water to the public in the area. In addition, the area is a large net exporter of water with Ullswater and Haweswater being used to supply water to other parts of the North West region.

Air quality is generally good though some deterioration is evident near busy roads and urban areas. The area has little industrial development compared to other parts of Cumbria, with only 4 Integrated Pollution Control (IPC) regulated processes. Landfill is the major method of waste disposal. While 25 of the sites licensed in the area only dispose of inert waste, there are 4 sites licensed to take a wide range of controlled waste and account for more than 65% of the total disposed waste.

In conclusion, the Eden, Esk and Solway is a largely rural area of outstanding natural beauty and general good overall environmental quality. Much of the landscape and ecological resource lies within designated sites.

1. Introduction

Effective protection of the environment and prudent use of natural resources are two of the fundamental aims underpinning sustainable development. To make sustainable development a reality these environmental aims together with social and economic aims must be built into policies and decisions. Policies and decisions need to be based on sound scientific knowledge and understanding.

We are committed to reporting the state of the environment and have a duty to form an opinion on the state of the environment under the Environment Act 1995. The information included here relates to the Environment Agency's responsibilities and details the current uses, resources and pressures, on the area as we see them. This Environmental Overview is not intended to be a complete environmental appraisal of the area. The aspects covered are:

- Air quality
- Water quality
- Sewage effluent disposal
- Industrial discharges to air and water
- Storage use and disposal of radioactive substances
- Waste management
- Contaminated land
- Mineral extraction
- Water abstraction
- Flooding and flood alleviation
- Biodiversity
- Fisheries
- Recreational use of water
- Landscape and heritage
- Agriculture
- Forestry

Local Environment Agency Plans (LEAPs)

This document has been prepared to provide supporting information to the Eden, Esk and Solway Local Environment Agency Plan, (LEAP) Consultation Report. It is a factual description of the local environment, and is intended to be used in conjunction with the LEAP, or in isolation, as a reference on the state of the local environment. From this overview, areas where actions are required to protect or improve the environment have been identified and brought forward through issues in the LEAP Consultation Report. These issues relate to the Agency's functions and are for consideration by its partner organisations, and those individuals and organisations generally interested in the local environment.

LEAP Consultation Report

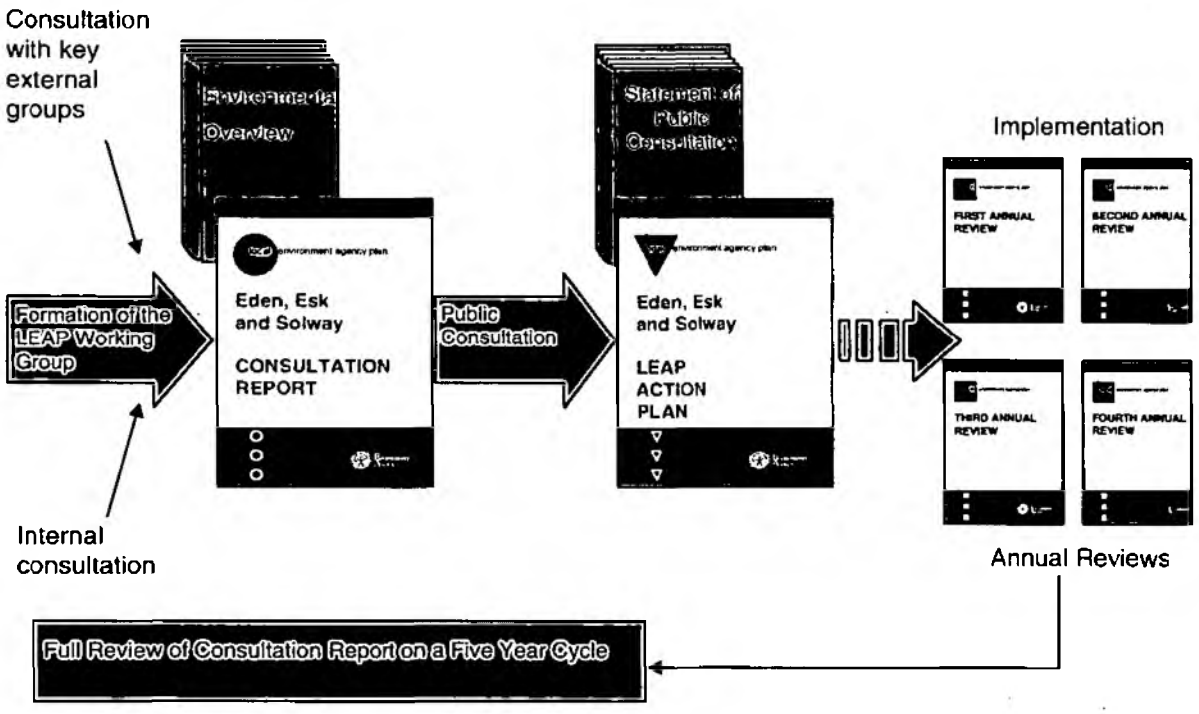
The Eden, Esk and Solway LEAP, Consultation Report, attempts to highlight the most significant issues following on from the Environmental Overview.

The LEAP Consultation Report is subject to formal consultation. The purpose of the consultation period is to enable the Agency and all external organisations and the general public to discuss and, where possible, reach a consensus about the management of the area. At the end of the consultation period a Statement of Public Consultation is produced, which summarises the views expressed during the consultation process. The views received are considered in preparing the next phase, the LEAP Action Plan.

LEAP Action Plan

The final LEAP Action Plan takes into account the results of consultation and the views expressed. It contains a list of actions based on the issues identified in the Consultation Report and takes account of costs and benefits identifies timescales and partner organisations. These agreed actions are incorporated into the Agency's annual business plans.

The Stages in the LEAP Process



The Structure of this Environmental Overview

Each section of this Environmental Overview has a brief introduction, followed by an outline of the role of the Agency, and where relevant, the role of other organisations. The 'state of the environment' in relation to each subject area is then described. While the Agency seeks to provide an integrated approach to the protection and enhancement of the environment, it only has direct control over those aspects which fall within its regulatory and operational activity. Over many factors, which have a significant impact on the environment such as the effect of traffic on air quality, or the impact of land-use, the Agency has to seek to influence others with more direct control eg Local Planning Authorities through the planning process. To this end, each section, where relevant, concludes with a set of principles or objectives which the Agency would like to see incorporated into Local Plan policies within the area to help further the objective of sustainable development. The Agency can provide technical information and advice relating to the environment, we hope this will ensure the early consideration of environmental issues.

Further Information

Further information about the Environment Agency, the state of environment and other data sets, can be found on our web site at www.environment-agency.gov.uk or by contacting the following Environment Agency offices:

North Area Office
Ghyll Mount
Gillan Way
Penrith 40 Business Park
Penrith
Cumbria CA11 1BP

Tel 01768 866666

NW Regional Office
PO Box 12
Richard Fairclough House
Knutsford Road
Warrington
WA4 1HG

Tel 01925 653 999

OS Copyright

2. Air Quality

Introduction

Air quality is an indicator of environmental quality. Air pollution can damage flora, fauna and buildings and have significant effects on soils and water. It can also cause serious problems for those with asthma, bronchitis and other respiratory diseases.

Air pollution may be in the form of gas or particulate matter. Its dispersion and dilution depend on climatic conditions. Its impact may be either local, especially regarding particulate matter that will often settle on nearby land or water or may be global, for example effecting the ozone layer or the concentration of greenhouse gases such as carbon dioxide.

The Role of the Agency

The Environment Agency has powers to regulate air quality principally by operating a system called Integrated Pollution Control (IPC) for certain industrial processes which stems from Part 1 of the Environmental Protection Act 1990 (EPA90). The processes regulated are the potentially most polluting industrial processes and include large combustion plant, iron and steel making, the chemical industry, solvent recovery and incineration plants. Nationally there are approximately 2,500 of such licensed processes of which there are 4 in the area covered by this LEAP.

The objective of IPC is to develop an approach to pollution that considers releases to all media from industrial processes in the context of the effect on the environment as a whole. This is to ensure that where releases to the environment cannot be avoided, the release is to the media, which offers the Best Practicable Environmental Option.

Under the IPC arrangements, the Agency places in the public IPC register the following:

- application for authorisations;
- representations from statutory consultees;
- authorisations including limits set on releases;
- monitoring information required by conditions of an authorisation;
- any enforcement action or prosecutions taken by the Agency.

The Agency also regulates landfill sites and, in particular, landfill gas which is a product resulting from chemical and biological breakdown at waste sites. This gas is principally a mixture of methane and carbon dioxide. Methane is a greenhouse gas, which is flammable/explosive when mixed with air and carbon dioxide is an asphyxiant.

The Role of Other Organisations

The Environment Agency has wide powers, but needs to work closely with others to achieve environmental improvements in local air quality. The Agency is only one of a number of regulatory bodies, and the Local Authority has primary responsibility for local air quality.

The Department of the Environment Transport and Regions (DETR) enforces controls on vehicle manufacturers.

The Health and Safety Executive monitors the nuclear industry by issuing site licences and monitoring their operation.

The Structure Plan contains policies on the need to control pollution and the County Analyst provides an analytical service for District Council Environmental Health Officers (EHOs).

District Councils Environmental Health Departments regulate air pollution from a large number of industrial premises under Part 1 of the Environmental Protection Act 1990. These are premises with a lower potential to pollute than those regulated by the Agency. The processes are designated as Part **B** processes under the Act, but Local Authorities can only regulate releases to air, whereas processes controlled by the Agency are regulated for releases to all environmental media. District Councils also have powers to deal with nuisances from a wide range of non-industrial activities, such as smells from domestic and agricultural premises, smoke from outdoor cable burning and noise pollution.

The Police are responsible for controlling emissions from vehicles.

The Local Authorities and the National Air Quality Strategy - The Environment Act 1995 laid the foundations for a nationwide system of local air quality management, in which the Local Authorities are obliged to review and assess the quality of air in their areas, and to take action where air quality standards or objectives are breached or at risk of being breached.

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

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

The actions and objectives are defined in the Air Quality Regulations 1997 and are to be achieved throughout the UK by 2005. The standards reflect advice from the EU and World Health Organisation (WHO) and take into account potential risks, costs and technical feasibility.

To ensure that the standards and objectives of the Air Quality Regulations are met it will be necessary for Local Authorities to carry out periodic reviews of air quality. Where standards are not being met an Air Quality Management Area should be declared, and an action plan produced to improve air quality. This will require objective assessments together with appropriate monitoring and modelling studies. The Agency is providing details of the processes it regulates together with air emission data from them, to Local Authorities, to assist with the modelling studies.

The Agency will ensure that releases to air from industrial processes which it regulates, will have **IPC** authorisations issued for new processes with appropriate conditions for achieving the objective for compliance with the air quality standards. Conditions for existing IPC authorised processes will be reviewed and varied as necessary. The whole burden of compliance with air quality standards will not be put solely onto industry where it is not the major source of the pollutant.

Local Perspective

Within the Eden, Esk and Solway LEAP area there are 3 regulated processes in Allerdale Borough Council area, and 1 in Eden District Council area. By process type there is 1 for the manufacture of organic chemicals, 1 for the use of toluene di-isocyanate, 1 combustion process and 1 lime making process.

Allerdale Borough Council, Eden District Council and Carlisle City Council all undertake air quality monitoring in the LEAP area. This is summarised in Table 1.

Table 1: Summary of Air Quality Monitoring Sites and Pollutants

Area	Smoke	SO_2	NO_2	Lead	Benzene	Particulates
Carlisle	1	1	12	1	6	
Allerdale			3			
Eden	1*	1*	8			

* site recently established.

Carlisle City Council have undertaken a "First Stage Review and Assessment of Local Air Quality" under the Air Quality Regulations. This review recommends a second stage review and assessment of NO_2 and particulates is undertaken. NO_2 monitoring results undertaken by Carlisle City Council in 1997 are given in Table 2.

Table 2: Results of NO_2 monitoring undertaken by Carlisle City Council (1997)

Site	Annual Mean (ppb)
225 Wigton Road (arterial road)	13.8
45 Scotland Road (arterial road)	28.8
328 London Road (arterial road)	14.5
215 Warwick Road (arterial road)	20.7
Shaddongate (inner city road)	24.7
Hardwicke Circus (inner city road)	22.5
Botchergate (inner city road)	24.4
45 Warwick Road (inner city road)	20.7
Tourist Information Centre	11.9
Sanderson Close (suburban)	7.5
Palmer Road (suburban)	5.7

EC Directive Limit = 40 ppb. EC Guideline = 28ppb

The NO_2 Air Quality Standard to be achieved by 2005 is 21ppb as an annual mean and is exceeded in some of the monitoring locations. The majority of local NO_2 in Carlisle is assumed to come from traffic.

Allerdale Borough Council and Eden District Council are yet to produce their equivalent First Stage Reviews and Assessments.

AIR QUALITY

Good air quality is important for sustaining human health and the health of the environment as a whole. The Agency is seeking the inclusion of policies within development plans which:

- resist development that would adversely impact upon air quality;
- maintain or improve air quality;
- complement the objectives of the National Air Quality Strategy.

Further Information

Further details of air quality monitoring and assessment are available from the Local Authorities.

3. Water Quality

Introduction

Water quality plays a significant role in determining the variety of uses that a catchment can support. This section explains the criteria used to assess water quality within the plan area and compares current water quality against quality targets, which have been based upon the recognised potential uses of a stretch of river.

The Role of the Agency

The Environment Agency has a statutory responsibility under the Water Resources Act, 1991 and some European Union (EU) Directives to monitor 'controlled waters' for pollution. Controlled waters include rivers, streams, lakes, ditches, groundwater, estuaries and coastal waters.

The chemical quality and the aquatic life in the LEAP area are monitored regularly in a routine program. This allows the water quality to be categorised and targets set relating to the Agency's River Quality Objectives (RQO) or General Quality Assessment (GQA) classification systems. Sampling for obligation arising from EU Directives is undertaken for assessment.

Pollution is controlled at source by a number of means:

- the discharge of effluent to a controlled water is allowed only with a consent to discharge. Conditions are attached to the consent to control the impact on the receiving water;
- inspection of farm and industrial sites are carried out and where appropriate, improvements are recommended to reduce the risk of pollution;
- during the consultation process with Local Authorities, the Agency gives advice regarding pollution control requirements to be included in planning permissions, Integrated Pollution Control authorisations and waste management licences;
- the Agency is also consulted by, and directs North West Water Ltd on the ongoing programme of sewerage and sewage treatment improvements.

The Agency provides a 24 hour response to pollution incidents.

The Role of Other Organisations

Other organisations such as the Institute of Freshwater Ecology (IFE), and the Freshwater Biological Association (FBA) undertake research and monitoring related to the water environment including water quality. NWW Ltd monitor the water quality of their abstractions for potable water.

Local Perspective - Water Quality Assessment

General Quality Assessment

The GQA scheme is used to make periodic assessments of the quality of river water in order to monitor geographical trends and changes over time. The scheme as presently envisaged will comprise four components - general chemistry, biology, nutrients and aesthetics - each providing a discrete 'window' upon which the quality of river stretches is assessed. The general chemistry component of the GQA scheme is currently used, and comprises six tiered grades defined by standards for dissolved

oxygen, BOD and total ammonia. The nutrients and aesthetics windows are still under development and will be applied when available.

Chemical GQA

A comparison of the 1990, 1995 and 1998 GQA for watercourses in the Eden LEAP area is given in Table 3 below. Water quality criteria for the GQA classes is given in Appendix 1.

Map 2 and table 3 show that in 1998 over 85% of the length of classified watercourse in the Eden catchment was of "good quality", and less than 3% was of "poor or bad quality".

Table 3: Lengths of Classified Watercourses by GQA Grade for 1990, 1995 and 1998

GQA Class		Km			Percentage		
		1990	1995	1998	1990	1995	1998
A	Good	124.2	450.3	654.2	9.3	33.8	49
B	Good	326.1	582	485	24.4	43.6	36.4
C	Fair	26.0	212.4	100.4	1.9	15.9	7.5
D	Fair	34.3	46.7	56.1	2.6	3.5	4.2
E	Poor	12.9	36.3	28	1.0	2.7	2.1
F	Bad	1.2	7.1	11.1	0.1	0.5	0.8
Unclassified		810.1			60.7		
Total		1334.8	1334.8	1334.8	100	100	100

Biological GQA

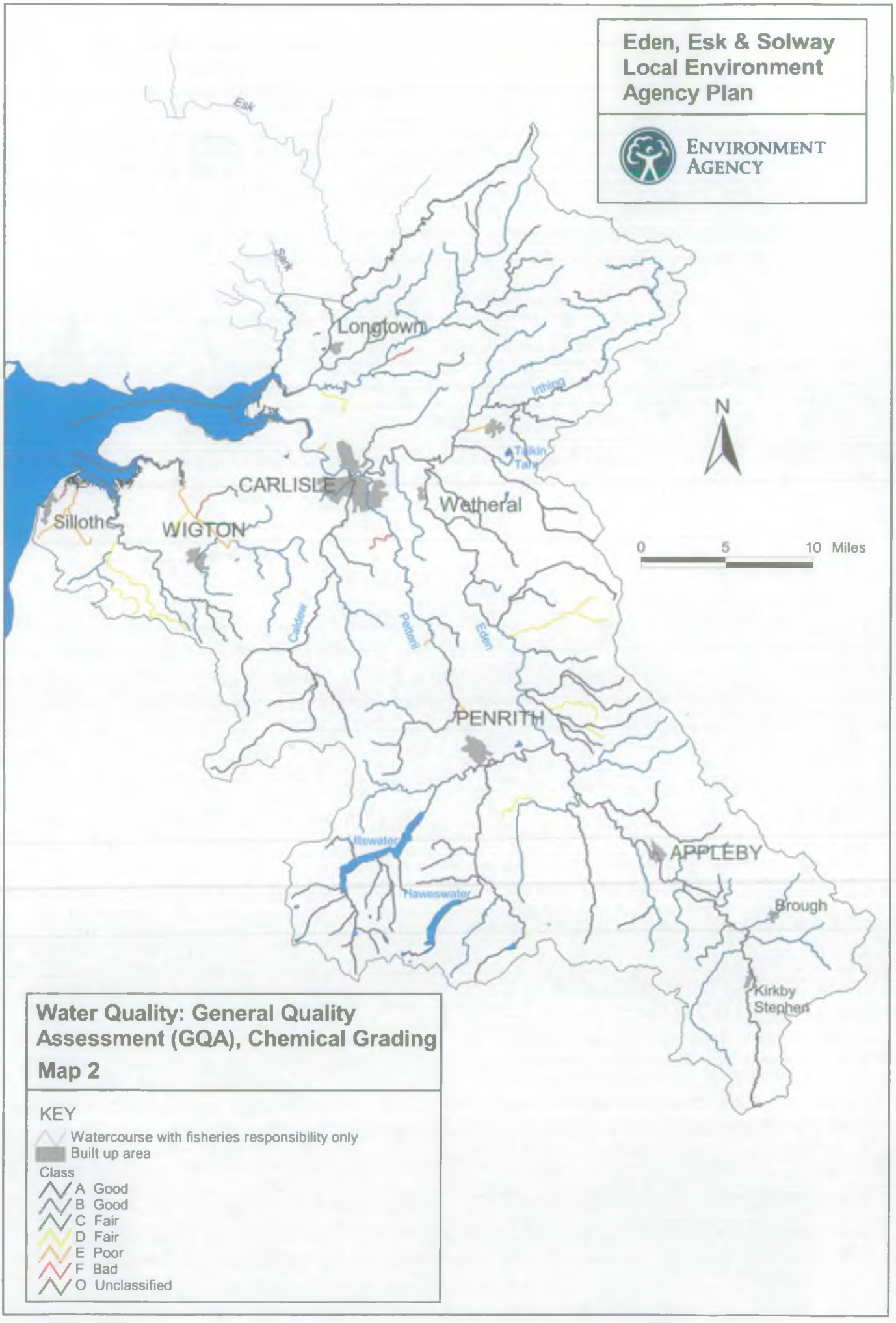
Monitoring of the invertebrate life living in and on the stream bed provides the basis for the biological window of the GQA scheme (Table 4). There are again six grades of quality recognised (as in the chemical GQA Table 3), assigned according to how closely the families of invertebrates present at a sample site approach our expectations for an unpolluted river of its physical type. The information content in the biological classification is different from, but complementary to, that given by the chemical classification; for example, it may serve to highlight intermittent or toxic problems more effectively.

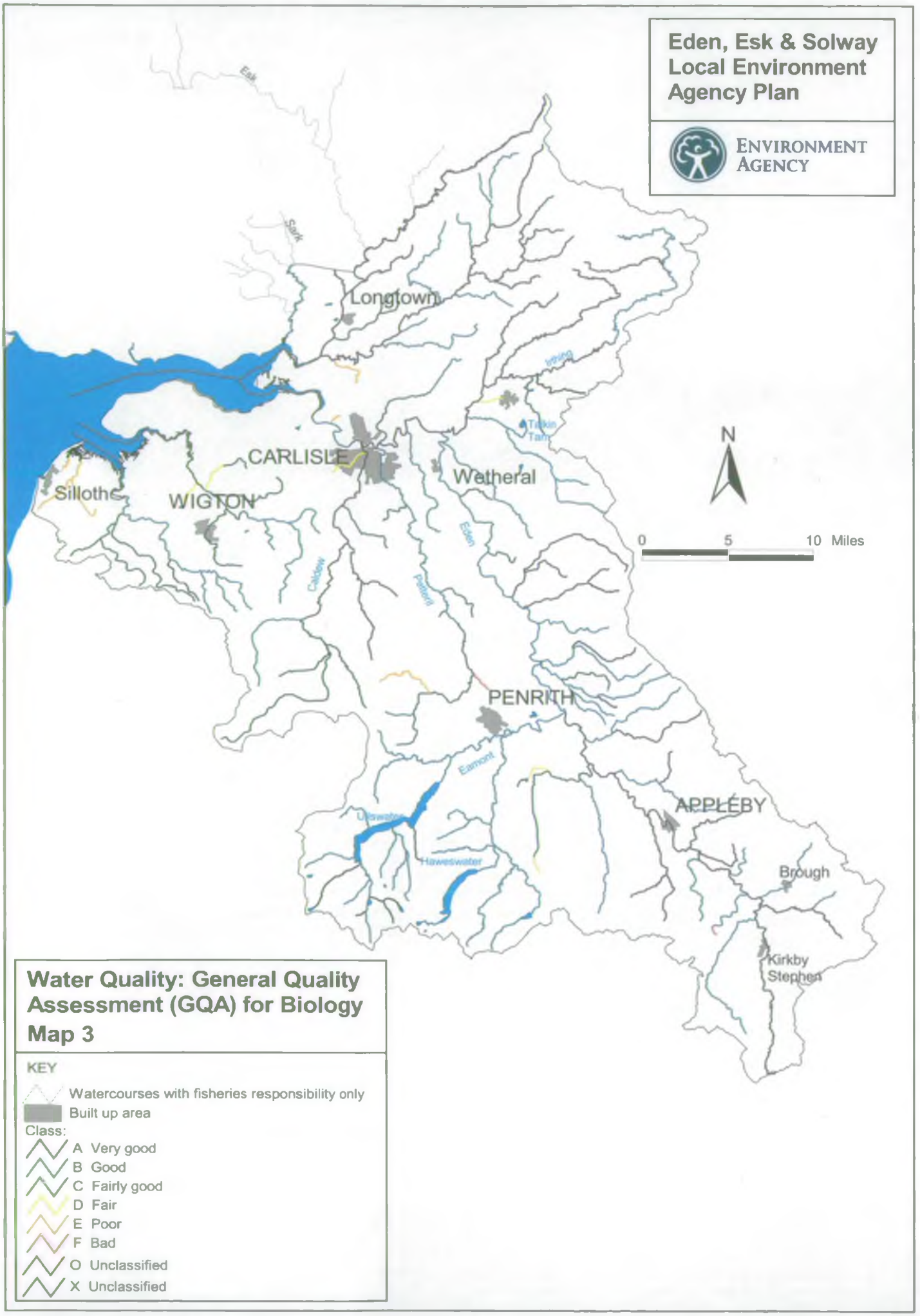
The formal classification of rivers by the biological GQA scheme are based on a five year survey; the results from the 1995 survey within the LEAP area are shown on Map 3.

River Quality Objectives

The Agency has strategic use related targets known as River Quality Objectives (RQO) which have been set for all rivers and provide a basis for planning the maintenance and improvement of river quality. The water classification scheme used to set RQO planning targets is known as the River Ecosystem Classification scheme. The scheme establishes a defined level of protection for aquatic life and comprises of 5 classes which reflect the chemical quality requirements of communities of plants and animals living in our rivers. Description of the River Ecosystem Classes are given below:

RE1 water of very good quality suitable for all fish species;
RE2 water of good quality suitable for all fish species;
RE3 water of fair quality suitable for high class coarse fish populations;
RE4 water of fair quality suitable for coarse fish populations;
RE5 water of poor quality which is likely to limit coarse fish populations.


Eden, Esk & Solway
Local Environment
Agency Plan
ENVIRONMENT
AGENCY
Esk
Sark
Longtown
Irthing
Talkin
Tarn
CARLISLE
Wetheral
Silloth
WIGTON
N
0
5
10 Miles
Caldew
Petteril
Eden
PENRITH
Ullswater
Haweswater
APPLEBY
Brough
Kirkby
Stephen
Water Quality: General Quality
Assessment (GQA), Chemical Grading
Map 2
KEY
Watercourse with fisheries responsibility only
Built up area
Class
A Good
B Good
C Fair
D Fair
E Poor
F Bad
O Unclassified


Eden, Esk & Solway Local Environment Agency Plan
Environment Agency
Esk
Sark
Longtown
CARLISLE
Wetheral
Silloth
WIGTON
Caldew
Eden
Petteril
PENRITH
Eamont
Ullswater
Haweswater
APPLEBY
Brough
Kirkby Stephen
Tarn
N
0
5
10 Miles
Water Quality: General Quality Assessment (GQA) for Biology Map 3
KEY
Watercourses with fisheries responsibility only
Built up area
Class:
A Very good
B Good
C Fairly good
D Fair
E Poor
F Bad
O Unclassified
X Unclassified

A more detailed outline of the scheme and the quality criteria from which these classes are derived can be seen in Appendix 1. Further use-related target schemes are still under development but include: Special Ecosystem; Abstraction for potable supply; agricultural/industrial abstraction and watersports.

Every classified stretch in the LEAP area has been set a River Ecosystem objective. These objectives are immediately effective in order to prevent deterioration of present water quality. These objectives have been incorporated into Map 4 and are designated for the lifetime of the plan.

Table 4: General Quality Assessment Scheme For Biology

Grade	Outline Description
A (Very Good)	Biology similar to (or better than) that expected for an average unpolluted river of this size, type and location. High diversity of taxa, usually with several species in each. Rare to find dominance of any one taxon.
B (Good)	Biology falls a little short of that expected for an unpolluted river. Small reduction in the number of taxa that are sensitive to pollution. Moderate increase in the number of individuals in the taxa that tolerate pollution.
C (Fairly Good)	Biology worse than expected for an unpolluted river. Many sensitive taxa absent, or number of individuals reduced. Marked rise in numbers of individuals in taxa that tolerate pollution.
D (Fair)	Sensitive taxa scarce and contain only a small number of individuals. A range of pollution tolerant taxa present, with some high numbers of individuals.
E (Poor)	Biology restricted to pollution tolerant species with some taxa dominant. Sensitive taxa rare or absent.
F (Bad)	Biology limited to a small number of very tolerant taxa such as worms, midge lavae, leeches and water hoglouse, some may be present in high numbers. In the worst case, there may be no life present.

River Ecosystem Assessment

Having set River Ecosystem targets it is now possible to assess the current state of the LEAP area against these targets.

The assessment has been made using data from the routine water quality sampling programme. A three year period (1996-1998 calendar years) is used to assess compliance with RE targets. The variation associated with routine sampling has been considered and statistical confidence limits calculated for the water quality data.

Compliance with Rivers Ecosystem targets for the Eden, Esk and Solway Area is shown in Map 5.

Failure to meet Targets and Issues Arising

The chemical quality of the watercourses in the Eden, Esk and Solway LEAP area is generally very good, with the majority of stretches suitable for all fish species. There are a few exceptions, noticeably in the slow flowing lowland watercourses.

