local environment agency plan

LUNE

CONSULTATION REPORT

FEBRUARY 1998

ENVIRONMENT AGENCY

Lune
Local Environment Agency Plan
Map 1

ENVIRONMENT AGENCY

FOREWORD

I am very pleased to introduce the Local Environment Agency Plan consultation for the Lune area. This plan consultation document forms part of a new and innovative approach to identifying, prioritising and solving local environmental issues which are related to the Agency's functions.

The plan identifies practical environmental issues within the Lune area and seeks to develop integrated and holistic strategies and actions to secure environmental improvement. Whilst the plan will be the focus for the Agency's actions, partnerships, influencing and involvement of the public and business communities will be essential to secure success. I invite you to consider the content of this document and to raise any issue, comment or suggestion that you feel may assist us in making a positive difference to your local area. The consultation period ends on Friday 15th May 1998.

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AREA MANAGER
CENTRAL

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Part 1 THE LEAP PROCESS & ISSUES

1.1 VISION FOR THE LUNE AREA

The vision for the Lune area in 25 years, providing an improved local environment would be to have:

An area where the treating, keeping, movement and disposal of controlled waste will be regulated so as to prevent pollution of the environment , harm to human health, and serious detriment to amenity. Controlled waste in the area will be managed in accordance with the principles of sustainability. In particular by reducing the amount of waste produced, making the best use of waste that is produced, and choosing waste management practices which minimise the risk of immediate and future environmental pollution and harm to human health.

An area where clean up of contaminated land has taken place and the land returned to use for the benefit of the local communities.

An area where water quantity, quality and riparian habitat, specifically in the Rivers Lune, Conder and Keer, have been improved and maintained to a consistent, high standard in which salmonid and coarse fish can live and breed successfully.

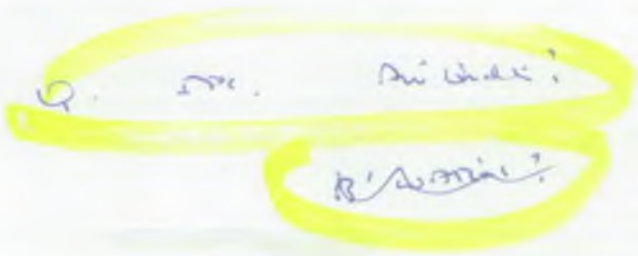
An area where the watercourses and coastal waters are attractive and clean environments supporting a wide range of recreational and amenity uses, such as angling, bathing and water sports and walking with continuous green corridors. The ecological value of the area have improved, landscape quality conserved and restored and the cultural heritage, including archaeological sites protected for future generations.

An area which achieves the right balance between the needs of the environment and those of abstractors. No shortage of water for future supplies and wise use of water which will protect the environment.

An area where the risk of flooding to property is minimised and the design of flood defences accommodates for and seeks to enhance where possible species, their habitats, and access to the watercourse for recreational pursuits.

An area where education has raised awareness of the ecological features such as wildlife habitats, landscape, archaeological and historic features. Their protection, promotion and enhancement is endorsed by legislation and has been adopted as policy through local development planning process.

These improvements will be achieved in partnership with industry and the farming community, riparian owners, local interest groups and the general public.



1.2 THE ENVIRONMENT AGENCY

Our Vision is:

'A better environment in England and Wales for present and future generations.'

Our Aims are:

- To achieve major and continuous improvement in the quality of air, land and water.
- To encourage the conservation and enhancement of our natural resources, landscape, heritage, animals and plants.
- To make the most of pollution control and river-basin management.
- To provide effective defence and warning systems to protect people and property against flooding from rivers and the sea.
- To reduce the amount of waste by encouraging people to re-use and recycle their waste.
- To improve standards of waste disposal.
- To manage water resources to achieve the proper balance between the Country's needs and the environment.
- To work with other organisations to reclaim contaminated land.
- To improve and develop salmon and freshwater fisheries.
- To conserve and improve river navigation.
- To tell people about environmental issues by educating and informing.
- To set priorities and work out solutions that society can afford.

We will do this by:

- Being open and consulting others about our work;
- Basing our decisions around sound science and research;
- Valuing and developing our employees; and
- Being efficient and businesslike in all we do.

The Environment Agency is a new body. It has a wide range of duties and powers relating to different aspects of environmental management. It is required and guided by Government to use these duties and powers in order to help achieve the objective of sustainable development. The Brundtland Commission defined sustainable development as '.... *development that meets the needs of the present without compromising the ability of future generations to meet their own needs*'.

At the heart of sustainable development is the integration of human needs and the environment within which we live. Indeed the creation of the Agency itself was in part a recognition of the need to take a more integrated and longer-term view of environmental management at a national level. The Agency therefore has to reflect this in the way it works and in the decisions it makes.
Taking a long-term perspective will require the Agency to anticipate risks and encourage precaution, particularly where impacts on the environment may have long-term effects, or when the effects are not reversible. The Agency must also develop its role to educate and inform society as a whole, as well as carrying out its prevention and enforcement activities, in order to ensure continuing protection and enhancement of the environment.

Although the Agency only has duties and powers to protect some environmental resources, it will need to contribute to other aspects of environmental management even if these are, in the first instance, the responsibility of others. The Agency can only do this effectively by working in partnership with and through others in order to set common goals and to achieve agreed objectives.

Most of the UK's environmental legislation originates from the European Union. To date there have been five EC Environmental Action Programmes which have collectively given rise to several hundred pieces of legislation of relevance to environmental protection, one of the most recent being the Directive on Integrated Pollution Prevention and Control. A number of other directives are currently under consideration, covering issues such as water management, air quality, and the management of waste using landfill.

The Agency also has to work in a wider international context because it is now generally accepted that environmental changes are occurring on a global scale. Individual countries contribute to these changes, and respond to them, in different ways. The Agency's long-term strategy therefore has to reflect these global issues, and it has to be delivered within the framework of international and national commitments which has been developed to address them.

Perhaps the major international issue is that of climate change. The UK is a contributor to the emission of gases such as carbon dioxide into the atmosphere which are believed to contribute to long-term climate changes. The UK will also be affected in a complex way as and when the climate does change. It is therefore a signatory to the Framework Convention on Climate Change, as agreed at the Rio Summit in 1992, and is taking an active part in international negotiations to obtain commitments beyond the year 2000 for credible, effective, and achievable reductions of greenhouse gas emissions.

Another outcome of the United Nations 'Earth Summit' held in Rio de Janeiro in 1992 was agreement by governments that, in order to solve global environmental problems, local action is crucial: we must all therefore think globally but act locally. The Local Agenda 21 initiative set out actions needed to achieve sustainable development, including the need to make clear the links which exist between local life-styles and the use of resources. In the UK plans have now been formulated by local government and local communities to identify and address a wide range of environmental issues including natural resource use, pollution, health, local amenity and quality of life. These programmes set out long-term solutions that take account of global implications, such as the use of resources that affect the global environment and thus local communities in other parts of the world.

The Agency is committed to a programme of Local Environment Agency Plans (LEAPs) in order to produce a local agenda of integrated action for environmental improvement. These LEAPs will also allow the Agency to deploy its resources to best effect and optimise benefit for the local environment.

1.3 THE LEAP PROCESS

Introduction

The Environment Agency are committed to delivering environmental improvement at the local level and one of the ways to do this will be through Local Environment Agency Plans. These plans reflect our close contact with industry, the public and Local Government and will contribute towards achieving sustainable development.

The process of drawing up these plans will involve close consultation with all interested parties. It will promote the effective, accountable and integrated delivery of environmental improvement at the local level. The plans will translate policy and strategy into delivery on the ground and will result in actions, either for the Agency to fulfil, or for others to undertake through influence and partnership. We believe the process will benefit the local community by influencing and advising external decision makers and public opinion. It will build trust by being open and frank when dealing with all issues.

We will complete public consultation on ten plans in 1997/98 and on all plans by 1999. We will have started implementing five action plans in 1997/98 and all of them by 2000.

Definition

A 'LEAP' is the Environment Agency's integrated local management plan, for identifying and assessing, prioritising and solving local environmental issues related to the Agency's functions, taking into account the views of the Agency's local customers. The outcome of the process is a local agenda of integrated action for environmental improvement in order to optimise benefit for the local environment.

The Scope of LEAPs

The Agency is the competent authority for managing and regulating the water environment, for regulating waste, major industrial processes, and contaminated land. We have duties to protect and enhance biodiversity in everything we do, to protect landscape and heritage, and to promote inland navigation and recreation.

A LEAP must not be a plan for managing each and every matter related to the environment, because we only have the authority and resources to plan for those matters which are part of our statutory responsibilities. Though where there are common areas of working LEAPs should attempt to influence third parties to plan and act in ways that support our Environmental Strategy. The boundary between planning and influencing may not in practice be clear cut, and in deciding on how far to go, it will be important to consult key external partner organisations, especially local authorities.

Delivery

LEAPs are delivered by Area Managers through teams in close conjunction with key partner organisations and Area Environment Groups. Consultation Reports and Action Plans are important statements of the Agency's stance on local environmental issues. Regions have an influencing role in ensuring consistency, technical quality, adherence to national requirements and resource allocation.

Timescales

Published LEAPs Consultation Reports must cover all parts of England and Wales by the end of 1999, but this is only the first milestone in what will be an ongoing national programme of LEAPs, which will be regularly updated, developed and improved.

Each LEAP should take a long term view of local environments and set out a five year plan of action for solving local issues. LEAP Action Plans should be subject to annual review, and the entire process reviewed in full every five years, and subjected to new documentation and consultation.

Key Stages:

The Consultation Report

Prepared over the last 8 months, this report identifies issues for a plan area which the Agency wishes to see resolved, due to the adverse impacts upon the environment. Some of the causes are known and these issues have detailed actions, whilst others are highlighted with the key groups for potential partnerships listed for further information or discussion. At the start of a plan, contact with key interested groups is made to inform them of the process and ask for their early thoughts. Later drafts may form the basis of further discussions and issue development. Finally the document is put out for three months consultation, to ensure the issues are circulated for comment as widely as possible. These plans are available to everyone.

Translation of the document into Action Plan

In order to produce the action plan, the issues will have to be confirmed with the responsible lead organisation in terms of timescales and allocation of budgets.
In some cases solutions are not always possible within the 5 year plan. In these circumstances the issues are defined as 'future'.

Future Review and Monitoring

Progress will be monitored and reported on annually, by means of a review document which will be publicly available. The review document will comprise of :

A detailed comparison of planned progress against actual.

Identification of additional actions to maintain progress in the light of changes.

1.4 THE LUNE LEAP AREA

The Lune and its tributaries drain an area of 1223 sq kms. It is one of the largest rivers in the North West of England. Rising at Ravenstonedale Common in Cumbria, it flows west to Tebay before turning southwards towards its confluence with the Irish Sea west of Lancaster. A total distance of 105km. Compared to many rivers in the Region, the Lune is relatively undeveloped and this is reflected in a vast range of wildlife. There are many designations for specific species and habitats. The Lune together with Morecambe Bay forms an area not only of local significance, but of regional, national and international importance.

In the upland areas around Howgill and Birkbeck Fells fast flowing streams cascade through the incised valleys. In contrast to the Orton Fells area which are composed of limestone and feature distinct pavements and lack of surface water. Fell walking and pot holing are popular and attract tourists to areas around Ingleton and Dent. Good quality watercourses are generally found in these Upper parts. Sheep faming predominates with dairy farming being practised around the Keer catchment. These activities can give rise to diffuse pollution problems. In particular from the spreading of farm waste, artificial fertilisers, pesticides and the disposal of sheep dip. Cattle can also contribute to the degradation of bankside habitat (see issue 1).

The River Lune supports rod and line and net fisheries for migratory salmon and sea trout, net fisheries for eels and elvers and a recreational fishery for coarse and brown trout. Around the Lune Estuary and Morecambe Bay there are commercial net fisheries for species such as Mullet and Bass.

Poorer quality watercourses subject to polluting effects are generally found in the more populated industrial parts around Lancaster and Heysham. Run off from industrial units, waste disposal sites and transfer stations give rise to contamination of soils, ground and surface waters. (see issue 9) There are a total of 32 wastewater treatment works within the area serving the populated areas.

The tourist centres in the lowland areas focus around the historic City of Lancaster, the beaches at Morecambe and more rural areas for example Kirkby Lonsdale, and beyond Carnforth. Walking and cycling trails provide a network through the area. The Lancaster Canal provides additional facilities for pleasure boating. The Lune itself is very popular for canoeing, in addition to a number of other water sports which take place in the Estuary and along the coast.

The area defined as the Lune for the purposes of this plan is shown on map 1 on the inside front cover. The area is based on the Lune surface water catchment. This map has been adapted throughout the document to highlight the various issues, uses and activities carried out within the Lune area. The issues affecting the Lune area are discussed in section 1.6.

1.5 PROTECTION AND PARTNERSHIP

Introduction

Much of the day to day work of the Agency is aimed at protecting the environment through education, pollution prevention and improvement.

This important work does not feature in the LEAP because the plan is primarily intended to address environmental problems and these are highlighted within the section detailing issues . Much of this routine work is undertaken by the Agency to fulfil its duties and responsibilities. Examples include routine inspection at landfill sites to ensure licence conditions are being complied with, anti poaching activities by Agency bailiffs, routine river sampling to detect trends in water quality and site visits to factories/sewage works etc. to ensure discharge authorisation are being complied with.

However, the Agency recognises that it is not the only body operating in the field of environmental protection and improvement and that our responsibilities often overlap with those of other organisations.

Where appropriate the Agency will work with partners to achieve environmental protection and improvements. Much of this co-operation goes on at a day to day level between officers in the field and does not require any formal setting up.

Examples include negotiation between Agency inspectors and representatives of individual companies over programmes of investment to improve environmental performance, or assistance afforded by the Police in difficult enforcement action.

However, in some cases the Agency does get involved in more formal partnerships and some of those which are relevant to this LEAP area are outlined below. Others are mentioned under the relevant issues in Section 1.6 of this plan.

Liaison with Local Planning Authorities (LPAs)

The Environment Agency is taking a pro-active role in the land-use planning system. We have recently published our national document 'Liaison with Local Planning Authorities 1997'. The document explains our role and contribution to the land use planning system .

Past development has had a major influence on shaping the area and the planning system plays an important role in protecting much of its special character. New development has to be carefully considered, to recognise both potential adverse effects, as well as the benefits, change can have on the environment. We consider LEAPs are an important part of the on-going dialogue with LPAs to foster partnerships and identify issues, where environmental problems and potentials can be most actively pursued.

Local Perspective - Links between LEAPs and Land Use Planning

Planning policy within the Plan area is guided by Regional Planning Guidance (RPG) for the North West Note 13, April 1996, and RPG 12 for Yorkshire and Humberside August 1996. These documents set out the strategic planning framework for the Regions, highlighting development pressures and the development framework for such issues as the Environment, the Economy and Housing etc.

The link between Development Plans and LEAPS is most important. Section 54a of the Town and Country Planning Act 1990 indicates that decisions on development proposals should be made in accordance with development plans unless material considerations indicate otherwise. The recognition of LEAPS in development plan preparation is essential, as certain LEAP issues, could have an impact on future land use planning.

The plan area in planning terms is administered by a number of LPAs. These are:

Cumbria County Council
Lake District National Park
Eden District Council
South Lakeland District Council
Yorkshire Dales National Park
Craven District Council
Lancashire County Council
Lancaster City Council

Each of these LPAs are in the process of preparing, or has in place a development plan. Due to the Plan boundary being based on a catchment no one Council boundary is wholly contained within this plan area.

The Plan Area

Table 1 indicates the current state of development plan preparation within the area. The table highlights current LPA development plan policies which protect our interests. There will be further opportunities for the LPAs and the Agency to highlight designations which will support actions in this LEAP and potential areas for enhancement.

From the above, the Agency seeks to ensure the following policy objectives will be translated into all land-use planning policy and we look to develop our partnership roles to protect and enhance the environment.

Development Policy Objectives for Local Authority Development Plans and Development Control.

Flood Defence

To discourage new buildings and land raising in areas at risk from flooding or where development could cause flooding elsewhere:

- By encouraging the protection of watercourses so they can fulfil their principal functions and contribute beneficially to the environment;
- By encouraging continuous unobstructed areas adjacent to watercourses to ensure access for essential maintenance or flood flows;
- By encouraging the protection of existing flood defences to prevent interference with the ability of the Agency and other bodies to carry out flood control works and maintenance activities;
- By highlighting where surface water storage or regulation may be necessary for catchments where increased rates and volumes of surface water run-off could cause or exacerbate flooding problems;
- By encouraging the protection and where necessary, restoring effective flood flow conveyance and flood water storage capacities of flood plains.

Water Quality

To protect and improve the quality of surface waters and groundwaters:

- By ensuring new development complies with the Policy and Practice for the protection of Groundwater;
- By ensuring new development does not cause water pollution via discharge points, and is served by satisfactory arrangements for the disposal of foul sewage, trade effluent and contaminated surface water;
- By encouraging where there are sewage treatment capacity problems causing premature and high frequency overflows, new development to be phased to coincide with improved infrastructure;
- By ensuring appropriate development complies with the Control of Pollution (Silage, Slurry, Agricultural Fuel Oil) Regulations 1991 and the MAFF Codes of Good Agricultural Practice for the Protection of water, soil and air;
- By ensuring leachate and drainage is controlled and monitored from contaminated land sites;
- By ensuring surface water disposal systems are protected, maintained and wrong connections are avoided.

Water Resources

To protect and manage the amount of surface water and groundwater resources to achieve the right balance between the needs of the environment and those of abstractors.:

- By promoting the incorporation of suitable water efficiency measures;
- By ensuring development can be or will be served by an adequate means of water supply which will not adversely affect existing users, river flows, water quality, agriculture, fisheries, amenity or nature conservation.

Conservation and Enhancement of the Water Environment

To protect, conserve and enhance areas of aquatic value and other important elements of the water environment:

- By highlighting the areas of the water environment, including river corridors which are, or have the potential to be of value;
- By discouraging development which would have an adverse impact on the nature conservation, landscape, heritage, fisheries, recreation or amenity value of watercourses, ponds and wetlands or on the land physically and visually linked to them;
- By siting development away, wherever possible, from river corridors;
- By seeking to ensure development proposals protect and enhance on-site features and where development is accepted because of overriding economic or social considerations, mitigation and compensatory measures are provided, to ensure no net loss of environmental value.

- By encouraging, where opportunities arise, recreational opportunities and the restoration of river corridors which have been degraded by past development.

Waste Disposal, Mineral Operations and Contaminated Land Sites

To ensure waste disposal, mineral operations and contaminated land redevelopment does not cause pollution or harm to human health:

- By ensuring where schemes are not controlled by the Environmental Protection Act 1990, adequate measures will be implemented to control and monitor water pollution and landfill gas,
- By encouraging compliance with the Government's National Waste Management Strategy;
- By encouraging the re-use of contaminated land sites where the degree and nature of the contamination has been assessed and appropriate measures to protect the environment incorporated.

Air Quality

To protect air quality :

- By ensuring certain development processes where schemes are not controlled by the Environmental Protection Act 1990 will not have an adverse effect on air quality.

Table 1 ENVIRONMENT AGENCY INTERESTS AND LPA DEVELOPMENT PLAN POLICIES DECEMBER 1997

	LPA Plan Policies which aim to protect the environment (their plan policy reference shown)			
DEVELOPMENT PLAN NAME & STATUS	AIR, WATER QUALITY AND WATER RESOURCES	FLOOD DEFENCE	FISHERIES RECREATION & CONSERVATION	MINERALS, WASTE DISPOSAL & CONTAMINATED LAND
Joint Cumbria County Council and Lake District National Park Joint Structure Plan adopted July 1995	9,22,23,56	18, 24	17	21, 58, 59, 60, 61, 62
Lake District National Park Local Plan including Minerals & Waste Inspectors Report received May 1997	UT1, NE9	UT3 - 5	New Policy	M1, M2, N5
Cumbria Minerals and Waste Modified Deposit Local Plan Public Inquiry commenced September 1997	Policy 5, 7	-	Policy 6	Policy 5, 6 and 7
Eden DC Adopted Local Plan. Adopted December 1996.	SE1, NR1	SE2	NE5, 6 and 7	N/A
Yorkshire Dales National Park. Adopted Local Plan September 1996.	WE1, WE2, WE3	WE4	AD3	N/A
South Lakeland DC Adopted Local Plan September 1997	S.29	C20, 21	C7, 22	S.32, 33
North Yorkshire CC Structure Plan October 1995	E24	-	E16	-
Craven DC Deposit Local Plan. Public enquiry commenced June 1997.	ENV14, 16, UT14, 15	ENV15, UT16	BE3, ENV6, 7	UT12, UT13
Lancaster City Deposit Local Plan consultation ended November 1997	E7	E8	E9-15, E27 and E28	N/A
Lancashire CC Adopted Structure Plan February 1997	Policy 13, 18, 70	Policy 14, 21	Policy 19, 25	Policy 62, 64, 66, 69,
Yorkshire Dales Minerals and Waste Adopted Local Plan	-	-	EA1	MLP 13, 17, 19 WLP 2
Lancashire CC Deposit Minerals & Waste Local Plan	Policy 21, 22	23	Policy 3, 20, 24	-
Nth Yorkshire Deposit Minerals Local Plan Sept 1995	-	-	-	4/1 4/10

KEY PARTNERS

Other Local Authority Departments
Other departments consulted on aspects of the Agency's work include: Environmental Health, Public Rights of Way and Access, Tourism, Drainage, Ranger Services, Ecologists and Archaeologists. This liaison occurs at County, Borough, District and City Council level. Strategic waste advise is also provided by the Agency through inputs to the Local Waste Management Plans in local authorities.