The Agency aims to maintain and improve water quality to ensure that River Quality Objectives are met. Where failures of the River Quality Objectives occur, the Agency will investigate the cause and identify measures to ensure compliance. Failures can be due to point source pollution (e.g. sewage or industrial discharges), diffuse pollution (eg agricultural run off or contaminated land) or may be due to natural sources (eg natural acidic run off in headwaters).

Tidal Waters

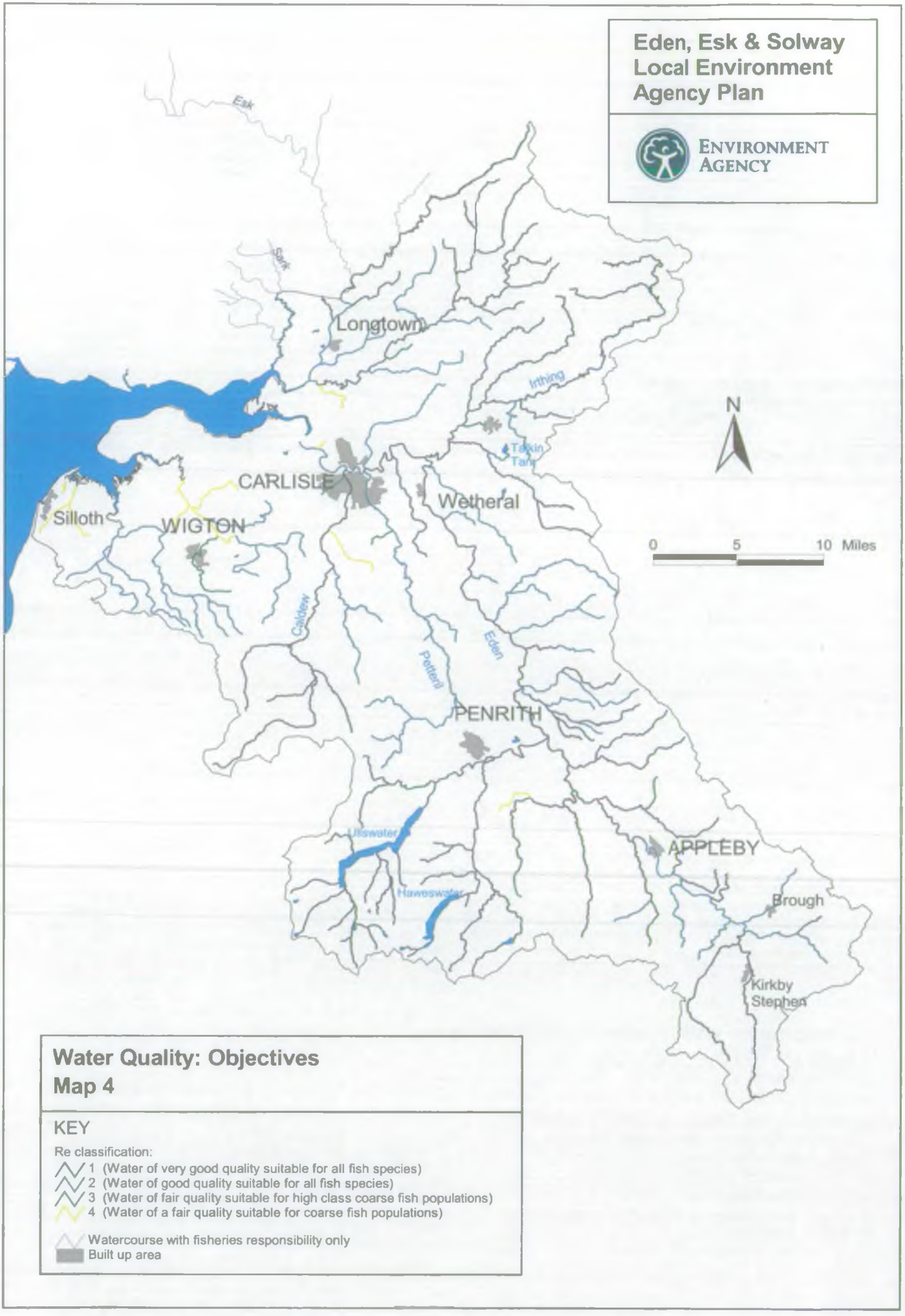
Tidal waters and estuaries are classified using the National Water Council (NWC) scheme. This scheme considers dissolved oxygen levels, aesthetic quality and biological quality and places water quality in one of four classes. Summary data for 1995 shown in Table 5 below indicates that 97% of the LEAP area's tidal and estuary water are of good to fair quality.

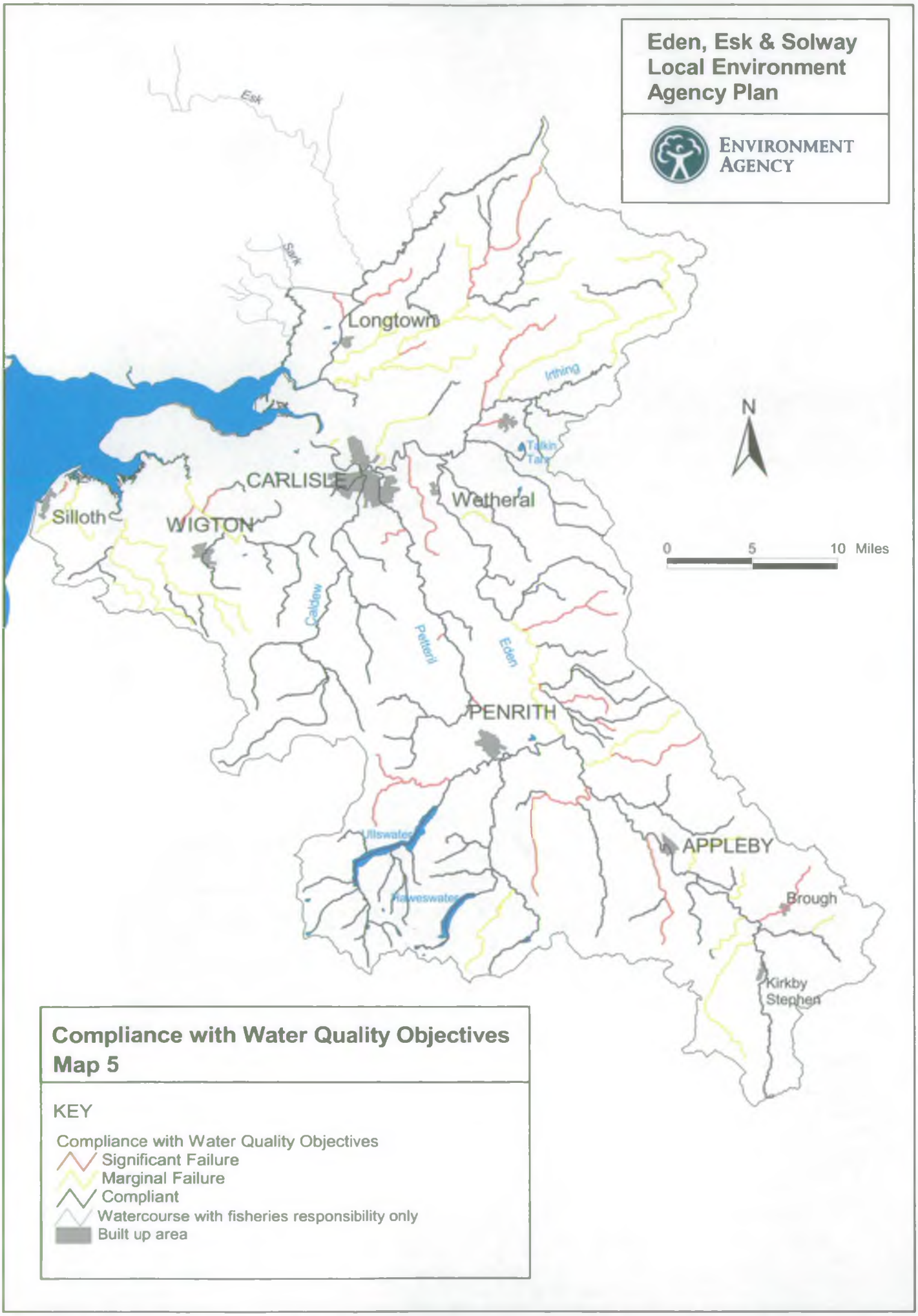
Table 5: Tidal Waters and Estuaries within the Eden Esk and Solway Area

	Class	Km	%
A	Good	64.2	90.8
B	Fair	4.7	6.6
C	Poor	1.8	2.6
D	Bad	0.0	0.0
	TOTAL	**70.7**	**100**

Still Waters

The Agency is currently developing a classification system for still waters (lakes). However, monitoring of still waters has taken place over the last 25 years, but the most comprehensive study using a consistent methodology, is the 'Lakes Tour' which began in 1990. This is a collaborative study between the Agency and the Institute of Freshwater Ecology. The Lakes Tour takes place approximately every 4-5 years and collects samples from 20 lakes at their deepest point. The Agency currently monitors Ullswater, Haweswater and Brothers Water, within the LEAP area as part of this project. Key physicochemical parameters and algal population density are measured to identify the trophic status of the lakes. Trophic status, (oligotrophic, mesotrophic and eutrophic), is classified according to their nutrient availability and the associated primary productivity is measured by chlorophyll-a concentration.


Eden, Esk & Solway
Local Environment
Agency Plan
Environment
Agency
Esk
Sark
Longtown
Irthing
Talkin
Tarn
CARLISLE
Wetheral
Silloth
WIGTON
N
0
5
10 Miles
Caldew
Petteril
Eden
PENRITH
Ullswater
Haweswater
APPLEBY
Brough
Kirkby
Stephen
Water Quality: Objectives
Map 4
KEY
Re classification:
1 (Water of very good quality suitable for all fish species)
2 (Water of good quality suitable for all fish species)
3 (Water of fair quality suitable for high class coarse fish populations)
4 (Water of a fair quality suitable for coarse fish populations)
Watercourse with fisheries responsibility only
Built up area


Eden, Esk & Solway
Local Environment
Agency Plan
ENVIRONMENT
AGENCY
Esk
Sark
Longtown
Irthing
Talkin
Tarn
CARLISLE
Wetheral
Silloth
WIGTON
N
0
5
10 Miles
Caldew
Petteril
Eden
PENRITH
Ullswater
Haweswater
APPLEBY
Brough
Kirkby
Stephen
Compliance with Water Quality Objectives
Map 5
KEY
Compliance with Water Quality Objectives
Significant Failure
Marginal Failure
Compliant
Watercourse with fisheries responsibility only
Built up area

Local Perspective – Compliance with EC Directives.

The following EC Directives contain standards which have implications for water quality in the LEAP area. Map 6 shows the EC Directive monitoring points and designated areas for the Eden, Esk and Solway area, as well as the state of the catchment in terms of compliance with the Directive standards.

1. The Dangerous Substance Directive (76/464/EEC)

The Directive provides a framework to control pollution caused by discharges of certain substances considered harmful to the aquatic environment. The Directive established two lists of substances. List I contains substances regarded as particularly dangerous because of their toxicity, persistence and bioaccumulation, while List II contains substances which are considered to be less dangerous but which still can have a deleterious effect on the aquatic environment. The Agency is required to take steps to eliminate pollution by List I substances and reduce pollution by List II substances.

UK Environmental Quality Standards (EQSs) have been established for concentrations of listed substances in watercourses. Limits for discharges containing listed substances have been set to ensure the Environmental Quality Standards are met. The Agency monitors downstream of all such discharges to assess and report on compliance with these Environmental Quality Standards.

During 1998 there were no failures to meet List I Environmental Quality Standards in the LEAP area, and only one site failed to comply with List II Environmental Quality Standard's. Great Gutter failed for Copper. Investigation has indicated that the failure is due to residual Copper from a discharge that has now ceased. Copper concentrations in Great Gutter have been falling since the discharge stopped.

2. The Freshwater Fisheries Directive (78/659/EEC)

The Directive is concerned with ensuring that water quality in designated stretches of water is suitable for supporting fisheries. This Directive contains two sets of quality standards, one at levels to support a cyprinid fish population (ie coarse fish) and another set at stricter levels to support a salmonid fish population (eg salmon and trout). There are two sets of standards for each fishery type, imperative (I) standards, which must be achieved and guideline (G) standards which Member States should aim to achieve. Most stretches in the LEAP area have been designated as Salmonid fisheries. Brunstock Beck is designated for cyprinids

Of the 174 stretches of designated salmonid fisheries, only two failed to comply with the Directives imperative standards in 1998. The failing stretches were Laversdale Beck (Chapwell to Brunstock Beck) and the River Petteril (Motherby to Greystoke). The failure on Laversdale Beck is being investigated. The failure on the River Petteril is due to farm drainage and the impact of contaminated groundwater from a former landfill site. The one cyprinid fishery, Brunstock Beck, complied with the imperative standards in 1998.

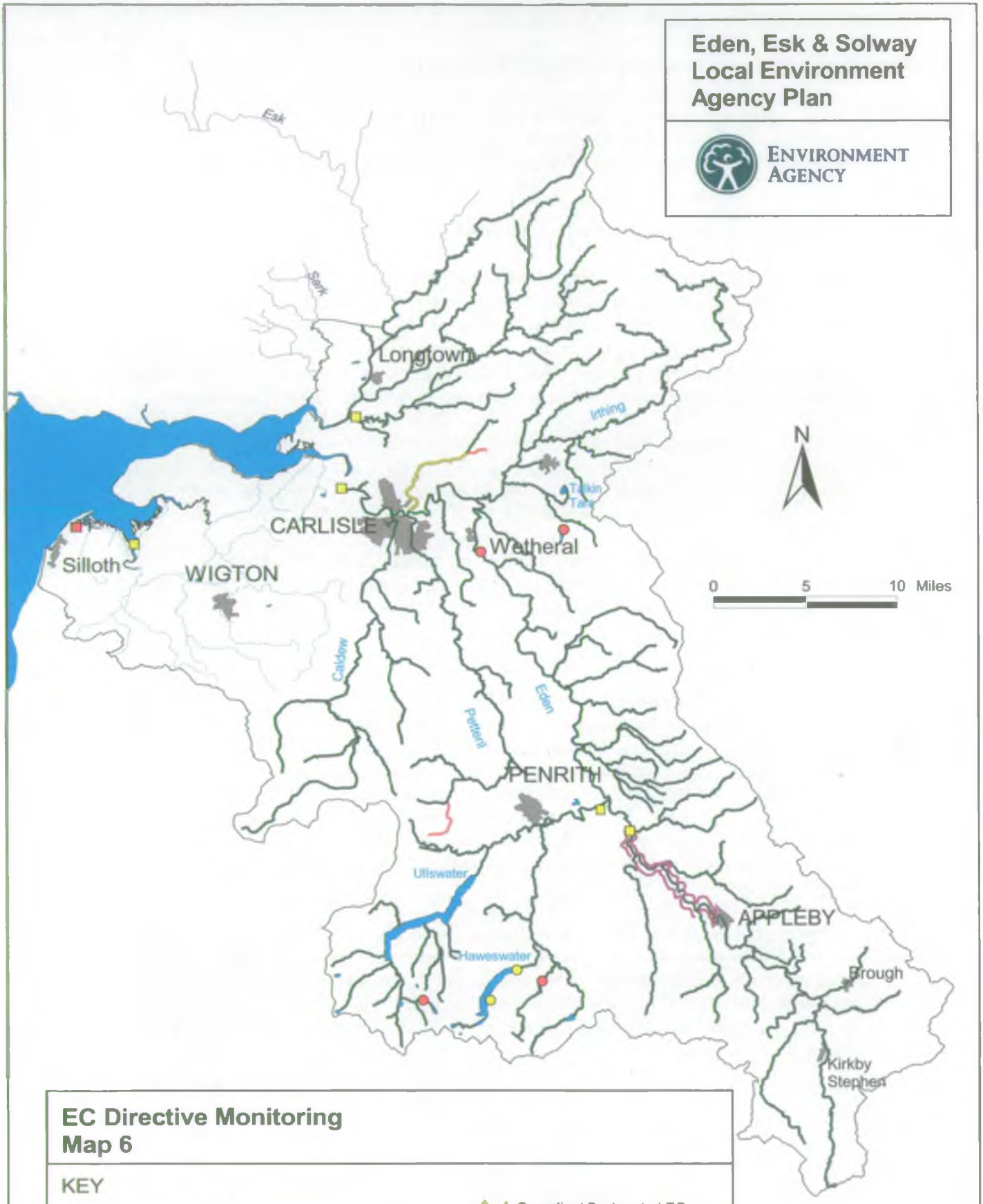
3. The Surface Water Abstraction Directive (75/440/EEC)

The Directive ensures that surface water abstracted for use as drinking water meets certain standards and is given adequate treatment before entering public water supplies. The Directive sets out imperative standards which must be achieved, and guideline standards which Member States should aim to achieve. Surface waters are divided into 3 categories A1, A2 and A3 which reflect the method of treatment received to meet the required water quality for potable supply.

During 1998 four sites in the LEAP Area failed to meet the requirements of the directive.

Eden, Esk & Solway Local Environment Agency Plan

ENVIRONMENT AGENCY



EC Directive Monitoring Map 6

KEY

EC Surface Water Abstraction monitoring points
- Failing
- Compliant

Designated under EC Waste Water Treatment Directive as a Sensitive Area

Watercourse with fisheries responsibility only

Built up area

Watercourse

Compliant Designated EC Cyprinid Fishery

EC Dangerous Substances Directive downstream monitoring points
- Failing
- Compliant

EC Freshwater Fisheries Directive designated salmonid fisheries
- Compliant
- Failing

Bleawater exceeded the phenol limit on two occasions and Hayeswater on one occasion. Castle Carrock exceeded the colour limit on two occasions and the River Eden at Cumwhinton exceeded the limit for Polycyclic Aromatic Hydrocarbons on one occasion.

The Agency is investigating these exceedances and an action plan will be produced for each site where a problem is confirmed.

4. The Urban Waste Water Treatment Directive (91/271/EEC)

The Directive lays down minimum standards for the provision of sewerage collection systems and sewage treatment. The Directive specifies that all discharges serving population equivalents greater than 2000 and discharging to fresh or estuarine waters must receive secondary treatment by the year 2005. Discharges below a population of 2000 must also receive "appropriate" treatment by 2005. The Directive also requires higher standards for discharges to sensitive areas. Sensitive areas are those waters that receive a Wastewater Treatment Works discharge greater than 10 000 population equivalent and:

- the waters are (or may become) eutrophic;
- the waters are used for public water supply and contain more than 50 mg/l nitrate;
- more stringent treatment is required to fulfil the requirements of other EC Directives.

The River Eden has been designated sensitive (eutrophic) under the Directive, from Appleby WwTW (the qualifying discharge) to Temple Sowerby. As a result of this designation nutrient removal was installed at Appleby WwTW during 1998 to reduce the phosphate load from the works.

The River Eamont from Penrith WwTW to the River Eden has been identified as a candidate for designation as a sensitive area (eutrophic). The Agency is continuing to collect data to determine whether the stretch meets the criteria for designation.

5. Groundwater Directive (80/68/EEC)

The Groundwater Directive (80/68/EEC) is implemented through the Groundwater Regulations and these are an environmental measure that provides a framework to protect groundwater. The provisions in the Regulations:

- Prevent discharges to groundwater of the most toxic List I substances (including pesticides, sheep dip, solvents, hydrocarbons, mercury, cadmium and cyanide).
- Prevent pollution of groundwater from List II substances, which are less dangerous, but if disposed of in large amounts could be harmful to groundwater (for example heavy metals).

The Regulations provide the Environment Agency with powers to control disposals or tipping for the purpose of disposal to land of listed substances. They require that prior to a disposal being authorised, an investigation of the impact of such a disposal on the local groundwater should be conducted. Once an authorisation is issued for a disposal it is then subject to requisite surveillance. In addition, a notice procedure under the Regulations allows the Agency to control activities other than disposals; if the manner in which they are being conducted threatens groundwater.

WATER QUALITY

The quality of groundwater, surface and coastal water affects their current and potential use and the quality of the environment. The Agency is seeking the inclusion of policies within development plans which:

- maintain or improve the quality of groundwater, surface or coastal waters;
- resist development that poses an unacceptable risk to the quality of groundwater, surface or coastal waters;
- ensure that adequate foul and surface water provision is available to serve new development and that the ultimate discharge does not cause an environmental problem;
- ensure that adequate pollution control measures are incorporated into new developments to reduce the risks of water pollution.

Further Information

Water quality information is available on the Public Register, at the Environment Agency Offices, and can be obtained by contacting the Customer Services Department at the North Area Office or the North West Regional Office.

The Eden Esk and Solway LEAP (Consultation Report) 1999, covers the following relevant issues:

Issue 5	The need to protect and improve the quality of still waters;
Issue 13	Potential pollution problems of drainage from major roads;
Issue 14	Adverse impact from overflows on the sewerage network;
Issue 15	Adverse impact from waste water treatment works;
Issue 16	Localised pollution from lack of rural sewerage.

4. Sewage Effluent Disposal

Introduction

This section relates to the disposal of domestic and industrial effluent to the water environment. Inadequate sewage effluent disposal can have an adverse effect on water quality.

The Role of the Agency

Discharge of sewage or trade effluent to surface waters requires the consent of the Agency. When determining consent application the Agency will set appropriate conditions to protect other uses of the receiving water. In some cases the Agency inherited consents set by predecessor bodies which do not adequately protect other water uses. These are being addressed progressively within the current restrictions, particularly in relation to water company expenditure.

The Role of Other Organisations

The Agency is involved in setting priorities for work necessary for environmental improvements. The Asset Management Plan (AMP) is the Water Service Company's programme of capital expenditure and investment for ten year periods. At present the Agency is involved in the second plan (AMP 2), for the year 1995 to 2005, the first five years of the programme, 1995 to 2000, has been confirmed. The priorities for the Asset Management Plan for 2000-2005 (AMP 3), has still to be confirmed and the Water Companies are producing detailed business plans. The final confirmed programme is scheduled for November 1999. The schemes included in AMP3 have been selected to fulfil statutory obligation and based on their actual and potential environmental benefits that would occur following the improvements in water quality. The Environmental Benefit Assessment of the AMP3 schemes considered factors such as habitat, water uses for potable and industrial abstraction, and water based activities like angling, boating and canoeing. This process was in consultation with the public, Local Authorities, industry, fishing and canoeing clubs and have been taken into account when making the decisions.

Local Perspective

Continuous Effluents

Continuous effluent refers to fully treated effluents such as those from Wastewater Treatment Works (WwTW) and trade effluent treatment plants.

North West Water Ltd (NWW Ltd) and Northumbria Water Ltd operate the more significant WwTWs, in this LEAP area. WwTWs may receive both domestic and industrial waste. The main works are operated by NWW Ltd and are:

- Carlisle WwTW discharging to the River Eden;
- Penrith WwTW discharging to the River Eamont.

There are many smaller works in the area operated by NWW Ltd, such as Kirkby Stephen and Great Asby. Map 7 shows the main WwTW within the LEAP area. There are also a number of private treatment facilities in the catchment, many associated with hotels and public houses and some cause localised problems by their impact on small watercourses. The rural nature of much of the LEAP area

means individual or small groups of properties are not sewered, and septic tanks serving properties are common place. Groups of septic tanks in a restricted area can cause problems in part of the catchment; for example Linstock where a tributary of the Eden is effected locally by sewage discharges.

The majority of North West Water Ltd WwTW's in the catchment do not have significant impacts on the receiving waters. Some of the exceptions are:

- Calthwaite WwTW that discharges to Calthwaite Beck, which is a small tributary of the River Petteril. The discharge contributes to Calthwaite Beck failing to meet its River Quality Objective RQO of RE2 for ammonia, BOD and dissolved oxygen.

- Little Bampton WwTW discharges to Bampton Beck, that is a tributary of the River Wampool. The discharge contributes to the failure of the RE4 RQO for BOD, ammonia and dissolved oxygen.

To ensure compliance with the RQO these works will be improved as part of the NWW Ltd AMP 3.

The discharges contain nutrients such as nitrates and phosphates, which lead to enrichment of the water. Excessive weed and algal growth, variations in the dissolved oxygen level on a daily basis and decrease in the diversity of fish and invertebrates are all indicative of eutrophication. Watercourses which show symptoms and receive a discharge from a Wastewater Treatment Works (serving a population equivalent of greater than 10,000) are put forward as candidates for designation as 'sensitive waters' under the Urban Wastewater Treatment Directive.

The River Eden, downstream of Appleby WwTW, has been designated as a 'sensitive water' and under the provisions of the EC Urban Wastewater Treatment Directive phosphate stripping was installed from 31 December 1998. The River Eden will be monitored on an ongoing basis to assess the degree of improvement this brings about.

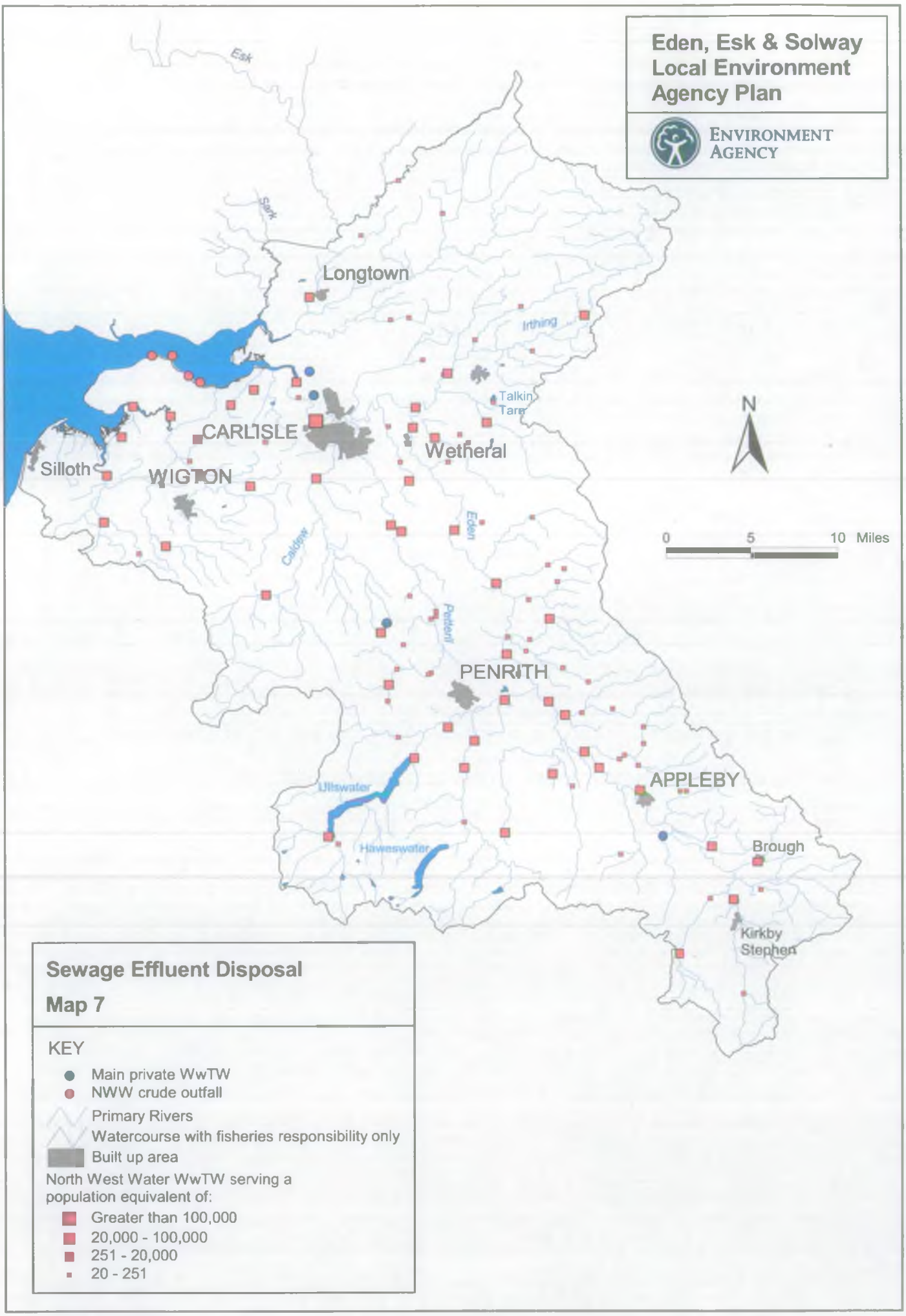
Other recent improvement schemes include new treatment works being built at Great Asby and Glenridding to resolve local pollution problems from sewage.