Local Agenda 21
The lead in developing local Agenda 21 is taken by Local Authorities. The Local Authorities in Lancashire are developing local Agenda 21 initiatives and meet quarterly to exchange ideas and information. The Agency also has responsibilities with regard to sustainable development, and joins with the local authorities at their liaison meetings to assist in pursuing the goal of sustainable development.

Education Establishments
The Agency provides education packs for schools and colleges covering areas of its work. Myerscough College holds annual open days where Agency staff are on hand to advise.

Lancaster University Archaeological Unit
Form part of the routine planning consultation process within the Lune area.

The Morecambe Bay Strategy
This is intended to be the foundation of a partnership between the users and regulators of Morecambe Bay. The strategy has been prepared by Local Authorities and English Nature working with local people and organisations in accordance with Government guidance. The Agency has been closely involved in drawing up the strategy and will be heavily involved in implementing many of the proposals in collaboration with others.

Morecambe Bay Conservation Group
This is an informal group organised through Lancaster City Council and is intended to focus public attention on the conservation value of the bay. Various activities are organised annually to increase public knowledge about the bay and its management. The Agency is on the group which steers the annual programme.

Shoreline Management Plans (SMPs)
Shoreline Management Plans are produced by maritime local authorities and provide a strategic framework for sustainable coastal defences and to set objectives for management of the shoreline locally.

Coastal Zone Management Plans (CZMPs)
Department of Environment Initiative. The Agency will be involved but will not be the lead.

Site Emergency Plan
As part of the County Council's emergency planning procedures, certain industrial sites have specific emergency plans. The Agency is involved in these plans to deal with any potential pollution problems which may arise. Exercises designed to test and improve procedures are held regularly, and include staff from the Agency.

The Fire Service and Pollution Incidents
The Agency is working closely with Lancashire Fire Service in providing a first line pollution prevention service at road traffic accidents.

The Fire Service are normally first on the scene at road accidents. This gives them a unique opportunity to deal with polluting spillages before they reach a watercourse. The Fire Brigade have agreed to undertake this role where practicable and the Agency has provided training and materials such as oil absorbents. The Fire Service will also notify the Agency of any potentially polluting spillages so that Agency staff can be on site to deal with follow-up action.

Highways Agency
Liaison meetings in respect of highways issues.

Annual Conservation Liaison Meeting
Staff from the Agency meet annually with local representatives of conservation organisations. The purpose is to discuss the Agency's annual flood defence maintenance programme and other relevant conservation related issues.

The other organisations represented include English Nature, Lancashire Wildlife Trust and the Royal Society for the Protection of Birds. The Agency also has an annual meeting with the National Trust with a view to working together on matters of mutual interest.

Flood Warning Zones
The Environment Agency takes the lead in the dissemination of Flood Warnings, but other organisations including the Local Authorities and the Police are also involved.

The Environment Agency have also identified sites most likely to suffer from flooding and have put into place systems to give those people living in these areas advanced warnings. The Agency calls these sites Formal Flood Risk Zones. In the Lune catchment there are 3 such zones at Hornby, on the River Wenning, Skerton in Lancaster, on the River Lune, and the Castle Ward area of Lancaster also on the River Lune.

In providing the Core Flood Warning service, the Environment Agency makes use of Local Media (TV and Radio), a recorded message system (Flood call), loud hailers and for the Flood Risk Zones above Automatic Voice Messaging. All of the above enable the Environment Agency to give the best possible Flood Warning Service to those who live in Formal Flood Risk Zones.

The Flood call Message Service mentioned above is a free phone telephone number which is continually updated to provide the public with up to date Flood Warning Information. The telephone number is : 0645 881188

River Valley Initiatives
The Agency, would like to work in partnership with groups from the private, public and voluntary sector, in establishing a series of new River Valley Initiatives (RVIs) throughout its Central Area. One such initiative could work alongside this LEAP. RVIs use the river corridors as a focal point for their activity, and provide detailed actions on the ground to further the broad range of environmental issues highlighted within the LEAP and develop these further. In doing so, they contribute to the practical delivery of Local Agenda 21.

Each RVI has its own unique identity, created by the partners and largely determined by the nature of the area concerned. However topics such as education, habitat creation and improvement and access tend to be common to all RVIs. Joint ownership of each initiative by all the partners including local businesses and community groups, is essential for the RVIs long term success.

All the essential ingredients for an RVI are present within the Lune catchment. Hence during 1998 we would like to explore this opportunity, and expand on the local issues raised through this document and subsequent consultation process. We are interested to hear from anyone in the area who feels that they have an interest or active role to play in the formation and development of this initiative.

Industrial liaison
Routine liaison and progress meetings are held between The Agency and industrialists. For example: North West Water Ltd, waste site operators.

Farming Wildlife Advisory Group (FWAG)
Pond Life Project
Liaison in respect of pond issues.

Barn Owl Conservation Group
Liaison in respect of biodiversity and conservation issues

MAFF Liaison Groups
Liaison in respect of flood defence responsibilities, farming aspects and other Agency interests.

Country Landowners Association
Liaison as appropriate.

National Farmers Union
Liaison as appropriate.

Recreational Organisations
British Canoe Union and Ramblers Association.
Ad-hoc meetings to discuss recreational issues.

River Keer Rehabilitation Project
River Keer Rehabilitation Group consists of representatives from the Environment Agency and local angling clubs. Flood defence works on the River Keer in 1959-60 led to the loss of 24 pools and associated habitat as the banks have been straightened and reformed.

The group was created to improve the River Keer salmonid fishery. In 1995, a study was undertaken to summarise rod catch, redd count and fisheries survey data. Fisheries and habitat surveys were undertaken to establish what factors were limiting the salmonid population. The report made recommendations of actions which might lead to improvement.

Lune and Wyre Fisheries Association
Quarterly meetings are held to discuss fishery issues in the Lune and Wyre

North West & North Wales Sea Fisheries
Enforces National and European legislation pertaining to sea fisheries and makes local byelaws as appropriate. The area of jurisdiction extends from Cemaes Head in Dyfed to Haverigg Point in Cumbria covering an area 1700 sq nautical miles.

1.6 ISSUES AND OPTIONS FOR THEIR RESOLUTION

The issues describe some of the challenges which lie ahead. We are seeking your views on how we and others should deal with the identified issues or if there are any more which should be raised.

A LEAP must not be a plan for managing each and every matter related to the environment, because we only have the authority and resources to plan for those matters which are part of our statutory responsibilities. Though where there are common areas of working LEAPs should attempt to influence third parties to plan and act in ways that support our Environmental Strategy. The boundary between planning and influencing may not in practice be clear cut, and in deciding on how far to go, it will be important to consult key external partner organisations, especially local authorities.

Have all the issues been identified?
Which option is likely to provide the best outcome?
The consultation period extends until Friday 15th May 1998.

<u>List of Abbreviations used in tables</u>

The Agency	-	Environment Agency
LA	-	Local Authority
RO	-	Riparian Owner
MAFF	-	Ministry of Agriculture, Fisheries and Food
NWW	-	North West Water Ltd
RSPB	-	Royal Society for the Protection of Birds
BW	-	British Waterways
BCU	-	British Canoeing Union
NFU	-	National Farmers Union
ADAS	-	Agricultural Development Advisory Service Consulting Ltd
EN	-	English Nature
WDA	-	Waste Disposal Authority
CLA	-	Country Landowners Association
FWAG	-	Farming Wildlife Advisory Group
LWT	-	Lancashire Wildlife Trust
CC	-	Countryside Commission
AMP	-	Asset Management Plan
CWT	-	Cumbria Wildlife Trust
YDNP	-	Yorkshire Dales National Park
FRCA		The Farming and Rural Conservation Agency

NB: Organisations listed within the responsibility column are not shown in any order of priority.

Issue 1: The protection and restoration of existing and degraded important habitat types and their associated species, to protect and increase biodiversity and landscape quality.

1.1 The protection and restoration of riverbank habitats

The degradation of bankside habitat is a serious problem within the River Lune catchment. Accelerated rates of erosion caused by livestock overgrazing and trampling of river banks results in a degraded wildlife habitat and large amounts of silt can be deposited in the river. The fencing off of river banks from livestock will allow the natural regeneration of riparian vegetation and would also reduce damage through trampling of banks. The river banks would become more stable thereby reducing erosion and siltation. The bankside vegetation will increase the diversity and distribution of habitat for wildlife by providing cover and food (in addition see issue 1.5 regarding benefits to fisheries) . The creation of riparian buffer strips along certain rivers and streams may also alleviate pollution and land run-off.

The sustainable river management project is a collaborative scheme between the Environment Agency and FWAG which aims to promote sustainable river management through demonstration and education. Riparian fencing will be encouraged in catchments throughout the North West and farmers will be assisted in claiming for grants for suitable management schemes from both national and local sources.

Lancashire has one of the lowest levels of tree cover in the country. The production of a Lune Tree Strategy is needed to highlight the sparsity of tree cover within the catchment, The Environment Agency is interested specifically with increasing bankside tree coverage especially along the main River Lune. Only smaller tributaries at the downstream end of the catchment have significant tree cover, including Artle Beck, River Roeburn and River Hindburn. Tree planting (particularly oak and ash) along buffer strips will be encouraged by grants available to landowners through MAFF.

The increasing spread of alien invasive plant species along watercourses in the North West is a cause for concern as the biodiversity of the riverbank can decline rapidly. Japanese knotweed (*Fallopia japonica*) is a particular problem on the River Lune and River Rawthey and other areas of the catchment. This invasive plant can quickly colonise large areas, out competing the native plant species, leaving the river bank almost a 'monoculture' of Japanese knotweed. Himalayan Balsam (*Impatiens glandulifera*)is also increasing in numbers along the banks, especially along the middle reaches. Once these plants are controlled the bankside native vegetation can quickly re-establish.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Increase tree and bankside vegetation to improve habitat. Produce Lune Tree Strategy. Sustainable Rivers Management Project to promote the installation of fencing to prevent livestock overgrazing and poaching of banks.	RO Farmers The Agency FWAG Angling Clubs MAFF	Creation of habitat for growth of mature bankside vegetation. Improve visual, wildlife and fisheries value. Increase fish holding capacity . Provide shelter from sun and predators. Reduce siltation of spawning gravels through reducing erosion. Provide food source. Prevents denudation and creates a buffer zone against farming operations, improving water quality. Natural control of bank erosion and assisting in the prevention of fly tipping.	1997 - 2002
Control and removal of Japanese Knotweed and other alien invasive species. Eradicate competition with native riparian species.	CWT- Sedbergh Branch The Agency RO YDNP South Lakes District Council Lancs County Council Lancaster City Council	Maintain and increase the diversity of bankside vegetation.	1997 - 2002

Constraints: MAFF, RO, Farmers, Angling Clubs, Land Drainage constraints. Cooperation of land owners.

1.2 Creation of Otter Habitat

Otters (*Lutra lutra*) are short-listed in the UK Biodiversity Action Plan and are protected under the Wildlife and Countryside Act 1981. Although otter activity is regularly recorded within the Lune catchment the large scale removal of trees and bankside vegetation and extensive drainage of wetlands has affected otter populations on the River Lune. The creation of suitable habitat is required to ensure any long-term viability of breeding populations of otters within this catchment.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Promote and support habitat creation initiatives for Otters.	LWT CWT The Agency YDNP RO	Maintain and increase the available suitable Otter habitat within the Lune catchment.	1997 - 2002

Constraints: Availability of habitat

1.3 Protection of native crayfish populations.

The Lune is an important catchment for native crayfish (*Austropotamobius pallipes*). This species is highlighted in the Department of the Environment's Biodiversity Challenge document. Healthy populations exists within the catchment but are under threat from the spread of non-native signal crayfish (*Pacifastacus leniusculus*). This signal crayfish can carry crayfish plague to which the native crayfish is particularly susceptible. A programme of eradication needs to be established to protect the native population.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Protection and management of existing native crayfish populations. Eradicate non-native species in watercourses.	The Agency MAFF	Containment and eradication of non-native species.	1997 - 2002

Constraints: MAFF, RO, Farmers, Angling Clubs, Land Drainage constraints.
Cooperation of land owners.

1.4 River Rehabilitation and Management

Lower sections of the River Keer underwent extensive engineering works in the late 1960s. The riverine and bankside habitats of this lower section are very degraded. The rehabilitation project aims to increase habitat variation and flow types and features to improve the stretch for fisheries, wildlife and recreation.

Problems associated with the engineering of rivers occurs in many areas covered by this LEAP. Historically a number of artificial reaches have been created, straightening and deepening the existing channels. On the River Wenning below Hornby, immediately above its confluence with the Lune, a large meander was removed. Sediment accumulation on this stretch has lead to inundation of the flood plain upstream and the farmer undertaking dredging works. An artificial reach upstream of Kelleth on the upper Lune has created an unsightly, severely degraded habitat with suspected instability problems downstream. Both Austwick Beck and Clapham Beck have been subject to considerable '' improvement '' in the past and as a result have little or no bank side vegetation and ongoing stabilisation works are required to maintain the status quo. An associated difficulty is the control of the practice of fly tipping, by a number of landowners throughout the catchment, under the guise of erosion control.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
River Keer Rehabilitation Project	RO The Agency FWAG FRCA RSPB Angling Clubs Local Interest Groups	Increase habitat range and quality for fish and wildlife and enhance the landscape and increase recreational opportunities.	1997 - 2002
Sustainable Rivers Management Project	RO The Agency FWAG FRCA Angling Clubs	Encourage fencing of river banks from stock and long-term erosion. control techniques.	1997 - 2000

Constraints: MAFF, RO, Farmers, Angling Clubs, Land Drainage constraints.
Cooperation of land owners.

1.5 Improving in-river habitat

Over the past 10 years there has been a reduction in the numbers of salmonid fish spawning in some tributaries. This has occurred partly because of a lack of suitable spawning habitat and in some cases to extreme fluctuations in river flows. The maintenance of fish populations is important to support the recreational and commercial fisheries of the Lune and to ensure continuing enjoyment for future generations. The Agency will attempt to increase the effectiveness of existing spawning areas and create new areas where necessary. In particular addressing and resolving fisheries habitat problems in the river will result in a significant increase in fish populations. There has been a loss of spawning habitat for salmonid and coarse fish. Spawning areas have been lost through compaction, being loose or mobile. There is poor habitat for salmonids and coarse fish fry. The Agency is seeking to rectify these issues in partnership with angling clubs, farmers and riparian owners, by assisting their bid for European funding under the EAGGF Objective 5B Scheme.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Creation of in river structures	Angling Clubs RO The Agency	Provide in river habitat for juvenile and adult salmonids	1997 to 2002
Manual loosening of compacted gravels. Seeding and stabilisation of new gravels in suitable areas..	Angling Clubs RO The Agency Farmers	Increase natural spawning.	1997 to 2002
Creation of improved coarse fish habitat in the Lower Lune..	Angling Clubs Ministry of Defence Farmers/RO Lancashire County Council The Agency	Increase coarse fish production in suitable areas.	1997 to 2002

Constraints: MAFF, RO, Farmers, Angling Clubs, Land Drainage constraints. Cooperation of land owners.

Issue 2: Locations at risk of flooding within the Lune area.

Main Rivers are watercourses which have been identified as being fundamentally essential to the natural drainage of a river catchment and which have been formally registered with the Ministry of Agriculture Fisheries & Food. Their status enables the Agency to carry out works of improvement and maintenance using permissive powers contained in the 1991 Water Resources Act and to legislate on the activities of riparian interests.

There are a number of sites throughout the area which are susceptible to flooding from watercourses. It should be noted that a number of these sites are under the jurisdiction of the Local Authority. The main river sites will require further investigation following a prioritisation exercise.

In addition to these, there are a number of locations on the Estuary and coast where a combination of high astronomic tidal surges and strong onshore winds can result in tidal defences being overtopped and property flooded. Locations that are particularly susceptible are at Aldcliffe, Brick Croft, Conder Green, Thurnham Mill and Glasson on the south side of the Estuary and Sunderland Point, Keer Estuary and Teal Bay to the North.

Lancaster City Council has schemes in hand to address similar problems in Morecambe and at St George's Quay in Lancaster.

Non Main River Location	Description of property affected
Shap Wells, un-named watercourse.	House and surrounding land.
Orton, Chapel Beck.	Flooding problems in centre of village.
Old Tebay, small un-named watercourse.	Houses.
Firbank, run off from fells.	Houses and highway
Sedbergh, Settlebeck	Houses and agricultural land.
Millthrop	Highway.
Millbeck.	Farmhouse.
Kirkby Lonsdale.	Houses
Bolton le Sands, Red Bank Dyke.	Flooding of land above railway.
Claughton	Land.
Morecambe.	Generally poor drainage behind embankments leads to isolated flooding problems.
Lancaster, Burrow Beck.	Surrounding land.
Halton Village, Cote Beck	**House, Public House, Highway**
Carnforth, Back Lane Watercourse	**Houses, Highway, Land**

Main River* Location	Description of property affected
Greenholme, Birk Beck.	Highway.
Newbiggin on Lune, Lune confluence with Bessy Beck.	Houses.
River Dee floodplain	Agricultural land
Dent, Dee floodplain	Agricultural land.
Barbon, Black Beck.	Land
Keerholm	Agricultural land.
Carnforth, Millhead.	River Keer. Houses, commercial premises, sewage pumping station .
Keer above A6.	Land on left bank.
Greta	Land adjacent to Greta Bridge.
Gressingham, Lune floodplain.	Highway.
Crag Bank, Carnforth, Black Dyke System.	Galley Hall, low lying area liable to tidal flooding.
High Bentham, River Wenning.	Highway and playing field. House close to being affected
Low Lanshaw, Fen Beck.	Low lying area behind flood protection embankment
Galgate, Conder	Property affected

* Those stretches of watercourse identified as essential to conveying water through the catchment and as such are maintained by the Environment Agency

** Those areas covered by the formal flood warning system are also part of this list of sites requiring improvement.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Implement development control policy to maintain status quo	Local Authority Agency	Provides a mechanism to maintain standards of protection	Ongoing
Non Main River Consider extending lengths of main river to include sites currently designated non main. Undertake investigations, identify solutions.	Local Authority MAFF The Agency	Provides a mechanism for investigation and evaluation of problems.	By 2000 2003
Main River Undertake investigations, identify solutions and implement works.	The Agency MAFF Local Authority	Alleviation of existing problems to acceptable standards.	2003
Tidal Flooding Improvement of existing defences at: Teal Bay - North Morecambe Slyne Sunderland Point, Aldcliffe Embankment, Glasson & the Thurnham area	The Agency Local Authority Land Owners	Alleviation of existing problems to acceptable standards Alleviation of existing problems to acceptable standards	By 2003 Under Discussion 2000

Constraints : Pressure for developable land. Prioritisation against existing main river works. The need to find cost beneficial solutions.

Issue 3: Low flow conditions within the catchment adversely affecting wildlife due to historic rights of abstraction.

Historical rights of abstraction of water from the River Conder result in low flows. These historic rights are enjoyed by British Waterways(BW) for maintaining levels in the Glasson branch of the Lancaster Canal, particularly the basin at Glasson. Detrimental effects have been identified in the fauna and flora in the River Conder for several kilometres downstream of the BW point of abstraction. The Agency is working with BW to identify solutions and policies to reduce or remove the detrimental effect in the River Conder.

OPTIONS	RESPONSIBILITY	BENEFITS	TIMESCALE
Evaluate effective control of BW abstraction from River Conder	The Agency BW	Improved flow conditions which will benefit the flora and fauna in the river Conder downstream of the BW point of abstraction.	1997 - 1998
Carry out works to alleviate problem	The Agency BW		

Constraints: Co-operation of BW

Issue 4 : Adverse impact of discharges from North West Water (NWW) Ltd Wastewater Treatment Works and Sewerage Systems on water quality.

Asset Management Plan

Water Service Company capital expenditure is negotiated in talks between the Agency, the Office of Water Services, the Department of the Environment and the Water Services Association. The agreed programme of work is referred to as an Asset Management Plan (AMP). The Agency is involved in targeting investment towards environmental improvements, including water quality improvements. Priority for these is currently given to schemes necessary to meet or maintain existing EC and domestic statutory obligations such as the Urban Wastewater Treatment and the Freshwater Fish Directives. Non-statutory schemes are also considered if they are necessary to maintain or improve river water quality and produce positive cost-benefit arguments.

AMP2 governs the expenditure for the period 1995-2000. AMP3 will detail expenditure planned for improvements which will be undertaken during the period 2000 to 2010. Initial prioritisation of schemes and cost benefit analysis is already being undertaken. Expenditure for some of the following solutions fall within the AMP process.

4.1 Impact of Wastewater Treatment Works

River Wenning - High Bentham WwTW

Failures to meet objectives :
Discharge from High Bentham WwTW contribute to the significant failure to meet the long term objective of RE1 in the River Wenning due to BOD and ammonia. Public complaints due to poor aesthetics, for example foaming, have also been received.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Provision of new WwTW providing improved secondary treatment	NWW	Improved water quality, potential compliance with long term objective	1998

Constraints : Cost to NWW

Lune Estuary - Lancaster (Stodday) WwTW

Wastewater flows generated in Lancaster and Heysham presently receive primary treatment only and are discharged on an ebb tide from the Stodday WwTW to the Lune Estuary.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Provision of secondary treatment	NWW	Improved water quality. Compliance with Urban Waste Water Directive.	by 2000

Constraints : Costs to NWW

Nether Beck/tributary of River Keer - Nether Kellet WwTW & Over Kellet WwTW

The effluents from Nether Kellet WwTW and Over Kellet WwTW presently discharge to very small streams/ditches and cause poor water quality and poor aesthetic conditions. The Agency considers these watercourses to be unsuitable for receiving discharges of sewage effluent and would like to see wastewater generated in these areas transferred to Carnforth WwTW for treatment and discharge to the Keer Estuary.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Abandonment of Nether Kellet WwTW and Over Kellet WwTW and transfer of flows to Carnforth WwTW for treatment (preferred solution)	NWW	Elimination of poor water quality and aesthetics in vicinity of present discharge.	by 2005
Provision of additional treatment at present sites	NWW	Improved water quality	by 2005

Constraints : Costs to NWW/work scheduled for completion no later than year 2005 in AMP2 programme in line with UWWTD

4.2 Adverse impact of overflows from combined sewerage systems on water quality.

Combined sewers are used to convey both foul drainage and uncontaminated surface waters (rain falling on roofs and hard standing areas) to wastewater treatment works. Combined sewer overflows (CSOs) are located on sewers or at pumping stations and discharge to local watercourses. When properly designed and constructed they should only operate during storm conditions when there is adequate dilution available in the receiving watercourse.

Historically sewerage systems were of the combined type. Problems now exist due to the increase in residential and commercial development resulting in inadequate sewer capacity and the frequent operation of storm overflows, many of which have inadequate solids retention capability, in 'non-storm' conditions with consequent deteriorations in water quality and adverse impact on river aesthetics.

Within certain parts of the Area, e.g. Lancaster City Centre, sewerage systems have been assessed both for structural integrity and impact on water quality and Drainage Area Plans (DAPs) have been drawn up. Over the past couple of years NWW Ltd have began to address the problems on the Lancaster sewerage network and some schemes have now been completed. The Agency is currently involved in joint discussions with NWW Ltd over the remaining schemes that are planned for the next few years.

There are presently around 30 unsatisfactory CSOs requiring improvement out of a total number of around 60 overflows within the Lune LEAP area. The unsatisfactory overflows have been highlighted to North West Water (NWW) Ltd as requiring resolution and as part of the agreed programme of work to be undertaken during the Asset Management Plan AMP2 period, NWW Ltd have already addressed 2 unsatisfactory overflows and plan to improve or abandon a further 11 of these unsatisfactory overflows by the year 2001.

Location of unsatisfactory overflows :

Due to the intermittent nature of storm overflow discharges, impacts on receiving waters are not always picked up by routine chemical sampling. In addition many CSOs discharge to minor watercourses which are not routinely monitored by the Agency. The unsatisfactory CSOs within the Lune LEAP area are described below:

i) 11 unsatisfactory CSOs discharging to the Lune Estuary in Lancaster City Centre. NWW Ltd plan to address these overflows by 2001.
ii) 6 unsatisfactory CSOs discharge to Overton Dyke or Lades Pool or their tributaries in the Overton/Middleton area.
iii) 3 unsatisfactory CSOs that discharge to the River Lune upstream of the Crook of Lune.
iv) 2/3 unsatisfactory CSOs discharge to the River Keer/ Black Dyke near Carnforth.
v) 1 unsatisfactory CSO discharges to Morecambe Bay near Hest Bank
vi) 5 unsatisfactory CSOs discharge to the River Rawthey in Sedbergh.
vii) 2 unsatisfactory CSOs discharge to Chapel Beck in Orton. These discharges may contribute to the marginal failure to meet the long term objective of RE1 for BOD in this reach.
viii) 1 unsatisfactory CSO discharges to Galloper Pool near Tebay.
ix) 2 unsatisfactory CSOs discharges to Artle Beck in Caton.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Ensure resolution of unsatisfactory CSOs within present AMP2 programme	NWW	Reduction in the number of unsatisfactory CSOs by capital works. Improved water quality. Improved aesthetic quality.	1997-2001
Review designations for remaining CSOs and prioritise problems to be resolved in AMP3	NWW The Agency	Aid decision making	1997-1998
Pursue further improvements to sewerage network to resolve problem of remaining unsatisfactory CSOs	NWW The Agency	Further reduction in the number of CSOs, or improved performance of existing CSOs. Improved water quality. Contribute to achievement of water quality objectives. Improved aesthetic quality.	2001+

Constraints : Costs to NWW/Resolution of all problems not scheduled in AMP2

4.3 Adverse impact of contaminated surface water discharges from separate sewerage systems on water quality.

Modern developments have separate sewerage systems for dealing with uncontaminated surface water run-off and foul sewage. Clean water is piped and discharged to a local watercourse and the foul sewage is conveyed to a Wastewater Treatment Works(WwTW).

The advantages of this network compared to the traditional combined sewerage system are the elimination of the need for storm sewage overflows and the reduced treatment costs due to the smaller volumes treated.

However, problems arise where foul water is incorrectly plumbed to the surface water system (e.g. from household washing machines) or where contaminated liquids are poured down surface water drains instead of drains connected to the foul sewer. This leads to Contaminated Surface Water (CSW) or "Wrong Connection" problems.

The Agency in conjunction with North West Water Ltd (NWW) and the local authorities carry out site inspections to identify CSW problems. These visits allow site occupiers to be made aware of the impact on water quality and to rectify any problems.

A list of contaminated surface water discharges from NWW surface water outfalls was produced and forwarded to NWW for rectification. These CSWs were investigated over a three year period, ending in March 1995, during which time NWW sought to eliminate these sources of pollution. Although the three year project finished some time ago a number of CSWs originally identified are not totally resolved and some wrong connections do still exist. Some of these are being followed up by local authority environmental health departments. A number of new CSWs have also recently been identified in the Lune area although at present it is not clear that the responsibility for these soley rests with NWW. All the CSW problems in the NW region are presently being jointly considered by the Agency and NWW Ltd with an agreed timescale for investigating and improving these CSWs expected in the near future.

Water quality problems :

i) Three contaminated surface water discharges at Abbeystead Drive, Newlands Avenue and Gressingham Drive in Lancaster cause poor aesthetic conditions in a tributary of Burrow Beck and parts of the top reach of Burrow Beck. These discharges may contribute to the marginal failure to meet the short term and long term objectives of RE2 for this reach.

ii) Contaminated surface water from Kirkby Lonsdale town centre causes localised poor aesthetics at the point of discharge into the River Lune.

iii) Contaminated surface water from Caton discharges to Artle Beck and causes poor aesthetics in the vicinity of the outfall.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Draw up and agree a new timetable for addressing outstanding CSW problems from original list and newly identified CSWs	The Agency NWW LA		1997
Resolution of CSW problems by investigating sewer connections and remedying problems found	NWW Agents Environmental Health Householders The Agency	Improved water quality and aesthetics following resolution of CSW problems.	2001 = >

Constraints : Costs and Resources for NWW/LAs/Householders

4.4 Adverse impact of crude sewage discharges from Glasson and Galgate on water quality.

At present wastewater flows from Glasson village are discharged crude via two outfalls at Fishnet Point and Victoria Hotel into the Lune Estuary close to Glasson Docks. Until recently a further discharge of crude sewage was made at Conder Green into the tidal River Conder from Galgate village and a small number of houses may still be connected up to this outfall. These discharges cause nuisances due to the presence of gross sewage solids in discharges into high amenity areas.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Transfer of flows to Lancaster WwTW for treatment (preferred solution)	NWW	Improved aesthetics and improved water quality	by 2005
Construction of new treatment facilities and extension of existing outfalls	NWW		

Constraints : Costs to NWW / Work not scheduled until 2005 under the UWWTD

Issue 5 : Failure to comply with Water Quality Objectives and impact on water quality due to agricultural activities.

Agricultural activity is widespread throughout the Lune area. In the upper Lune area the emphasis is on sheep farming. The emphasis shifts towards dairy farming in the Keer catchment and in the middle and lower parts of the Lune area. There is also some arable farming around Galgate. Farms in certain parts of the area are situated above permeable limestone ground and if spillages or specific problems occur pollution can often be found several kilometres away.

Diffuse run off from agricultural land associated with cultivation, fertilizer usage and slurry spreading can result in pollution and the stretches listed below are those for which agricultural activities are considered to contribute to the failure of a water quality objective.

Failures to meet objectives :

i) Marginal failure to meet the short term and long term objectives of River Ecosystem for the upper reach of the River Lune for BOD.

ii) Marginal failure to meet the short term and long term objectives of RE1 for the upper reach of the River Keer for BOD.

iii) Marginal failure to meet the long term objective of RE1 in Swarth Beck for BOD.

iv) Significant and marginal failures to meet the long term objectives of RE1 in the River Wenning for BOD and ammonia. Discharges from High Bentham WwTW, Low Bentham WwTW and Bentham fish farm also contribute to these failures.

v) Significant failure to meet the long term objective of RE1 in Claughton Beck for BOD and ammonia. Discharges from Claughton WwTW may contribute to this failure.

vi) Significant failure to meet the long term objective of RE2 in the River Conder for BOD.

vii) Significant failure to meet the long term objective of RE1 in Fen Beck for BOD.

viii) Significant failure to meet the long term objective of RE1 in Bull Beck for BOD.

ix) Significant failure to meet the long term objective of RE1 in Cant Beck due to BOD. Septic tank discharges in Tunstall may be partly responsible for this failure.

Concern has been growing recently over the increased use of synthetic pyrethoids, most notably cypermethrin, as sheep dip chemicals and the potentially harmful effects of these substances on the environment. Increased use of these synthetic pyrethoids has come about because of the concern about the effects of organophosphorus pesticides on the health of farmers involved in sheep dipping. However, synthetic pyrethoids can be up to 100 times more toxic to aquatic organisms than organophosphorus pesticides. In 1996 significant deteriorations in biological quality believed to be due to discharges of sheep dip were detected in Clapham Beck, the upper reaches of the River Wenning and in Deepdale Beck. Cypermethrin was detected in a discharge to Clapham Beck at a concentration which wiped out invertebrates

for several kilometres. More recently the upper reaches of the River Conder have similarly been affected. Awareness of the environmental effects of sheep dip are currently being raised through a recently launched campaign.
There are also concerns over drainage from a large mushroom farm to a tributary of the River Conder. Biological monitoring indicates that there are toxic materials present in the discharges from this farm that are having a significant adverse impact on ecology in the receiving watercourses. Investigations and discussions with the owners are presently on-going.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Where appropriate carry out intensive surveys and ecological monitoring to identify and quantify inputs, e.g. Rivers Keer, Conder & Fen Beck catchments	The Agency	Sources identified enabling prioritisation of proactive pollution prevention work.	1997-1998
Continue farm inspections and where necessary carry out farm pollution control campaigns to identify and rectify point sources of farm pollution, eg. Rivers Keer, Conder Fen Beck	The Agency Farmers MAFF FRCA HSE	Improved water quality. Contribute to achievement of water quality objectives. Improved macroinvertebrate community and resource for fish populations.	1997-1998
Promote sustainable/best management practices			1998-1999

Constraints : Costs to Farmers

Issue 6: Adverse impact of contaminated land on the environment.

There are four particularly significant areas of contaminated land within the Lune LEAP area. These are the former Trimpell site and former ICI fertilizer site, Middleton Business Park which are included in Lancaster City Council's Middleton Community Wood proposals. The other two are the former Great Lakes Chemicals site at Halton and R & W Howards at St Georges Quay.

Former Trimpell Site

This site was historically a petrochemical manufacturing site. The activities on this site have given rise to a widespread contamination problem associated with hydrocarbons and chlorinated organic compounds in soils and groundwater across the site. The Agency is presently pursing with others a solution to this problem. As a result of such discussions and further studies on the site it is hoped that a remedial strategy will be forthcoming over the next few years. Options for resolution include 1 & 2.

Former ICI Fertilisers site, Middleton Business Park

This site is currently being demolished. Once this aspect
of the works are complete the site will undergo an investigation in to the types and extent of contaminative sources on the site. Contaminated surface water is currently collected and pumped to Lades Pool.
Options for resolution include 1&2

Former Great Lakes Chemicals

Work on this site to remediate contamination began in June 1997. Contaminated soils were excavated and remove from the site to suitably licenced facilities. Groundwater clean-up involves removal of VOCs by air sparging. Discussions with the site owners are continuing regarding additional works in relation to groundwater clean-up.
Options for resolution include 1 & 2b.

R & W Howards

R & W Howards' site on St George's Quay, Lancaster is a metal recycling and battery breaking facility which was licensed in April 1994. Battery acid and lead have contaminated the site. Lead levels have an impact on groundwater quality and are a risk to health. The Environment Agency seeks the decontamination of the site and is currently discussing with the licence holder options for borehole investigations to be carried out as part of the site clean up. The surrender of the licence will discount contamination from earlier uses of the land unless they were in connection with the management of waste. Therefore the total decontamination of the site may not be achievable during a surrender. Options for resolution include 1 & 2.

Failures to meet objectives:

i) Significant failure to meet the long term objective of RE4 for BOD and dissolved oxygen in Trimpell Dyke. Discharges of contaminated surface water from the adjacent contaminated land contributes to this failure.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
1.Undertake detailed investigations to determine extent of contamination	The Agency LA Developer Site Owner	Determine degree of decontamination required and most suitable remedial technique.	1997-2000
2a. Remedy situation by removal of contaminated areas or redundant stores	LA Developer Site Owner	Improved ground and surface water. Contribute to compliance with water quality objectives	1998-2000
2b. Remedy situation by treating pollutants			1997-2000

Constraints : Costs to land owners/developers

Issue 7: Deterioration in water quality due to lack of adequate sewerage/sewage treatment facilities.

In most communities in the UK domestic residences are connected to a sewerage system, most are owned and run by a Water Service Company. However, in some rural areas where there are only a few dozen properties or less, a public foul sewer may not be available. In such situations the provision of a sewerage system may be excessively costly, as it could involve the laying of many kilometres of pipe and need pumping stations to take the waste to the nearest treatment works.

Where there is no provision of a foul sewer, domestic waste often goes to a private treatment facility such as a septic tank. These then discharge to a soakaway or to the nearest watercourse. Most modern small treatment plants incorporate a biological filter system and treat waste to a very good quality, if maintained properly and not overloaded.

Many old established septic tanks and soakaways worked successfully at one time. The increased use of water and rural housing developments has put a greater load on existing systems which are unable to cope. If the discharge was to stream or river with sufficient flow to give good dilution and dispersal there would not be a problem. However, it is more likely that the discharges go to a village drain or ditch. In summer there may be insufficient water available to flush these and they could become stagnant or septic.

Section 22 of the Environment Act 1995 places a new duty on sewerage undertakers, via Section 101A of the Water Industry Act 1991, to provide, where appropriate and cost effective, first time sewerage facilities in areas suffering from environmental or amenity problems caused by the existing sewage disposal arrangements. Developments in these areas will be restricted due to the present inadequate drainage facilities.

Failure to meet Objectives:

i) and Significant failure to meet the long term objective of RE4 in Oxcliffe Dyke due to BOD, ammonia dissolved oxygen below the septic tank discharges in Green Lane.

ii) Significant failure to meet the long term objective of RE1 in Cant Beck due to BOD. Septic tank discharges in Tunstall may be partly responsible for this failure.

Examples of Other Potential Water Quality Problems;

i) Melling
ii) Cantsfield
iii) Leck
iv) Cowan Bridge
v) Barbon
vi) Gressingham Beck
vii) Clapham Station
viii) Caton Green
ix) Conder Green

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Additional ecological/ chemical monitoring to assess extent of problems	The Agency		1997-1999
Pursue provision of first time sewerage facilities for known problem areas, e.g. Oxcliffe Dyke	Householders LA The Agency	Improved water quality	1997-2000
Provision of sewer connection or new WwTW	NWW Householders	Improved water quality	By 2005

Constraints : Costs to NWW / Mechanism for progressing/prioritising areas not fully established. Dependant upon householders applying to NWW Ltd for connection to the sewerage network.

Issue 8 : Failure to meet Bathing Water Directive Standards at Morecambe North, Morecambe South and Heysham Half Moon Bay beaches.

Until recently crude sewage generated in the Morecambe area was discharged twice daily, after receiving fine screening only, from the Schola Green pumping Station into Morecambe Bay. It is thought that largely as a result of these discharges the designated bathing waters at Morecambe North, Morecambe South and Heysham Half Moon Bay have failed to comply with the Bathing Water Directive mandatory bacteriological standards. A new WwTW has recently been commissioned at Middleton and flows are now transferred to this new works and are discharged out into the Heysham channel after receiving secondary treatment. The Schola Green outfall has been retained to allow infrequent discharges of storm sewage during exceptionally wet weather (around one discharge per bathing season is anticipated). Following completion of the scheme there has been some improvements in bathing water quality and for the first season ever, both Morecambe North and Morecambe South beaches complied with the mandatory Bathing Water Directive Standards in 1997. However, bathing water quality at Half Moon Bay beach at Heysham failed to comply with Bathing Water Directive standards in 1997 and further monitoring and investigations are required to identify the cause of continued poor quality water in this area.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Monitoring of Morecambe North & South & Heysham-Half Moon Bay bathing waters and further investigations to assess impact of completed scheme and identify any additional work required	NWW The Agency	Compliance with Bathing Water Directive standards, improved bathing water quality	1997/1998
Resolution of any outstanding or new problems found	NWW LA The Agency		1997/1998

Constraints: Costs to NWW Ltd/Local Authorities

Issue 9: Adverse impact of industrial site and trading estate drainage on the environment.

Most incidents of pollution originating from industrial sites and trading estates arise from accidents, negligence, poor storage and the mishandling of oil, chemicals and waste. As well as spillages, a common problem on more modern estates occurs from wrong connections to surface water drains resulting in wash waters, process effluents, contaminated yard washings etc all discharging to the nearest watercourse. Where industrial units have been converted from older premises and sub-let drainage systems have not usually been updated. These older systems are also more prone to blockages and leaks. The major industrial sites in the Lune area are situated on the outskirts of Lancaster and Heysham.

In the Lune Catchment and sited specifically on the White Lund Industrial Site, are two waste oil storage and recovery sites. There are little or no controls at present to ensure that the waste is kept in a manner that would minimise pollution either to groundwater or surface water.

Failures to meet objectives:

The following failures to meet objectives may be due, in part to contaminated surface water from industrial sites and trading estates

i) Significant failure to meet long term objective of RE4 in Oxcliffe Dyke due to . Discharges of contaminated surface water from the Vickers and White Lund Industrial Estates contribute to this failure.

ii) Significant failure to meet the long term objective of RE4 f or BOD and dissolved oxygen in Trimpell Dyke. Discharges of contaminated surface water from the Trimpell Industrial Estate contributes to this failure.

Other Water Quality Problems

i) Drainage from the White Cross Industrial Estate affecting the Lancaster Canal. Regular complaints have been received about the impact of discharges from this estate on the Canal.

ii) Drainage from the industrial estate at Tebay affecting Old Tebay stream. Old Tebay Stream used to suffer from sewerage as well as industrial drainage problems. Whereas improvements to the sewerage network have now been carried out the watercourse still receives contaminated discharges, particularly of oil, from the industrial estate plus also the motorway services area, a fuel storage depot and run-off from the motorway slip roads and other highways.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Identify and rectify any site drainage problems and site contamination including remediation where appropriate	The Agency Owners/Occupiers LA NWW	Improved water quality and improved aesthetics. Contribute to compliance with water quality objectives Reduce health risk implications	1997-2000
Promote good house keeping on sites Promote initiatives e.g Aire/Calder waste minimisation project	The Agency Owners/Occupiers LA		1997-2000
Installation of surface water interceptors, e.g. on White Lund Estate	NWW Owners/Occupiers LA		1997-2000

Constraints: Costs to Owner/Occupiers/NWW

Issue 10: Reduced runs of the mature salmon and sea trout stock.