Intermittent Effluents

Intermittent effluents include storm overflows on the sewerage network, emergency overflows, storm drains and surface water run-off. Of these, the storm overflows are the most significant in terms of effect on water quality. Combined sewer and sewerage pumping station overflows occur on most sewerage systems in the catchment to prevent foul flooding of properties during times of heavy rainfall. Such overflows are subject to Agency consents, which aim to limit the frequency of discharge to occasions of heavy rainfall when adequate dilution is available in the receiving watercourse. There are approximately 130 overflows from the sewerage network. However, this number changes as improvement work on the sewerage system is carried out and new overflows replace the older ones.

Although these discharges occur sporadically, the organic input from overflows can result in sudden increases in the biochemical oxygen demand and ammonia that can have an effect on the aquatic ecosystem and the watercourse to fail its River Quality Objectives. There may also be a visual impact, poor aesthetics, caused by sewage solids and litter.

Where a NWW Ltd discharge results in pollution problems, criteria are used to designate the discharge as being unsatisfactory. The intermittent discharge is then included for improvements in the NWW Ltd Asset Management Plan (AMP). Examples of unsatisfactory intermittent discharges


Eden, Esk & Solway
Local Environment
Agency Plan
Environment Agency
Esk
Sark
Longtown
Irthing
Talkin Tarn
CARLISLE
Wetheral
Silloth
WIGTON
Caldew
Eden
Petteril
PENRITH
Ullswater
Haweswater
APPLEBY
Brough
Kirkby Stephen
N
0
5
10 Miles
Sewage Effluent Disposal
Map 7
KEY
Main private WwTW
NWW crude outfall
Primary Rivers
Watercourse with fisheries responsibility only
Built up area
North West Water WwTW serving a population equivalent of:
Greater than 100,000
20,000 - 100,000
251 - 20,000
20 - 251

included in NWW Ltd AMP 3, for the period 2000 to 2005 are Infirmary Street and Pooley Bridge combined sewer overflows.

Surface water drainage from industrial estates/premises often discharges direct to a watercourse. These drains can become contaminated by spillages, cross connection and inappropriate working practices leading to intermittent pollution, for example by oil. Silloth Airfield Industrial Estate has been problematic with intermittent pollution of Great Gutter. The estate has been the subject of intensive pollution prevention campaigns in order to improve the situation.

FOUL AND SURFACE WATER DRAINAGE

Inadequate foul and surface water drainage provision can have an adverse effect on water quality. The Agency is seeking the inclusion of policies in development plans which:

- ensure that adequate foul and surface water drainage infrastructure is available to serve new developments and the discharge points will not cause water pollution;
- discourage the proliferation of private sewage disposal facilities;
- ensure that effective pollution prevention measures are incorporated within development schemes.

Further Information

The Eden Esk and Solway LEAP (Consultation Report) 1999, covers the following relevant issues:

Issue 14	Adverse impact from overflows on the sewerage network;
Issue 15	Adverse impact from waste water treatment works;
Issue 16	Localised pollution from lack of rural sewerage.

5. Industrial Discharges to Air and Water

Introduction

Pollution can harm the whole environment and can arise from many sources, not just industry. However, many of the worst pollutants – those that can do most harm if mishandled or are hardest to dispose of safely, are used in industry or are by-products of industrial processes.

The Role of the Agency

The Agency has responsibility for regulating the largest and most complex industrial processes. This is achieved using authorisations issued under the Integrated Pollution Control (IPC) regulatory regime set up by the Environmental Protection Act 1990.

IPC requires that the person carrying on the process must use the best available techniques not entailing excessive costs (BATNEEC):

- for preventing the release of substances prescribed for any environmental medium into that medium or, where that is not practicable by such means, for reducing the release of such substances to a minimum and for rendering harmless any such substances which are so released; and
- for rendering harmless any other substances which might cause harm if released into any environmental medium.

IPC considers releases to all environmental media and requires that the releases as a whole have regard to the best practicable environmental option (BPEO).

Discharges to watercourses from such processes are controlled by consents issued by the Agency under the Water Resources Act 1991.

The Role of Other Organisations

Discharges to air from potentially less polluting processes are controlled by a Local Authority Air Pollution Control (LAAPC) authorisation issued by the Local Authority.

Local Perspective

IPC Regulated Processes

Within the LEAP area the Agency regulates 4 processes under the IPC regulations (see Map 8).

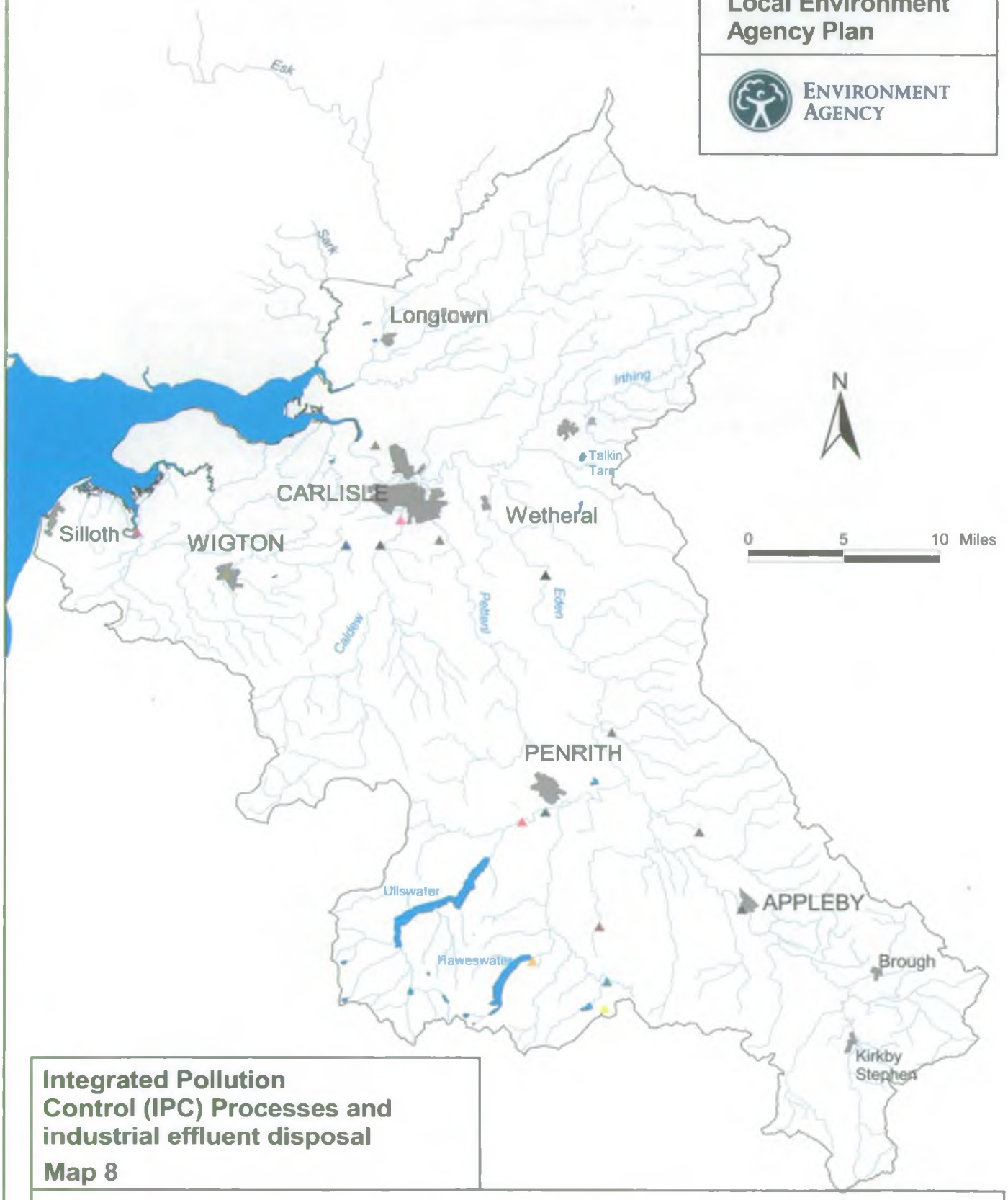
The UCB (Sidac) site at Wigton has 2 authorised processes one for the manufacture of cellulose film and one for a boilerhouse, which provides the steam, used in the process.

Releases from the boilerhouse are predominantly combustion gases (NO_x, SO_x, CO and particulates) to air.

Releases from the cellulose plant include significant quantities of the gases hydrogen sulphide (H_2S) and carbon disulphide (CS_2) to air and large quantities of effluent containing suspended solids and

Eden, Esk & Solway Local Environment Agency Plan

ENVIRONMENT AGENCY



Integrated Pollution Control (IPC) Processes and industrial effluent disposal

Map 8

KEY

Primary Rivers
Watercourse with fisheries responsibility only
Built up area

Industrial Effluent Disposal:

1 ARC Shap Sweetholme Quarry
2 British Steel Shapfell
3 British Gypsum Birks Sike
4 Express Foods
5 Lakeland Smolts Fish Farm
6 Calsil Brickworks
7 Nestle
8 Pirelli
9 Southwaite Green Mill Fish Farm
10 RMC Shap Granite
11 Thompsons Board Mills
12 Ullswater Trout Farm
13 Lakeland Smolts
14 BSW Timber
15 New Mills Trout Farm
16 UCB Sidac Trade Effluent
17 UCB Sidac Cooling Water
18 Tilcon Cardewmires Quarry

sulphur-containing compounds to the sewer. UCB undertake background environmental monitoring for hydrogen sulphide (H_2S) and carbon disulphide (CS_2).

The Johnson Controls site at Silloth manufactures foam car parts. The process involves the use of toluene di-isocyanate. Toluene di-isocyanate is released to air. There is no significant release to water from the site.

British Steel operate lime kilns at Shap Fell. Releases are predominantly combustion gases (NO_x, SO_x, CO and particulates) to air. There are no significant release to water from the site.

Discharges to Watercourses

As a result of a long standing policy of encouraging the discharge of industrial effluent to sewer, there are only a limited number of consented discharges to inland watercourses. Within the LEAP area, the Agency regulates 25 premises that have 31 consents to discharge under the Water Resources Act 1991. These are generally associated with:

- mineral extraction;
- small scale fish farm operations;
- treated effluent from other industrial premises.

Further Information

The Eden Esk and Solway LEAP (Consultation Report) 1999 covers the following relevant issue:

Issue 8 Adverse impact from industrial discharges into the River Waver.

6. Storage Use and Disposal of Radioactive Substances

Introduction

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

The Role of the Agency

The Agency has responsibility for regulating the keeping and use of radioactive material and the accumulation and disposal of radioactive waste under the Radioactive Substances Act 1993.

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

Discharges from the major nuclear establishments are authorised by the Agency. These discharges arise from day to day operations at the sites. Site operations are required to ensure that numerical discharge limits are met and also to employ the best practicable means (BPM) to minimise the radioactive content of discharges.

The Agency authorises discharges from non-nuclear sites such as hospitals, universities, research centres and manufacturing sites. These are generally less significant discharges than from nuclear sites.

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

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

The Role of Other Organisations

The Nuclear Installation Inspectorate (NII), part of the Health and Safety Executive (HSE) license the Operation of the major nuclear establishments and are responsible for the storage and accumulation of radioactive waste on such establishments.

The Ministry of Agriculture, Fisheries and Food (MAFF) monitor the impact of radioactive substances on the food chain.

Local Perspective

Registrations are held by 8 companies to keep and use closed sources of radioactivity. These sources are used for industrial process control, eg level or thickness gauging or self illuminating devices.

Carlisle Hospital has a registration to use radioactive materials for medical reasons and an authorisation to dispose of waste from that use. The radiological impact of this disposal is negligible.

Fallout from Nuclear Weapons Testing and the Chernobyl Accident

Nuclear weapons have been tested in the atmosphere since the later 1940s. The testing had virtually ceased by 1963 following the Nuclear Test Ban Treaty. France and China did not sign the treaty and continued to test weapons in the atmosphere until 1980. The detonation of a nuclear weapon in the atmosphere releases radionuclides and the heat of the explosion carries some of this material up into the stratosphere within which it disperses around the earth. The radionuclides gradually transfer downwards to earth at a rate that varies with the seasons. The particulate components of fallout tend to deposit mainly in rain.

Levels of radionuclides in the environment from this source reached a peak in the early 1960s but have since declined. Overall this source now contributes only about 0.2% to the average UK exposure to radiation.

The incident at Chernobyl in the Ukraine in 1986 resulted in radionuclides being dispersed over much of Europe and further afield. MAFF continue to monitor the levels of radioactivity from this accident. Caesium is still being detected in sheep grazing certain upland areas of the UK including areas in Cumbria. Restrictions are still in place on the movement and slaughter of sheep from these areas. By the end of January 1999 there were still a total of 389 holdings in the restricted areas of Cumbria, North Wales and Scotland, 10 of which are in Cumbria. This number is only 4% of the number originally restricted immediately following the accident.

Levels of Chernobyl fallout in Cumbrian freshwater fish are also measured by MAFF and the latest results show a continuing downward trend in concentrations in fish flesh.

7. Waste Management

Introduction

Every household, business and industry produces waste and its safe handling, treatment and disposal is essential to the health and wellbeing of the environment and the community. There are a variety of facilities that perform the necessary function of processing, recycling and disposing of this waste.

The Role of the Agency

Waste Licensing

The Agency's principal role in directly protecting the environment from waste is through the licensing and monitoring of waste management facilities, and the regulating of activities exempt from licensing. The different types of waste management facilities controlled by the Agency include landfill, transfer stations, civic amenity sites, treatment plants, incinerators, scrap yards and recycling plants.

The objective of the licensing and exemption system is to ensure that waste management facilities:

- do not cause pollution to the environment;
- do not cause harm to human health; and
- do not become seriously detrimental to the amenities of the locality (only applicable if planning permission is not in force).

The definition of controlled waste is given in the Controlled Waste Regulations 1992 and generally consists of household, commercial and industrial waste. Wastes that are not classified as controlled waste and hence do not fall within the waste licensing regime include:

- waste from mines and quarrying operations;
- agricultural waste;
- decommissioned explosives.

Radioactive waste is not classified as controlled waste and legislation concerning radioactive waste is regulated under the Radioactive Substances Act 1993, (see Section 6).

Planning permission for the facility has to be approved by the relevant Planning Authority, before the Agency can issue a waste management licence. Waste management licences issued by the Agency include conditions relating to site preparation, infrastructure and operation, pollution control, monitoring and records. Applicants must be 'fit and proper persons' to hold a licence and this depends upon technical competence, financial capability and any conviction for relevant offences.

Failure to comply with any licence condition is an offence. The Agency ensures compliance with licence conditions by frequent inspection of licensed facilities and by taking enforcement action in line with national policy. Licences can only be surrendered when the Agency is satisfied that no further pollution will occur.

Some waste management activities are exempt from waste management licensing (these exempt activities are set out in Schedule 3 of the Waste Management Licensing Regulations 1994). Although exempt from licensing such exemption should be registered with the Agency.

Any person who transports controlled waste in the course of their business must register with the Agency as a carrier of controlled waste. These provisions are an integral part of the 'Duty of Care' system, that requires persons involved in the handling of waste, including producers, carriers, brokers

and disposers, to take all reasonable steps to ensure that waste is contained, handled and disposed of safely. Waste must only be transferred to an authorised person such as a registered carrier or the holder of a waste management licence and all such transfers should be documented through a 'Duty of Care' consignment note system.

The management of more hazardous waste (controlled waste that the Secretary of State considers may be so dangerous or difficult to keep, treat or dispose that special provisions are required for dealing with it) is controlled by the Special Waste Regulations 1996 (as amended). Typical examples of 'special waste' include acids, alkalis, industrial solvents, oil, pesticides and pharmaceutical products. The Regulations define special waste in terms of its hazardous properties and describes the notification process, for use by waste producers and carriers, for the movement of special waste by use of consignment notes.

Waste Minimisation

To promote a more sustainable approach to waste management the Government consultation paper on the development of a national waste strategy 'Less Waste, More Value' featured seven key commitments:

(1) substantial increases in recycling and energy recovery from waste;

(2) increased public involvement in reuse and recycling of household waste, possibly charging for the waste for disposal;

(3) the need for challenging, but realistic targets;

(4) strong emphasis on waste minimisation;

(5) a need to change the perception of the waste hierarchy (see below);

(6) more creative use of economic incentives, possibly for the landfill tax revenues to refund recycling;

(7) increase public involvement in the decision making process.

The Government has made it clear that it wishes to achieve the movement of waste up the waste hierarchy which is summarised as:

- reduction;
- reuse;
- recovery (recycling, composting, energy recovery);
- disposal.

The Agency has a strategic planning role to provide the Secretary of State at the Department of the Environment, Transport and the Regions (DETR) with advice in the preparation of the National Waste Strategy and its future development through:

- improved collection of data, particularly by carrying out a national waste survey to provide a comprehensive assessment of the types and quantities of waste produced together with its method of disposal;

- advice and guidance on good waste management practices and by sponsoring research;

- its regulatory functions in respect to waste (including new responsibilities in relation to producer responsibility, the first of which cover packaging and packaging waste).

In addition, the Agency will also liase with Local Authorities to provide, among other things, relevant information to assist:

- waste collection authorities in their recycling plans and in deciding their collection arrangements for household waste;
- waste disposal authorities in determining their contracts, with an objective assessment of the environmental costs and benefits of the various options for dealing with household waste;
- Local Planning Authorities with information they require for development plans and responding to planning consultations where issue concerning waste may be a relevant factor;
- input to proposed regional waste management strategies.

The Producer Responsibility Obligation (Packaging Waste) Regulations 1997 aim to reduce the amount of packaging waste going to landfill. This is achieved by placing legal obligations to recycle and recover packaging waste directly on those that produce or use it. Those companies involved in manufacturing raw materials used for packaging, converting raw materials into packaging, packing or filling packaging or selling packaged goods are obligated, providing they the handle 50 tonnes or more of packaging per year and have an annual turnover of £5 million or more per year. This will reduce to £2 million from 1 January 2000. The Agency has a responsibility to implement and enforce the Regulations.

The Role of Other Organisations

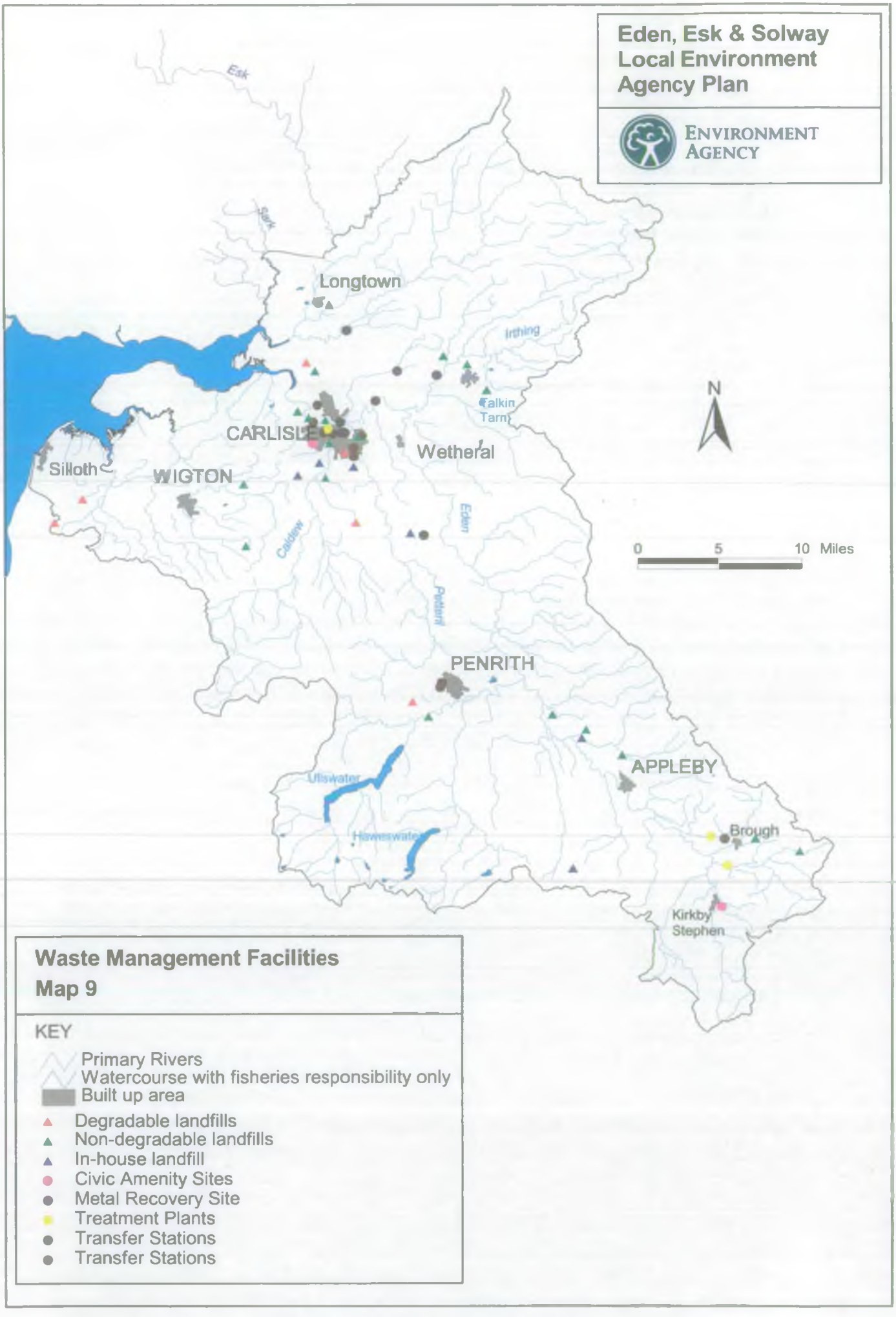
Both Cumbria County Council and the Lake District National Park Authority are responsible for issuing planning permission for waste management sites in their areas. This is guided by the Development Plans. Within the LEAP area there are three such plans. The Cumbria and Lake District Joint Structure Plan (1991-2006) was adopted in 1995. The plan aims to ensure an adequate supply of land-fill sites to meet local, needs while ensuring that development associated with waste management does not have an unacceptable impact on the environment and local amenities. The Cumbria Minerals and Waste Local Plan (due to be adopted in 1999) sets out more detailed waste policies for the area of the County outside the National Parks. The Lake District National Park Local Plan was adopted in May 1998 and contains policies on waste for the period up to 2004.

Local Perspective

The LEAP area is predominantly rural in nature with the greater part of industry, and hence wastes arisings, being concentrated on the only major centre of population at Carlisle.

Landfilling remains the major waste disposal option in the area with approximately 400,000 tonnes being disposed of in this way (See Table 6 and Map 9). Table 7 shows that the majority of landfill sites in the area (25) are licensed to dispose of inert waste only. There are four sites licensed to take a wide range of controlled wastes including household, commercial and industrial, (of these three can take special waste) and account for more than 65% of the total waste disposed of in the area. These are located at:

- Hespin Wood, Carlisle - a range of special wastes including liquids;
- Flusco Pike, Penrith - special waste, but no liquids;
- Aldoth, Abbeytown - asbestos special waste only;
- Thackwood, Southwaite - no special waste.


Eden, Esk & Solway
Local Environment
Agency Plan
Environment Agency
Esk
Irthing
Longtown
CARLISLE
Wetheral
Talkin Tarn
Silloth
WIGTON
Caldew
Eden
Petteril
PENRITH
Ullswater
Haweswater
APPLEBY
Brough
Kirkby Stephen
N
0 5 10 Miles
Waste Management Facilities
Map 9
KEY
Primary Rivers
Watercourse with fisheries responsibility only
Built up area
Degradable landfills
Non-degradable landfills
In-house landfill
Civic Amenity Sites
Metal Recovery Site
Treatment Plants
Transfer Stations
Transfer Stations

Approximately 5,500 tonnes of special waste arose in the area, the majority of which (about 85%) was disposed of outside the area. Special waste amounting to about 5800 tonnes was also imported into the area. Much of this imported waste went to a special waste transfer facility and was then re-exported, but in 1998/99, 2500 tonnes of this waste is included in the total deposited in the area.

Table 6: Controlled Waste Disposal-Licensed Landfill Sites 1997/98 (Tonnes)

Inert Waste Only Sites		=	162582
Other Sites	Inert	=	49659
	Construction/Demolition	=	9137
	Household/Commercial/Industrial	=	173684
	Special	=	3260
	Total	=	398322

Table 7: Licensed Waste Management Facilities (31.03.99)

Landfills - inert only	=	25
Landfills - other waste	=	4
Transfer Stations	=	12
Civic amenity sites	=	3
Scrap yards	=	2

Of these licensed waste management facilities 11 have been completed but still have a license, 4 are pre-operational and 31 are operational.

Landspreading represents an economical way of recovering value from a variety of controlled wastes including paper industry waste, abattoir waste and wastes generated from the food and drink processing industry. It involves the direct deposit of controlled waste on agricultural land by direct injection into the soil or by spraying onto the land, for the purpose of fertilising or conditioning that land.

The spreading of controlled waste to land is an exempt activity subject to the controls of Regulation 17, Schedule 3, of the Waste Management Licensing Regulations 1994. Under this exemption no more than 250 tonnes per hectare of waste can be applied to any one site in any one year. The activity must result in agricultural benefit and be registered with the Agency.

In the previous year the amount of controlled waste applied to agricultural land within the LEAP area amounted to some 15,000 tonnes. This arose from two principle sources; Frank Bird (Poultry) Ltd in Langwathby comprising feathers and wash water and Eden Valley Oils Ltd in Brough who disposed of wash water by surface spreading.

There are three Civic Amenity Sites within the area located at:

- Flusco, Penrith;
- Kirkby Stephen;
- Carlisle.

Those facilities are provided for local residents to deliver household waste free of charge. All have recycling for wastes such as paper, glass and oil. Small recycling centres, run by the District Councils, are also available through out the area.

WASTE HIERARCHY

The best way of dealing with waste should be assessed in relation to the environment as a whole. The Agency is seeking the inclusion of policies in development plans which:

- seek to reduce the amount of waste created;
- encourage re-use and recycling where these are environmentally beneficial;
- ensure that schemes for waste disposal are environmentally acceptable.

WASTE DISPOSAL

Landfill, including land raising, may be the best practicable environmental option for dealing with waste. However, unless effectively engineered it can pose a threat to the pollution of the surrounding environment. The Agency is seeking the inclusion of policies in development plans which:

- ensure that the disposal of waste does not have an adverse effect on any watercourse or groundwater;
- protects floodplains and areas at risk from flooding from landfill and land raising proposals;
- ensure proposals do not adversely affect the amenity or recreational value of river corridors and coastal margins;
- ensure leachate and drainage is controlled and monitored;
- ensure adequate provision is made for the containment and collection of landfill gas where necessary.

Further Information

'Making waste work' – a strategy for sustainable waste management in England and Wales DETR 1995

'A way with Waste' – A draft waste strategy for England and Wales DETR 1999

The Eden Esk and Solway LEAP (Consultation Report) 1999 covers the following relevant issue:

Issue 11 The need to encourage sustainable waste management.

8. Contaminated Land

Introduction

Contaminated land arises largely as a result of past industrial processes which have left behind a legacy of many substances, including for example: oils and tars, heavy metals, organic compounds and soluble salts. Such land is mainly situated in urban areas, but the mining of minerals and coal has resulted in many rural areas also being effected. Not all contaminated land is the result of historical activity and it can also be the result of present day industrial processes.

Contaminated land may have an impact on the environment including human health, and the mobility of contaminants in soils is an important factor to consider, in terms of its effect on the quality of water. This is determined by the solubility of contaminants, and degree of leaching. The threshold criteria for acceptability of a) contaminants in surface water and groundwater and b) target values required for clean up, are site specific.

The Role of the Agency

One of the main aims of the Agency is to deal with major environmental concerns as part of its contribution to sustainable development. Contaminated land can cause degradation of groundwater and surface water and harm to human health. Development can often lead to remediation of contaminated land. Some remediation technologies may require waste management licensing to control discharges to the environment. Contaminated land, if not satisfactorily remediated, can burden development by means of its inherent chemical characteristics and potential for detriment to building fabrics.

The principle aim of the Agency's Land Quality function is 'to secure with others, the remediation of contaminated land'. The Agency has a number of statutory duties for preventing new contamination and for dealing with historical contamination. The management of contaminated land is a two fold process:

- remedial works for land already contaminated;
- the implementation of improved management and standards which will minimise future contamination.

At present, the main controls regarding the identification and remediation of contaminated land are through the planning process and the building control system. Where pollution is occurring, the Agency has powers under the Water Resource Act 1991 to require the polluter to take remedial action.

The Environment Act 1995, contains the framework for a new contaminated land regime. The pending Contaminated Land Regulations for the first time in UK law will give a specific definition of contaminated land and a specific duty for remediation. The associated guidance will contain an explanation of a number of key terms contained within the Act and guidance regarding the identification of contaminated land, its remediation, apportioning liability and appeals procedure.

The new regime will be based on the 'suitable for use' approach and it will take into account the actual or intended use of the site. It is the intention that, wherever possible, land contamination will be dealt with on a voluntary basis, or in conjunction with new development, rather than by imposing remediation notices.

Remedial action will be taken on sites where contamination presents unacceptable risks to health or the environment and liability for the remediation will be in accordance with 'the polluter pays principle'. The implementation of the new regime will mostly be the responsibility of the Local

Authorities but the Agency will be the 'lead authority' for sites which represent a particularly serious threat to the environment. The Agency will develop its role as a consultee with the Local Authorities on technical details where there is local expertise. Part IIA specifies that certain types of site identified as contaminated land by the Local Authority will be further classified as 'Special Sites'. The Agency is considered to have the expertise appropriate for dealing with the type of harm or pollution of Controlled Waters that may be caused by these types of sites.

The Role of Other Organisations

Many other organisations are involved in the remediation and development of contaminated land, for a variety of reasons:

English Partnerships – funded by government to develop derelict land in partnership with other organisations.

The North West Development Agency - (NWDA) is responsible for accelerating economic and social regeneration. NWDA is a major source of funding for reclamation of contaminated land. NWDA produce a regional development strategy which includes brownfield site regeneration.

Local Authorities – own large areas of land, a proportion of which will no doubt be contaminated. They will also have a duty to implement the forthcoming regulations, which will involve:

- producing a strategy for identifying and investigating contaminated land;
- close liaison with the Agency;
- implementation of the strategy;
- remediation of contaminated land;
- Petroleum Licensing –reports of loss of product from underground storage vessels can result in land and groundwater contamination.

Local Perspective

The risk for contamination of Controlled Waters (see also Section 3) by contaminated land is based on risk assessment in terms of source/pathway/receptor. A large proportion of the LEAP area is underlain by major and minor aquifers which are important groundwater resources and need protection from pollution. There are also important high quality watercourses supporting international important wildlife (see Section 12), which also need to be protected from contamination.

As already stated, land detrimentally affected by the legacy of previous industrial uses is primarily endemic to the urban areas. However, there are also rural locations, which have been affected by historical mineral extraction and waste disposal activities. Within the LEAP area Greenside Lead Mines, Glenridding is a location where mining in the past has left contaminated land in the form of tailings dams, spoil heaps, and associated problems of contaminated mine water.

CONTAMINATED LAND

Development on or near to contaminated land can cause the release of contaminants, which may result in significant harm to the environment. The Agency is seeking the inclusion of policies within development plans which:

- encourage the reclamation and re-use of contaminated land where the degree and nature of the contamination has been assessed;
- require appropriate site investigations and risk assessments to be carried out on land suspected of being contaminated;
- ensure appropriate remediation measures will be carried out prior to redevelopment of a site.

Further Information

The Eden Esk and Solway LEAP (Consultation Report) 1999 covers the following relevant issue:

Issue 9 Adverse impact of contaminated land.

9. Mineral Extraction

Introduction

This section relates to the mining of minerals by either underground workings or surface excavations. The development of mineral extraction is guided and controlled by Minerals Planning Authorities that make planning policy and decide on planning applications.

The Role of the Agency

The Agency has a strong interest in development of minerals because of the potential impacts on the environment both during and after operations.

The Agency is a consultee with regard to local minerals and waste plans and seeks to work with the Minerals Planning Authority to ensure planning policies protect the environment. In addition, the Agency is consulted on individual planning applications and passes appropriate comments to the Planning Authorities concerned.

The Role of Other Organisations

For the purposes of minerals planning within the LEAP area there are two mineral planning authorities. Cumbria County Council cover the area outside the National Park and the Lake District National Park Authority cover the area within the Lake District National Park.

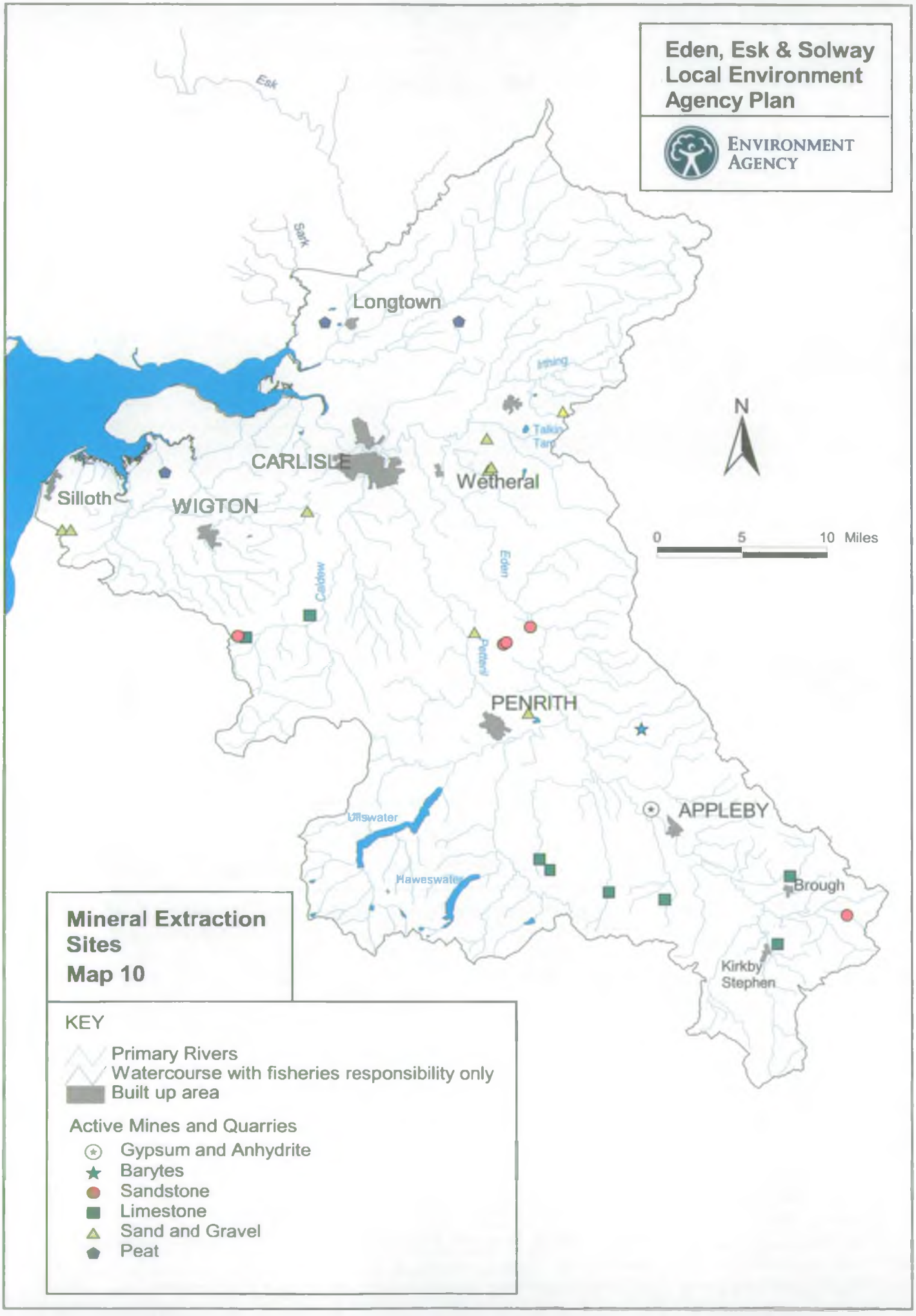
Minerals planning is guided by Development Plans. Within the LEAP area there are three such plans. The Cumbria and Lake District Joint Structure Plan (1991-2006) was adopted in 1995. The plan aims to ensure an adequate supply of minerals to meet local, regional and national needs while ensuring that mineral development does not have an unacceptable impact on the environment and local amenities. The Cumbria Minerals and Waste Local Plan (due to be adopted in 1999) sets out more detailed minerals policies for the area of the County outside the National Parks. The Lake District National Park Local Plan was adopted in May 1998 and contains policies on minerals for the period up to 2004.

The National Park Local Plan policies seek to ensure that major minerals development should not take place in the National Park, other than in exceptional circumstances where a case can be made in the national interest, and all reasonable alternative locations and methods of supplying the need have been explored and shown to be unacceptable.

For the area outside the National Park, Cumbria County Council seeks to grant sufficient permissions to maintain a landbank of permitted reserves for at least seven years extraction of sand and gravel, and at least fifteen years extraction of crushed rock aggregate. Levels of provision are not set for other minerals.

Local Perspective

There are two main locations within the LEAP area where sand and gravel quarries are operational (see Map 10). There is a cluster of four sites to the south of Aspatria (New Cowper and Aikshaw, Overby No. 2, Highfield and Aldoth). The area to the east of Carlisle has four sites (Kirkhouse, Low Gelt and Faugh 1 and 2). Cardewmires Quarry, situated between Wigton and Carlisle, is a wet worked, river terrace site, which involves a diversion of the river Wampool. Low Plains is a large


Eden, Esk & Solway
Local Environment
Agency Plan
Environment
Agency
Esk
Sark
Longtown
Irthing
Talkin
Tarn
CARLISLE
Wetheral
Silloth
WIGTON
N
0
5
10 Miles
Caldew
Eden
Petteril
PENRITH
Ullswater
Haweswater
APPLEBY
Brough
Kirkby
Stephen
Mineral Extraction
Sites
Map 10
KEY
Primary Rivers
Watercourse with fisheries responsibility only
Built up area
Active Mines and Quarries
Gypsum and Anhydrite
Barytes
Sandstone
Limestone
Sand and Gravel
Peat

sand and gravel site in the Eden Valley, which has recently started production. There is a small scale sand pit at Bonnie Mount, near Penrith. All of these sites, with the exception of Cardewmires are glacial deposits.

Limestone production for aggregates and industrial use is concentrated around Shap, at Shap Fell and Shap Beck Quarries. Limestone aggregate is also produced at Hartley and Helbeck Quarries in the southern part of the Eden Valley near Kirkby Stephen, at Silvertop Quarry situated between Carlisle and Haltwhistle, and at Parkhead Quarry near Caldbeck.

Hornfels is produced at Shap Blue Quarry. This is used for general aggregates and railway ballast.

There is a long history of underground mining for gypsum and anhydrite in the Eden Valley around Kirkby Thore. The only mine currently extracting gypsum is Birkshead, which has plentiful reserves and produces approximately 250,000 tonnes per annum. Anyhdrite is extracted from Newbiggin Mine, producing approximately 50,000 tonnes per annum, which constitutes the whole of the UK's anhydrite production. Mining activity in the area over the last century has created a depression in the local water table. Therefore any future cessation of mining in the area should address the re-establishment of the natural water table.

There is an opencast mine at Silverband, near Great Dunn Fell, where barium sulphate is extracted for use in the oil and chemical industries.

Peat has been worked on a significant scale in Cumbria since the end of the last century. There are three large sites within the LEAP area which produce peat on a commercial scale for the horticultural market. These sites have to be worked dry and so they do not can affect drainage and water quality. Bolton Fell, situated to the south of the River Lyne, Solway Moss situated to the north of the River Esk and Wedholme Flow situated between Wigton and the Solway Firth provide approximately 20% of the UK's national peat production.

There are a number of small building stone quarries within the LEAP area which do not generally cause problems for the water environment. These supply stone for constructing, renovating and cladding buildings and for ornamental purposes. There are four active sandstone quarries in the Eden Valley near Lazonby (Scratchmill Scar, Crag Nook, Brackenbank and Bowscar) and one on Stainmore (Mousegill Bridge). A further site in the Eden Valley has permission but has not yet commenced quarrying (West Brownrigg). There are two limestone quarries near Orton (Rooks and Pickering) and Snowhill Quarry, which is situated between the Skiddaw Fells and Wigton. These sites tend to be small scale.

MINERALS

Mineral extraction can affect adversely the environment if appropriate safeguards are not put in place. Conversely, restoration works may offer opportunities for environment enhancement and recreation. The Agency is seeking the inclusion of policies in development plans which:

- seek to resist proposals for new mineral extraction where there is likely to be an adverse effect on groundwaters, surface waters and other water bodies and associated habitats;
- encourage restoration works that result in environmental enhancement and/or encourage the provision of water based recreation where appropriate.

10. Water Abstraction

Introduction

Water is abstracted for many purposes such as industry and public water supply, but water is an important feature of the environment, which needs to be carefully managed if adverse impacts are to be avoided.

The Role of the Agency

The 1995 Environment Act gives the Agency the statutory duties and responsibilities relating to the planning and management of resources. It is specifically responsible for licensing, and enforcing abstractions made from water held in natural underground storage and from all surface waters above the tidal low water mark.

To support the Agency in carrying out its water resource management function it is essential to collect quantitative data on the various aspects of the hydrological cycle. Water resources staff routinely monitor rainfall quantity and intensity, surface water level, riverflow and groundwater levels.

The Agency's water resources activities are also influenced by certain EC directives which have a bearing on the quality of water resources for public water supply and other purposes (see Sections 3, 4 and 5).

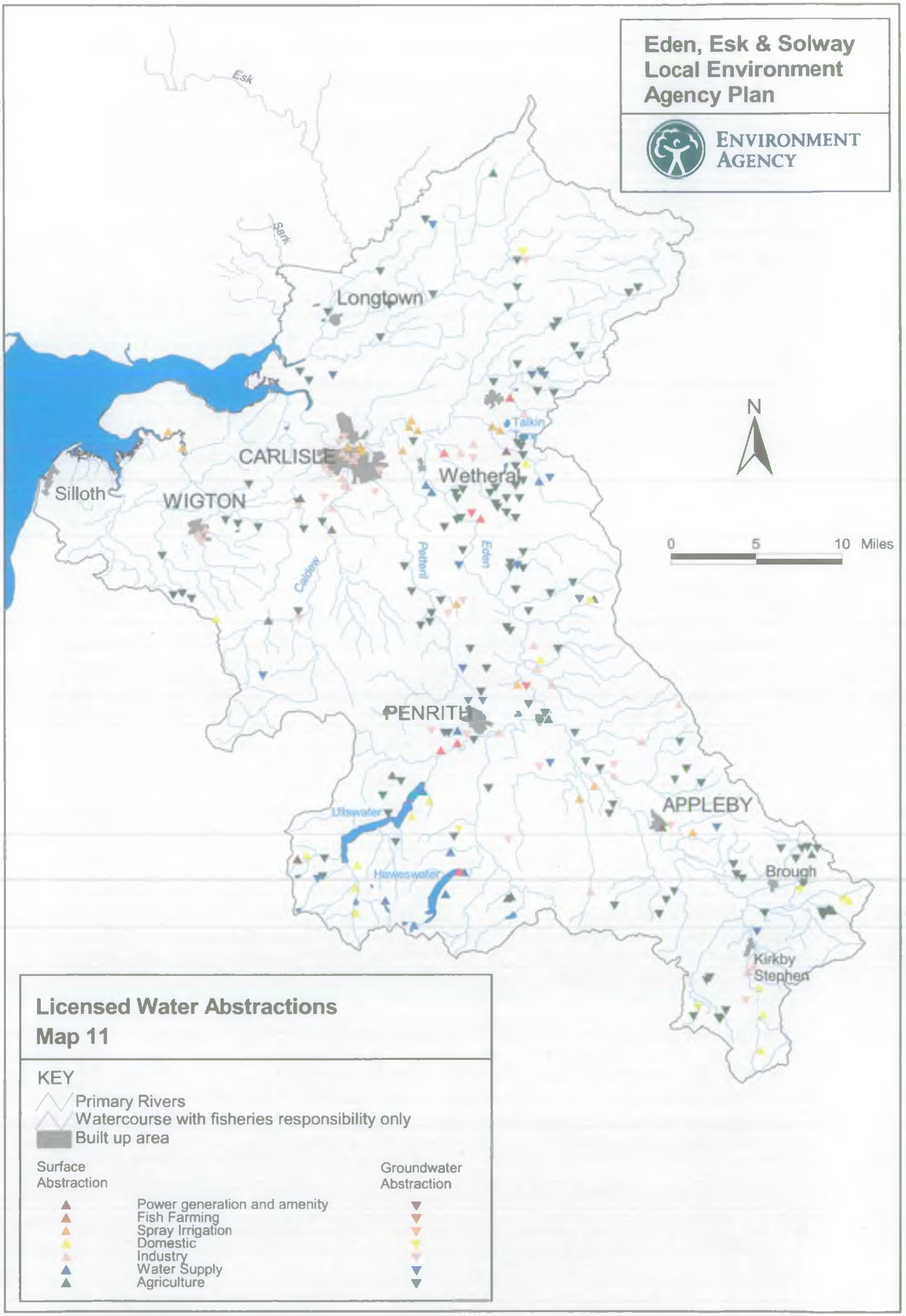
The Role of Other Organisations

The responsibility for public water supply in the LEAP area lies with North West Water Ltd.

Local Planning Authorities have responsibility for giving planning permission for new developments that could affect the demand and management of water. The Agency is a consultee in this process. This means the Agency gives views and advice on applications which could affect the demand for, or quality of, water resources.

Local Perspective

Map 11 indicates the distribution of the various licensed surface and groundwater abstractions within the catchment and the purpose of use, is indicated by colour coding. In addition to licensed abstractions, the use of surface and groundwater sources for small unlicensed domestic and agricultural supplies is common in rural parts of the catchment.


Eden, Esk & Solway
Local Environment
Agency Plan
Environment Agency
Esk
Sark
Longtown
CARLISLE
Wetheral
Talkin
Silloth
WIGTON
Caldew
Petteril
Eden
N
0
5
10 Miles
PENRITH
Ullswater
Haweswater
APPLEBY
Brough
Kirkby Stephen
Licensed Water Abstractions
Map 11
KEY
Primary Rivers
Watercourse with fisheries responsibility only
Built up area
Surface Abstraction
Groundwater Abstraction
Power generation and amenity
Fish Farming
Spray Irrigation
Domestic
Industry
Water Supply
Agriculture

Surface Abstractions

There are approximately 100 licensed abstractions from surface sources within the catchment. The licences for surface abstractions can be broken down into the following categories with percentage figures of the total daily licensed volume for the catchment.

Type	Percentage
Potable Water Supply	90%
Fish Farming	4%
Power Generation	3%
Industrial	2%
Amenity	<1%
Spray Irrigation	<1%
Domestic	<1%
Agriculture	<1%

Groundwater Abstractions

Groundwater may be abstracted from water bearing strata (aquifers) by means of wells or boreholes. There are approximately 200 licensed abstractions from groundwater sources within the catchment. The licences for groundwater abstractions fall into the following categories (percentages of the total daily licensed volume).

Type	Percentage
Water Supply	73%
Fish Farming	15%
Industrial	10%
Agricultural	<2%
Domestic	<1%

Surface sources of the catchment, rather than groundwater, have the greatest demands made on them in order to satisfy the needs of licensed abstractors. The sandstone aquifer of the Eden Valley is extensive, and recently there has been increased demand for licensed abstractions from boreholes to satisfy the needs of water supply, industry, and particularly agriculture in this part of the catchment.

Discharges from groundwater represent significant contribution to the River Eden baseflow. It is evident that groundwater resources of the catchment are being utilised and caution is required when considering new abstraction especially in terms of localised impacts on surface water and environmental interests.

North West Water Licensed Abstraction for Public Water Supply

North West Water are, by far, the largest abstractor and are licensed to take a total of approximately 340,000 Ml/year from the LEAP area.

Groundwater sources are used mainly for local supply. There is a licensed abstraction of approximately 1,000 Ml/d from the Haweswater system and this water is almost totally exported from the catchment, via the Haweswater and Shap aqueducts, to supply the Manchester area.

It should be noted that water is abstracted from the River Eden to meet Carlisle's supply requirements. In addition, 31 Ml/d can be taken from the River Gelt and springs on Geltsdale, for local supply purposes.

WATER RESOURCES AND WATER SUPPLY

In some parts of the area water abstraction is causing adverse environmental damage and further abstractions could exacerbate the situation. An available and adequate water supply is an important factor when considering new development and its location. The Agency is seeking the inclusion of policies in development plans which:

- ensure that new development is served by an adequate means of water supply;
- locate development in areas where adequate water resources are available or where it can be made available without detriment to the water environment;
- reduce the demand for water.

Further Information

The Eden Esk and Solway LEAP (Consultation Report) 1999 covers the following relevant issues:

Issue 6	Demand on water resources during prolonged dry weather causing possible adverse environmental impact;
Issue 7	Abstraction causing low flows on the Rivers Gelt and Lowther.

11. Flooding and Flood Alleviation

Introduction

This section looks at land drainage and flood defence. Historically, many settlements, such as Carlisle and Appleby, have established close to rivers. Over time, these settlements have expanded into the flood plain. Flood plains are areas of land adjacent to a watercourse, over which water flows in times of flood, or would but for the presence of defences. Flood plains perform the essential function of storing water during flood events. Development within flood plains, is not only itself at risk from flooding but by reducing the amount of land available for flood water storage, and by impeding flows can increase the risk of flooding in off-site and sometimes remote locations.

A related area is the artificial drainage of land to benefit agricultural productivity. While circumstances have now changes there are on-going maintenance commitments.

The Role of the Agency

In undertaking its flood defence and land drainage functions the Agency operates within duties conferred by legislation under the Water Resources Act 1991 Land Drainage Act 1991 and Environment Act 1995. The legislation imposes a basic duty on the Agency to "exercise a general supervision over all matters relating to flood defence". In discharging its functions, the Agency is concerned with the natural catchment area of watercourses and rivers. This excludes surface water drainage systems of development areas other than where they affect the natural system in terms of storage, discharge and outfall requirements.

The principal flood defence and land drainage functions are to:

- supervise, regulate and influence the actions of others through land drainage consents, and commenting on planning applications;
- provide an effective flood-warning;
- maintain and operate existing flood defences;
- build new or improved flood defences where appropriate;
- maintenance of land drainage systems.

All watercourses are classified as either 'main river' (which is defined on maps held by the Agency, MAFF and Local Authorities) or 'ordinary watercourse' (sometimes called 'non-main river'). The Agency has permissive powers to carry out, or control work, on main rivers and sea defences. However, the Agency is not obliged to maintain or carry out works on main river. The main rivers within the LEAP area are shown on Map 12.

The Agency also has powers to control the works of others on or near a watercourse through Land Drainage Consents. Any works in, under, over, or within 8 metres of a Main River requires prior consent. On ordinary watercourses consent is required for any culverting or works which could affect the flow of water. However, the Agency does not have powers to protect the flood plain from inappropriate development, and is dependent on the Local Planning Authorities exercising their powers through the planning system. The Agency is a statutory consultee in the planning process and so has the opportunity to influence planning decisions through close co-operation and dissemination of information such as the Section 105 flood risk maps. This is to enable Local Planning Authorities to make informed and sound planning decisions with regard to land drainage and flood defence matters.

The Role of Other Organisations

It is the Local Planning Authority's responsibility to prevent further development in the flood plain which itself may be at risk of flooding and could obstruct flood water and so exacerbate flooding problems elsewhere in the catchment.

District Councils have permissive powers to offer assistance during floods. This may include placing sandbags, moving possessions or even evacuating people. Each has a different policy on the type and amount of help they give.

The fire service provides help in flood emergencies if they are able to do so. The local station can advise the public on what help may be available and whether a charge will be made.

County Councils are responsible for public highways and would deal with any flooding problems associated with road drainage. All County Councils have Emergency Planning Officers who may become involved in more serious flood events.

Public surface water sewage systems, are the responsibility of NWW Ltd, who may sometimes use District Councils as their agents. Local Authorities have similar permissive powers for flood defence on ordinary watercourses and for protecting the coast from erosion by the sea.

Sea defence is the protection of any low-lying land or assets by inundation from the sea. Both the Agency and Local Authorities have permissive powers to carry out works to prevent flooding from the sea. While coastal protection is defined as the prevention of erosion by the sea of land and this is the responsibility of the Local Authorities. The Shoreline Management Plan produced by Allerdale Borough Council provides a strategic framework for the management of coastal defences in the area.

Local Perspective

The River System

The vast majority of the LEAP catchment area is rural with agricultural activity concentrated in the Eden Valley area and the Solway Plain. The principal urban areas within the catchment are Appleby, Penrith, Brampton, Carlisle and Wigton, but they only represent a small percentage of the total catchment area.

The western flank of the Pennines provides the upland catchment area in the east. The northern Lake District provides the mountainous source of the southern boundary of the catchment. The primary rivers within the LEAP are the Rivers Eden, Eamont, Lowther, Caldew, Irthing, Petteril, Esk, Wampool and Waver. The headwaters of the River Eden rise above Mallerstang which is also the location of the source of the River Lune and River Ure. It flows northwards and westwards to meet the River Eamont, which drains the majority of the North East Lake District. The River Irthing joins the River Eden at Warwick Bridge before the River Eden turns westward to follow through Carlisle where it is joined by the River Petteril and River Caldew. The extreme limit is on the western boundary of the city area. In the Solway Firth the River Eden is joined by the River Esk which comes from the North East. Further down the Solway Firth the River Wampool and River Waver enter from the northern part of Cumbria after having drained the Solway Plain area.

The Nature of Flooding

The river network carries surplus water from land to sea as part of the natural water cycle. The river and watercourse channels can only cope with a certain maximum flow, and when this is exceeded during prolonged rainfall, thunderstorms or rapid snow melt, flooding occurs because the surplus

water flows into the flood plain. Watercourses of a similar nature can, however, respond differently to the same rainfall conditions due to variations in areas and land use. Localised flooding may also occur where watercourses become blocked at particular points such as bridges or inside culverts. There is also a potential for flooding where either surface water drainage capacity is exceeded, or drains are unable to discharge because of high water levels in the river.

There have been several flood events over the century on the River Eden. In 1927, large areas of Carlisle flooded. A major flood occurred in 1968 when the River Eden was unable to cope with severe storm conditions. Appleby, Langwathby, Warwick Bridge and Carlisle suffered particularly badly. In response to this event, the Carlisle floodbank system was constructed, by the then Cumberland River Authority, in 1970. In January 1995 and 1997, floods up to a 1 in 35 year severity caused flooding in the Eden Valley, but the Carlisle floodbanks prevented significant flooding of properties in the city.

In low-lying coastal areas, flooding can occur when meteorological conditions such as low atmospheric pressure and high winds coincide with high tides to produce surges. In estuaries, a combination of freshwater flows and tidal surges can also cause flooding.