The River Lune was at one time one of the best salmonid fisheries in England and Wales with very high catches to both anglers and netsmen. During the 1960s, the stock was decimated by the disease Ulcerative Dermal Necrosis which caused a dramatic reduction in catches. Most fishermen believe that the fish stocks have not recovered to pre-disease levels. In August 1997, the Agency carried out a public consultation exercise for the Lune Salmon Action Plan(draft) to discuss some of these problems. The tables below detail the information consulted upon. Following consideration of the responses and further discussions, the Lune Salmon Action Plan has now been formulated and this updated document is now available along with this LEAP.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Implement the recommendations of the Lune Salmon Action Plan. See following summary tables.	The Agency RO LA MAFF Netsmen	Improve the migratory salmonid run to allow sustainable exploitation.	1997-2002

Constraints: Cooperation of Angling Club, netsmen, riparian owners

ISSUE	LIMITING FACTORS	OPTIONS	RESPONSIBILITY	COST £	PRIORITY
Lack of juvenile habitat	1. Poor riparian vegetation	Fencing off buffer zone and planting of trees. Proposed 10km per year Utilisation of FWAG to target grants for this project.	The Agency/ Angling clubs/ Local farmers/ FWAG	EA committed to £2,500 per year. Additional funding required.	High
	2. Lack of in-river habitat	Raking of gravels and in-river improvements in conjunction with work parties from angling clubs Advice and contributions to Angling Clubs concerning in-river works to improve juvenile habitats	The Agency/ Angling clubs/ Local farmers Environment Agency/ Angling clubs	2K per year 2K per year	High High
Farming Practices (see Lune Salmon Action Plan- Table 18 & "Lack of juvenile habitat" above)	1. Impact of land drainage on whole river catchment	Encourage a change in farming practices	The Agency/ Local farmers/FWAG	100K, cost of FWAG officer over 5 years	High
	2. Impact of slurry and chemical fertilisers on whole river catchment				High
	3. Impact of cattle and sheep access and poaching of banks				High
	4. impact of forestry on the Rivers Rawthey and Hindburn				Medium

Farming Practices	5. Impact of pyrethrin sheep dips	Raise awareness of dangers to aquatic biota, take enforcement action where necessary, raise awareness of deactivation methods	The Agency/ Local farmers/FWAG	20K over 5 years	High
Adult run size erratic and may fail target	1. Rod exploitation rate may be too high	Promote catch and release Promote voluntary bag limits by clubs Byelaws to reduce length of season	The Agency/ Angling clubs The Agency/ Angling clubs The Agency	5K 5K 10-100K	High High High
	2. Net exploitation may be too high	A reducing net limitation order A change to the fishing season A restriction on net mesh size	The Agency	10-100K	High
Fish eating birds	1. Populations possibly impacted by goosanders and cormorants feeding on juvenile salmon. 2. Problem is compounded by the problems associated with identifying the impact of these birds on whole river systems.	Persons seeking advice should first contact MAFF Should a party wish to apply to MAFF for a licence to shoot birds, the EA will supply available data which the party may use to support their application Await results from 3 year study commissioned by MAFF on fish eating birds	The Agency	1K	High

High seas and Irish drift net fisheries	1. Marine exploitation rate of River Lune stock unknown	Continue to monitor through the national microtagging programme - particularly to assess the impact of the recent constraints imposed on the Irish Drift Net fishery	The Agency/ MAFF	minimal	High
Lack of information on in-river populations	1. Survival of juveniles unknown, particularly following two dry summers and the closure of Hatchery	Electric fishing survey of main river and becks to assess fry and parr populations	The Agency part of 5 year rolling survey programme	40K	Medium
Spring salmon stock	1. Spring salmon present in very low numbers	Investigate/ Identify spawning and nursery areas of spring salmon Consult with clubs/ Associations on a workable methodology for preservation of spring run salmon	The Agency/ Angling clubs The Agency/ Angling clubs	5K 1K	High High
Impact of potholers	1. Potholing activities affect river flows on River's Dee, Clough, Twiss and on Barbon Beck	Meet potholing groups and discuss implementation of better practices	The Agency/ Interested parties	1K per year over 5 years	Medium

Ingress of rainbow trout into the River Wenning	1. Potential impact of adults on salmon juveniles through predation or competition	Monitor catches in river and evaluate following production of R&D report on the Impact of stocked rainbow trout on resident salmonid populations in 1997	Environment Agency/ Angling clubs	1K	Medium
	2. Impact of trout farm intakes on salmon smolts	EA becomes enforcement agency for fish farm screens in 1999. Fish farms with high impact on migratory salmonid populations will be prioritised for upgrade/ remedial action on screen arrangements	Environment Agency/ Fish farms	1K	Medium
Impact of man made structures on river ecology	1. May affect the stability of the river bed and the whole river ecology	Investigative work ongoing with PhD project at Lancaster University and R&D projet on flow requirements for fish.	Environment Agency/ University of Lancaster	10K per year over 3 years for PhD project.	Medium

Issue 11: The impact of barriers restricting the distribution of fish in the River Lune area.

Several barriers, either full or partial, to fish migration have been identified including:

Skerton and Forge weirs for elvers
Skerton Weir for coarse fish fry.
Winterscales road crossing
Havrah beck and Bellow End beck road culverts
Canal abstraction weir -River Conder
Old fish trap at Capenwray on the River Keer

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Fit elver passes at Skerton and Forge weirs	The Agency	Improve upstream passage of elvers	1997
Assess effects of other obstacles and improve where necessary	Angling Clubs RO The Agency	Maximise use of natural spawning grounds.	1997-1999
Install fish pass at canal abstraction weir on River Conder	BW The Agency Angling Club	Maximise and improve timing of fish runs	1997-1998
Improve fish access through old fish trap River Keer	RO The Agency Angling Club	Maximise and improve spawning and fish runs	1997- 1998

Constraints: Cooperation of RO, BW, Angling Clubs, Flood Defence interests

Issue 12: The conflict of interests between different types of recreational users.

There is good access to most of the River Lune catchment for most recreational groups. Some groups impact on wildlife and other recreational users.

The Agency work with the different user groups in educating users, maintaining and improving access to the watercourse and by encouraging users to utilise less sensitive areas.
This is done in cooperation with the LAs, EN and user groups e.g. BCU, Angling Associations.

As part of the pre consultation exercise, several respondents raised the issue of a lack of a formal access agreement to the river for canoeing.

OPTION	RESPONSIBILITY	BENEFIT	TIMESCALE
Education of user groups.	LA EN User groups The Agency	Reducing conflict between different groups.	1998-2002
Promote new attractions.	LA RSPB EN The Agency	Stream people away from more sensitive habitats.	1998-2002
Identify areas where canoe access to the river can be improved and facilitate negotiations for the use of the river for canoeing in suitable areas and periods	The Agency BCU Owners Angling Clubs LA	Increase the recreational use of the resource	1998-2002
Identify areas where pot holing is causing a reduction in the base flow and carry out remediation works	The Agency Pot Holing Clubs	Increase surface water flows in spawning areas	1998-1999

Constraints: Co-operation of parties with conflicting interests.

Issue 13: Adverse impacts of flytipping at Oxcliffe Marsh.

There is a high incidence of flytipping in the Oxcliffe Marsh area. The wastes tipped include demolition/excavation waste, tyres, general skip waste and black bin bags. It is very difficult to prove who the culprits are and fly tipping tends to encourage more flytipping. The tipping is polluting to land and water, creates a hazard to the public and increases the risk of vermin and malodours.

OPTION	RESPONSIBILITY	BENEFIT	TIMESCALE
Increase monitoring and enforcement if possible	The Agency LA	May ascertain the fly-tipper	Over the next five years
Site clean up	Landowner LA The Agency in a facilitating role	Will improve the amenity of the area and this may discourage more flytippers	1997-1998

Constraints : Cost of clean up may be high for landowner and cost of monitoring and enforcement will be high for the Agency

Issue 14: Adverse impacts of land spreading of controlled waste in the Lancaster area.

Land spreading is a form of waste recycling which is exempt from the need for a waste management licence. The spreading of waste can lead to the potential to pollute watercourses and groundwater and may be dusty or malodorous. The wastes include abattoir waste, agricultural wastes, construction and demolition wastes, sewage sludge and paper pulp.

There are a number of paper pulp producers and landspreaders based in the Lancaster area. Therefore, there has been an increasing incidence of paper pulp spreading in and around the Lancaster area, which could lead to pollution of surface water courses and dust impact on local amenities. The Agency is seeking to negotiate and agree a code of good practise for landspreaders which will minimise any adverse environmental impact of this activity.

Failures to meet objectives

Lack of control of the methods and timing of land spreading which due to the concentration of the activity in the Lancaster area has a greater potential to pollute watercourses and increases the adverse impact of dust and odour emissions to the locality.

OPTION	RESPONSIBILITY	BENEFIT	TIMESCALE
Seek to agree a code of practise for land spreading	The Agency Landspreaders Waste Producers	Increase understanding of the activities and control the activity to minimise adverse environmental impact	1997-1998

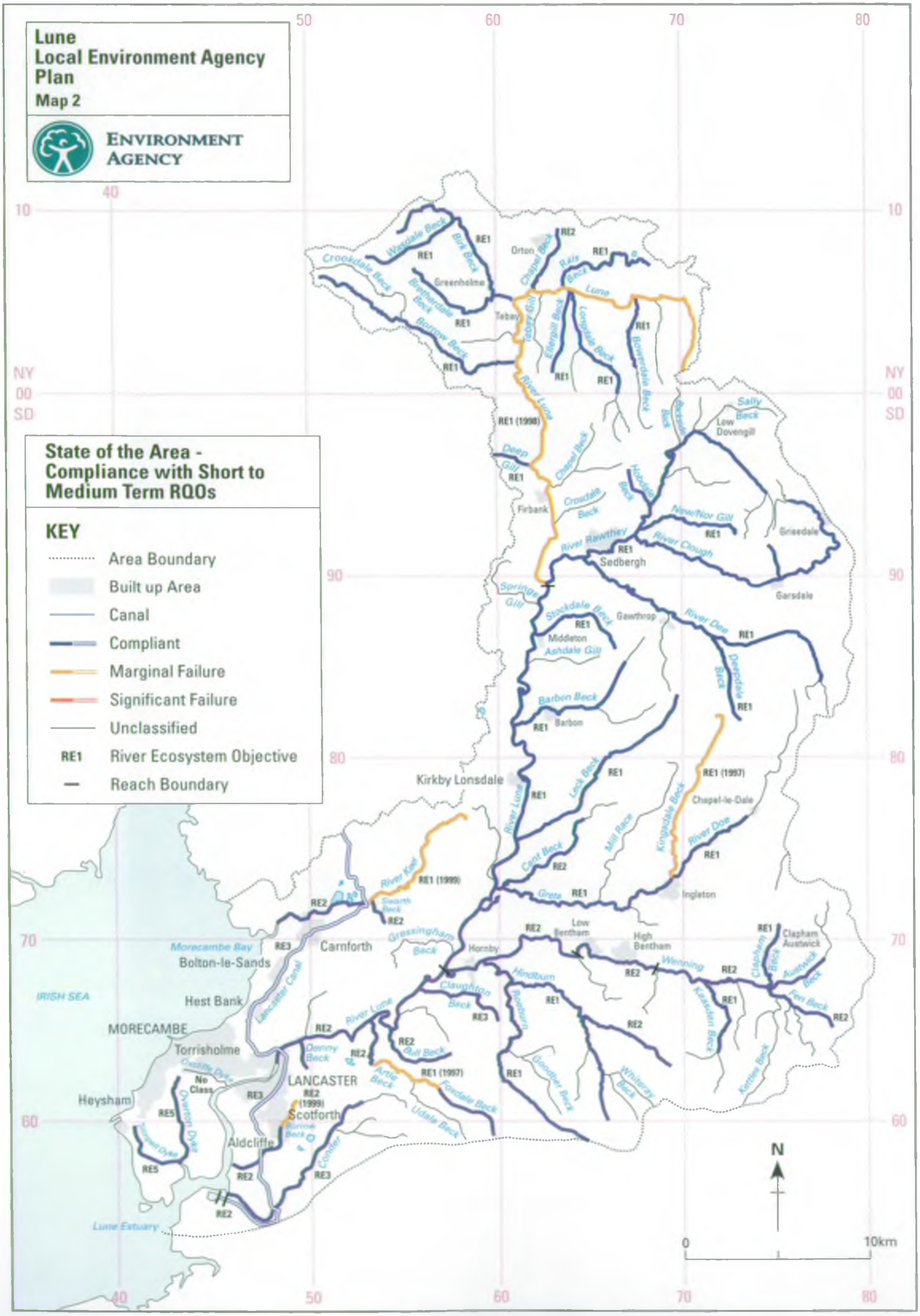
Constraints: Identifying times and extent of spreading.

Issue 15: The lack of knowledge of archaeological and historical interest within the riparian zones.

The Lune catchment area has never been densely populated but has a long history of settlement. This ranges from prehistoric enclosures in the area, the majority of which are on the fells. Evidence from Roman settlement includes a road and Roman forts at Lancaster and Burrow. There are also Norman motte and bailey structures along the length of the river at Halton, Hornby, Arkholme, and Kirby Lonsdale. Old bridges such as Devils Bridge at Kirby Lonsdale form a major feature along the river. However, little is generally known of the total archaeological interest within the riparian zone.

OPTIONS	RESPONSIBILITY	BENEFIT	TIMESCALE
Archaeological Survey within 10m of River Lune and its tributaries.	The Agency Lancashire County Council	Increase knowledge of riparian archaeological interest in order to protect and conserve them.	1997 - 2002

Constraints: Lack of current knowledge


Lune
Local Environment Agency Plan
Map 2
Environment Agency
State of the Area - Compliance with Short to Medium Term RQOs
KEY
Area Boundary
Built up Area
Canal
Compliant
Marginal Failure
Significant Failure
Unclassified
RE1 River Ecosystem Objective
Reach Boundary
Crookdale Beck
Wasdale Beck
Birk Beck
Greenholme
Bretherdale Beck
Borrow Beck
Orton
Chapel Beck
Rais Beck
Lune
Tebay
Tebay Gill
Ellergill Beck
Longdale Beck
Bowderdale Beck
River Lune
RE1 (1998)
Deep Gill
Firbank
Crosdale Beck
Hobdale Beck
Sally Beck
Low Dovengill
New/Nor Gill
River Clough
Grisedale
River Rawthey
Sedbergh
Garsdale
Springs Gill
Stockdale Beck
Gawthrop
Middleton
Ashdale Gill
River Dee
Deepdale Beck
Barbon Beck
Barbon
Kirkby Lonsdale
Leck Beck
RE1 (1997)
Chapel-le-Dale
Mill Race
Kingsdale Beck
River Doe
Cant Beck
Ingleton
Greta
River Keer
RE1 (1999)
Swarth Beck
Gressingham Beck
Hornby
Low Bentham
High Bentham
Wenning
Clapham
Austwick
Austwick Beck
Fen Beck
Keasden Beck
Hindburn
Roeburn
Claughton Beck
Bull Beck
Goodber Beck
Whitray Beck
Kettles Beck
Morecambe Bay
IRISH SEA
Carnforth
Bolton-le-Sands
Hest Bank
Lancaster Canal
MORECAMBE
Torrisholme
River Lune
Denny Beck
Artle Beck
Foxdale Beck
Udale Beck
Heysham
No Class
Overton Dyke
LANCASTER
Scotforth
Burrow Beck
Conder
Aldcliffe
Lune Estuary
NY 00 SD
N
0
10km

Part 2 USES, ACTIVITIES, STATE AND PRESSURES IN THE AREA

This section contains supporting information on the environment of the Lune area. It focuses on the uses, activities and current state of physical resources of the area in relation to the work of the Agency.

This "analysis" of the local environment has been helpful in identifying the issues outlined in Part 1 of the plan.

2.1 Water Quality

Water quality plays a significant role in determining a variety of uses that the Lune LEAP Area can support. This section explains the criteria used to set water quality standards within the Area and the method of assessing current water quality against these standards.

Agency Monitoring duties

The Agency has a duty to monitor the extent of pollution in controlled waters which include rivers, streams, ditches, lakes, groundwaters, estuaries and coastal waters. This is achieved by chemical, biological and microbiological sampling programmes. Details of the current monitoring and classification schemes are given in Appendix 1 Water quality information is available to the public and held on the Water Resources Act Register.

Water Quality Objectives

Water Quality Objectives can be considered in three parts:

Short to medium term River Ecosystem Water Quality Objectives
EC Directive Water Quality Objectives
Long term River Ecosystem Water Quality Objectives

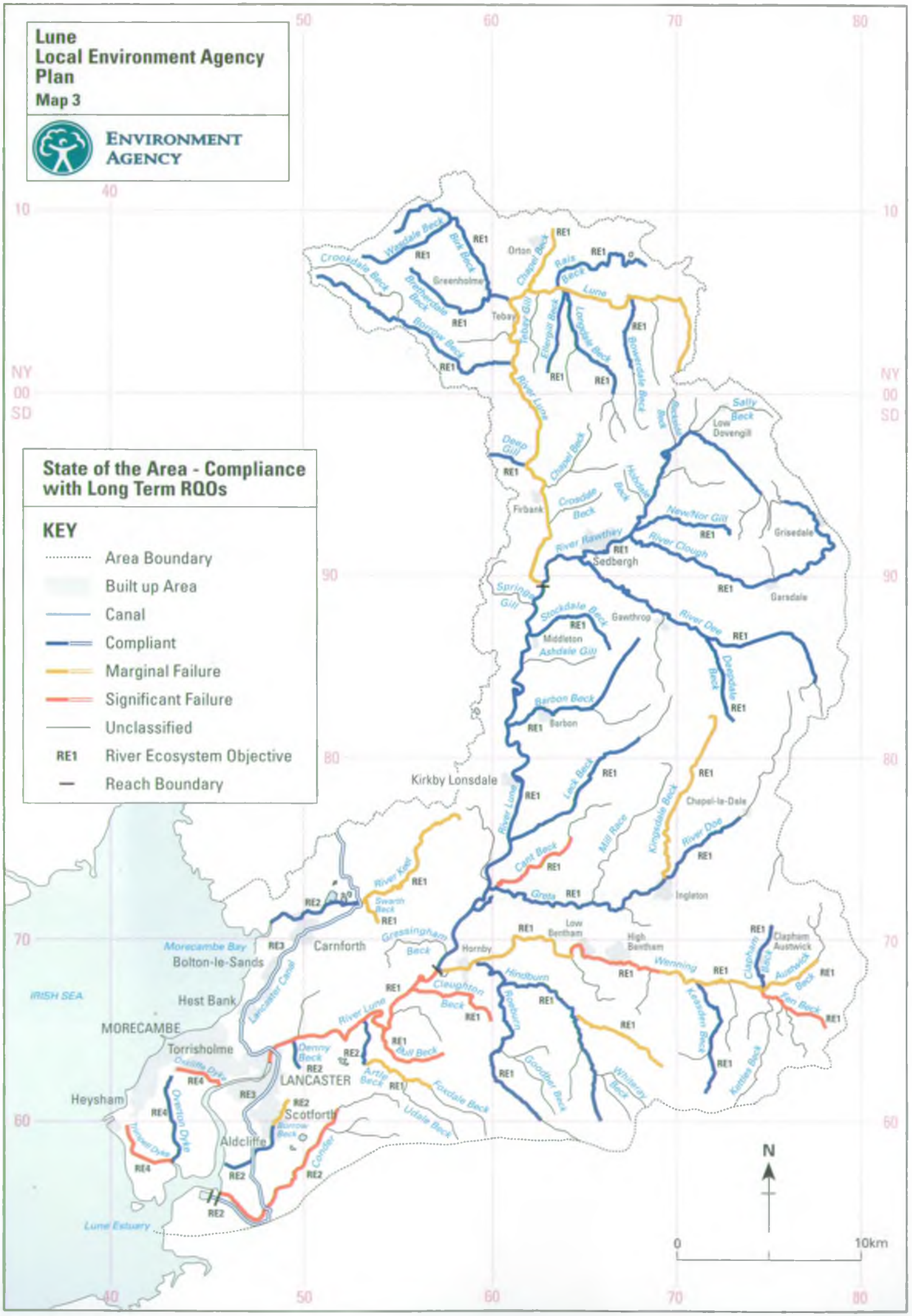
Short to Medium Term River Ecosystem Water Quality Objectives

Every classified stretch in the Lune Area has been set a short to medium term water quality objective (RQO) comprising a River Ecosystem class and an associated target date. Descriptions for the five River Ecosystem Use classes and the quality criteria for each class are given in Appendix 3.

Where an objective has been set in order to prevent deterioration of present water quality the objective applies with immediate effect. For the other stretches, target dates have been set to coincide with completion of capital works or farm campaigns by Agency pollution control staff for example RE3(1997). This indicates an objective of class RE3 to be attained by the year 1997.

Lune
Local Environment Agency Plan
Map 3

ENVIRONMENT AGENCY



EC Directive Water Quality Objectives

The following EC Directives contain standards which have implications for water quality within the Lune Area:

The Dangerous Substances Directive (76/464/EEC) which is concerned with controlling pollution caused by discharges of certain dangerous substances.

The Bathing Water Directive (76/160/EEC) which sets Environmental Quality Standards (EQSs) for designated waters that are used for bathing.