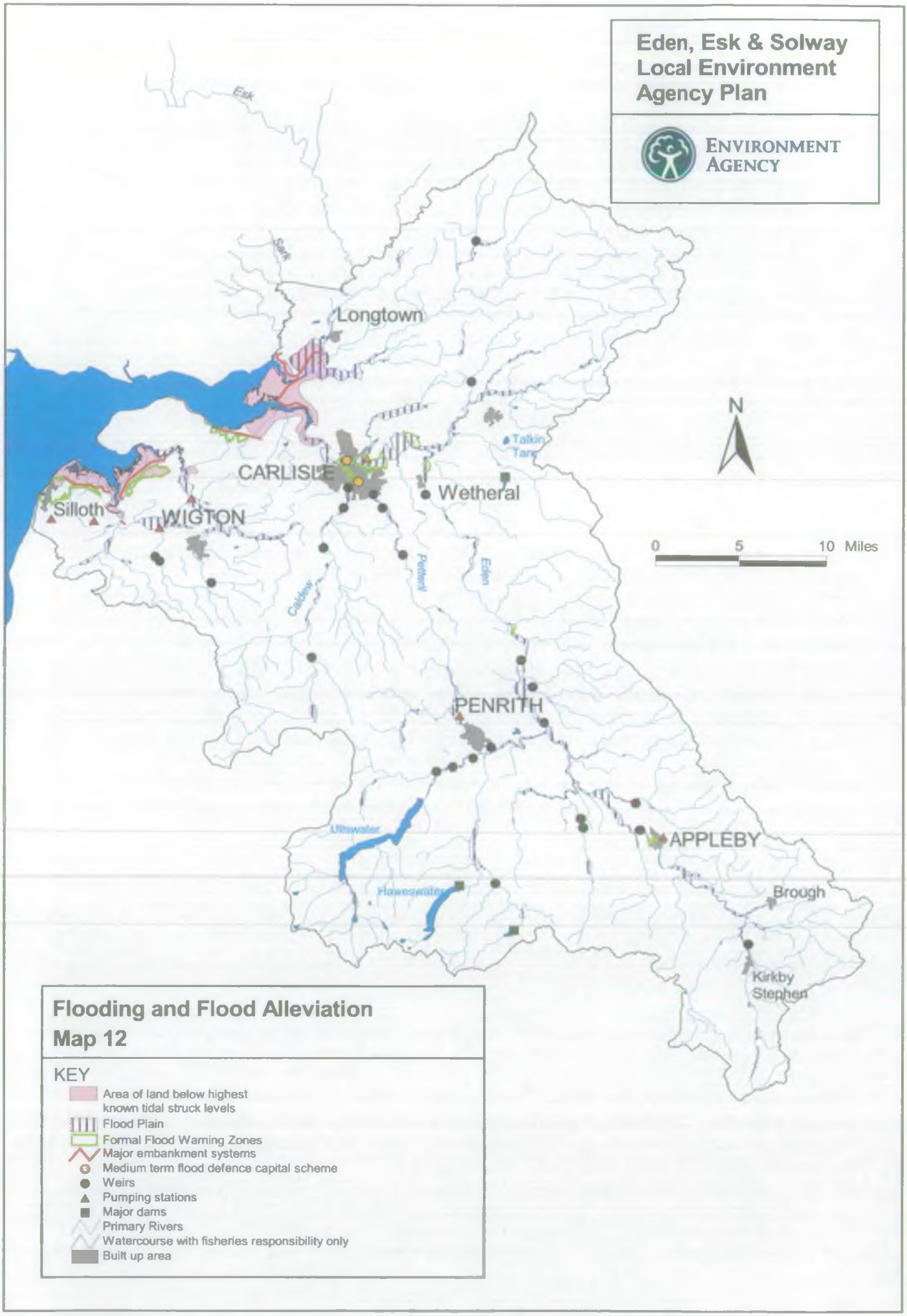
Flood Warning

The Agency operates a free 24-hour warning system, which enables advance preparations to be made to reduce the impact of flooding. This system utilises information gathered from water level gauges in rivers, rain gauges, weather radar, on-site monitoring and forecasts. Within this LEAP area there are five formal fluvial flood risk zones (see table 9) and one coastal flood risk zone from Silloth to Sarkfoot on the coastal plain.

Flood warnings involve a computer, which is activated when flooding is expected, sending a telephone message to people living within the flood warning zones. Up to date flooding information is also available on Radio Cumbria, CFM Radio, the Environment Agency's Flood Call Line, AA Road Watch, the Meteorological Office and page 154 of Teletext. Warnings are also passed to the relevant Local Authorities, police, utilities and the coastguard.

Table 8: Primary Rivers

River	Km of Main River	No of Pumping Stations	Formal Flood Zones
Upper Eden	177.482	1	Appleby
Eamont	96.115	1	Eamont Bridge
Mid Eden – Warwick Bridge	52.418	-	Carlisle Warwick Rd
Irthing	61.195	-	-
Petteril	50.260	-	-
Caldew	53.819	-	Dentonholme
Lower Eden	192.182	1	Eden Valley
Border Esk	71.983	-	-
Wampool	198.949	2	-
Waver	129.795	2	-


Eden, Esk & Solway
Local Environment
Agency Plan
Environment
Agency
Esk
Liddel
Longtown
CARLISLE
Silloth
WIGTON
Wetheral
Talkin
Tarn
N
0
5
10 Miles
Caldew
Petteril
Eden
PENRITH
Ullswater
Haweswater
APPLEBY
Brough
Kirkby
Stephen
Flooding and Flood Alleviation
Map 12
KEY
Area of land below highest known tidal struck levels
Flood Plain
Formal Flood Warning Zones
Major embankment systems
Medium term flood defence capital scheme
Weirs
Pumping stations
Major dams
Primary Rivers
Watercourse with fisheries responsibility only
Built up area

Flood Defence - Capital Schemes

While flooding is a natural process, historically, development and land drainage have inhibited the natural function of the flood plain. Over the years flood defences have been built in these areas to protect property and prevent risk to life. The risk of flooding can never be completely removed, but the Agency has powers through its capital works programme to minimise the risk by improving channel capacity, improving existing defences or building new defences.

New flood alleviation schemes or improvements to exiting flood defences can only be considered by the Agency where the predicted existing standard of protection against flooding is less than the "indicative standard" for the land use type as determined by the Ministry of Agriculture, Fisheries and Food. Any flood defence work undertaken has to have clear cost benefits. This is calculated based on the land use and associated flood risk of the area under consideration.

Within the LEAP area there are no new Flood Alleviation schemes which have progressed beyond the feasibility study stage. However, the investigation into the existing standards of defence for River Eden/River Petteril, Carlisle/Little Caldew, Carlisle/Parham Beck, Willowholme, Carlisle/River Caldew, Carlisle, are planned within the next 5 years.

Minor improvements to defences on the River Eden at Appleby and River Wampool at Kirkbride are being considered at present. The investigation into raising the defence levels at the Sands in Appleby will consider raising defences a limited extent, to prevent flooding occurring at the present probability of a 20% chance in any one year. At Kirbride an investigation to establish the feasibility of promoting works to reduce the threat of tidal/fluvial flooding in the village will be considered.

Flood Defence - Maintenance

In some locations, river maintenance in the form of dredging, weed cutting and tree maintenance is undertaken to ensure the free flow of water and lessen the flood risk. This work is carried out only where it is essential to protect life and property, or as part of a previous commitment to benefit agricultural land. Any necessary work is timed to take account of wildlife such as migratory or breeding fish. Where appropriate, the Agency incorporates wildlife features such as two-stage channels or riffles when undertaking its maintenance operations and flood defence schemes.

While the Agency has permissive powers to undertake river maintenance work, the ultimate responsibility for the upkeep of a watercourse rests with the riparian owner and erosion control of existing river channels is not part of the Agency's maintenance activity.

Development in the Flood Plain

Flood defence capital schemes and maintenance can never totally remove the risk of flooding and the best way forward is to prevent further development in the flood plain, which naturally accommodate water during periods of flood.

The Agency is responsible under Section 105 of the Water Resources Act 1991 for producing maps showing the location and extent of areas at risk from flooding which are passed on to the Local Planning Authorities. The Agency's Indicative Maps provide information for all flood risk areas. Further modelling of the river basin establishes the Section 105 survey data which provides a more defined flood risk envelope. The Indicative Maps show the natural flood plain areas, where flooding is known to have occurred or may occur at least once in one hundred years (also expressed as a 1% chance in any one year). For tidal flooding, one in two hundred years (0.5% chance in any one year) probability of flooding is used. The aim of the Section 105 flood plain map is to provide more

accurate information to assist Local Authorities, it places particular emphasis on those river reaches where future development is most likely.

Culverting of Watercourses

A related issue is the culverting of watercourses. This can have several adverse effects such as increasing flood risk by confining the flood channel and it removes open space which can be particularly valuable to wildlife. For these reasons, the Agency seeks to have culverted watercourses restored to open channel where practicable. Furthermore, an application for Land Drainage Consent under the Water Resources Act 1991 or Land Drainage Act 1991 will generally only be approved if there is no reasonably practical alternative or if the detrimental effects of culverting would be so minor that they would not justify a more costly alternative. In all cases, where it is appropriate to do so, adequate mitigation must be provided for damage caused.

FLOOD RISK

Unless carefully sited and designed, development could itself be at risk from flooding, or could increase the risk of flooding elsewhere, placing life and property at risk. Flood defences can adversely effect the environment by altering or interfering with natural processes. The Agency is seeking the inclusion of policies in development plans which:

- seek to protect floodplains and prevent development which would create an unacceptable increase in the risk of flooding on site or elsewhere;
- seek to restrict developments which would be subject to unacceptable risk of flooding;
- prevent developments which would adversely affect the water environment as a result of an increase in surface water run-off;
- protect existing or proposed flood defences and prevent interference with the ability of the Agency or other bodies to carry out flood control works and maintenance activities;
- prevent developments which would require additional public finance for flood defence works;
- prevent developments which would prejudice the capability of the coast to form a natural sea defence;
- avoid building over or culverting watercourses.

Further Information

The Eden Esk and Solway LEAP (Consultation Report) 1999 covers the following relevant issues:

Issue 4	River restoration and conservation;
Issue 17	Areas at risk from Coastal Flooding;
Issue 18	The need for additional information to carry out more effective flood warning and assessment of flood risk.

Other relevant Agency documents:

Policy Regarding Culverts – Explanation of policy, Environment Agency 1999;
Policy and Practice for the Protection of Floodplains, Environment Agency 1997;
Flood Warning Information: What to do if your property is at risk, Environment Agency 1997.

12. Biodiversity

Introduction

"Biodiversity" is the entire variety of life on Earth, from mammals to micro-organisms. Biodiversity conservation includes conservation of:

- species;
- genetic variation within species;
- ecosystems within which species occur;
- the whole natural world, from commonplace to endangered species.

This section considers the biodiversity of the LEAP area.

The Role of the Agency

The Agency has statutory duties to further wherever possible the conservation of special features when carrying out water management activities, to have regard for conservation as part of its pollution prevention and control activities and generally to promote the conservation of natural beauty and the wildlife dependant on the aquatic environment. The principle aim of conservation in the Agency is to help protect special conservation assets and improve the rest, for the benefit of current and future generations. To this end, the main objectives are to:

- take full account of conservation before taking policy and operational decisions;
- give priority to protecting statutory sites;
- ensure the Agency takes full part in implementing the UK Biodiversity Action Plan (See Issue 2);
- demonstrate through its work, the benefits of best environmental practice for conservation of the wider countryside;
- clearly demonstrate how the Agency applies conservation criteria when considering activities it authorises;
- take a lead in promoting the conservation of key water related habitats and species;
- influence, at both national and local level, plans for rural and urban development to the benefit of conservation as a whole.

In areas of national conservation importance (eg nationally designated sites or with an endangered species listed under Schedule 5 or 8 of the Wildlife & Countryside Act 1981) the Agency will protect those features of special interest. In areas of local conservation importance eg County Wildlife Sites, Regionally Important Geological/Geomorphological Sites (RIGS), or sites with locally important species, the Agency will ensure sensitive river management to maintain those interests and prevent them from being degraded. In areas of poor conservation interest, the Agency will encourage sensitive river management and endeavour to improve the value of these sites.

In pursuance of the Government's commitment to biodiversity conservation, through the Biodiversity Action Plans, the Agency will be helping to develop and implement targets for species and habitats of conservation concern (see Issues 1 and 2 Eden Esk and Solway LEAP Consultation Report 1999).

The Role of Other Organisations

English Nature designates Sites of Special Scientific Interest (SSSI) and National Nature Reserves, (NNRs). The Secretary of State, on behalf of the EU, designates Special Areas for Conservation (SACs) and Special Protection Areas (SPAs). English Nature is a consultee in this process. In

addition, the Cumbria Wildlife Trust (CWT) has designated County Wildlife Sites, which are areas of County Interest for their flora and/or fauna. The Local Authority designate local nature reserves. There are also a number of RIGS designated by the Cumbria RIGS group. These complement the geological SSSIs.

Natural Areas are a key component of English Nature's *Strategy for the 1990s*. This strategy examines the local distinctiveness of each part of England, to identify their characteristic wildlife and natural features. Their boundaries are based on amalgamations of the Countryside Character Map (see Section 14), that is based on the distribution of wildlife and natural features, and on the land use pattern and human history of each area, thus offering a framework for planning nature conservation objectives. They are not designations. LEAPS are based on whole river catchments, which means the LEAP boundaries do not match with those of Natural Areas. The Eden, Esk and Solway LEAP comprises the whole of the Eden Valley natural area, most of the Solway Basin natural area and small parts of the Cumbria Fells & Dales natural area and the North Pennines natural area. The latter two areas include many of the more upland tributaries of the Eden catchment. The Natural Areas profiles recognise that wildlife is not restricted to designated sites. It is seen by English Nature as a way of determining priorities for nature conservation areas with ecological and landscape integrity and to set objectives which reflect these priorities.

Local Perspective - Designated Sites

SSSIs cover a significant area of the catchment, and many of these are associated with the aquatic environment. In particular the River Eden, together with many of its tributaries, is SSSI and a candidate Special Area of Conservation (cSAC) under the European Habitats & Species Directive. It is the largest riverine SSSI in Britain.

Map 13 shows all the SSSIs and NNRs within the LEAP area. cSACs and SPAs designated under the EC Habitats and Species Directive and EC Birds Directive respectively, are shown on Map14.

Eden Catchment

The Eden Valley is predominantly pastoral land, much of it for dairy farming. The arable component is relatively limited. There are some commercial forestry plantations and there are important remnants of semi-natural woodland, most notably along the middle reaches where the River Eden has cut a gorge through New Red Sandstone. The most vulnerable habitats have survived on the steeper slopes where farming is more difficult.

The River Eden and many of its tributaries have been designated SSSI as England's finest large river system on limestone and sandstone. This outstanding floristically rich river includes uncommon species and those at the geographical limit of their British distribution. In places, there still remain natural riparian floodplains with wet woodlands, sedge swamp and oxbow lakes.

The Eden SSSI is also cSAC for brook, river and sea lamprey; for white clawed crayfish, bullhead and salmon; and for floating vegetation of the Buttercup family (*Ranunculus)* of plain and sub-mountainous rivers.

There are two major lakes, Ullswater and Haweswater in the LEAP area, both within the Eden catchment. Ullswater is part of the Eden and tribuataries SSSI, while of the smaller water bodies Brothers Water and Blea Water lie entirely within SSSIs.

Associated with these waters are two rare cold water fish, the Arctic Char which is found in Haweswater, and the Schelly which is found in Ullswater, Brothers Water, Haweswater and Red Tarn.

The main potential threats to these fish are eutrophication, pollution and the introduction of other fish species.

Esk Catchment

Between the River Irthing (Eden catchment) and the Scottish border is the River Esk. The Esk, and its most significant tributary the Lyne, have important valley woodlands and riparian habitats. This includes 7km of the River Lyne and Rae Burn, and 3km of the Black Lyne which are SSSIs for their outstanding range of semi-natural woodlands.

Waver, Wampool Catchments & Minor Catchments

Outside the Eden catchment are the Rivers Waver and Wampool together with numerous minor watercourses, which flow through an open, flat to gently undulating, landscape across the Solway plain. The most degraded river habitats in this LEAP are predominately within this area. The Rivers Waver and Wampool rise from the northern fells of the Lake District, and flow through low lying improved agricultural land. These have been modified by land drainage improvements and regular flood defence maintenance. Intensive agriculture has led to relatively isolated remnants of semi-natural habitats inland, but there is a large extent of contrasting semi-natural habitat found near the coast.

The minor watercourses of the Burgh area are mostly drainage ditches with low conservation interest and were part of an Internal Drainage Board until the NRA and subsequently the Environment Agency took over their regular maintenance.

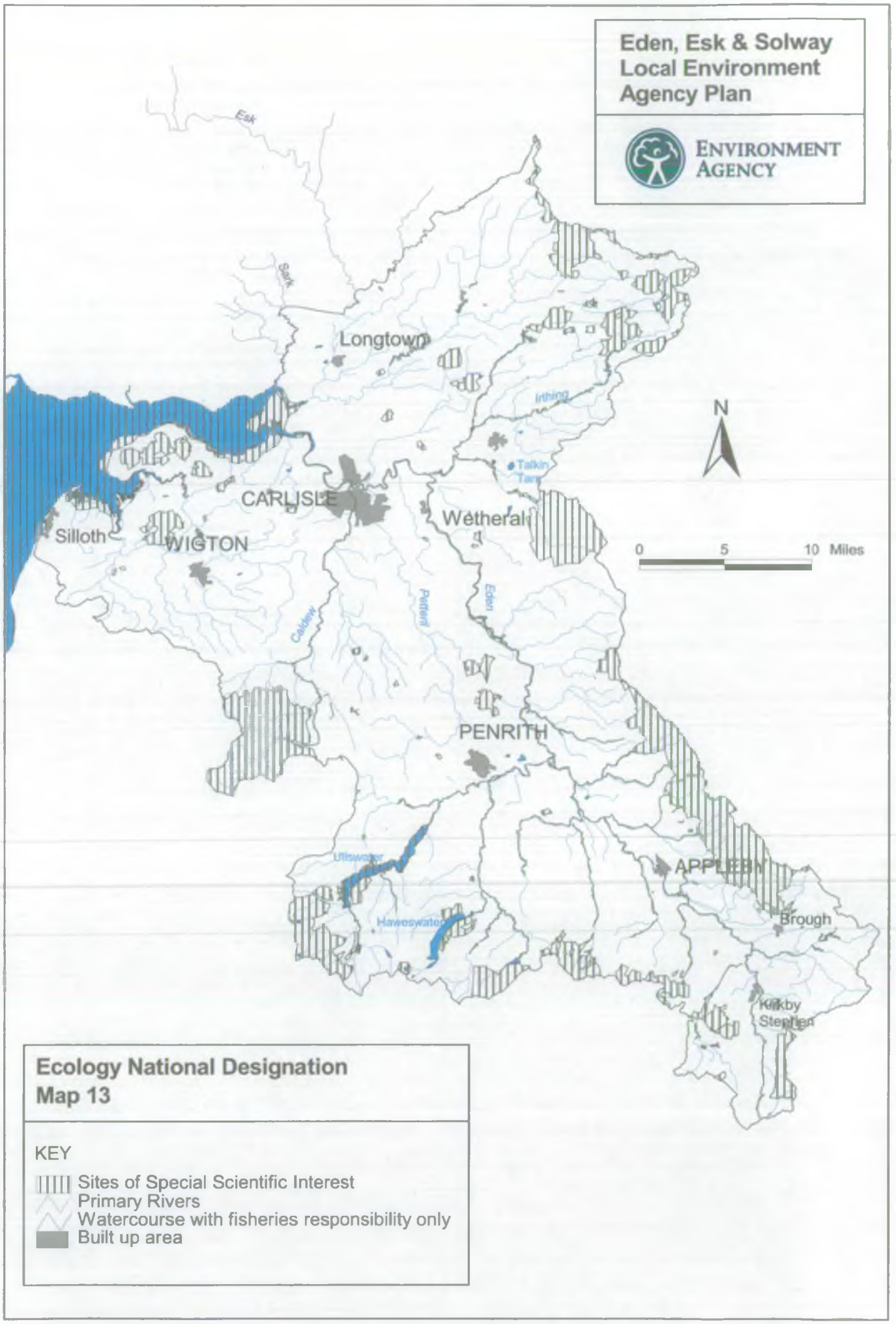
The major feature of nature conservation interest outside the Eden catchment within the Waver, Wampool and Burgh catchments, is the extensive system of lowland raised mires found along the Solway Plain from Solway Moss, through Drumburgh and Glasson Mosses to Wedholme Flow and Bowness Common. These collectively form the largest area of lowland raised bog in Britain and are designated SSSI and cSAC. There are also a number of other important basin mires and fens with associated woodland and heath.

Many minor watercourses surrounding these wetlands are maintained for flood defence purposes. MAFF promotes Water Level Management Plans to be drawn up for SSSIs where it is possible to control water levels on site. As a result Water Level Management Plans are being drawn up for a number of these sites.

Solway Firth

All of the river catchments in this LEAP area eventually flow out into the Solway Firth, one of the least developed large estuaries in Europe. The importance of this Firth is reflected in its designation as a SSSI, a Ramsar site (a wetland of international importance), a cSAC and a SPA under the European Birds Directive. Any SPA or SAC covering land below mean low water is known as a European Marine Site.

The Solway Firth European Marine (SEM) site has been selected for the high quality of its intertidal mud and sandflats, subtidal sandbanks, estuaries, saltmarsh, and pioneer saltmarsh, as well as for its wintering and migratory bird interest. The Environment Agency is a 'Relevant Authority' for the Solway Firth European Marine Site.


Eden, Esk & Solway
Local Environment
Agency Plan
ENVIRONMENT
AGENCY
Esk
Sark
Longtown
Irthing
Talkin
Tarn
CARLISLE
Wetheral
Silloth
WIGTON
N
0
5
10 Miles
Caldew
Petteril
Eden
PENRITH
Ullswater
Haweswater
APPLEBY
Brough
Kirkby
Stephen
Ecology National Designation
Map 13
KEY
Sites of Special Scientific Interest
Primary Rivers
Watercourse with fisheries responsibility only
Built up area

Eden, Esk & Solway Local Environment Agency Plan

ENVIRONMENT AGENCY

Ecology International Designations

Map 14

KEY

- Candidate Special Area for Conservation
- Species Protection Area
- Ramsar Site
- Primary Rivers
- Watercourse with fisheries responsibility only
- Built up area

SPA Bird Interest

Moricambe Bay, Cardurnock, Burgh Marsh and Rockcliffe Marsh have significant areas of saltmarsh and are important areas for pink footed geese, whooper swan, shelduck, scaup, oystercatcher, golden plover, dunlin, bar-tailed godwit, curlew, pintail, barnacle goose, goldeneye and teal. The inter-tidal areas are important for feeding and roosting.

Local Perspective - Species and Habitats

Key habitats and species of interest in the LEAP area, relevant to the water environment, are listed in the section below. Appendix 2 lists all the relevant species and shows their legal status/special interest.

Habitats

Key Habitats for UK Biodiversity Action Plans (BAPs), that are found in the Eden, Esk and Solway LEAP are coastal and floodplain grazing marsh, saltmarsh, raised bog, wet woodland, mesotrophic lakes and reed beds.

The **saltmarshes** of the Solway are exceptional for their variety and extent of vegetation communities and include the whole range of saltmarsh features, including all known types of saltpan. **Mesotrophic Lakes** in the area include Haweswater, Brothers Water, Thurstonfield Lough and Talkin Tarn. The UK Biodiversity Steering Group has produced a national action plan for mesotrophic lakes. The national objectives and targets are:

- maintain the characteristic ecology of mesotrophic lakes;
- identify and implement effective remedial action to address impacts which damage, or threaten to damage, current mesotrophic lakes;
- identify and implement effective action, where appropriate, to restore the characteristic ecology of former mesotrophic lakes.

Invertebrates

There has only been limited survey work to species level on the invertebrates of the River Eden. Nonetheless, it is of national interest for invertebrate species associated with river shingles and sandbanks. Species of interest include: a shore bug (*Saldula fucicola)* found on the Irthing and Eden, which requires areas of bare stones and gravel; 3 ground beetles and a leaf beetle found on the Eden near Langwathby; 3 notable species of fly found on the Eden, 2 near Langwathby and one near the Sheepmount.

There are only a few historical records of the **freshwater pearl mussel** on the River Eden, but there is an Agency and English Nature collaborative project being carried out presently to find its distribution in this LEAP area and throughout Cumbria.

The **native white-clawed crayfish** is found in a number of Eden tributaries. The most important crayfish streams on the Eden appear to be in the upper catchment. The Rivers Lowther, Lyvennet and Leith, and Scandal, Helm and Hoff Becks are known to have healthy populations with what seem to be locally high densities (Robinson 1996, Agency data). Outside this area there are crayfish records from the Pennine streams of Croglin Beck, Briggle Beck, Crowdundle Beck, Milburn Beck and Trout Beck. Crayfish are also known from the main channel of the River Eden from Bolton and Appleby upstream to just below Kirkby Stephen. Introduced signal crayfish from America have spread

crayfish plaque and are the most serious threat. However, there are no crayfish farms in the catchment, no records of alien crayfish and no substantiated reports of crayfish plague.

Sandbowl snails which live in humid calcareous flushes are found in several sites near the top of the Lyvennet and Hoff Beck sub-catchments in the Orton Fells.

Marsh fritillary butterflies are associated with boggy meadows where their caterpillars feed on devil's bit scabious - a small mauve to dark purplish-blue flower. They are found in the Caldew catchment, and were also previously found in the Wampool catchment, where there are attempts for re-introduction.

The River Waver and more recently the River Wampool and lower River Eden, provide a home for the most northern population of the **banded demoiselle**, a species of damselfly. Although common or even abundant in many parts of southern and midland England and Wales, this species here is at the edge of its range in Britain, and in Cumbria is not found outside the Eden Esk and Solway LEAP area.

The coastal and inter-tidal area of the Solway Firth has a number of notable national scarce invertebrates including 12 species of beetle, 3 species of weevil and a rare hydroid.

Amphibians

Natterjack toads naturally have a much more restricted distribution than the other native amphibians, but this has been further restricted by an estimated 70% decline in their UK population this century, and consequently they are now a protected species under the Wildlife and Countryside Act, 1981. The Upper Solway Flats and Marshes SSSI as a whole (much of which is outside the LEAP area) has up to 10% of the UK natterjack toad population, and within the LEAP there are at least two areas of saltmarsh with natterjack breeding ponds.

Fish

Much of the upper catchment of the Eden is open to spawning **salmon** (See Issue 3 Leap Consultation Report 1999 and section 12). Important spawning tributaries include the Irthing, Kingwater, the River Eden from Temple Sowerby upstream to Kirkby Stephen, the Belah, Scandal Beck, the Lowther system, the upper Eamont and some of the Ullswater feeder streams, and the Caldew. The Eden is not accessible to salmon upstream of Kirkby Stephen because of Stenkrith Falls, a natural barrier.

In the upper Eden, many of the streams running from the limestone and in the Pennines, appear to support high densities of **bullhead**. Parts of the Lowther, Eamont and Irthing catchments also support good populations.

River and **brook lamprey** are widespread and common in the Eden catchment, while **sea lampreys** are known to spawn from Carlisle upstream to Armathwaite, wherever there are suitable bed conditions. It is believed that there are significant sea lamprey nursery grounds between Warwick Bridge and the Solway.

Schelly are a nationally rare fish known from only seven lakes in Britain, four of which are in the Eden catchment – Ullswater, Haweswater, Brothers Water and Red Tarn. Of these four, Ullswater supports the largest and healthiest population. Schelly require relatively cool, oxygen rich water. During the day, schelly live in deep water, up to 30m deep, and at night they move into the shallow littoral areas. They shoal in large numbers and feed on zooplankton and invertebrates such as midge larvae and molluscs. Spawning takes place between late December and early February, typically in shallow gravelly areas off headlands or off shore reefs. Following hatching in the spring, the littoral zone is an important habitat for young schelly in the summer. IFE in 1999, completed research into

the status of the schelly population in Haweswater. The study identified threats to the population such as reservoir drawdown and predation by the local population of cormorants. Some schelly have been relocated to Blea Water and Small Water, at the head of Haweswater, with the aim of establishing additional populations. The effectiveness of this is still being monitored.

Char are found in Haweswater.

Both species of Shad (twaite, allis) are found in the upper regions of the Firth. Moreover, the fish may be sexually mature or spent, indicating that they spawn (in freshwater) in the area. Thus, there is a possibility that the lower reaches of the rivers in the LEAP may contain spawning sites for shad.

The **smelt** probably also occurred in this area but because of overfishing and environmental degradation, now appear to be limited to rivers such as the Cree, further out in the Firth.

Birds

The River Eden supports over 1% of the national population of wintering **whooper swans**. There are two stretches of the River Eden that are of particular importance to these birds, Lazonby-Culgaith in the middle reaches and Warwick Bridge-M6 motorway in the lower reaches. The main feeding areas are on croplands including improved grasslands, particularly around Langwathby, Watersmeet and Kirkby Thore in the middle reaches, and Aglionby, Crosby and Linstock in the lower reaches.

Breeding birds of the Eden associated with lowland damp grasslands include: **mute swan; redshank; teal; cuckoo; lapwing; yellow wagtail; snipe; sedge warbler; curlew** and **reed bunting**. Breeding birds associated with the upland waters include **little grebe; dipper; grey heron; grey wagtail; common sandpiper; redshank; teal; curlew; tufted duck; snipe; goosander** and **oystercatcher**.

The banks of the River Eden and its tributaries support the largest population of breeding **sandmartins** in Cumbria. In 1991 a survey by Cumbria Bird Club estimated 1642 pairs of sandmartins were breeding in 109 sub-colonies within the catchment.

The Solway Firth is of International Importance for migratory and wintering populations of **pink-footed geese, whooper swans, barnacle geese, golden plover, pintail, scaup, oystercatcher, knot, bar-tailed godwit, curlew, redshank.** Nationally important wintering population of the following species also occur: **shelduck, teal, shoveler, goldeneye, grey plover, sanderling, dunlin and turnstone**. Notable breeding birds include **oystercatcher, lapwing, redshank, herring gull** and **common tern**.

Otters

There is a strong otter population on the Esk catchment, which has been the most significant stronghold for the recolonisation of Cumbria. The lower Eden and the Irthing and Kingwater sub-catchments are also important strongholds for the otter in the Eden catchment. In recent years otters have spread throughout much of the catchment.

The presence of otters on the Rivers Waver and Wampool was first noted during the summer of 1993 by NRA staff, Cumbria Wildlife Trust's Otter Project Officer and the Otter Survey of England 1991-93. It is believed that prior to this time otters had been absent from this area for twenty to thirty years. Throughout the second half of 1993 and 1994 evidence of otter activity became more apparent, but with most records from the lower reaches of the Waver and Wampool and from along the neighbouring coastline. A survey by CWT Otter Project Officer in Jan-March 1995 found evidence of otters throughout both river systems, from the estuarine reaches to the headwaters, and along many

of the numerous tributaries. From the information collected it was apparent that otter numbers were increasing, though it is possible they may have been largely sub-adult non-breeding otters.

Water Vole

Once a familiar animal along the banks of waterways and ponds throughout mainland Britain, the water vole has suffered a significant decline in numbers and distribution due to predation by

American mink and habitat degradation. A national survey in 1989/90 found there were some rather localised water vole populations on the Eden, Eamont, Irthing and Caldew, particularly in back waters on the lower reaches. There were also some good populations at low lying sites on the Waver and Wampool.

Aquatic Plants

The main channel of the River Eden qualifies as a SSSI as the finest example of a river on a hard limestone and sandstone catchment. This quality can be seen in its very high diversity of aquatic plants - at least 184 species, which puts it in the top 10% of rivers surveyed in Britain. The Eden supports a diverse pondweed and water-crowfoot flora, and the following regionally rare species are present: flowering rush, whorl-grass, opposite leaved pondweed, lesser water parsnip and pink water speedwell. Floating vegetation of plain and sub-mountainous rivers are listed in Annex I of the EC Habitats and Species Directive.

The river jelly lichen is a rare and declining gelatinous foliose lichen occurring on sandstone on the shore of the River Eden and in the Helvellyn and Fairfield SSSI. It is a very pollution sensitive species that requires some water movement but is absent from rapids.

Invasive Species

Threats to natural biodiversity exist in the form of introduced non native species which can out-compete native species. Examples include invasive plant species such as **Japenese knotweed**, and **Himalayan balsam**. These grow in dense stands which shade out other species. **Giant hogweed** is a particularly noxious perennial plant which can grow up to 5 metres.' Throughout the LEAP area, the Agency operates a programme of eradication for Giant Hogweed on riverbanks.

BIODIVERSITY

Conserving and where practicable enhancing biodiversity is important for sustaining the distinctive character of the locality. The Agency is seeking the inclusion of policies in development plans which:

- seek to conserve and where possible enhance biodiversity;
- avoid loss of established habitats and associated species;
- encourage the provision of new habitats in appropriate locations.

Further Information

The Eden Esk and Solway LEAP (Consultation Report) 1999 covers the following relevant issues:

Issue 1	The need for the protection and management of internationally important wildlife sites;
Issue 2	The need for the protection and enhancement of the area's biodiversity;
Issue 3	The need for information to manage spring salmon in the River Eden;
Issue 4	Opportunities for river restoration and conservation;
Issue 5	The need to protect and improve the quality of still waters.

13. Fisheries

Introduction

This section 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 Role of the Agency

The Agency has a duty under the Environment Act 1995, to maintain, improve and develop salmon, trout, freshwater fish and eel fisheries under its jurisdiction.

In common with many other areas, the catchment's fish stocks are vulnerable to illegal fishing. Such exploitation is often highly organised and commercially motivated and requires considerable resources to police. The Agency enforces fisheries legislation throughout the catchment area of the LEAP including coastal waters out to 6 nautical miles. Such enforcement often involves partnership with other organisations such as the police, MAFF, the Cumbria Sea Fisheries Committee, and Scottish District Salmon Fishery Boards.

The Role of Other Organisations

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 through the River Eden and District Fisheries Association and other organisations, which represents local fishing interests.

A recent development in fisheries management has been the establishment of charitable trusts, dedicated to the protection of the riverine ecosystem. An example in the LEAP area is the establishment of the Eden Rivers Trust. The Agency welcomes opportunities to work in partnership with such organisations, where real environmental benefits based on sound science can be identified. Much of the work of the Eden Rivers Trust is undertaking habitat improvement work in the river corridor, together with a strong educational role.

The Scottish Environment Protection Agency (SEPA) which is mainly a pollution prevention organisation, is responsible for water quality issues on the River Esk and its tributaries in Scotland, while the Agency has responsibility for fisheries on these rivers. Close co-operation is maintained between the two organisations to ensure consistency in approach over cross-border issues and to share relevant information.

Local Perspective

Rivers and Lakes

The Border Esk and Eden catchments support significant fisheries for salmon and sea trout. These rivers are in the top handful of salmon rivers in the country. Fishing is also undertaken in many of their tributaries, including the Lyne, the Liddle, the Eamont and the Irthing. Declared catch returns are shown in Appendix 3. The River Eden is of national conservation and fisheries importance and is designated as a Site of Special Scientific Interest and is also proposed as a Special Area of Conservation. This EC designation based on several fish species including Atlantic salmon (see Section 11, this section also includes information on schelly and char found in some lakes in the area).

Under the EC Freshwater Fisheries Directive, 210km of the Border Esk in England and 926 km of the Eden catchments are designated as salmonid waters. This Directive is concerned with ensuring that water quality in designated stretches of water is suitable for supporting fisheries. The Agency is responsible for monitoring and ensuring compliance with the Directive (see Section 3).

Several barriers to migratory fish exist on the Eden catchment some of these are natural and some artificial. In 1998 a fish pass was built on New Water, a tributary of the Gelt, and now migratory fish have access to several kilometres of spawning area at the head of the catchment (see issue 7 Eden Esk and Solway LEAP Consultation Report 1999 for further information).

While salmon stocks are declining internationally, catches on the River Eden have been have been good until the last couple of years. However, catches in recent years have still been better than those recorded for other areas in England and Wales. Sea trout catches on the Border Esk recovered in 1998 compared to catches in the mid 1990s. The River Eden remains one of the finest brown trout fisheries in the North of England. Indigenous brown trout occur throughout the catchment in the lakes and higher reaches of most rivers, and are the mainstay of the sport fishery.

Dace, chub and grayling are fished in the River Eden and dace and chub are also caught from the Border Esk. There has been a decline in stocks on the Eden in over the last decade, particularly of dace and chub. Grayling numbers appear to be on the increase, with anglers recording good catches on Agency permits for lower Eden beats over the last three winters. Extensive investigations have been carried out to try and determine the cause of the decline and the location of spawning areas so they can be protected. The causes, and spawning areas have yet to be determined, but the introduction of artificial gravels in to Brunstock Beck is being undertaken on a trial basis. Netting surveys of sunbathing juvenile dace and chub will be carried out to determine whether recruitment is occurring each year. Unfortunately, flows in 1998 were too high to undertake this successfully.

Perch are fished in Ullswater, Brothers Water and Talkin Tarn. Pike are also found in many locations. There are a number of small still water fisheries for both coarse fish and trout in the area. This includes Crofton Lake, which encourages young anglers.

The Rivers Waver and Wampool are not significant fisheries although coarse fish and trout are present in good numbers in certain stretches. Both rivers have a small run of sea trout.

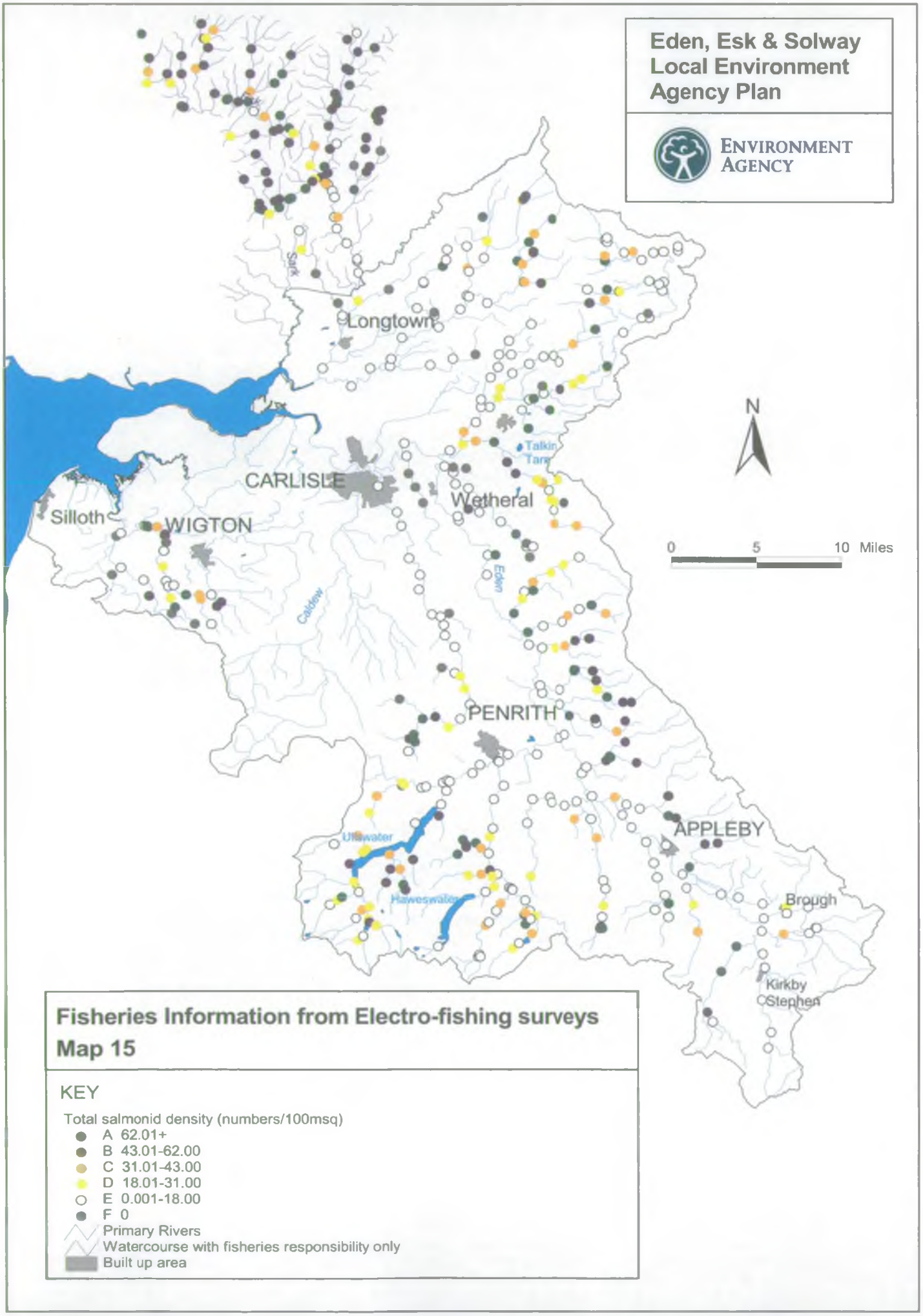
In 1995/6, Drought Orders were sought to enable additional water abstraction from the catchment. At the time, concern was expressed about the impact this would have on the river environment in particular the fisheries. To protect fisheries and fish populations during droughts, the Agency is running a project to determine minimum flows and flow regimes that would be acceptable if Drought Orders were sought in future.

Coasts and Estuaries

There are four net fisheries for salmon and sea trout in these waters. Regulation of these fisheries is the responsibility of the Agency. Drift netsmen can operate anywhere from Grune Point to Haverigg Point except in certain restricted 3 km 'boxes' around specific river. In the Inner Solway there is a haaf net fishery which dates back to Viking times. The Net Limitation Order was reviewed in 1997 and it is currently set at 155 haaf nets. Declared catch returns are shown in Appendix 3.

Monitoring of Fish Numbers and Stocking

The Agency and its predecessors have undertaken extensive monitoring work such as electro-fishing surveys, to estimate fish numbers. Map 15 indicates juvenile total salmonid densities obtained from electro-fishing surveys between 1992 and 1998. The rolling programme of surveys will continue.


Eden, Esk & Solway
Local Environment
Agency Plan
Environment Agency
Longtown
CARLISLE
Wetheral
Silloth
WIGTON
PENRITH
APPLEBY
Brough
Kirkby Stephen
Ullswater
Haweswater
Talkin Tarn
Caldew
Eden
Esk
N
0
5
10 Miles
Fisheries Information from Electro-fishing surveys
Map 15
KEY
Total salmonid density (numbers/100msq)
A 62.01+
B 43.01-62.00
C 31.01-43.00
D 18.01-31.00
E 0.001-18.00
F 0
Primary Rivers
Watercourse with fisheries responsibility only
Built up area

To gain information about migratory fish numbers, the Agency built a fish counter at Corby Hill on the River Eden in 1996/7 and it has been operational since May 1997. The River Eden has a set of coops at Corby Castle which date back to the 12th Century. They have a certificate of privilege dating back to the 1860s and are now a Grade 1 listed building. The coops still operate and have recently been used for scientific purposes to catch fish for the Spring Salmon Radiotracking project.

The Agency also runs a full adult fish trap on the River Caldew at Holmhead. The Caldew trap is located within the fish pass on the Holmhead weir. Passes were installed on the river in 1988, and the population has been recovering since this time. The numbers of fish caught in the trap are shown in table 9.

Table 9: Number of Salmon and Sea Trout Caught in the Caldew Trap From 1988 to 1998

Year	Salmon	Sea Trout	
1988	204	0	
1989	159	4	
1990	115	0	
1991	600	3	
1992	501	22	(including brown trout)
1993	767	118	
1994	1590	126	
1995	1417	127	
1996	1289	125	
1997	889	106	
1998	1106	117	

NB The data between years is not strictly comparable for two main reasons:

1 Prior to 1993 the trap was run for between two to six months each year, since July 1993 the trap has been run continuously.

2 In March 1993 the trap was modified to catch smaller fish which accounts for the low numbers for sea trout in earlier years.

The Agency runs a fish hatchery near Carlisle, this is primarily used for producing salmon and sea trout for mitigation work in the catchment. The Agency's stocking policy is that fish can be reared in hatcheries and stocked for mitigation, restoration and scientific purposes, but that it will no longer stock for enhancement purposes. The policy of stocking migratory fish upstream of natural barriers to migration has now ceased.

In the past, salmon parr were reared at the hatchery and microtagged as part of a national programme. Now, work will concentrate on tagging wild smolts to gain a better understanding of marine survival rates and interception in offshore fisheries; hatchery reared fish will no longer be microtagged and released. A smolt trap has been installed in the trap at Holmhead, and when resources allow, smolts will be caught and microtagged. The adult trap provides an excellent screening system for returning tagged fish and is one of the best of such facilities in the country.

Fisheries Management

The Agency's predecessor, the National Rivers Authority, produced a 'Strategy for the Management of Salmon in England and Wales' in February 1996. It sets out four objectives for the future management of this resource and outlines how this could be achieved in practice.

The Agency will produce a Salmon Action Plan for the Eden in 1999 (see Issue 3 Eden Esk and Solway LEAP Consultation Report 1999), and aims to produce one for the Border Esk in 2000/01, subject to the required resources being available.

To protect salmon stocks in the early part of the season, the Agency has introduced National Salmon Byelaws; these came into effect in mid April 1999 and will be in place for 10 years until 31st Dec 2008. These byelaws require salmon caught before the 16th June to be released.

Devolution

Associated with Scottish Devolution, there has been ongoing discussion on a variety of cross-border issues, primarily relating to the catchment of the Border Esk and the Solway. Under a territorial waters order a boundary has now been established in tidal waters. In addition, the Government has decided that, at least for the present, the regulation of the Border Esk fishery should remain in the hands of the Environment Agency, but have imposed a requirement for any new regulations to be jointly approved by the Scottish and Westminster Parliaments. In this context, it should be noted that the entire catchment of the River Sark is now to be treated as an Esk tributary. The relevant legislation is entitled "The Scotland Act 1998 (Border Rivers) Order 1999"

The Order also covers the Salmon & Sea Trout fishery in the inner Solway. It clarifies the areas of operation of the English & Scottish fisheries and creates a specific offence for anyone fishing in this area who does not have the appropriate link with either the legitimate English or Scottish fisheries.

FISHERIES

Conservation of wild populations of fish and their habitats is best addressed through conservation of the environment as a whole. The Agency is seeking the inclusion of policies in development plans which:

- protect, enhance and restore where appropriate river corridors and coastal margins;
- avoid erosion of established habitats and associated species;
- encourage the provision of new habitats in appropriate locations;
- avoid building over or culverting of watercourses.

Further Information

The Eden Esk and Solway LEAP (Consultation Report) 1999 covers the following relevant issues:

Issue 1	The need for the protection and management of internationally important wildlife sites;
Issue 2	The need for the protection and enhancement of the area's biodiversity;
Issue 3	The need for information to manage spring salmon in the River Eden;
Issue 4	Opportunities for river restoration and conservation;
Issue 5	The need to protect and improve the quality of still waters;
Issue 7	Abstraction causing low flows on Rivers Gelt and Lowther.

14. Recreational Use of Water

Introduction

Leisure time is increasing, as is the number of people taking part in outdoor activities. National trends show that the greatest percentage increase in outdoor activities is for those using the water environment.

The Role of the Agency

The Agency's recreational duties cover three areas:

(a) to take account of recreation in the performance of all the Agency's functions;
(b) to ensure that land or water in the Agency's control is made available for recreational purposes;
(c) a general duty to promote the use of inland and coastal waters and associated land for recreational purposes (but not to promote the recreational uses themselves).

The Agency's main activity in relation to recreation is in collaborative ventures and, building recreational facilities into flood defence capital and revenue projects. The Agency does not own any recreation assets within the LEAP area and is not responsible for managing navigation on any of the area's waters. The Agency's principal role is in maintaining waters of sufficient quality and quantity to allow a high standard of recreational experience.

The Agency is currently developing a regional recreational strategy. Any recreational work promoted by the Agency will be sensitive to other water users and the environment. With this in mind, the Agency recognises that its main role is likely to be in bringing together land-owning interests, canoeing, fishing, and other interests where all parties are keen to further the multiple use of waters and minimise conflict. The extent to which the Agency assumes a key role in the promotion of the recreational use of water must be set in the context of other organisations with a much wider remit, such as the Sport England, Local Authorities and National Park Authorities.

The Role of Other Organisations

At a national and regional level, organisations such as the Sport England and Northern Sport look after sporting interests on a broad front. National recreational user groups, for example the national Association of Fisheries and Angling Consultatives, Royal Yachting Association and British Canoe Union (BCU), look after the specific interests of particular recreational pursuits, with organisations such as Northern Federation for Sport and Recreation linking governing bodies. Within the LEAP area, the BCU have had an important role in negotiating access agreements and disseminating information about agreements to their members. At a local level, organisations such as the local angling associations, sailing and canoe clubs, cater for more local recreational needs.

Local Authorities have a key role in maintaining and identifying the need for new recreational facilities though the development plan process. For example, Carlisle City Council recognises the importance of retaining open spaces such as Rickerby Park within the River Eden flood plain for informal recreation. Local Authorities also have an important role in safeguarding existing public rights of way and establishing new and permissive paths. In addition, the National Park Authorities and National Trust have designated access land that is land available for access by the public, on foot.

There are two National Parks within the LEAP area, Northumberland and the Lake District. The primary purposes of National Park designation are to conserve the landscape, wildlife and cultural

heritage and promote the enjoyment and understanding of the special qualities of the area. The National Park Authorities have a major task in balancing recreational use with the objective of conservation. They recognise that management is essential if conflicts are to be avoided. The broad objectives and policies are set out in the National Park Management Plans and cover topics which include the water environment. In addition, the Lake District National Park Authority has produced area management plans for all of the major lakes, including Ullswater and Haweswater, which outline more specific proposals.

There are also two Areas of Outstanding Natural Beauty (AONBs) in the LEAP area, the Solway Coast AONB and the North Pennines AONB. There are published management plans for both areas. While recreation is not an objective of designation, the demand for recreation should be met in so far as this is consistent with the conservation of natural beauty and the needs of agriculture, forestry and other uses.

The Solway Firth Partnership, which covers the Solway both sides of the border, sees recreation and tourism as an important part of the economy. It has produced the Solway Firth Strategy with an overall objective of securing an environmentally sustainable future for the area which allows the economy to prosper while respecting the distinctive character, natural features, wildlife and habitats of the Firth.

Local Perspective

Scale of Recreational Use

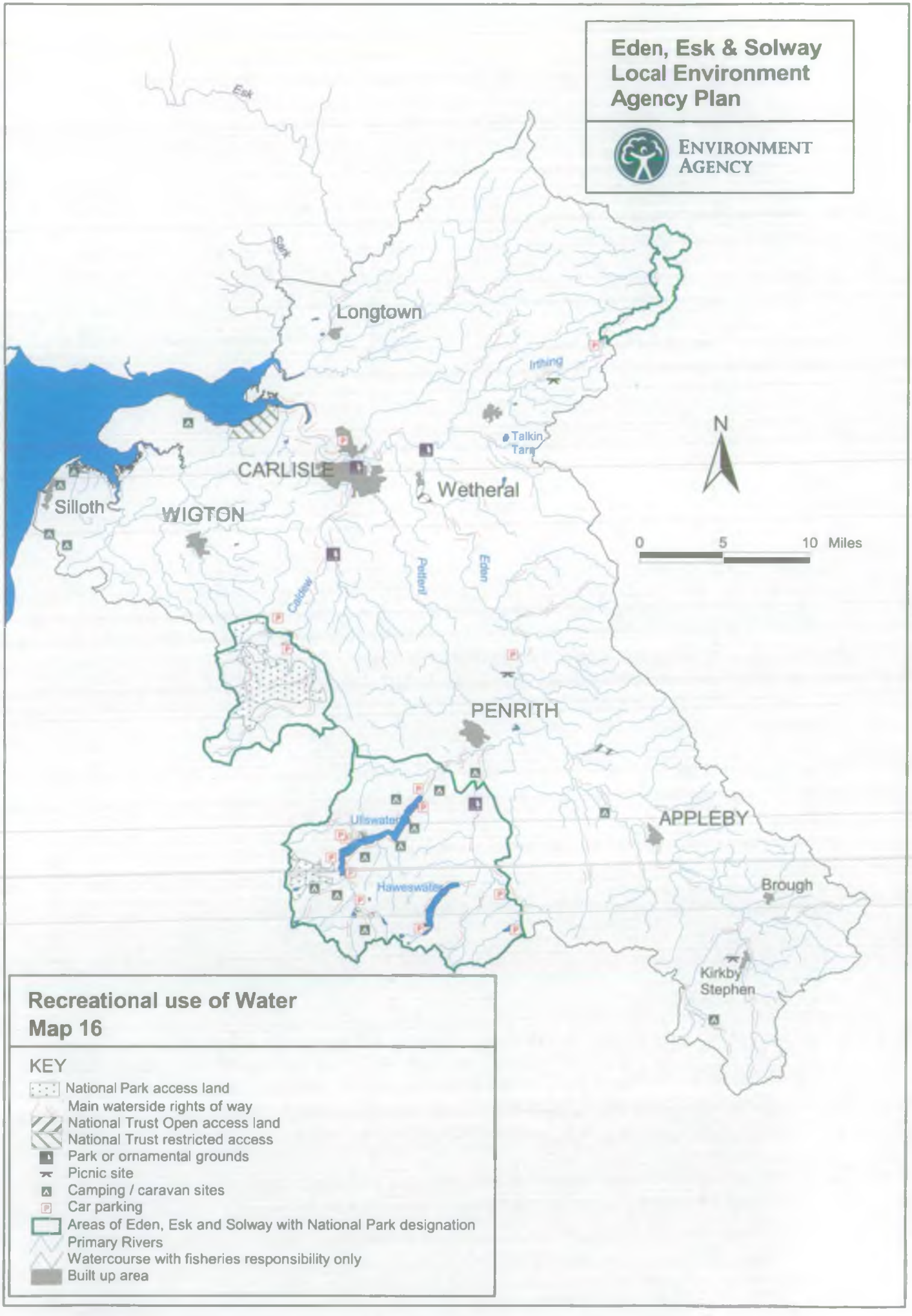
Figures for the number of recreational visits as a whole to the LEAP area are not available. However, data for the recreational use for the south western and northern part of the LEAP area emphasises the scale and differences in recreational use within the area.

The National Parks Visitor Survey, 1994, a survey of all the National Parks in England and Wales, estimates that 30% of visitor days to the Lake District are spent in the Helvellyn/Ullswater area, and 1% of visitor days are spent in the Kentmere/Haweswater Area. The Lake District National Park Authority estimates that 22 million visitor days are spent in the Lake District each year. A survey based on districts within Cumbria, carried out by Ecotec in 1992 for Cumbria Tourist Board, estimated 8 million and 3 million visitor days that year were spent in the Districts of Eden and Carlisle respectively. This is in marked contrast to the 1.3 million visitor days spent in Northumberland National Park and Border Forest Park as a whole. Only 200,000 (excluding visits to Kielder Reservoir), of these visitor days are spent in the Border Forest Park area which is part of the Eden, Esk and Solway. Again by contrast, 5.5 million visitor days are spent in Dumfries and Galloway as a whole, which includes the River Esk and its tributaries.

People visit these areas for a variety of different reasons, but the opportunities they afford for outdoor recreation is amongst the main reasons. Map 16 shows the recreational provision in the LEAP area.

Lakes

Ullswater- is the second largest lake in the Lake District; it has a public right of navigation and a 10 mph speed-limit for motorised craft. On an average summer Sunday there are approximately 200 craft in use at any one time of which 23% are sailing dinghies and 26% are canoes. Ullswater, with an average density of 23 craft/Km^2, is the least busy lake of the four lakes with a public right of navigation in the National Park. The public right of navigation means that all kinds of craft can be navigated on the lake, the only constraint on access being the availability of launching places. Ullswater is very popular for lakeshore walks and around 90,000 people walk through Hallinhag Woods along the shores of Ullswater each year (LDNPA, unpublished survey).


Eden, Esk & Solway
Local Environment
Agency Plan
Environment Agency
Esk
Liddel
Longtown
Irthing
Talkin Tarn
CARLISLE
Wetheral
Silloth
WIGTON
Caldew
Petteril
Eden
N
0
5
10 Miles
PENRITH
Ullswater
Haweswater
APPLEBY
Brough
Kirkby Stephen
Recreational use of Water
Map 16
KEY
National Park access land
Main waterside rights of way
National Trust Open access land
National Trust restricted access
Park or ornamental grounds
Picnic site
Camping / caravan sites
Car parking
Areas of Eden, Esk and Solway with National Park designation
Primary Rivers
Watercourse with fisheries responsibility only
Built up area

Haweswater - its use as a reservoir confines recreational activity to angling and occasional sub-aqua without boats. It is generally considered to be one of the less busy areas of the Lake District. This is confirmed by traffic counts, which show an average of 200 cars a day travelling along the road, by the side of Haweswater during August. However, during the prolonged dry period of 1996 when draw-down of Haweswater revealed the remains of the hamlet of Mardale and this was publicised on national television, over 1000 cars a day were recorded (LDNPA, unpublished survey).

Wet Sleddale Reservoir - recreational activity including fishing is prohibited on the water, but there is good public access on foot around the shore.

Brothers Water - is owned by the National Trust, recreational activity is limited to fishing, but there is good public access on foot around the shore.

Talkin Tarn Country Park - is owned by Cumbria County Council. It is popular for recreational activities including sailing, windsurfing, canoeing, rowing and fishing. Sub-aqua also takes place on a more limited basis.

Rivers

There is good access to many river banks in the area for walking (see Map 16). Many of the rivers in the area are of national and international importance for nature conservation and any proposals to increase public access will need careful consideration.

The only significant recreational activities on the rivers themselves, are angling and canoeing. A number of canoe access arrangements are in existence in the area eg Rivers Eamont and Eden, which have been brought about by agreements between landowners and canoeing interests.