The Freshwater Fisheries Directive (78/659/EEC) which sets Environmental Quality Standards for stretches of water that are designated as being suitable for salmonid or cyprinid fisheries.

The Urban Waste Water Treatment Directive (91/271/EEC) which specifies requirements for the collection and treatment of industrial and domestic waste waters at urban wastewater treatment works and for treatment of wastewater from certain sectors of industry prior to direct discharge to watercourse.

Long Term River Ecosystem Water Quality Objectives.

River Ecosystem water quality objectives for the short to medium term have already been described above. These targets reflect the improvements in water quality expected to come about through investment and pollution control measures which should take place over the next five years.

For some stretches of river no investment is planned over the short to medium term although water quality is presently poor or bad. In the longer term the Agency is committed to seeking further improvements in these reaches and in this respect long term River Ecosystem objectives have also been proposed for all classified stretches in the Lune Area. Further details of the proposed objectives are given in the Appendix 1.

State of the local Environment

General

It is possible to assess the state of the watercourses within the Lune Area against these targets.

The assessment has been made using data from the routine water quality sampling programme. A three year period (1994-1996 calendar years) has been taken, the error involved in sampling has been considered and statistical confidence limits calculated for the water quality data.

In assessing compliance with River Ecosystem objectives, stretches which presently **comply with** their water quality objectives are coloured blue, stretches that **marginally fail** to comply with their water quality objectives are coloured orange and stretches that **significantly fail** to comply with their water quality objectives are coloured red.

The state of the Lune Area in terms of compliance with short to medium term River Ecosystem objectives is shown on map 2. The state of the Lune Area in terms of compliance with long term River Ecosystem objectives is shown on map 3 and the state of the Lune Area in terms of compliance with EC Directive objectives is shown on map 4. A table of River Ecosystem objectives is included in the Appendix and views on these are welcomed.

Lune
Local Environment Agency Plan
Map 4

ENVIRONMENT AGENCY

EC Directives - Water Quality Designations and Monitoring Points

KEY

- Area Boundary
- Main Watercourse
- Minor Watercourse
- Canal
- Built up Area

FRESHWATER FISH DIRECTIVE:

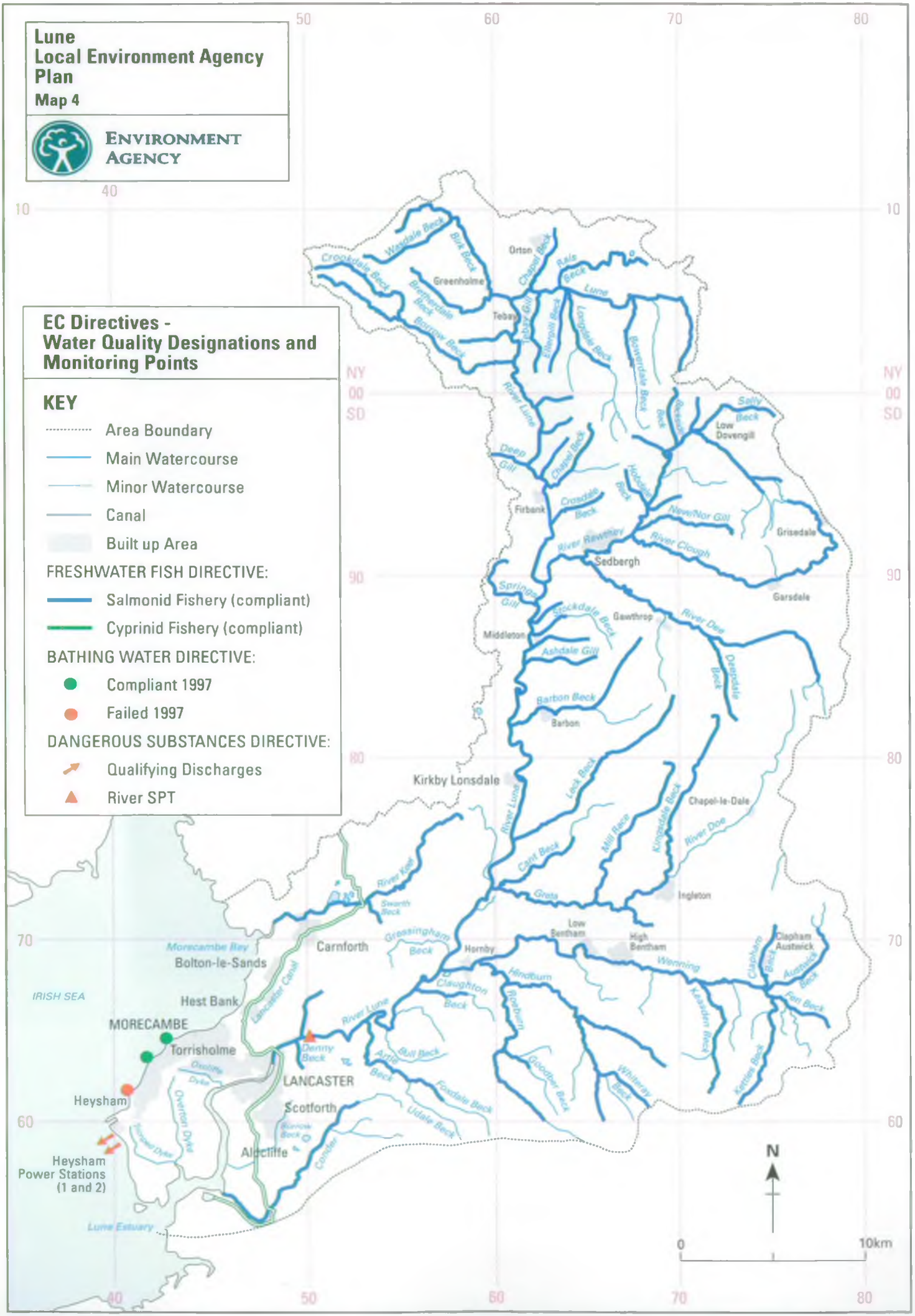
- Salmonid Fishery (compliant)
- Cyprinid Fishery (compliant)

BATHING WATER DIRECTIVE:

- Compliant 1997
- Failed 1997

DANGEROUS SUBSTANCES DIRECTIVE:

- Qualifying Discharges
- River SPT



Failures to meet objectives and issues arising

Three subsequent types of failures to meet objectives have arisen:

Failures to meet short to medium term River Ecosystem objectives (RQOs)
Failures to comply with EC objectives
Failures to comply with long term River Ecosystem objectives

Failures to meet objectives and other water quality problems i.e. problems occurring in watercourses not routinely sampled and water quality problems not detected by the River Ecosystem classification scheme, have been grouped together and are also discussed in the **Issues** section.

2.2 AIR QUALITY

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

Air pollution may be in the form of gas or particulate matter. The dispersion of pollutants depends on wind direction and climatic conditions, so it does not respect administrative or hydrological boundaries. The impact of air pollution may be local (eg. particulate matter settling on nearby land) or may be global (eg. damaging the ozone layer).

It is vital that we protect the air since it affects the future health of mankind and the environment. Among the main air quality issues are acid rain, stratospheric ozone depletion, ground level ozone formation and global warming.

The Environment Act 1995 provides a framework within which local authorities have responsibility for the overall management of local air quality. The Act requires Government to publish a national strategy for air quality which sets a framework of standards and objectives for the pollutants of most concern to human health. The strategy includes a timetable for achieving quality objectives on the concentrations of benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, ozone, particulates and sulphur dioxide. The standards for these pollutants are given in Table 2 and the main sources of the pollutants is given in Table 3.

Table 2 : Pollutant standards under the National Air Quality Strategy

POLLUTANT	STANDARD		SPECIFIC OBJECTIVE to be achieved by 2005
	concentration	measured as	
Benzene	5 ppb	running annual mean	the air quality standard
1.3 Butadiene	1 ppb	running annual mean	the air quality standard
Carbon Monoxide - CO	10 ppm	running 8-hour mean	the air quality standard
Lead	0.5 $\mu g/m^3$	annual mean	the air quality standard
Nitrogen Dioxide - NO_2	150 ppb 21 ppb	1 hour mean annual mean	the air quality standard *
Ozone	50 ppb, measured as the 97th percentile	running 8-hour mean	the air quality standard *
Fine particles - PM_{10}	50 $\mu g/m^3$ measured as the 99th percentile	running 24-hour mean	the air quality standard *
Sulphur Dioxide - SO_2	100 ppb measured as the 99.9th percentile	15 minute mean	the air quality standard *

ppm = parts per million; ppb = parts per billion; $\mu g/m^3$ = micrograms per cubic metre
* these objectives are to be treated as provisional

Table 3 : Main sources of pollutants								
SOURCE	PM_{10}	NO_2	CO	SO_2	Lead	Benzene	VOC	Butadiene
Transport	29%	59%	90%	5%	64%	68%	35%	77%
Combustion (Industry)	35%	24%	3%	92%	4%	5%	2%	-
Chemicals and Fuels	-	-	1%	-	-	11%	25%	18%
Other Industrial	24%	14%	-	-	27%	16%	25%	-
Waste	-	-	1%	-	4%	-	-	5%
Domestic/Other	14%	3%	5%	3%	1%	-	13%	-

The National Air Quality Strategy was published in 1997 and outlines the steps that the Government is taking, and the measures it expects others to take, to see that air quality objectives are met. The Agency will be working closely with local authorities to help achieve the objectives.

Local Authorities will be required to review the present and future air quality against the standards and objectives. The Government will set air quality targets which should be achieved throughout the UK by the year 2005 and this will necessitate periodic reviews of air quality. Where standards are not being met (or are not likely to be met), an air quality management area ("Designated Area") can be declared, and an action plan produced to improve air quality.

Air quality monitoring results can be obtained from the relevant local authorities. Data has been published in local authority State of the Environment reports and occasionally in specific air quality reports.

Control of Releases to Air

Although Local Authorities have primary responsibility for local air quality management, a number of organisations have some control on the release of air pollutants.

The Environment Agency has powers under part I of the Environmental Protection Act 1990 to regulate releases to air by operating a system called Integrated Pollution Control (IPC). This applies to the larger and potentially most polluting industrial processes. The Agency also regulates landfill sites which may release landfill gas to air. This is a mixture of methane and carbon dioxide which results from chemical and biological breakdown of waste.

Local Authorities control emissions to air from many small industrial processes under Part I of The Environmental Protection Act 1990. They also have powers to deal with Statutory Nuisance and to impose smoke control areas.

Emissions from cars are controlled principally under the Road Traffic Act 1972 which regulates the construction of cars to meet certain emission limits. This is enforced by The Department of Environment Transport and the Regions (DETR). The MOT test includes an emission test and the police have powers relating to smoke from vehicles.

Monitoring of Air Quality

There is a national network of automated Air Quality Monitoring stations operated on behalf of the DETR. None of these are located within the Lune LEAP area, but there are monitoring sites operated by the local authority at the following locations:

Location		Determinand
Lancaster City Council	4 sites in Lancaster	Sulphur Dioxide Nitrogen Dioxide Ozone
	2 sites in Morecambe	Nitrogen Dioxide

Further details of air quality monitoring can be obtained by contacting the Local Authority.

2.3 INDUSTRY AND INTEGRATED POLLUTION CONTROL

Part 1 of the Environmental Protection Act 1990 (EPA 90), establishes two separate systems for regulating those processes with the greatest potential for pollution of the environment. These are Integrated Pollution Control (IPC) and Local Authority Air Pollution Control (LAAPC). In England and Wales, the Agency is the enforcing authority for all processes prescribed for IPC whereas the local authority, in almost all circumstances, is the regulator for those processes prescribed for LAAPC.

Operators who wish to carry on an IPC process must seek prior authorisation from the Agency. Under EPA 90 it is not only the emissions to air water and land that are regulated but the entire process, including any waste management activities carried out on the site as part of the process. Separate licences under EPA90 Part II, or the Water Resources Act 1991 are not required - pollution control is truly integrated.

Before an authorisation can be granted, a detailed application must be provided giving information about the process, the equipment, abatement measures, environmental releases, the impact of releases to all media and proposals for monitoring those releases. During determination of the application the Ageney formally consults the Health and Safety Executive, the Ministry of Agriculture, Fisheries and Food, the Local Authority, English Nature and (where relevant) the Harbour Authority and Water Companies. The application is placed upon public registers held at the Agency's Regional Offices and at the Local Authority offices. In addition to the views of the statutory consultees, the views of any member of the public will also be taken into consideration. Only, after taking account of all of these issues, and any comments from consultees and members of the public, will the Agency issue an Authorisation to the Operator.

Although the Authorisation can be reviewed at any time, a formal review is required under the provisions of the Act every four years. The dates given later in this document are indicative of the proposed review timetable.

Public Registers

Public access to information under the Environmental Protection Act 1990 is available via a public register which is held at Richard Fairclough House, at Warrington. The information is in the form of:

(i) copies of notices seeking additional information of applications for authorisation

(ii) copies of authorisations

(iii) discharge returns

(iv) environmental monitoring information which has been required in an authorisation

(v) copies of any enforcement notices issued by the Agency.

Copies of all the above are sent to the District Council in whose area the authorised process is carried out. Local "subsets" of the register are therefore held by the District Council and are similarly available for inspection by the general public.

Authorised IPC Processes

Processes in the Lune Leap area, authorised under part I of the Environmental Protection Act 1990, are briefly described below. For a more detailed description the reader should refer to the specific Authorisations which can be viewed on the public register. Authorisations are reviewed every four years and the target dates for review are indicated for each site. Locations of the following sites are shown on map 5.

Angus Fire Armour Target date for review of authorisation 31/12/98

This site manufactures a range of fire fighting foams based on aqueous solutions of hydrolysed proteins extracted from animal by-products. The process gives rise to releases to air and sewer as well as solid waste arisings for disposal to landfill.

Avocado Research Chemicals, Heysham. Target date for review of authorisation 31/5/99.

This company produces a large range of organic chemicals for research and development. The authorisation gives permission for the production, on a laboratory scale, of organic chemicals and the reprocessing and repackaging of others.

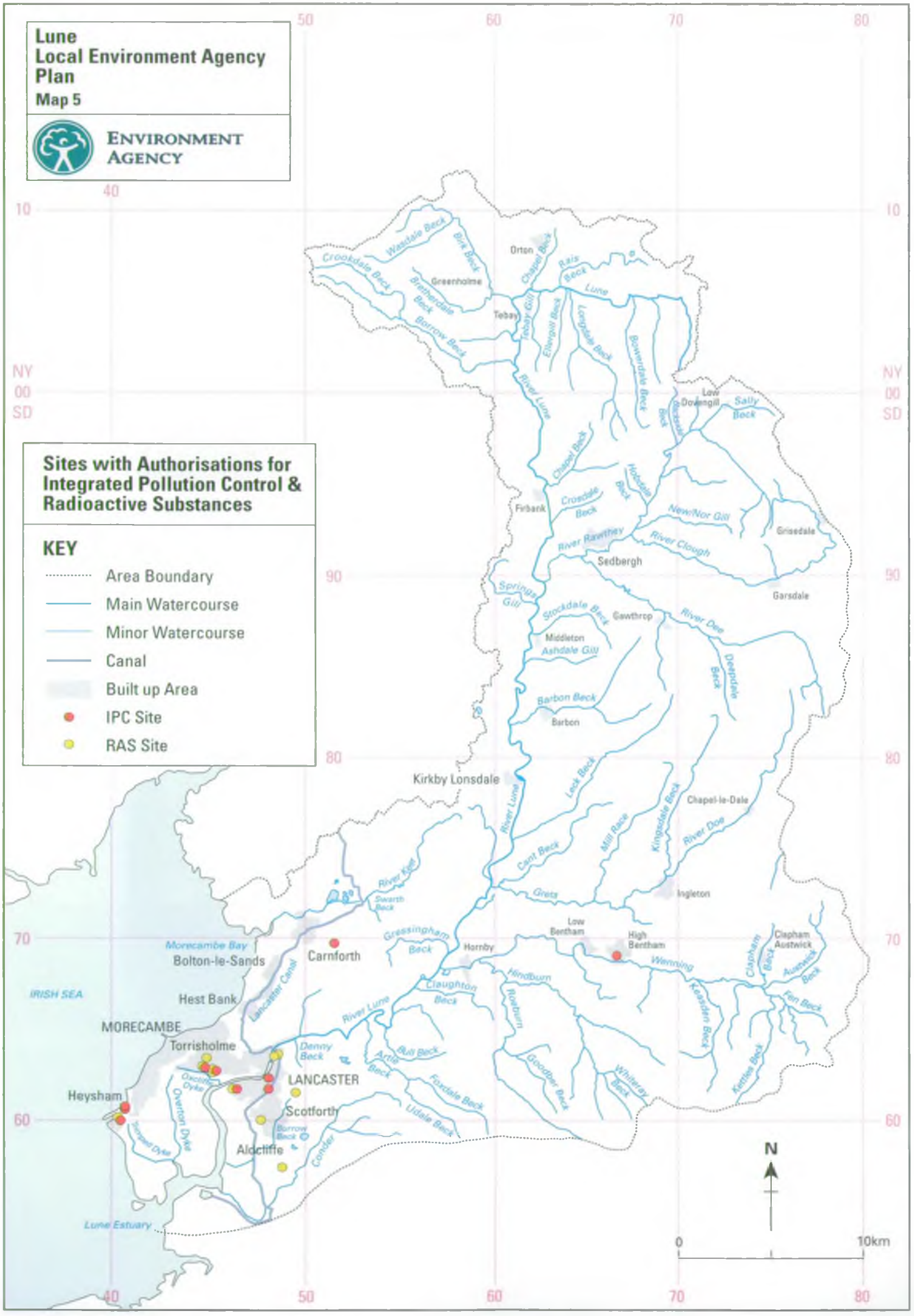
Processes are carried out in extracted fume-cupboards which vent to atmosphere via roof-level nozzles. Releases to controlled waters consist of roof drainage, and uncontaminated surface drainage from roads.

Process water, such as cooling waters, vacuum pump water, and wash waters, are discharged to sewer.

Solid waste arisings consist of packaging materials, and small quantities of drummed waste which is sent for solvent recovery, incineration or landfill as appropriate.

Lune
Local Environment Agency Plan
Map 5

ENVIRONMENT AGENCY



British Gas Transco, Carnforth. Review of authorisation currently underway to take account of the proposed installation of a third compressor.

Since the mid 1960s a network of high pressure buried pipelines, known as the National Transmission System (NTS), has been built to transport natural gas throughout the United Kingdom. Compressor Stations are located at intervals along the pipeline to provide transmission capacity and restore pressure lost though friction.

British Gas Transco are authorised to operate two such compressors at Carnforth, comprising two modified Rolls Royce RB211-24C aircraft engines.

Releases to air consist of the hot exhaust gases and occasional releases of unburnt gas for maintenance purposes.

The only release to controlled waters is uncontaminated site run-off which discharges via an oil/water separator.

Small amounts of solid and liquid waste are disposed of off-site.

Courtaulds Chemicals, Nelson Acetate Works, Lancaster. Target date for review of authorisation 1/5/00

This site is authorised to manufacture cellulose acetate flake for use in the photographic film and plastics moulding industries.

Acetate flake is manufactured from various reactions involving cellulose, acetic anhydride, and acetic acid in an organic solvent dichloromethane.

Releases to air are treated by water and activated carbon gas scrubbers and consist primarily of acetic acid and dichloromethane.

Cooling water is extracted from the River Lune and is discharged further downstream. Electronic systems protect the river discharge from contamination with process waters, which are discharged to sewer.

Solid wastes consist of general packaging waste, settled solids from the effluent treatment plant and a very small percentage of scrap cellulose acetate. Waste is disposed of to landfill.

Joseph Storey and Company Limited, Lancaster. Target date for review of authorisation 31/1/99

Joseph Storey Ltd. manufacture inorganic powders, mainly for use as non-toxic fire retardants. The company has produced chemicals and dyes for the textile industry at the site since 1860 but, with the demise of the adjacent mill, production is now limited to metal borates, stannates and lead acetates.

Releases to atmosphere are at roof level and consist mainly of steam from the drying process plus traces of boric acid.

There are no liquid wastes and solid waste is confined to minor dust spillages and waste packaging.

Lancaster Basalt Limited, Lancaster. Target date for review of authorisation 1/5/00

Lancaster Basalt Ltd are authorised to produce Basalt Wool, a non asbestos mineral fibre used as thermal and acoustic insulators in applications such as building materials and vehicle exhaust silencers.

The process consists of melting basalt rock chippings in a furnace which is then run onto a rotating spinner head. Fibres are formed by centrifugal action of this rotating disk, and are then collected on a moving conveyor for stitching into a laminated sheet.

Releases to air consist of scrubbed and/or filtered exhaust air from the process areas.

There are no releases to controlled waters or sewer and solid waste arisings are sent for landfill.

Lancaster Synthesis Limited, White Lund, Morecambe. Target date for review of authorisations 1/3/98

Two authorised processes are operated by Lancaster Synthesis, both involving the synthesis of organic chemicals.