The Three Rivers Strategy has been developed by Carlisle City Council to exploit the tourist, leisure, ecological, and environmental potential of the Eden, Caldew and Petteril Rivers. As part of this initiative, a cycleway has been developed along the River Caldew, which was partly funded by the Agency.

Coast and Estuaries

Limited sailing, wind-surfing and other boating activities take place in the Solway Firth. The Haaf net fishery in the English waters of the Inner Solway is a recreational activity with a long tradition.

Although much of the salt-marsh is common land, access is restricted. The Cumbria Coastal Way long distance regional footpath runs through the area along the coastal plain.

WATER RECREATION

Water bodies and coastal margins provide or have the potential to provide for water related recreation in appropriate locations. The Agency is seeking the inclusion of policies in development plans which:

- retain, improve, or restore public access, where appropriate;
- ensure developments do not harm the recreational and amenity potential of inland waters and coastal margins;
- prevent the loss of waterside recreational space;
- promote water recreation whilst balancing recreational needs with nature conservation.

15. Landscape and Heritage

Introduction

The quality and diversity of the landscape is dependent on wildilfe, geology and physiographical features together with man's influence over the centuries. This section looks at the landscape and heritage which characterises the Eden, Esk and Solway Area.

The Role of the Agency

The Agency has a duty to conserve and enhance the natural beauty of inland and coastal waters and associated land. The Agency has also to consider the need to protect and conserve buildings and objects of historic interest associated with the aquatic environment.

Through the Agency's role in issuing land drainage consents for operations within 8 metres of a main river and in work undertaken as part of the Agency's capital and maintenance programmes, the Agency seeks to accommodate any necessary change by taking into account the area's special characteristics. As a consultee in the planning process, other opportunities for improvement are achieved by working with Local Authorities and developers. However, other land-use changes such as some aspects of agriculture and forestry do not require planning permission and many of the factors creating change are beyond the Agency's influence.

The Role of Other Organisations

Within this LEAP area there are landscape and heritage designations of international, national and local importance. World Heritage Sites are internationally recognised and are nominated by the Secretary of State subject to ratification by UNESCO. The national landscape designations of National Parks and Areas of Outstanding Natural Beauty are designated by the Secretary of State on the recommendation of the Countryside Agency. One of the primary purposes of the National Park Authorities is to conserve the landscape, wildlife and cultural heritage. They are also required under the Wildlife & Countryside Act 1981 to map those areas of mountain, moor and heath, woodland and coastal features, which they feel it is particularly important to conserve. At a County level, the County Council through the structure plan has designated county landscapes. While at a local level, the individual District Councils determine the exact boundary of these areas in their local plans. In addition, Carlisle City Council have identified areas of local landscape significance.

In relation to heritage, English Heritage designates Schedule Ancient Monuments (SAMs), which are archaeological features of national importance. Cumbria County Council maintains a register of SAMs together with other known archaeological sites and finds. The National Trust is a national charity, which owns and manages land and properties for the benefit of the nation. It has significant land holdings in the Ullswater catchment and small land holdings near Appleby and on the edge of the Solway. In addition, organisations such as the New Mills Group look after the interests with respect to particular heritage features.

English Nature and the Countryside Agency, (formerly the Countryside Commission) with help from English Heritage, have produced a map of England that depicts the natural and cultural dimensions of the landscape. This map, 'The Character of England; landscape, wildlife and natural features' divides the country into areas of similar character. Countryside Character defines those aspects which make one place different from another area; that is the interaction of the physical factors of geology and weather with biological factors of plants and animals, and most importantly the influence and management practices of man. It is these factors that give a particular area its sense of place, its own

unique character. It is now widely recognised that everywhere has its own local character, which should be respected and enhanced where possible.

These Character Areas have been used by English Nature as the basis for their Natural Areas, that is areas that share a similar ecology. Within the LEAP area, there are six Natural Areas. Four of these are exactly the same as the Character Areas: The Solway Basin, Eden Valley, North Pennines and the Yorkshire Dales, while the Border Uplands Natural Area comprises two Character Areas: the Tyne Gap and Hadrians Wall and the Border Moors and Forests. The sixth Natural Area, the Cumbrian Fells and Dales again comprises two Character Areas, the Cumbrian High Fells and the Orton Fells.

The Landscape Character Areas provide a useful tool for describing the broad characteristics of a large diverse area such as the Eden, Esk and Solway and are summarised in the following section.

Local Perspective - Designations

The LEAP area is situated between two of England's principal upland areas. To the west are the Cumbrian Mountains, to the east are the Pennines separated by the Eden river valley and to the north are the Southern Uplands of Scotland. This is a diverse area including high mountain and moorland, lowland valley and a large low-lying coastal plain. The area is largely rural and includes many highly valued landscapes, habitats and archaeological features. It includes parts of two National Parks, Lake District and Northumberland and two Areas of Outstanding Natural Beauty, Solway Coast and the North Pennines. These national designations cover over 30% of the area, while a further 30% is designated as landscape of County importance. The LEAP area also includes Hadrians Wall which has been designated a World Heritage Site, and the Lake District has recently been nominated for World Heritage Status as a cultural landscape. In addition, the LEAP area has over 300 Scheduled Ancient Monuments, which indicates the long and interesting history of human settlement. Map 17 shows the landscape and heritage features within the LEAP area.

Local Perspective - Countryside Character Areas

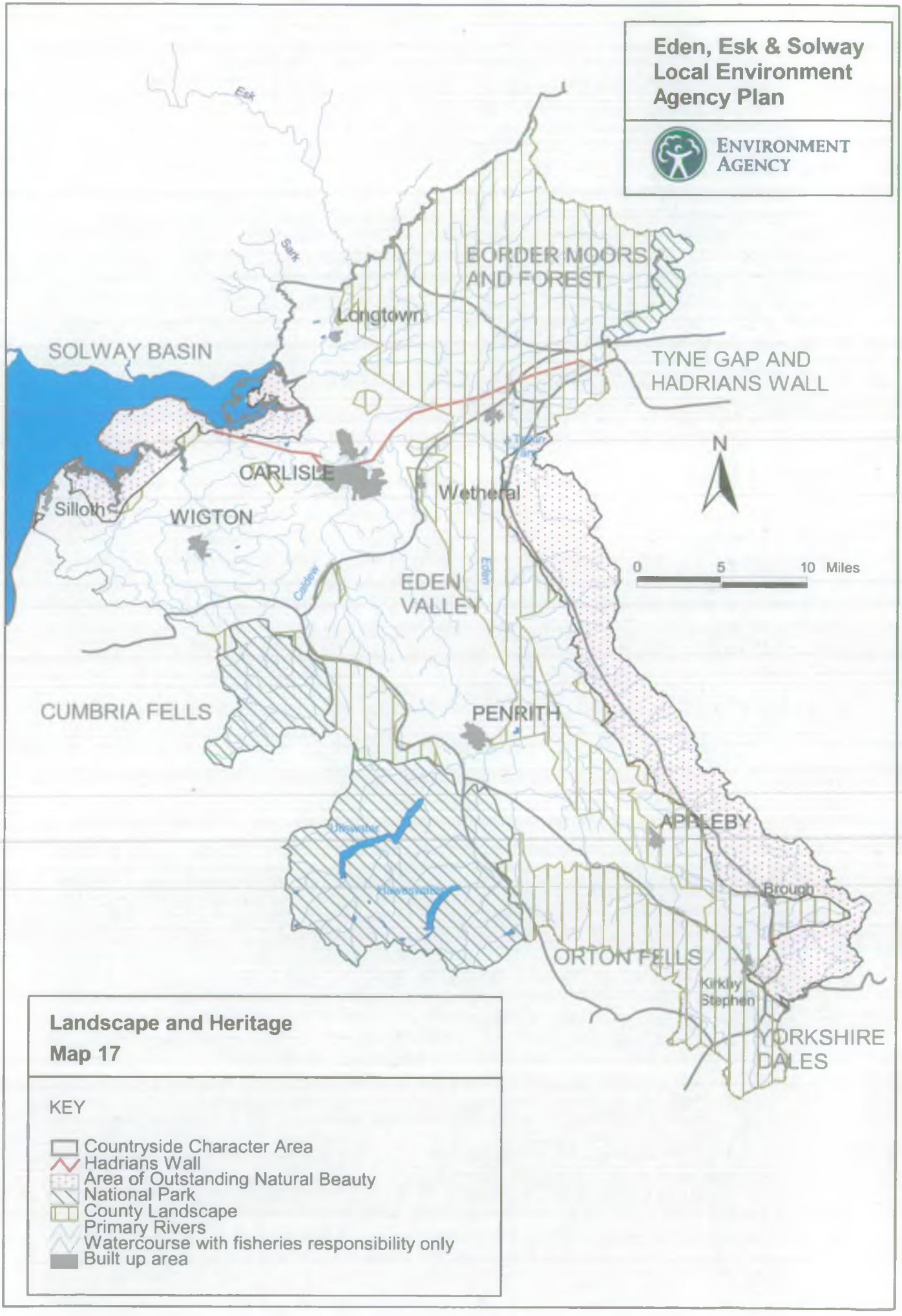
The North Pennines

The North Pennines dominates the eastern skyline of the Eden Valley. It is mainly limestone with areas of sandstone and coal measures. There is a substantial fault bordering the Eden Valley resulting in a steep scarp slope rising to a height of about 500 to 600 metres. Behind this is an extensive plateau of blanket bogs and drier moorlands consisting of heather, bracken and acid grassland rising to a height of 693 metres at Cross Fell. The area is characterised by remote moorland with impressive outcrops, scarps and dip slopes, streams and waterfalls.

The area although seemingly wild and remote, is a farmed landscape and has experienced the same changes seen in other upland areas. Overgrazing and agricultural intensification has impoverished the moorland vegetation. There are also development pressures from communications masts, pylons and wind farms that threaten the remote, unspoilt character.

The Cumbrian High Fells

To the west, the high fells of the Lake District dominate the skyline of the Eden Valley. The Cumbrian High Fells, within this area, consists of Ordovician lavas, tufa and slates that are responsible for the dramatic landscape of precipitous crags, vertical rock faces and outcrops that in the LEAP area reach a maximum height of 949 metres at the summit of Helvellyn. This area is characterised by high, wild and exposed fells contrasting with flat-bottomed cultivated valleys. Settlements are concentrated in the valley bottoms and on the lower slopes. The effects of glaciation are particularly pronounced with many sharp aretes, mountain tarns, deep valleys and ribbon lakes,


Eden, Esk & Solway
Local Environment
Agency Plan
ENVIRONMENT AGENCY
Esk
Sark
BORDER MOORS AND FOREST
Longtown
SOLWAY BASIN
TYNE GAP AND HADRIANS WALL
CARLISLE
Wetheral
Silloth
WIGTON
N
0 5 10 Miles
Caldew
Eden
EDEN VALLEY
CUMBRIA FELLS
PENRITH
APPLEBY
Brough
ORTON FELLS
Kirkby Stephen
YORKSHIRE DALES
Landscape and Heritage
Map 17
KEY
Countryside Character Area
Hadrians Wall
Area of Outstanding Natural Beauty
National Park
County Landscape
Primary Rivers
Watercourse with fisheries responsibility only
Built up area

including Ullswater the Lake District's second largest lake. Mans influence over the centuries is much in evidence from the archaeological sites to the creation of Haweswater reservoir in the valley of Mardale.

Orton Fells

To the south of the Eden Valley are the Orton Fells, a distinctive block of upland limestone. The landscape is dominated by high limestone scars and pavements. The area is very important for its geology and wildlife. There are three distinct landscape elements: a fringe of rolling farmland, a central core of higher limestone farmland and areas of open moorlands and commons. Settlements consist of older nucleated villages with small groups of trees and stone walls and newer dispersed farmsteads. The large expanses of moorland and commons give the area a remote character with long distant views to the higher land of the Cumbrian High Fells and North Pennines.

The area has a rich concentration of highly visible archaeological remains that include Bronze Age circles and burial mounds, Romano British settlements and Roman Roads

The Eden Valley

Situated between the Lake District and the North Pennines is the broad, low lying Eden Valley. The soft sandstones and mudstones are responsible for this relatively low and rolling landscape, which is overlain by boulder clay deposited by the last glaciation. The area is a mixture of improved, productive pasture and arable land in the lower lying areas with less intensively managed rolling or hilly pastures and lowland heath intersected by numerous gills in the foothills of the North Pennines. There are large broadleaved and coniferous woodlands and areas of ancient, semi-natural woodland. Mature hedges, with many hedgerow trees, bound the fields. There are also numerous copses and shelterbelts.

Settlements have a strong distinctive character. Red sandstone is the dominant building material and is a unifying feature towards the north, while further south limestone is typical. There is an intricate network of minor roads. However, the area is also an important transport corridor with the Settle to Carlisle railway line, M6 motorway, and the mainline west coast railway running through the valley.

The valley has interesting archaeology, which includes stone circles and henges of prehistoric origin. There are also sites with assocaited legends relating to King Arthur and the Round Table. The area was important in Roman times with a major road running from Penrith to Carlisle. In the tenth century, the River Eamont marked the boundary between Scotland and England. In this turbulent and violent era many castles were built. Some of these survive as ruins at Appleton, Brough and Broughton.

The intensification of agriculture has resulted in the loss of tree cover, hay meadows and heathlands and the drainage of wetlands. New developments are also having an impact with large modern farm buildings and pressure to expand villages, sometime with the use of modern building materials rather than traditional red sandstone. There is also development pressure at motorway junctions, and the increases in vehicle numbers is reducing the overall tranquillity of the area.

Solway Basin

The Solway Basin is a broad lowland plain fringed by a low, rugged and remote coastline to the north with the Scottish Border hills beyond. To the south are the Cumbrian High Fells and to the west the Pennines and Border Moors. The area is predominantly flat to gently undulating, and intensively managed for pasture. Fields are medium to large in size with windswept hedges or stone-faced hedgebanks as boundaries with limited tree cover. The area is drained by highly managed drainage

ditches and canalised waterways often in a rectilinear pattern. A large part of this agricultural landscape can be attributed to the work of the Cistercian monks of Holm Cultram Abbey, established at Abbeytown in 1150. Despite agricultural intensification over the centuries, there are still some large and relatively intact raised bogs of high nature conservation value. On the coast there are extensive saltmarshes beyond which are large expanses of intertidal mudflats.

Small villages and hamlets are well dispersed throughout the area. Red sandstone has often been used as building material, but other locally available materials like cobbles, rendered rubble, freestone and limestone have also been used. Some of these stones have been taken from Hadrian's wall and other historic buildings like Holme Cultram Abbey. Carlisle is the only major town and is the area's commercial and administrative centre. It has a rich heritage, with an ancient cathedral, castle and Georgian architecture.

Although there is only limited evidence of pre-Roman occupation, the area has a rich record of Roman archaeology. Hadrian's Wall runs through the area terminating south of Maryport and the area has been much influenced by its proximity to the Scottish Border which has been mobile at times. The area has a violent and turbulent history, particularly after 1296 when the Scots invaded the area.

In Anglo-Saxon times salt production was the third most important industry after agriculture and fishing. Salt was required in large quantities by the local fishing industry. Remains of the salt works can be seen at Saltcotes and Newton Marsh.

Border Moors and Forests

This is an extensive landscape, a high, rolling or undulating plateau with expanses of sweeping moorland, blanket bog, large tracts of coniferous woodlands and a sparse population with no major towns. The plateau is generally in the height range of 200 to 300 metres with broad hills and wide shallow valleys. The moorland areas are dominated by a mixture of heather and unimproved grassland and are heavily grazed by sheep. The conifer plantations form a patchwork of felled areas and different aged stands. There are few broadleaved trees.

There is some evidence of Neolithic and Bronze Age occupation. However, there are many Romano-British homesteads and the area was reasonably well populated in Roman times. Following the departure of the Romans, little is known about the area. From the 12th to the 16th century the area was very unstable and violent. This led to the development of defensible stone built farmsteads with a ground floor byre and a first floor living space many of which survive today in various states of repair. After the Union of the Crowns in 1603, living conditions gradually improved and the area developed agriculturally with more land under cultivation.

RIVER CORRIDORS AND COASTAL MARGINS

Development in river corridors and coastal landscapes can adversely affect their character and value. The Agency is seeking the inclusion of policies within development plans which:

- protect, enhance and restore where appropriate river corridors and coastal margins;
- ensure that developments make a positive contribution to the value of these areas in terms of nature conservation, landscape, heritage, fisheries, amenity, and recreation;
- avoid building over or culverting of watercourses.

Further Information

The Eden Esk and Solway LEAP (Consultation Report) 1999 covers the following relevant issue:

Issue 4 Opportunities for river restoration and conservation.

16. Agriculture

Introduction

Agricultural activity has moulded much of the rural landscape of the county and has also had other wide ranging effects on the environment.

The drive for self-sufficiency in food production following the Second World War promoted intensive production methods, with the intensification of grassland management and animal husbandry, and the loss through neglect and removal of hedges, wetlands and other landscape features. Circumstances have now changed, and the emphasis on production has diminished with opportunities to reverse past trends.

This section considers changes to Agriculture Land Use in the Eden Esk and Solway Area.

The Role of the Agency

The Agency's primary role in respect to agriculture is in pollution prevention and control. This is mainly achieved by providing guidance on best practice and recommended code of practice. The Agency also has statutory powers to regulate agricultural activities through the Water Resources Act 1991, which is intended to regulate and prevent the discharge of polluting substances to controlled waters.

The Control of Pollution (Silage, Slurry and Agricultural Fuel Oils) Regulations 1991, which set legally enforceable minimum standards for storage facilities, and the Groundwater Regulations 1998, which control the discharge of list I and II substances in order to prevent the contamination of groundwater.

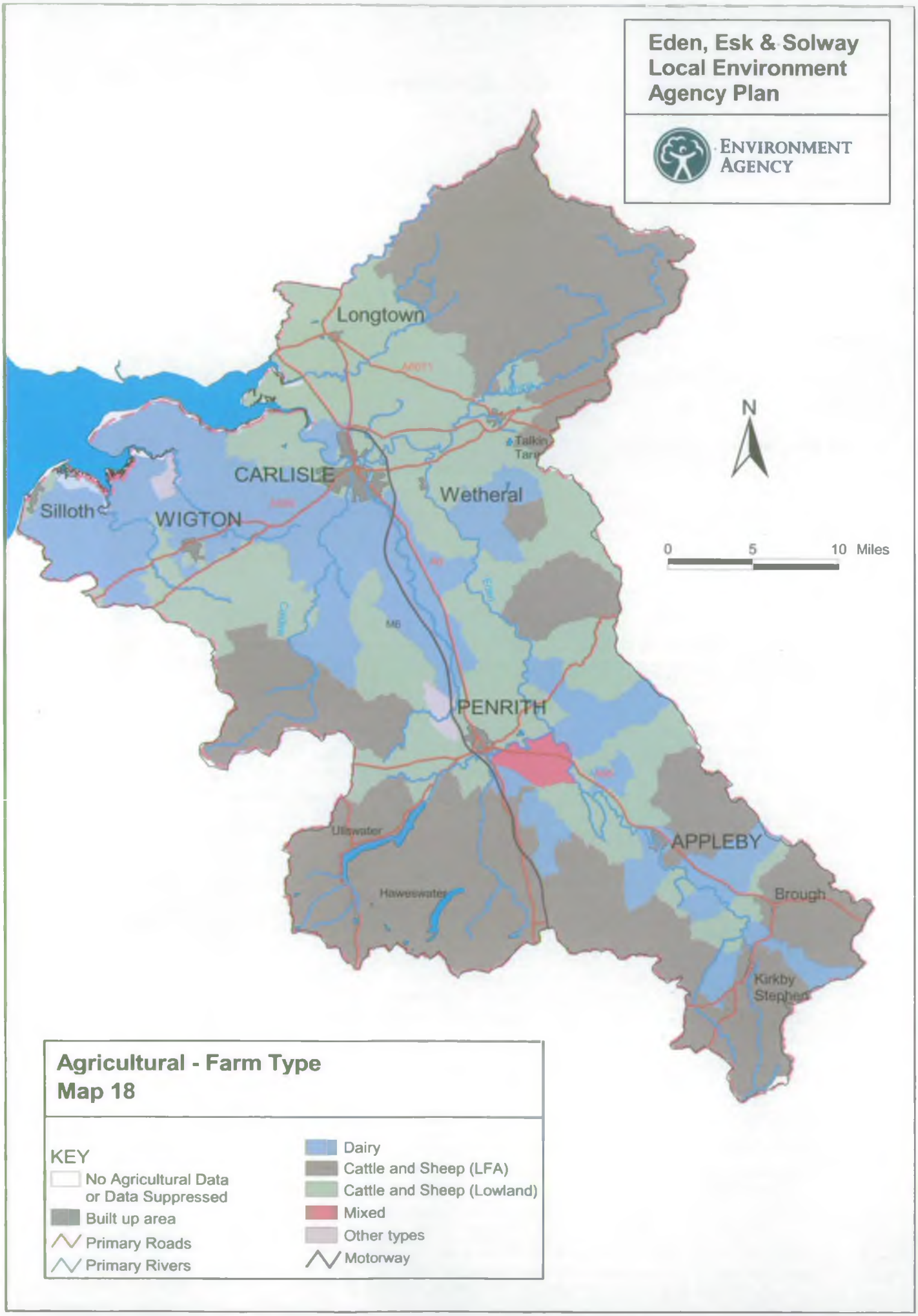
Issues of particular concern to the Agency over which it has little direct influence, are agricultural practices and intensive grazing which can lead to increased rates of soil erosion through run off and increased erosion of river banks. This leads to an increase in sediments within watercourses which lowers the wildlife value and in some cases, the material deposited further downstream where it has to be removed to reduce flood risk.

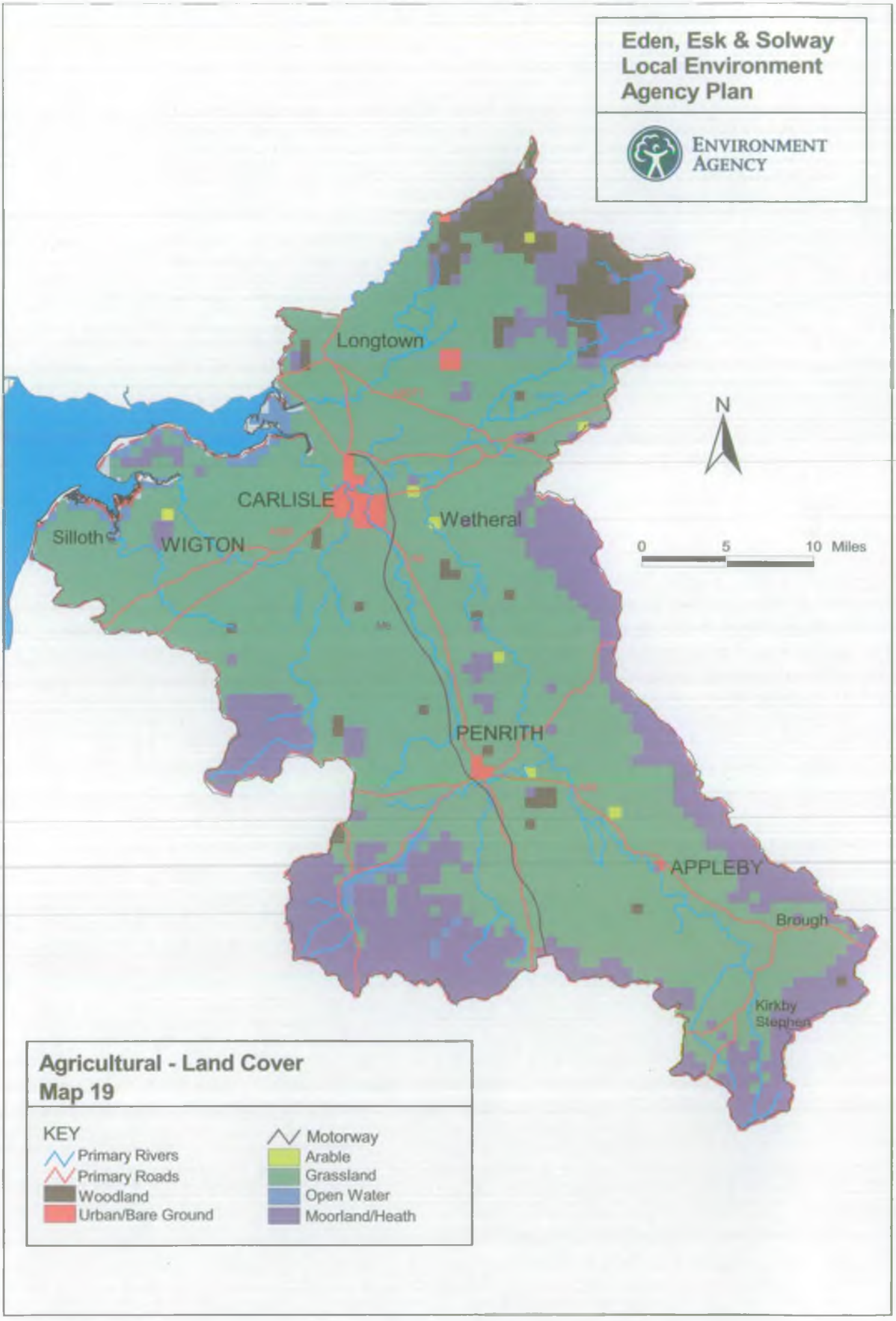
The Role of Other Organisations

Ministry of Agriculture Fisheries and Food (MAFF) has introduced Codes of Good Agricultural Practice for the protection of the environment.

MAFF has also promoted less intensive and more environmentally friendly farming through schemes such as the MAFF habitat creation scheme, environmentally sensitive areas and countryside stewardship. Farming and Rural Conservation Agency (FRCA) implements the ESA and Countryside Stewardship Scheme on behalf of MAFF. The Countryside Agency, Lake District National Park Authority, English Nature and other bodies also provide grants for environmental agricultural projects.

The Farming Wildlife Advisory Group (FWAG) is a national charitable trust set up to give advice to farmers. National farmers Union (NFU) and Country Landowners Association (CLA) are organisations which look after the specific interests of farmers and landowners.


Eden, Esk & Solway
Local Environment
Agency Plan
ENVIRONMENT AGENCY
Longtown
CARLISLE
Silloth
WIGTON
Wetheral
PENRITH
APPLEBY
Brough
Kirkby Stephen
Ullswater
Haweswater
N
0 5 10 Miles
Agricultural - Farm Type
Map 18
KEY
No Agricultural Data or Data Suppressed
Built up area
Primary Roads
Primary Rivers
Dairy
Cattle and Sheep (LFA)
Cattle and Sheep (Lowland)
Mixed
Other types
Motorway


Eden, Esk & Solway
Local Environment
Agency Plan
Environment
Agency
Longtown
CARLISLE
Wetheral
Silloth
WIGTON
N
0
5
10 Miles
PENRITH
APPLEBY
Brough
Kirkby
Stephen
Agricultural - Land Cover
Map 19
KEY
Primary Rivers
Primary Roads
Woodland
Urban/Bare Ground
Motorway
Arable
Grassland
Open Water
Moorland/Heath

Local Perspective

Agriculture is one of the mainstays of the economy in this predominantly rural area. The Eden, Esk and Solway has some of the best agricultural land (grade 2), as well as some of the poorest (grade 5) in Cumbria (see Table 10). Maps 18 and 19 clearly show that the grade 4 and 5 agricultural land is associated with the upland areas of the Lake District and Pennines, in these areas sheep farming with some beef cattle are the predominant activities.

Table 10: The Agricultural Land Classification in the Eden, Esk and Solway

Agricultural Land Classification				
	LEAP Area (Km^2)	% of LEAP area	% for Cumbria	% for England
Grades 1 & 2	103	3.2%	1.5%	16.1%
Grade 3	1,271	39.3%	26.8%	43.6%
Grade 4	559	17.3%	20.7%	12.7%
Grade 5	999	30.9%	39.4%	8.3%
Non-Agricultural	252	7.8%	9.5%	10.1%
Urban	50	1.5%	2.1%	9.2%
Total	3,234	100.0%	100.0%	100.0%

The central area of the Eden Valley and parts of the Irthing Valley, heading towards the Solway Firth, is mainly Grade 3 with some pockets of Grade 2. Grade 2 land is classified as high quality with only slight limitations on its potential agricultural use. Here, the farm type is predominantly lowland sheep and cattle with the importance of dairy farming increasing towards the Solway. Dairy farming is very intensive in the lowland areas of the Eden Valley, Petteril, Caldew and Solway Plain. A few areas of arable farming are scattered throughout the low lying areas, with 17,000 hectares given over to cereal in 1997, a 12% decrease on 1987. The trends in agricultural land use are shown in the Table 11.