One authorisation is for laboratory scale manufacture and the other on a larger, but nevertheless small scale, manufacturing plant.

Releases to air are from fume cupboards, general fume extraction and scrubbed vents from the small scale plant.

There are no releases to controlled waters and discharges to sewer consist of only sink waste, emergency showers, and surface waters.

Waste packaging, process residues, etc are disposed of to landfill.

Solrec Limited, Heysham. Target date for review of authorisations 31/1/98

Solrec operate two authorised processes.

In the first, waste solvents are recovered for direct re-use or for use in the manufacture of general purpose thinners or for use as a substitute fuel in the cement manufacturing industry.

The second Authorisation concerns the site steam raising combustion plant facility which burns some contaminated process/surface waters in addition to support fuel, such as gas oil. Steam raised in this plant is used in the process.

There are a number of releases to atmosphere from the authorised processes. These arise from the combustion plant, vacuum pumps and distillation units.

Liquid wastes that comply with authorised limits, discharge to sea. Other wastes may be disposed of to landfill or via incineration.

Nuclear Industry

Radioactive Substances

Radioactive substances are present in the environment as a result both of natural sources and of man's technological developments. Whilst most of the radiation exposure of the UK population is from natural sources, over which we have little control, the uncontrollable use of radioactivity from technological developments can be a hazard. It is important to the future of our environment that this additional use of radioactivity is limited and controlled.

The Radioactive Substances Act 1993 (the Act) provides for controls to be exercised over the use and keeping of radioactive materials and the accumulation and disposal of radioactive wastes. Since its formation on 1 April 1996, the Agency has been responsible for the administration and enforcement of the Act in England and Wales. Prior to that date the work was undertaken by Her Majesty's Inspectorate of Pollution.

The Agency's objective is to regulate the use of radioactive substances so that radiation doses within the environment are 'As Low As Reasonably Achievable' (ALARA). As a consequence the Agency ensures that any practice involving radiation exposure is justified and that ALARA is exercised. This commitment is carried out through registration, authorisation, inspection and enforcement arrangements.

The range of premises using radioactivity is large and includes hospitals, universities, research establishments and various components of the nuclear industry. The types of radioactive wastes from these premises are diverse. The Agency regularly assesses the limits and conditions attached to the certificates of these premises to ensure that there is an acceptable level of protection for human health and the environment.

Map 5 shows the sites currently regulated under the Radioactive Substances Act 1993.

Public Registers

Public access to information under the Radioactive Substances Act 1993 is available on the public register. The information is in the form of:

(i) copies of applications for both registrations and authorisations;

(ii) copies of any notices seeking additional information

(iii) decision document for nuclear sites;

(iv) copies of registrations and authorisations;

(v) discharge returns;

(vi) environmental monitoring information which has been required in an authorisation;

(vii) copies of notices issued by the Agency

Copies of the registrations are sent to the District and County Councils in which the certificated premises lie. In addition copies of authorisations are sent to the District and County Councils in which the certificated premises lie and also those District and County Councils in whose areas radioactive waste is received for treatment or disposal.

Lune
Local Environment Agency Plan
Map 6

ENVIRONMENT AGENCY

Trade Effluents

1	Bessy Beck Fish Farm	12	Butterley Bricks
2	Lindsay Fold Fish Farm	13	Butterley Bricks
3	Ingleton Quarry	14	Brookhouse WTP
4	Shap Quarry	15	Heysham Sub-Station
5	Twistleton Fish Hatchery	16	Forbo Kingfisher
6	Tilcon Quarry	17	Middleton Park
7	Mason Gill WTP	18	Trimpell Estate
8	Redland Quarry	19	Heysham 1 PS
9	Angus Fire Armour	20	Heysham 2 PS
10	Bentham Trout Farm	21	Stoops Quarry WTP
11	Keasden WTP		

NWW WwTWs

1	Orton	18	Farleton
2	Tebay	19	Claughton
3	Garsdale Head	20	Over Kellet
4	Sedbergh	21	Nether Kellet
5	Dent	22	Carnforth
6	Casterton	23	Hest Bank New
7	Kirkby Lonsdale	24	Hest Bank Old
8	Ingleton	25	Caton
9	Cold Cotes	26	Halton East
10	Burton-in-Lonsdale	27	Halton West
11	Austwick	28	Lancaster
12	Clapham	29	Overton
13	Newby	30	Morecambe
14	High Bentham	31	Glasson West
15	Low Bentham	32	Glasson East
16	Hornby	33	Wray
17	Low Gill	34	Whittington

Effluent Disposal

KEY

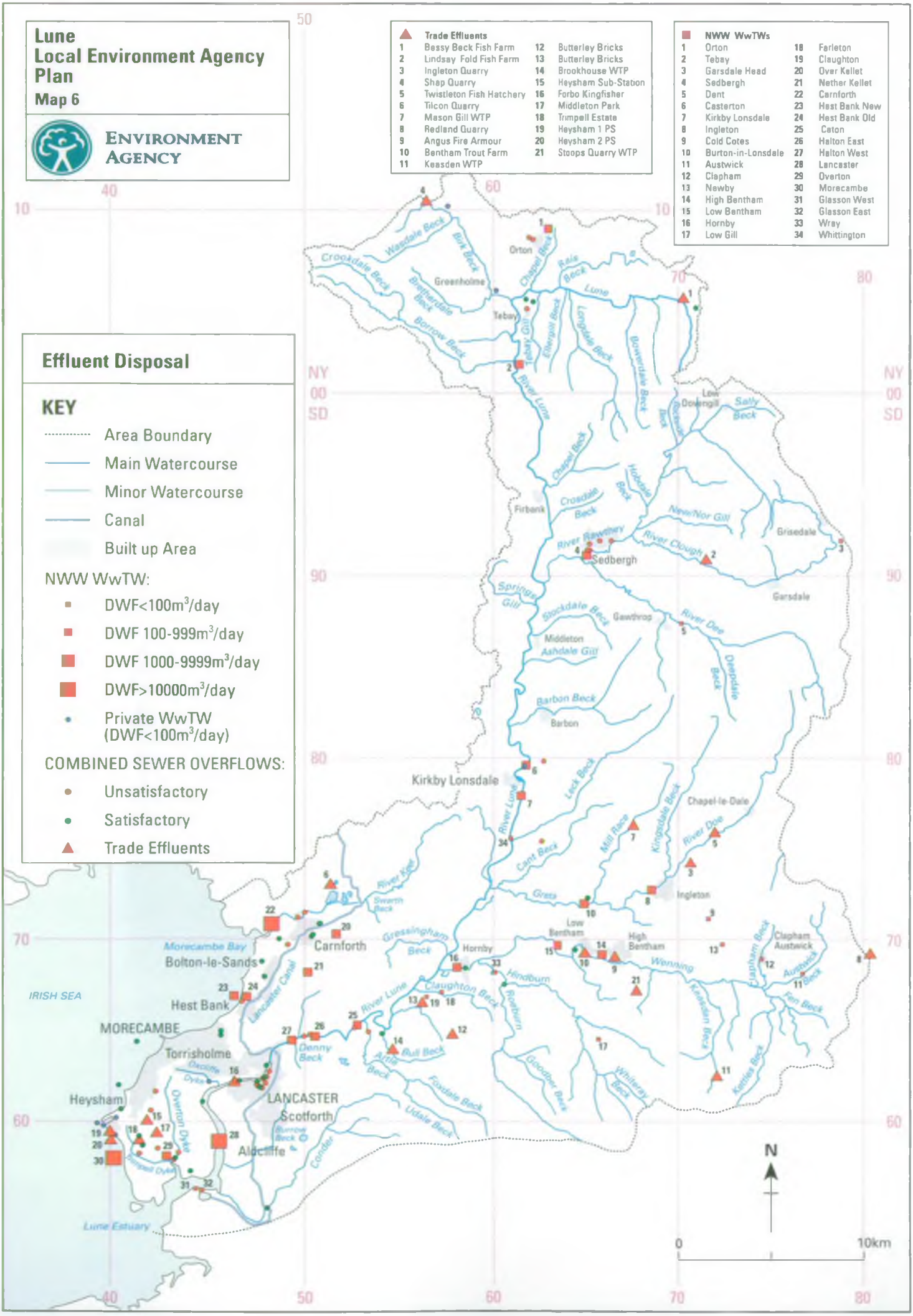
- Area Boundary
- Main Watercourse
- Minor Watercourse
- Canal
- Built up Area

NWW WwTW:

- DWF<100m³/day
- DWF 100-999m³/day
- DWF 1000-9999m³/day
- DWF>10000m³/day
- Private WwTW (DWF<100m³/day)

COMBINED SEWER OVERFLOWS:

- Unsatisfactory
- Satisfactory
- Trade Effluents



Heysham Power Station, Heysham.

There are 2 nuclear power stations in the area which are owned and operated by Nuclear Electric Ltd. The Heysham 1 & 2 sites are authorised by the Agency under the Radioactive Substances Act 1993 to dispose of radioactive wastes generated as a result of operating the stations.

The stations use carbon dioxide as a heat exchange medium. The coolant contains a number of trace components or impurities which become radioactive as a result of the coolants proximity to the fuel. Some of the carbon dioxide coolant is discharged to atmosphere by stacks either deliberately when statutory inspections are carried out on the reactors, or as a result of natural leakage (the coolant is under pressure in the cooling circuit).

Liquid waste is produced as a result of the operation of dryers which maintain the gas chemistry by removing water vapour. This liquid waste, together with other liquid effluents, is discharged into Morecambe Bay via a cooling water discharge system.

The radioactive discharges are kept under regular review and monitoring of the local environment is carried out by the operators, Agency staff and MAFF. The radiological impact of the stations is not significant when tested against currently accepted protection levels.

The sites also have emergency back-up electrical systems which operate if the reactors trip. These are required to be tested for reliability but operate typically less than 100 hours per unit per year. Heysham 1 utilises gas turbines for this purpose and Heysham 2 diesel units. These are operated under the terms of an authorisation granted under the Environmental Protection Act 1990.

The stations also have a number of consents for the discharge of non-radioactive liquid effluent to Morecambe Bay. These discharges consist mostly of cooling water although the cooling water streams do also receive smaller discharges of process waters and treated sewage effluents. These discharges are subject to control under the Water Resources Act 1991 and the Environmental Protection Act 1990. These typically seek to control the temperature and residual oxidant content of the effluent.

2.4 EFFLUENT DISPOSAL

General

This use relates to the disposal of domestic and industrial effluents to controlled waters, from non authorised processes (see map 6). Disposal of sewage or trade effluent to controlled waters requires the consent of the Agency. Consents granted under the provisions of the Water Resources Act 1991, normally include limits on the nature, volume and chemical composition of the effluent. Consents and are a means of ensuring that the effects of a discharge are limited to such an extent that water quality remains acceptable for relevant downstream uses. Many consents inherited by the Agency were set at levels below current requirements to meet the requirements of downstream uses. These are progressively being addressed within the prevailing restrictions, particularly those restrictions on the Water Companies expenditure.

The Agency seeks to ensure that authorisations and consents protect the uses of the receiving watercourses and also aim to eliminate pollution from discharges of dangerous substances.

Details of discharge consents and authorisations are available for inspection on the public registers in the Area office. The Agency also regulates the discharge of certain substances to sewer under the provisions of

the Water Industry Act 1991. Notices issued by the Agency under this Act are available from the sewerage undertakers public registers.

Local Perspective

Discussion follows under two headings:

- Continuous effluents
- Intermittent discharges

Continuous Effluents

Sewage

North West Water Ltd (NWW) have 32 Wastewater Treatment Works (WwTWs) in the Lune area. The WwTWs in the catchment vary in size with the smallest WwTW treating a population equivalent of less than 250 and the largest WwTW at Lancaster a population equivalent of more than 130,000.

The Lancaster WwTW at Stodday presently provides primary treatment only for wastewater generated in Lancaster and Heysham and discharges are made to the Lune Estuary around high water. In order to comply with the Urban Waste Water Treatment Directive (UWWTD) secondary treatment must be provided by the year 2000. This will lead to a significant reduction in the organic and bacteriological load discharged to the Lune Estuary

A new WwTW has recently been constructed at Middleton to provide secondary treatment for sewage generated in the Morecambe area which was formerly discharged twice daily, after receiving fine screening only, from the Schola Green pumping Station into Morecambe Bay. The Schola Green outfall has been retained to allow discharges of storm sewage only during exceptionally wet weather. A frequency of around one discharge per bathing season is anticipated. It is expected that the completion of this scheme will lead to compliance with the Bathing Water Directive in 1997.

Several other WwTWs have been identified as having a significant impact on water quality. The WwTW at High Bentham is undersized and of poor design and a new works is being built to provide better treatment of wastewater prior to its discharge to the River Wenning. This scheme should be completed by March 1998.

The effluents from Nether Kellet WwTW and Over Kellet WwTW presently discharge to very small streams/ditches and cause poor water quality and poor aesthetic conditions downstream. The Agency considers these watercourses to be unsuitable for receiving discharges of sewage effluent and would like to see wastewater generated in these areas transferred to Carnforth WwTW for treatment and discharge to the Keer Estuary. Appropriate improved treatment is required by the year 2005 to comply with the UWWTD.

At Glasson sewage is presently discharged crude at two locations into Lune Estuary near to Glasson Docks. In order to comply with the UWWTD appropriate treatment will be required here by 2005. Regular complaints are received about these discharges due to the poor quality of the discharges and their location in high amenity areas used for a wide range recreational activities.

There are also a small number of private sewage treatment works in the Lune Area. The impact on the receiving waters from these works is generally of minor significance. In parts of the area that are unsewered many properties are served by septic tanks and problems can be caused where there are either conglomerations of septic tank discharges or poor ground conditions making treatment by soakaway unsuitable.

Such a particular problem affects Oxcliffe Dyke where discharges from septic tanks in the Green Lane area are the major cause of poor water quality. The following areas are also affected but to a lesser extent:

Tunstall, Melling, Cantsfield, Leck, Cowan Bridge, Barbon, Gressingham Beck, Clapham Station, Caton Green and Conder Green.

Under The Environmental Act 1995 Water Companies have been given a new duty to provide, where appropriate, first time sewerage facilities in areas suffering from environmental or amenity problems caused by the existing sewage disposal arrangements. It is possible that these problems may therefore be addressed over the next few years.

Industrial

As a result of former policies of encouraging discharges of trade effluent to sewer, there are relatively few discharges of industrial trade effluent direct to watercourse within the Lune area.

Industrial discharges are made from Angus Fire Armour to the River Wenning, Butterley Bricks to tributaries of the River Lune at Claughton, and from quarries situated at Ingleton, Shap, Dry Rigg near Austwick and the Tilcon quarry near Carnforth.

There are several fish farms within the area, the most significant one being situated at Low Bentham which abstracts water from and discharges water back to the River Wenning. There are also a small number of North West Water and Yorkshire Water water treatment plants (WTPs) in the catchment. Discharges from these plants to surface waters are subject to consent conditions and generally do not cause water quality problems.

Intermittent Discharges

Combined Sewerage Systems

Combined sewerage systems carry both foul drainage and surface water runoff e.g. rainfall. Combined sewer overflows (CSOs) and sewage pumping station overflows are located on most sewerage systems in the catchment and are subject to consents which aim to limit the frequency of the discharge to occasions when intense rainfall occurs and adequate dilution is available in the receiving watercourse.

However, on many sewerage systems, particularly older systems, sewers may be overloaded and overflows may occur at a greater than acceptable frequency.

There are in the region of 60 combined sewer overflows in the Lune Area. Of these overflows approximately 30 are presently identified as unsatisfactory. NWW Ltd are presently implementing a seven stage sewerage rehabilitation scheme to upgrade the Lancaster City sewerage system and the Agency is involved in detailed discussions over this scheme. Two unsatisfactory overflows have recently been improved and 11 unsatisfactory overflows are due to be tackled over the next few years. The performance and designations of the remaining overflows are presently being reviewed and any major problems will be highlighted as priorities for AMP3.

Separate Sewerage systems

Separate sewerage systems use surface water sewers for dealing with surface water and foul sewers for dealing with foul drainage. However watercourses are liable to contamination, mainly due to wrong connections of foul drainage into the surface water drainage network. In 1996 NWW completed a three year

project aimed at resolving the most significant contaminated surface water (CSW) discharges. Several new problems have since been found causing localised water quality problems in Burrow Beck, Artle Beck and the River Lune in Kirkby Lonsdale.

Industrial Estates

There are a number of industrial estates within the Lune Area and drainage systems on these estates are liable to contamination. Contaminated discharges from these can potentially have an impact on the receiving water. Contamination from the Vickers and White Lund estates near Lancaster contribute to poor water quality in Oxcliffe Dyke. Poor water quality in Trimpell Dyke is associated with contamination from the Heysham Industrial estate and leachate draining from land in the vicinity of the former Trimpell site near Heysham. Smaller estates at Tebay and at White Cross in Lancaster can cause localised problems in Old Tebay Stream and the Lancaster Canal.

Agriculture

Agricultural activity predominates over much of the Lune area. In the upper Lune area the emphasis is on sheep farming with more dairy farming found in the Keer catchment and in the middle and lower parts of the Lune catchment.

Incidents from livestock farms including releases of silage, slurry and other farm waste can cause serious pollution problems. Proactive surveys and farm visits are ongoing within the catchment to identify sources of farm pollution and pollution control staff provide advice to farmers to improve their waste handling and storage facilities to prevent pollution incidents occurring. In general there is a good degree of co-operation from farmers and many farmers have carried out significant improvements to their facilities in recent years. This was largely done with help from the Farm Conservation (MAFF) grant scheme which paid up to 50 % of the costs of new facilities. The ending of this scheme a few years ago now means that farmers must themselves fully meet the costs of further improvements. A River Keer rehabilitation scheme has recently been launched and farm drainage problems within the Keer catchment will be investigated as part of this project.

Agricultural activity can also cause problems from diffuse pollution, in particular from the spreading of farm waste as well as artificial fertilizers and pesticides. These diffuse pollution sources are more difficult to control. The use of Farm Waste Management Plans to control this type of pollution is promoted by both the Agency and agricultural consultants.

Effluent Disposal Objectives

Environmental Objectives

To monitor surface waters and discharges to establish compliance with river quality objectives and effluent consent standards and to ensure that other uses are not compromised.

To ensure requirements for improvements are identified and pursued for both continuous and intermittent discharges.

Environmental Requirements

Water Quality

No deterioration in upstream water quality, beyond that assumed in setting consents.

Water Quantity

No significant reduction in river flow beyond that used in setting licences.

Physical Features

Outfalls should be sited to achieve rapid mixing of effluent with river contents and to minimise impact on amenity value.