Table 11: Agricultural Land Use in the Eden, Esk and Solway

Agricultural Land Use			
	1987	1992	1997
Grassland < 5 years	14.7%	13.8%	13.6%
Grassland > 5 years	53.3%	55.1%	55.1%
Rough Grazing	19.9%	20.2%	19.4%
Crops & Fallow	10.1%	8.3%	8.8%
Farm Woodland	1.3%	1.5%	1.9%
Other Land	0.7%	0.8%	0.9%
Set-Aside	0.0%	0.3%	0.3%
Total Agricultural Area	100.0%	100.0%	100.0%

Land use patterns have remained fairly static over the past 10 years with only farm woodland increasing by almost half during this period, although it still covers a relatively small area.

There have been more significant changes in livestock numbers during this period as shown in Table 12.

Table 12: Livestock Numbers in the Eden, Esk and Solway Area

Livestock Numbers					
	1987	1992	1997*	% Change 87-92	% Change 92-97*
Dairy Herd	88,875	81,631	79,503	-8.2%	-10.5%
Beef Herd	28,688	36,375	37,312	26.8%	30.1%
Breeding Herd Replacements	56,426	50,026	57,707	-11.3%	2.3%
Other Cattle > 1yr	50,647	58,254	58,787	15.0%	16.1%
Calves < 1yr	93,186	89,556	81,750	-3.9%	-12.3%
Breeding Ewes	451,890	557,543	549,393	23.4%	21.6%
Lambs under 1 year	525,427	676,361	665,490	28.7%	26.7%
Non-breeding Pigs	39,054	46,146	44,082	18.2%	12.9%
Laying Flock*	441,474	315,352	(92,212)	-28.6%	(-79.1%
Table Chickens*	1,419,718	1,181,932	(1,352,114)	-16.7%	(-4.8%)

* 1997 census data unavailable for Fowls. Figures in brackets represent 1996 data.

Throughout the Eden, Esk and Solway Area there has been a shift from smaller holdings (below 100 hectares) to larger holdings of over 100 hectares. However, the shift in this LEAP area is not as marked as for other LEAP areas in Cumbria.

Table 13: Holdings by Areas of Crops and Grass in the Eden, Esk and Solway Area

Holdings by Areas of Crops & Grass*					
	1987	1992	1997	% Change 87-92	% Change 87-97
Less than 5 ha	361	368	378	1.9%	4.7%
5 ha & < 20 ha	544	590	542	8.5%	-0.4%
20 ha & < 50 ha	955	842	778	-11.8%	-18.5%
50 ha & < 100 ha	924	896	872	3.0%	-5.6%
100 ha & over	459	483	504	5.2%	9.8%
Total Number of Holdings	3,243	3,179	3,074	-2.0%	-5.2%

While Table 13 shows that farm size has increased, the number of farm workers employed full-time in farming has decreased by 14% between 1987-97. There has been a corresponding 23% increase in the part-time workforce. However, the total agricultural workforce has decreased by 6% throughout this period.

Further Information

The Eden Esk and Solway LEAP (Consultation Report) 1999 covers the following relevant issue:

Issue 12 Adverse impact of rural land use.

17. Forestry

Introduction

Woodland is an important element in the countryside. The size of woodlands, their locations in relation to landform and settlement, their species composition, their value as a timber crop, stock shelter or recreational resource are all important aspects. This section considers forestry within the LEAP area.

The Role of the Agency

Locally the Agency has a good working relationship with the Forestry Commission and others involved in woodland management. The Agency is given an opportunity to comment on all woodland management proposals, which pass through the Forestry Commission Woodland Grant Scheme. In addition, the Agency is consulted over all Forest Design Plans produced by Forest Enterprise, the land-holding section of the Forestry Commission.

The Role of Other Organisations

The Government with the help of others, including the Environment Agency, has produced 'A new focus for England's woodlands - an England Forestry Strategy'. This has priorities for woodlands and forestry. These are forestry for, rural development, economic generation, recreation, access and tourism, environment and conservation. A 'Cumbria Woodland Vision' has been developed based on the strategy and the Countryside Character Map areas developed by the Countryside Agency (formerly the Countryside Commission). Its aim is to look at the management of existing woodlands and how this might be improved or increased. It provides a vision for the future.

A Cumbria Woodland Forum, comprising representatives of many different organisations with an interest in woodlands in Cumbria, has been set up by the Forestry Commission. Its purpose is to develop initiatives relating to trees and woodlands including the implementation and review of the Cumbria Woodland Vision, identify and maximise advice and funding for woodland management, exchange information, and promote woodland in Cumbria.

Although not requiring planning permission, the Forestry Commission, through their Woodland Grant Scheme and felling licence system guides most forestry activity. The Forestry Commission require operators to follow sound environmental practices as a condition of woodland grants and felling operators. These are laid down in a series of guidance notes which the Forestry Commission issue to operators. Any planting scheme exceeding 40 hectares needs a full environmental appraisal which must be approved by the Forestry Commission before a grant can be paid.

The Forestry Commission may also provide grant money for management of existing woodland including biodiversity management. Other bodies may also provide financial assistance for woodland management in specific circumstances. For example MAFF may pay grants within the Lake District Environmentally Sensitive Area (ESA) for riverside trees, pollarding etc and the Lake District National Park Authority or English Nature may provide grant and practical assistance for appropriate projects.

Local Perspective

Cumbria as a whole has a mixture of fragmentary ancient woodland, former coppice and in a few areas a concentration of mostly coniferous plantation (see Map 20). Based on the Woodland Vision and the

Countryside Character map, the woodlands in the Eden, Esk and Solway area can be described as follows:

The North Pennines

Woodland cover is sparse, and comprises mainly remnant ancient and semi-natural woodlands in gills and along valley sides; conifer-dominated plantations overlooking some valleys; hedgerow trees on the lower slopes and more sheltered areas and some scarce juniper scrub on limestone. Woodland is an important element of a landscape dominated by high moorland. Natural woodland expansion is virtually non-existent because of grazing pressure.

The Cumbrian High Fells

There are significant pockets of semi-natural woodlands in the valley bottoms and flanking the valley sides. These contrast with the rugged fells and enclosed farmed landscape of the valley bottoms. The public sees woodland as one of the special qualities of the area. Juniper scrub is a prominent feature on some lower slopes around Ullswater. Coniferous plantations, while small in scale compared to other parts of the Lake District, are present around Haweswater and Matterdale.

The Orton Fells

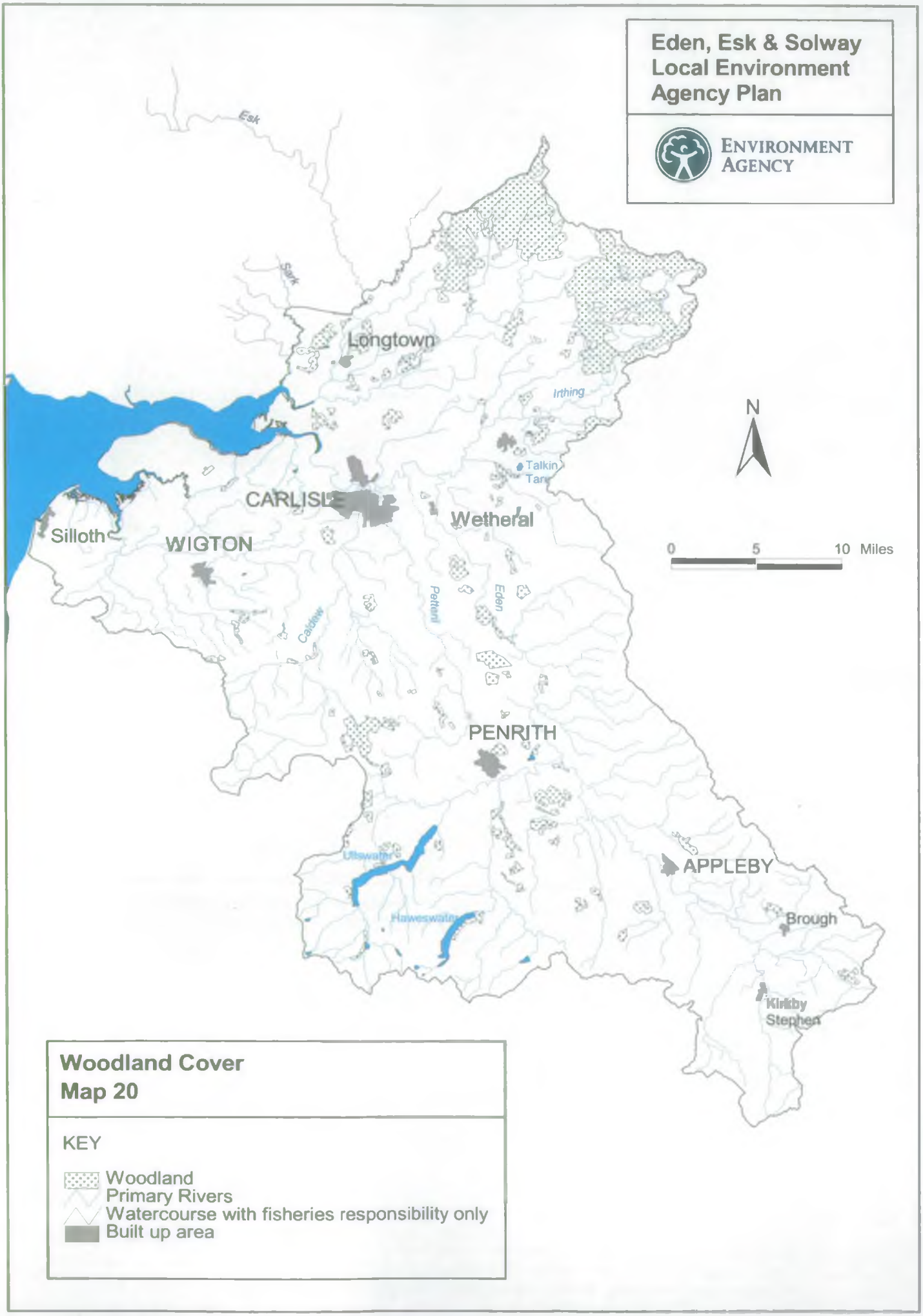
This area has sparse tree cover in the form of isolated trees, shelter woods around farmsteads, small semi-natural copses and mixed woodland. In addition, there are gill type woodlands in valleys and blocks of conifers.

The Eden Valley

This area is generally well wooded, with a mix of farm and woodland, including woodland on steep river banks. There are large broadleaved and coniferous estate/farm woodlands, areas of semi-natural woodland, sandstone hills with woodland and lowland heath vegetation, small copses, shelterbelts, mature tall hedgerows, and hedgerow trees all contributing to the well wooded character of the valley. There are also significant blocks of conifer.

Solway Basin

Woodland cover is very limited and is restricted to shallow valleys of the rivers Esk and Lyne, with some larger blocks of conifer and mixed woodland and secondary growth of birch on the mosslands. The small farm woodlands, copses and beckside remnants are seen as very important. Closer to the coast, the landscape is very windswept with few trees, and therefore those present are very important.


Eden, Esk & Solway
Local Environment
Agency Plan
ENVIRONMENT
AGENCY
Esk
Sark
Longtown
Irthing
N
Talkin
Tarn
CARLISLE
Wetheral
Silloth
WIGTON
0
5
10 Miles
Caldew
Petteril
Eden
PENRITH
Ullswater
Haweswater
APPLEBY
Brough
Kirkby
Stephen
Woodland Cover
Map 20
KEY
Woodland
Primary Rivers
Watercourse with fisheries responsibility only
Built up area

Border Moors and Forest, and Tyne Gap and Hadrian's Wall

Border Moors and Forest area is characterised by extensive conifer plantations, interspersed by open moorland and high farmland. The area contains few broadleaf trees, mainly restricted to small woodland blocks, hedgerows and remnant semi-natural woodland in deeper valleys.

The Tyne Gap and Hadrian's Wall is an open valley, between the North Pennines and Border Moors, with significant blocks of semi-natural woodland on the steep valley slopes and river banks.

Further Information

A new focus for England's woodlands - an England Forestry Strategy, Forestry Commission
Cumbria Woodland Vision Forestry Commission

Appendices

Appendix 1 Comparison of Water Quality Criteria for General Quality Assessment and River Ecosystem Schemes

General Quality Assessment Scheme: Water Quality Criteria

GQA	Dissolved Oxygen % Saturation	BOD (ATU) mg/l	Total Ammonia mgN/1
	10 percentile	90 percentile	90 percentile
A	80	2.5	0.25
B	70	4.0	0.6
C	60	6.0	1.3
D	50	8.0	2.5
E	20	15.0	9
F*	-	-	-

*Quality which does not meet the requirements of Grade E in respect of one or more determinands.

River Ecosystem Classification: Water Quality Criteria

Re Class	Dissolved Oxygen % Saturation	Bod (ATU) mg/l	Total Ammonia mgN/l	Un-ionised Ammonia mgN/l	pH	Hardness mg/l CaCO3	Dissolved Copper µg/l	Total Zinc µg/l
	10 percentile	90 percentile	90 percentile	95 percentile	Lower Result on 5 percentile		95 percentile	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	3.020e+1 0
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			<10 >10 and <50 >50 and <100 >100	5 22 40 112	30 200 300 500

Appendix 2 Species and their Legal Status/Special Interest

SPECIES	UK BAP	Cumbria BAP	Wildlife& Countryside Act 1981	Habitats Directive Species	Birds Directive Species	Bern Convention
Freshwater Pearl Mussel	✓ (2)		✓ Schedule 5	✓ Annex IIa, Va		✓ App. III
Native White-clawed Crayfish	✓ (1)		✓ Schedule 5 (taking & sale only)	✓ Annex IIa, Va		✓ App. III
Sandbowl Snail	✓ (3)		✓ Schedule 5			
Marsh Fritillary	✓ (4)		✓ Schedule 5	✓ Annex IIa		✓ App.II
Banded Demoiselle		✓				
Salmon	✓ (-)			✓ Annex IIa, Va		✓ App.III
Bullhead	✓ (-)			✓ Annex IIa		
Brook Lamprey	✓ (-)			✓ Annex IIa		✓ App.III
River Lamprey	✓ (-)			✓ Annex IIa, Va		✓ App.III
Sea Lamprey	✓ (-)			✓ Annex IIa		✓ App.III
Schelly	✓ (-)	✓	✓ Schedule 5	✓ Annex Va		✓ App.III
Great Crested Newt	✓ (3)		✓ Schedule 5	✓ Annex IIa, IVa		✓ App.II
Natterjack Toad	✓ (4)		✓ Schedule 5	✓ Annex IVa		✓ App.II
Reed Bunting	✓ (5)					✓ App II
Otters	✓		✓ Schedule 5, 6	✓ Annex IIa, IVa		✓ App II
Water Vole	✓ (1)	✓	✓ Schedule 5 Section 9 (4)(a)(b) only			
River Jelly Lichen	✓ (1)		✓ Schedule 8			
Pink-footed Geese	✓ (-)		✓ Schedule 2 (part 1)		✓ Annex II	✓ App.III
Whooper Swan	✓ (-)		✓ Schedule 1		✓ Annex I	✓ App II
Shelduck	✓ (-)				✓	✓ App II
Scaup	✓ (-)		✓ Schedule 1		✓ Annex II, III	✓ App. III
Oyster-catcher					✓	
Golden plover	✓ (-)		Schedule 2 (Part I)		✓ Annex I, II, III	✓ App. III
Dunlin	✓ (-)				✓	✓ App. II
Bar-tailed Godwit	✓ (-)				✓ Annex II	✓ App III
Curlew	✓ (-)				✓ Annex II	✓ App III
Pintail	✓ (-)		✓ Schedule 1, 2(Part 1)		✓ Annex II, III	✓ App III
Barnacle Goose	✓ (-)				✓ Annex I	✓ App II
Goldeneye	✓ (-)		✓ Schedule 1,2(Part 1)		✓	✓ App III
Teal	✓ (-)		✓ Schedule 2(Part 1)		✓	✓ App III

UK Biodiveristy Action Plan Species:

1	-	Priority BAP species, Agency is Contact Point
2	-	Priority BAP species, Agency is Lead Partner
3	-	Priority BAP species, with action allocated to Agency
4	-	Priority BAP species, no action for Agency, but involvement possible
5	-	Priority BAP species, no action or involvement for Agency
	-	species of conservation concern (Department of the Environment 1995), but not a priority species (UK Biodiversity Group, 1998)

Wildlife & Countryside Act 1981

Schedule 1	birds which are protected by penalties
Schedule 2, part 1 (amended 1992)	birds which may be killed or taken
Schedule 5 (amended 1998)	animals (other than birds) which are protected
Schedule 8 (amended 1998)	plants which are protected (i.e. special protection)

Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive)

Annexes IIa, IIb	animal and plant species of community interest whose conservation requires the designation of special areas of conservation
Annexes IVa, IVb	animal and plant species of community interest in need of strict protection
Annexes Va, Vb	animal and plant species of community interest whose taking in the wild and exploitation may be subject to management measures

Directive 79/409/EEC on the conservation of wild birds (Birds Directive)

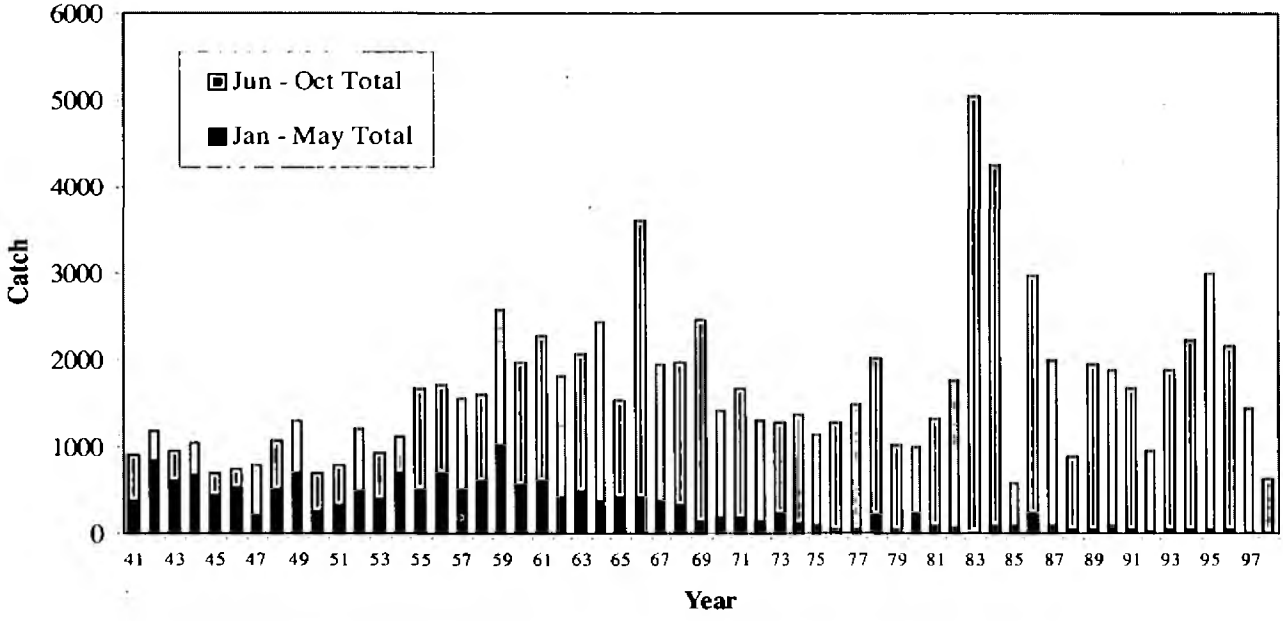
Annex 1	species subject to special conservation measures (Member states required to classify most suitable areas for Annex I species, and for other regularly occurring migratory birds, as special areas of protection)
Annex II	species which may be hunted
Annex III	species which may be sold

Convention On The Conservation Of European Wildlife And Natural Habitats (Bern Convention)

Appendix I	special protection for plant species listed
Appendix II	special protection for animal species and their habitats
Appendix III	exploitation of listed animals and plants to be subject to regulation

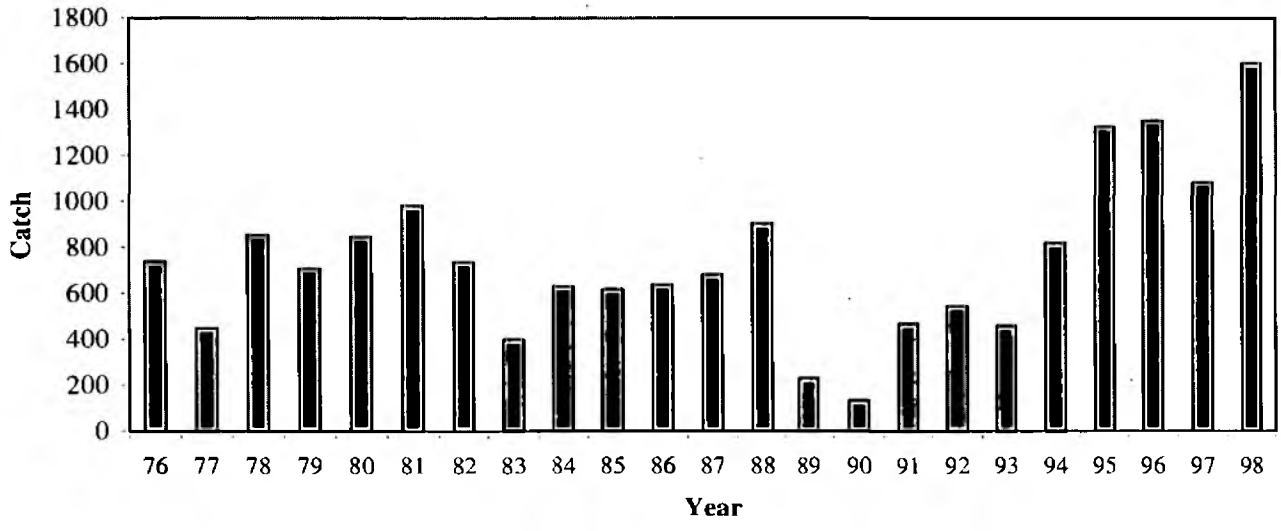
Appendix 3 Declared Catch Returns for Various Rivers

COMMERICAL SALMON CATCHES 1941-1998
EDEN & BORDER ESK DISTRICT (England Only)

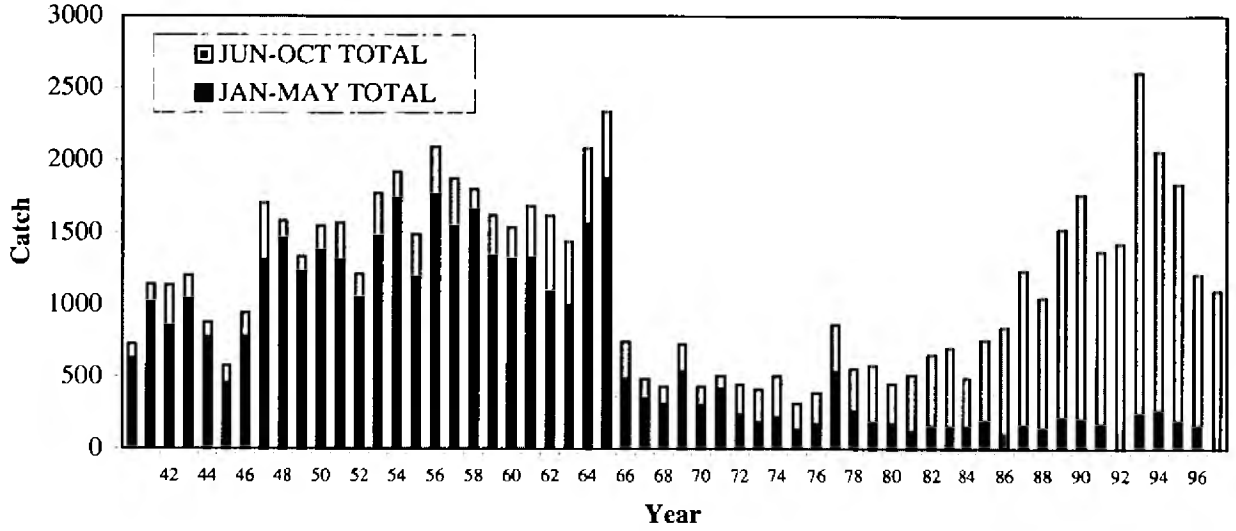


Inc drift,seine, haaf & coops but 1951-55 no haaf data, 1952 no drift

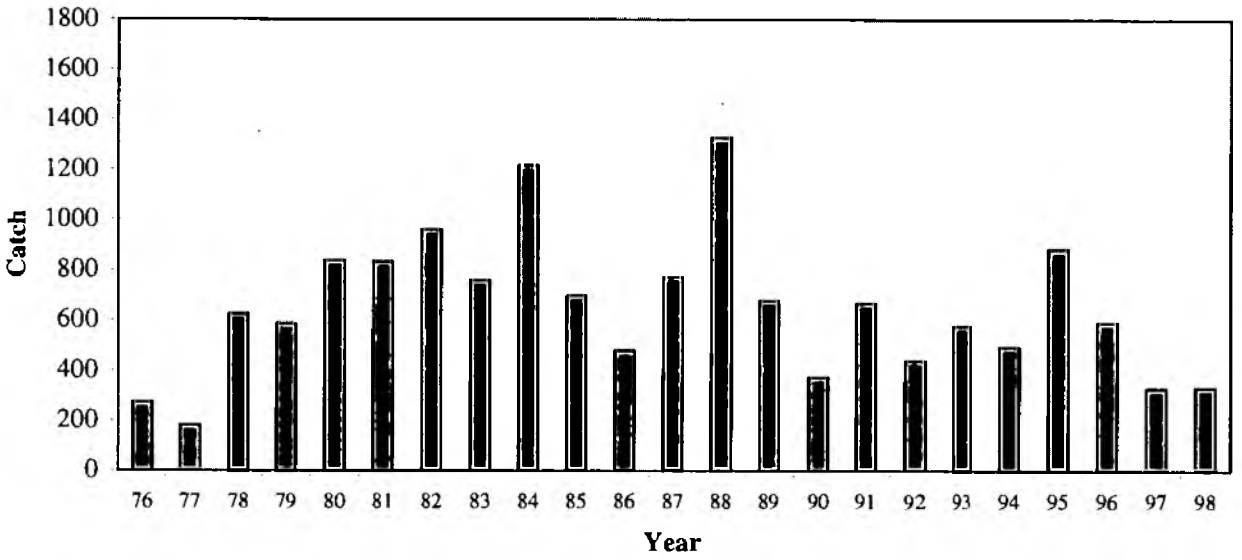
DECLARED SEA TROUT ROD CATCH 1976-1998
BORDER ESK CATCHMENT (England Only)



DECLARED SALMON ROD CATCH 1941 - 1998
EDEN CATCHMENT



DECLARED SEA TROUT ROD CATCH 1976-1998
EDEN CATCHMENT



NORTH WEST REGION ADDRESSES

REGIONAL OFFICE
Environment Agency
PO Box 12
Richard Fairclough House
Knutsford Road
Warrington WA4 1HG
Tel: 01925 653 999
Fax: 01925 415 961

NORTH AREA
Environment Agency
Ghyll Mount
Gillan Way
Penrith 40 Business Park
Penrith
Cumbria CA11 9BP
Tel: 01768 866666
Fax: 01768 865606

CENTRAL AREA
Environment Agency
Lutra House
PO Box 519
South Preston
Lancashire PR5 8GD
Tel: 01772 339 882
Fax: 01772 627 730

SOUTH AREA
Environment Agency
Appleton House
430 Birchwood Boulevard
Birchwood
Warrington WA3 7WD
Tel: 01925 840000
Fax: 01925 852260

For general enquiries please call your local Environment Agency office. If you are unsure who to contact, or which is your local office, please call our general enquiry line.

ENVIRONMENT AGENCY
GENERAL ENQUIRY LINE
0645 333 111

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

ENVIRONMENT AGENCY
EMERGENCY HOTLINE
0800 80 70 60

ENVIRONMENT AGENCY

NW-09/99-750-DII-BETB Printed on 100% recycled paper

North Area Office
Ghyll Mount
Gillan Way
Penrith 40 Business Park
Penrith
Cumbria CA11 9BP