Issues Arising:

Issue 4 Adverse impact of discharges from North West Water (NWW) Ltd Wastewater Treatment Works and Sewerage Systems on water quality
Issue 5 Failure to comply with Water Quality Objectives and impact on water quality due to agricultural activities
Issue 7 Deterioration in water quality due to lack of adequate sewerage/sewage treatment facilities
Issue 8 Failure to meet Bathing Water Quality Standards at Morecambe North, Morecambe South and Heysham Half Moon Bay beaches
Issue 9 Adverse impact of industrial site and trading estate drainage on water quality

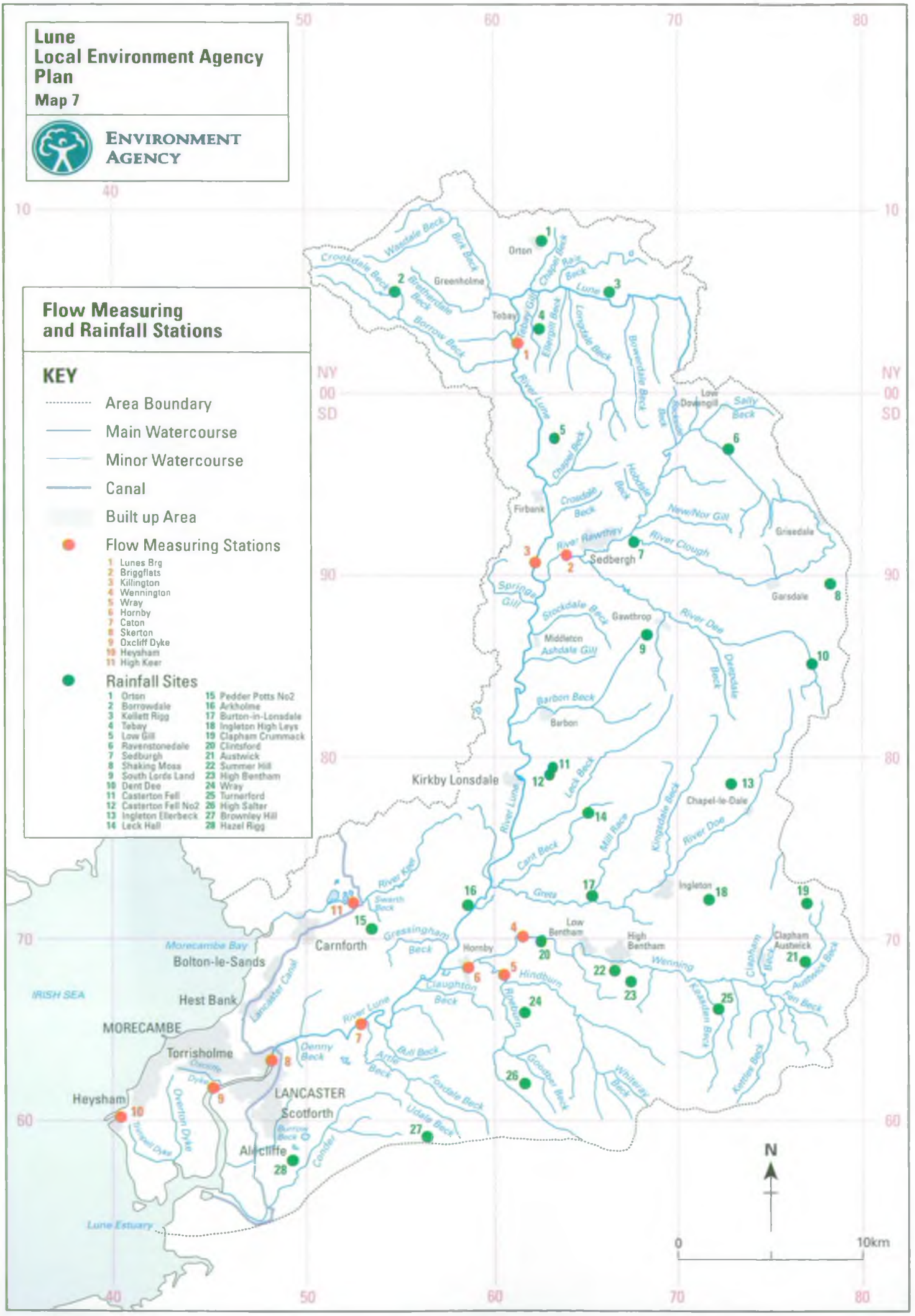
Lune
Local Environment Agency Plan
Map 7

ENVIRONMENT AGENCY

Flow Measuring and Rainfall Stations

KEY

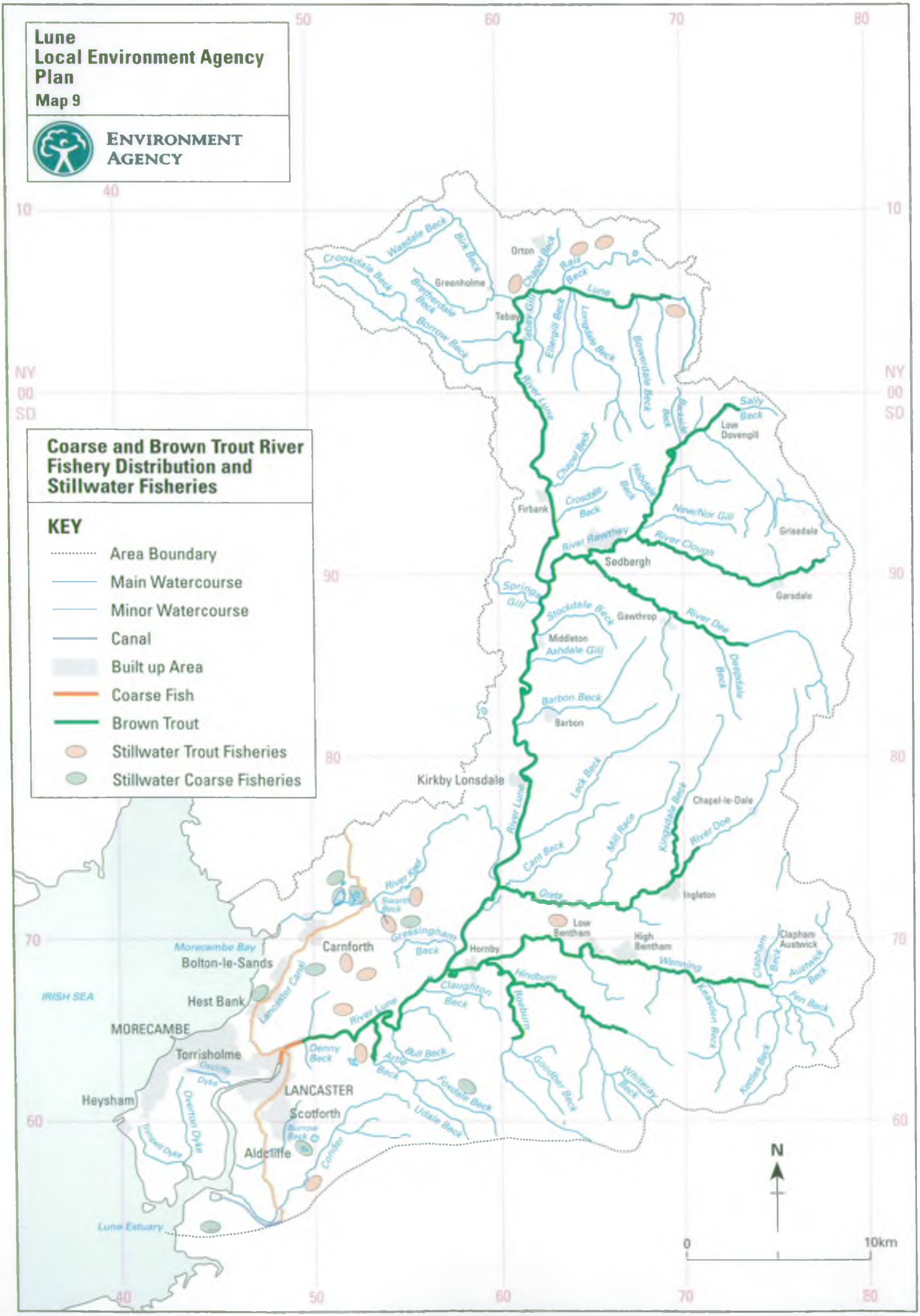
- Area Boundary
- Main Watercourse
- Minor Watercourse
- Canal
- Built up Area
- Flow Measuring Stations
  1. Lunes Brg
  2. Briggflats
  3. Killington
  4. Wennington
  5. Wray
  6. Hornby
  7. Caton
  8. Skerton
  9. Oxcliff Dyke
  10. Heysham
  11. High Keer
- Rainfall Sites
  1. Orton
  2. Borrowdale
  3. Kellett Rigg
  4. Tebay
  5. Low Gill
  6. Ravenstonedale
  7. Sedburgh
  8. Shaking Moss
  9. South Lords Land
  10. Dent Dee
  11. Casterton Fell
  12. Casterton Fell No2
  13. Ingleton Ellerbeck
  14. Leck Hall
  15. Pedder Potts No2
  16. Arkholme
  17. Burton-in-Lonsdale
  18. Ingleton High Leys
  19. Clapham Crummack
  20. Clintsford
  21. Austwick
  22. Summer Hill
  23. High Bentham
  24. Wray
  25. Turnerford
  26. High Salter
  27. Brownley Hill
  28. Hazel Rigg



Lune
Local Environment Agency Plan
Map 8
Environment Agency
Natural Obstructions to Fish Migrations and Location of Spawning Areas
KEY
Area Boundary
Main Watercourse
Minor Watercourse
Canal
Built up Area
Major Salmon Spawning Areas
Major Sea Trout Spawning Areas
Obstruction to Fish Migration
NY
00
SD
Wasdale Beck
Birk Beck
Crookdale Beck
Bretherdale Beck
Greenholme
Borrow Beck
Orton
Chapel Beck
Rais Beck
Lune
Tebay
Tebay Gill
Ellergill Beck
Longdale Beck
Bowderdale Beck
River Lune
Sally Beck
Low Dovengill
Chapel Beck
Hobdale Beck
Firbank
Crosdale Beck
New/Nor Gill
River Rawthey
River Clough
Grisedale
Sedbergh
Garsdale
Springs Gill
Stockdale Beck
Gawthrop
River Dee
Middleton
Ashdale Gill
Deepdale Beck
Barbon Beck
Barbon
Kirkby Lonsdale
Leck Beck
Chapel-le-Dale
Kingsdale Beck
River Doe
Mill Race
River Lune
Cant Beck
River Keer
Greta
Ingleton
Low Bentham
High Bentham
Clapham Austwick
Clapham Beck
Austwick Beck
Gressingham Beck
Hornby
Carnforth
Morecambe Bay
Bolton-le-Sands
IRISH SEA
Hest Bank
Lancaster Canal
Wenning
Keasden Beck
Fen Beck
Hindburn
Roeburn
Claughton Beck
River Lune
MORECAMBE
Torrisholme
Denny Beck
Artle Beck
Bull Beck
Kettles Beck
Goodber Beck
Whitray Beck
Heysham
Overton Dyke
LANCASTER
Scotforth
Foxdale Beck
Udale Beck
Conder
Aldcliffe
Lune Estuary
N
0
10km

Lune
Local Environment Agency Plan
Map 9

ENVIRONMENT AGENCY



2.5 HYDROLOGY

Rainfall

To secure the proper management of water resources the Agency operates a hydrometric network of rainfall sites and riverflow gauging stations (see map 7). These provide not only data for water resources assessment but also for flood prediction, impact of effluent discharges, fisheries management, conservation and recreation.

The long term average annual rainfall (LTA), based on met office 1961-1990, varies from 1866mm in measured at Dent Dee Side House SD677918 to 972mm measured at Pilling Abram House SD401483 with an overall catchment LTA rainfall of 1435mm. Figs 1a & 1b compares rainfall during 1996 with the LTA.

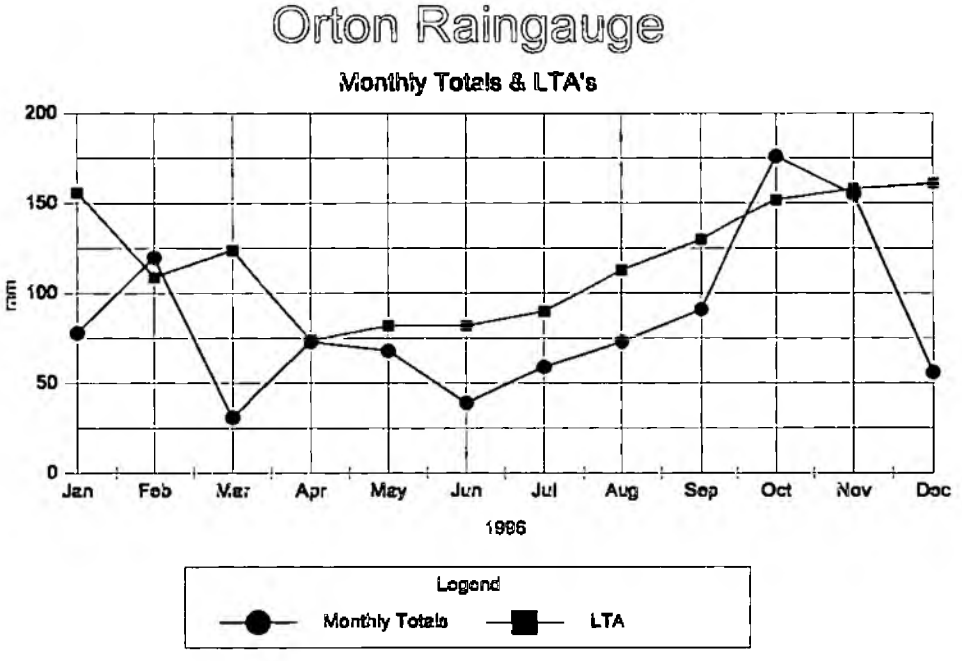


Figure 1a
This gauge is situated in the upper reaches of the catchment

Orton Raingauge NY626083

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
LTA 1961-1990	156	109	124	74	82	82	90	113	130	152	158	161
Monthly Totals 1996	78	120	31	73	68	39	59	73	91	176	155	56

Rainfall is measured in the area by a network of raingauges consisting of Storage Gauges (Read manually on a daily or monthly basis) and Tipping Bucket Raingauges (TBRs) which monitor continually and log the data. This logged data depicts rainfall events (amounts of rainfall over periods of time) and can be used in rainfall return period analysis.

All the Raingauges form part of the Agency's rainfall measurement network.

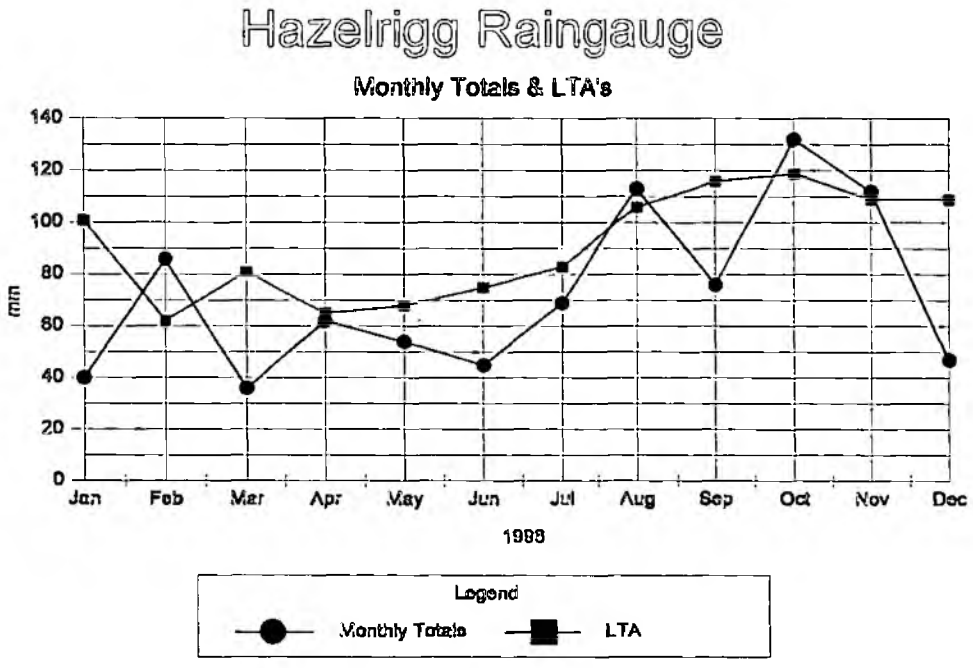


Figure 1b
This gauge is situated in the lower reaches of the catchment

Hazelrigg Raingauge SD493578

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
LTA 1961-1990	101	62	81	65	68	75	83	106	116	119	109	109
Monthly Totals 1996	40	86	36	62	54	45	69	113	76	132	112	47

At any time the availability of water resources will be a function of the rain fallen, capacity for storage of that rainfall and the manner in which it is exploited.

It is misleading to accept rainfall alone as an indicator of the available resources since it is subject to evaporation and other losses. It is the residual rainfall that determines the quantities replenishing groundwater and surface flows.

The effect of rainfall varies with it's intensity and the state of the catchment. Soil moisture deficit (SMD) is a measure of the dryness of the soil, and is expressed as the amount of rain in millimetres required to bring the soil to a saturated state and is generally higher in the summer than in winter. As an example, Fig 2 shows the 1996 weekly values of SMD for the Lune catchment.

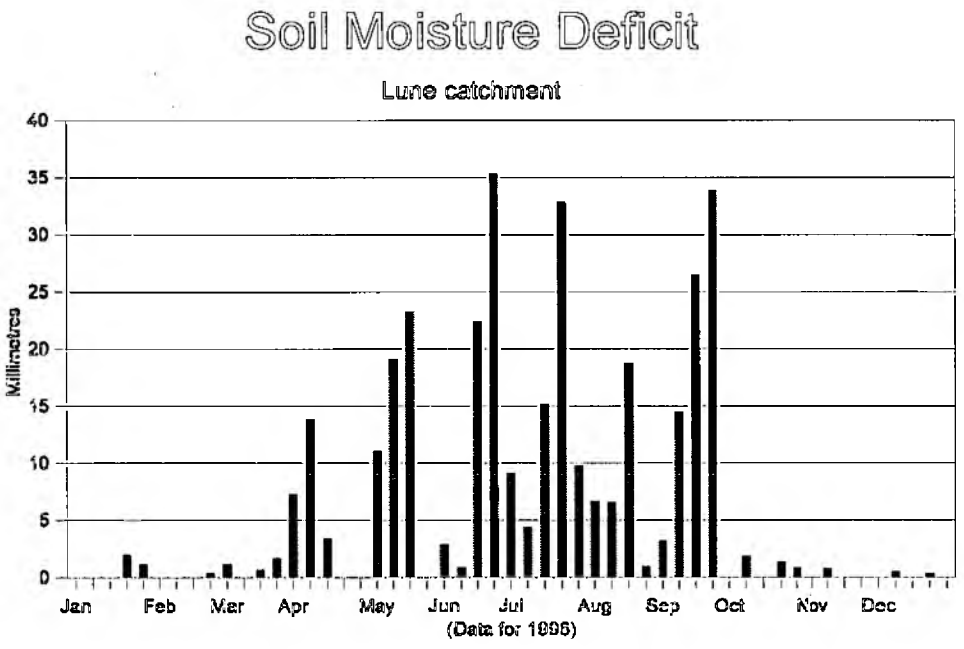


Figure 2

Data supplied by the Meteorological Office

River Flows

There are four primary flow measuring stations on the Lune situated at Lunes Bridge NY612029 (Catchment Area 142 km^2), Killington SD622907 (Catchment Area 219 km^2), Caton SD529653 (Catchment Area 983 km^2) and Skerton SD482633 (Catchment Area 1033 km^2). The total catchment area to the tidal limit at Skerton is 1033 km^2

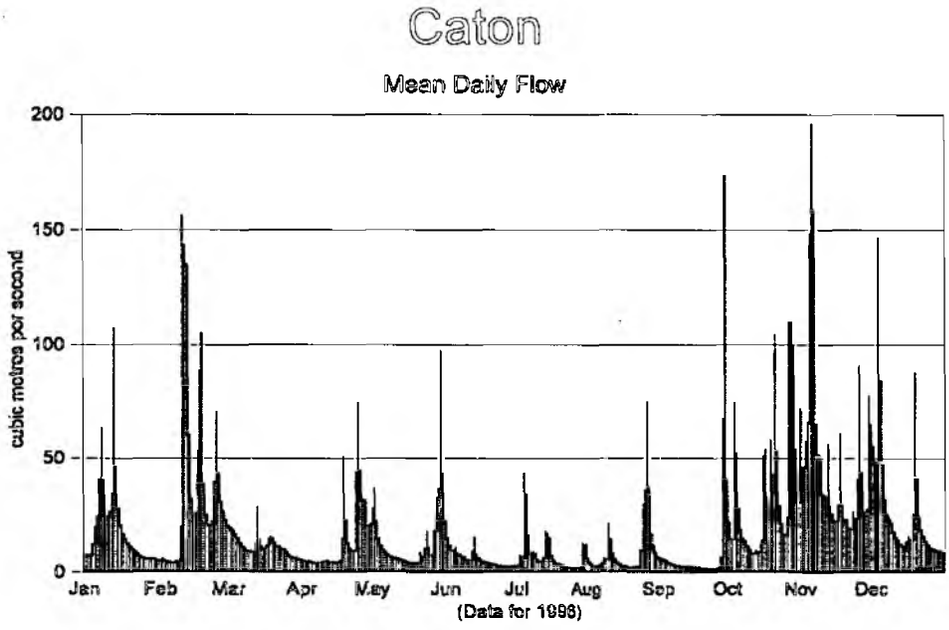


Figure 3

Issues Arising:

There are no issues arising from this section.

2.6 FISHERIES

Background

The River Lune was, at one time, considered to be one of the best rivers for salmon and trout in England and Wales, with a particularly remarkable salmon migration in the spring. During the 1960s, the stocks were decimated by a disease which killed thousands of fish, stocks have still not recovered to pre-disease levels.

The River Lune supports rod and line and net fisheries for migratory salmonids (salmon and sea trout), net fisheries for eels and elvers, and a recreation fishery for coarse fish and brown trout. The Environment Agency regulates these through licensing and bylaws that limit fishing methods and seasons.

There are commercial shellfish and sea fisheries in the Estuary and coastal waters regulated by the North West and North Wales Sea Fisheries Committee and MAFF.

Salmonid Fishery

The Agency operates sites for monitoring the populations of adult salmon and sea trout entering into the River Lune on their spawning migrations, at Forge Weir, Caton, and at Broadraine Weir, Killington. Each site has an automatic fish counter and a trap. The information gained from these allows the Environment Agency to determine the size of the salmon and sea trout "run" each year (the number of fish that migrate in from the sea to spawn).

The Estuary supports net fisheries for migratory salmonids operating from the beginning of April until the end of August and consisting of 26 Haaf nets, 10 drift nets and 1 seine net. The 10 year average catch from these nets is 2403 salmon and 1175 sea tout.

The rod fishery operates annually for salmon from February 1st until October 31st, and for sea trout from May 1st until October 15th. Catches of salmon tend to increase throughout the season with a peak in October, sea trout catches peak in July. The 10 year average catches are 1085 for salmon and 1372 for sea trout.

The Environment Agency has produced a Salmon Action Plan for the River Lune which provides a discussion of the issues that are thought to limit the salmon population in the river and actions that can be undertaken to alleviate them.

As part of the ongoing monitoring of the salmon and trout populations of the River Lune, extensive surveys are carried out of juvenile populations by a technique known as electric fishing. Recent surveys have indicated that the highest densities of juveniles are found in the upper reaches of the system where water quality and habitat is suitable both for spawning (laying eggs in the river bed) and the rearing of young fish.

There are a number of problems which may be affecting different life stages of the salmon and trout in the River Lune leading to a reduction in the potential number of fish present. The exploitation (number of fish caught and killed) by the rods and nets may be too high, man made barriers may impede fish passage upstream (see map 8), or there may be a problem with fish eating birds. There are also significant areas of the River in which the habitat has been degraded by a number of actions including, low flows, siltation and land drainage amongst others. All of these problems need to be understood, solutions need to be found and put into operation in order to improve the rivers salmon and trout stocks for this and future generations.

Coarse Fishery

The River Lune supports populations of coarse fish species in its lower reaches consisting of bream, dace, roach, gudgeon, perch and eels. These populations have been in decline since the 1970s. Successful spawning of these species is erratic and some populations appear to be maintained through stocking alone. The Agency will work with local interested parties to rehabilitate spawning areas for coarse fish in the lower parts of the river.

The Lancaster Canal passes through the catchment and supports good fisheries for bream, roach, carp, tench, ruff, pike and eels. There are also a number of still water lakes and ponds which support coarse and trout fisheries.(see map 9)

River Keer

The river Keer currently supports small populations of salmon, trout and sea trout and an elver dip net fishery below the M6 motorway bridge. At one time the river supported a good fishery with catches of up to 1000 sea trout and a few small salmon (grilse) each season. By 1996 the rod catch had dropped to one sea trout.

River Keer Rehabilitation Project

River Keer Rehabilitation Group consists of representatives from the Environment Agency and local angling clubs. Flood defence works on the River Keer in 1959-60 led to the loss of 24 adult salmonid holding pools and associated habitat as the banks have been straightened and reformed.

The group was created to improve the River Keer salmonid fishery. In 1995, a study was undertaken to summarise rod catch, redd count and fisheries survey data. Fisheries and habitat surveys were undertaken to establish what factors were limiting the salmonid population. The report made recommendations of actions which might lead to improvement.

River Conder

The River Conder has also had a declining salmon, sea trout and brown trout fishery despite good spawning and nursery habitat and a sustainable river flow.

Common problems

There are some problems that occur throughout the catchment which have been discussed further in the Lune Salmon Action Plan. These include:

The River Keer, River Conder and Lower River Lune have suffered with enrichment. There are vast blooms of blanket weed which have the potential to deoxygenate the water and disrupt angling.

Fish-eating bird numbers are thought to be increasing throughout the catchment. Numbers appear to be rising on rivers, still waters and the Lancaster Canal. Ways of mitigating their effects on fish population need to be investigated.

There are many borehole abstractions on the River Keer which require monitoring so that they do not reduce in-river flows.

Non native species e.g. Signal Crayfish are spreading through the River Keer catchment. Rainbow trout have escaped into the River Wenning and down to the River Lune possibly causing competition with native species.

Sea Fisheries

Around the estuaries and coast of the River Lune catchment there are commercial net fisheries for marine species such as mullet and bass using mobile, set nets and set lines. The limit of the Sea fisheries district ends at the seaward side of Carlisle Bridge, Lancaster.(see map 10)

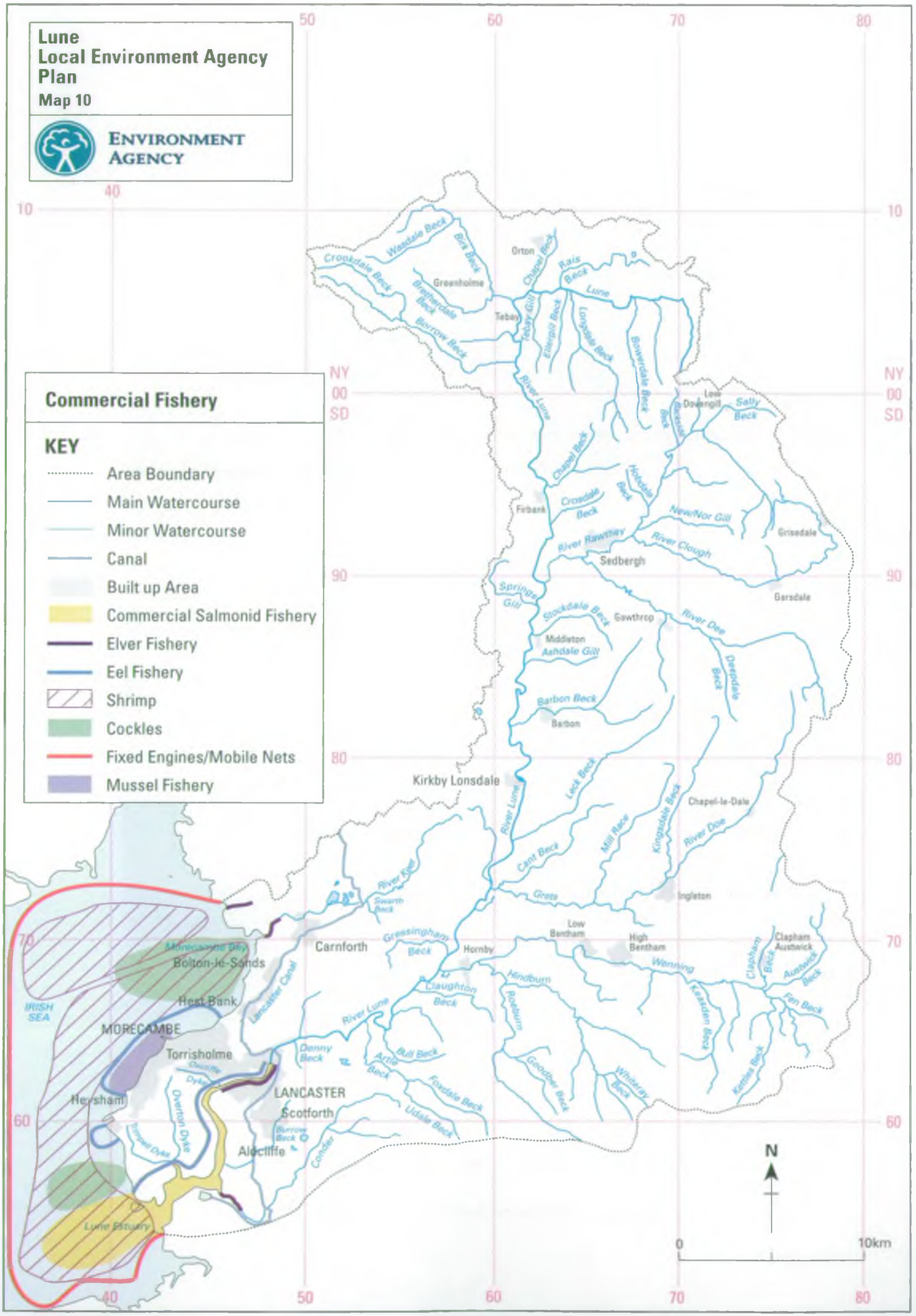
Issues Arising:

Issue 10 **Reduced run of the mature salmon and sea trout.**

Issue 11 **The impact of barriers restricting the distribution of fish in the River Lune area.**

Lune
Local Environment Agency Plan
Map 10

ENVIRONMENT AGENCY



2.7 RECREATION

The River Lune catchment offers full and varied opportunities for recreation (see map 11). The recreational use of the river corridor occasionally gives rise to a conflict of interest between different types of users. For example motor boats in the Estuary can disturb bird watchers and breeding birds. In these instances the Agency will attempt to resolve conflict by education of, and liaison with the user groups and by encouraging good codes of practice where possible. The area wide tourist industry has centres at Lancaster, Morecambe, Carnforth, Kirkby Lonsdale, Sedbergh, Dent and Ingleton.

There are many footpaths throughout the area and open fell walking is available in the Upper Valley. With the assistance of one of the Agency's predecessor organisations, Lancaster City Council established a Lune Valley ramble along the banks from Lancaster to Kirby Lonsdale. There is also a coastal footpath running through the catchment. Some cycle ways have been created around the Lower Lune Valley including the Lancaster to Bull Beck cycle way. Lancaster City Council have been successful in a bid for a Millennium Lottery Grant to create a riverside millennium park on the lower river. The park will incorporate a new circular path on the river bank and a new bridge over the river to encourage new walks and cycle routes. The Agency will work in collaboration with landowners and local government to improve environmentally sustainable access routes along the river corridor for a variety of user groups.

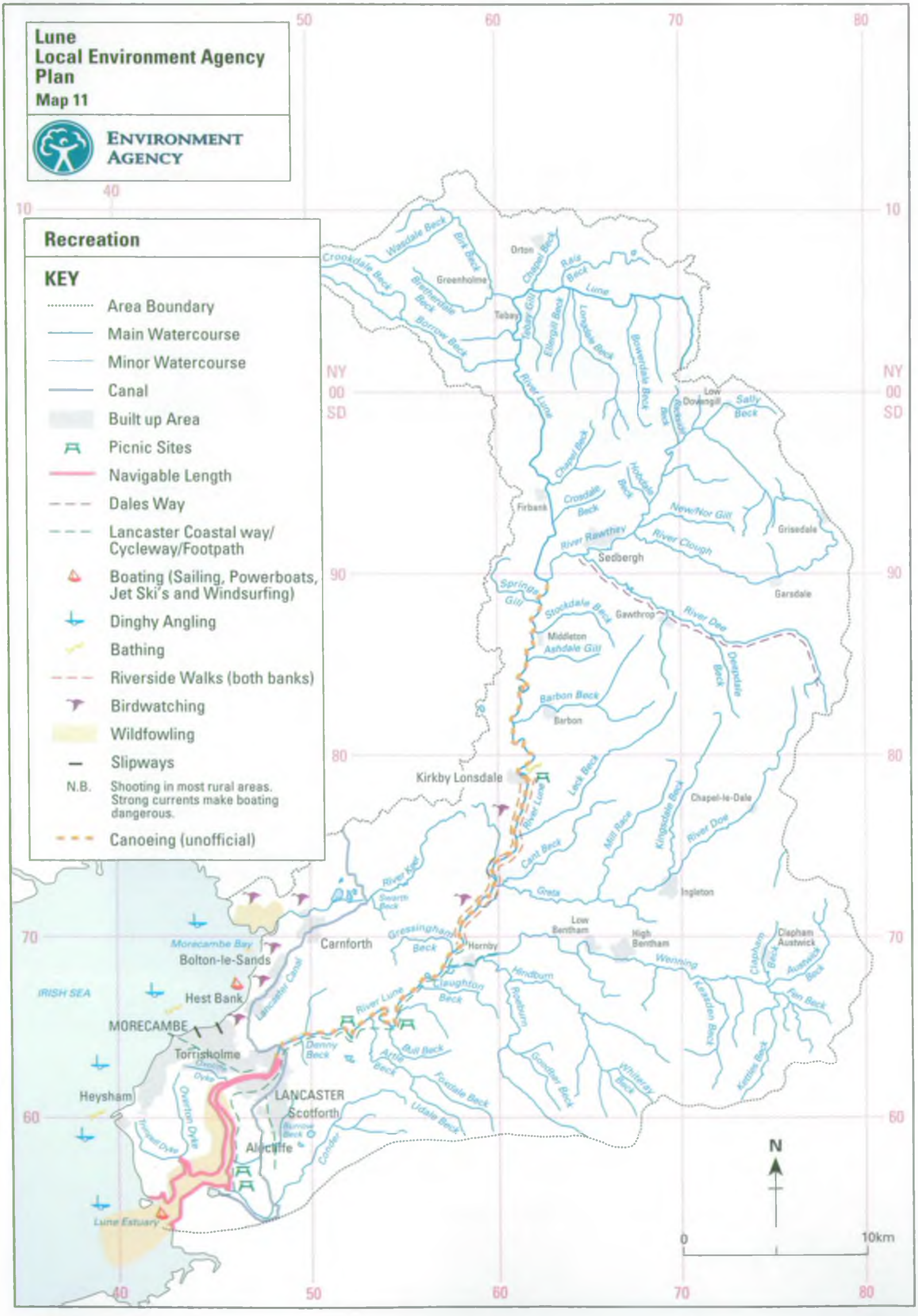
The River Lune is one of the best rivers in the North West for canoeing, both for touring and white water runs. Although there is no right of navigation above the tidal limit, the Lune is regularly paddled from the Crook o' Lune bridge to the confluence with the River Rawthey and from Halton rapids to the Estuary at Glasson Dock. Most canoeing takes place outside of the fishing season, although the Agency is facilitating discussions between one riparian owner and a local canoe club to provide extra days during the start of the fishing season with the eventual aim of bringing a national slalom event back to Halton. Paddling from Halton to Glasson Dock takes place throughout the year, some tributaries are also canoed under high water conditions. Access for canoeing could be improved at Skerton Weir and a point near to Salt Ayre. John O'Gaunt Rowing Club utilises the River Lune just upstream of Lancaster by agreement with the Lansil Angling Club.

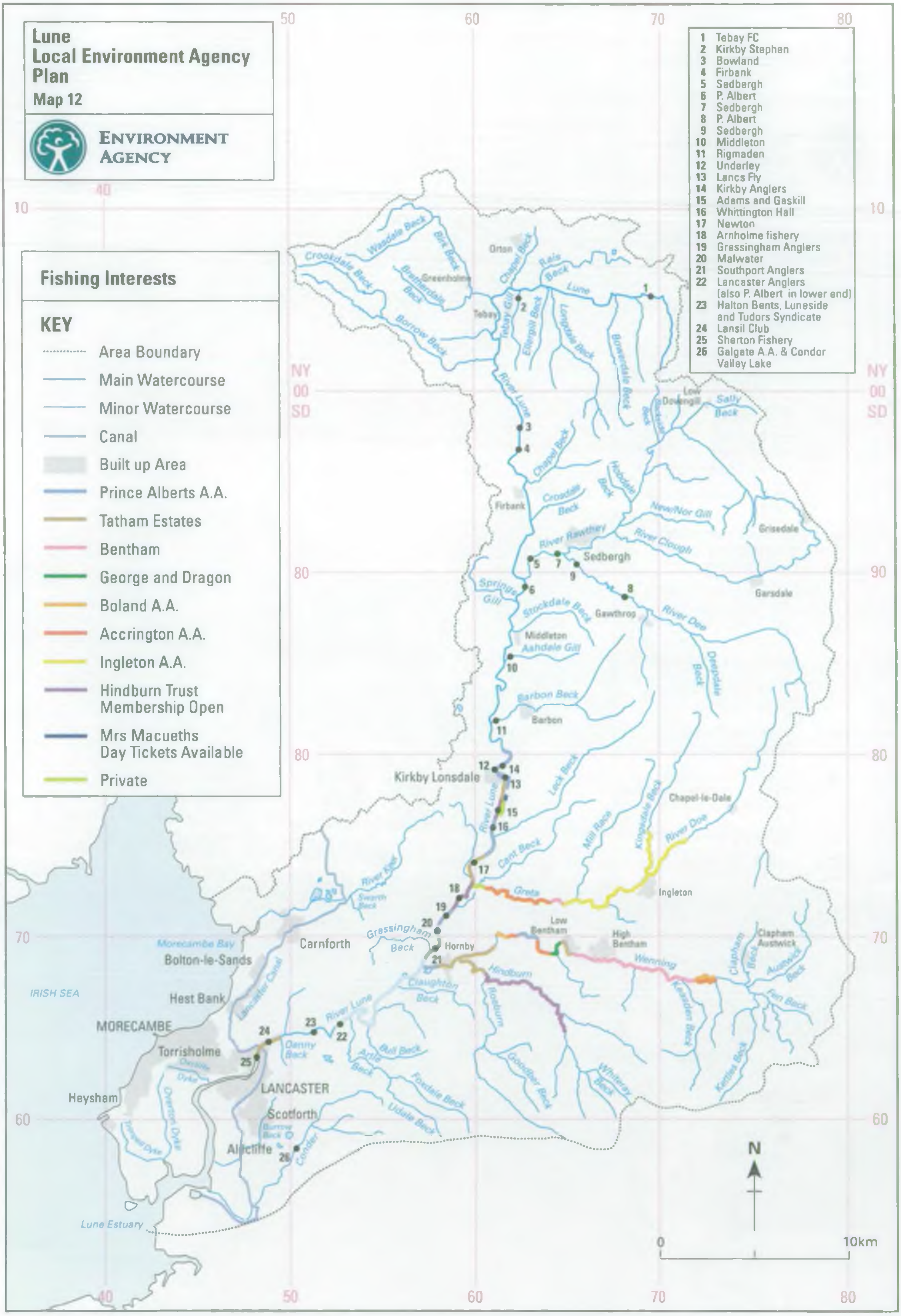
There is pot holing in the limestone areas, centering on the village of Ingleton. There is also diving in the River Lune, with a diving club based on Over Kellet Quarry. Sailing clubs are based on the River Lune and at Morecambe. There are slipways at Morecambe and boat launching at Snatchems. There is bathing at Morecambe, skiing, power boating and jet skis operate around the Bay and on the Lune Estuary. Ski-ing and wind surfing also take place near Morecambe.

The Lune catchment has a major migratory salmonid fishery. The Agency owns the fishing rights to parts of the River Lune at Halton and Skerton. These fisheries are run on a day ticket basis to provide good quality fishing to local residents and tourists. The majority of angling in this area is under private club control. There is coarse fishing on the Lower River Lune, Lancaster Canal and still waters, together with some still water trout fisheries (See map 12). The Lancaster Canal also provides recreational facilities for walkers, cyclists and pleasure boaters.

Issue Arising:

Issue 12 **The conflict of interest between different types of recreational users.**


Lune
Local Environment Agency Plan
Map 11
Environment Agency
Recreation
KEY
Area Boundary
Main Watercourse
Minor Watercourse
Canal
Built up Area
Picnic Sites
Navigable Length
Dales Way
Lancaster Coastal way/ Cycleway/Footpath
Boating (Sailing, Powerboats, Jet Ski's and Windsurfing)
Dinghy Angling
Bathing
Riverside Walks (both banks)
Birdwatching
Wildfowling
Slipways
N.B. Shooting in most rural areas. Strong currents make boating dangerous.
Canoeing (unofficial)
NY
00
SD
Orton
Greenholme
Tebay
Firbank
Sedbergh
Grisedale
Garsdale
Gawthrop
Middleton
Barbon
Kirkby Lonsdale
Chapel-le-Dale
Ingleton
Low Bentham
High Bentham
Clapham
Austwick
Hornby
Carnforth
Bolton-le-Sands
Hest Bank
MORECAMBE
Torrisholme
Heysham
LANCASTER
Scotforth
Aldcliffe
Morecambe Bay
IRISH SEA
Lune Estuary
River Lune
River Rawthey
River Clough
River Dee
River Doe
River Keer
Lancaster Canal
Wenning
Hindburn
Roeburn
Greta
N
0
10km



Lune
Local Environment Agency Plan
Map 12
ENVIRONMENT AGENCY
Fishing Interests
KEY
Area Boundary
Main Watercourse
Minor Watercourse
Canal
Built up Area
Prince Alberts A.A.
Tatham Estates
Bentham
George and Dragon
Boland A.A.
Accrington A.A.
Ingleton A.A.
Hindburn Trust Membership Open
Mrs Macueths Day Tickets Available
Private
1 Tebay FC
2 Kirkby Stephen
3 Bowland
4 Firbank
5 Sedbergh
6 P. Albert
7 Sedbergh
8 P. Albert
9 Sedbergh
10 Middleton
11 Rigmaden
12 Underley
13 Lancs Fly
14 Kirkby Anglers
15 Adams and Gaskill
16 Whittington Hall
17 Newton
18 Arnholme fishery
19 Gressingham Anglers
20 Malwater
21 Southport Anglers
22 Lancaster Anglers (also P. Albert in lower end)
23 Halton Bents, Luneside and Tudors Syndicate
24 Lansil Club
25 Sherton Fishery
26 Galgate A.A. & Condor Valley Lake
Orton
Greenholme
Tebay
Crookdale Beck
Wasdale Beck
Birk Beck
Bretherdale Beck
Borrow Beck
Chapel Beck
Rais Beck
Lune
Tebay Gill
Ellergill Beck
Longdale Beck
Bowderdale Beck
River Lune
Low Dovengill
Sally Beck
Firbank
Croasdale Beck
Hobdale Beck
Chapel Beck
New/Nor Gill
Grisedale
River Rawthey
River Clough
Sedbergh
Garsdale
Springs Gill
Stockdale Beck
Gawthrop
River Dee
Middleton
Aashdale Gill
Deepdale Beck
Barbon Beck
Barbon
Kirkby Lonsdale
Leck Beck
Chapel-le-Dale
Kingsdale Beck
River Doe
Mill Race
Cant Beck
River Keer
Swarth Beck
Greta
Ingleton
Morecambe Bay
Carnforth
Bolton-le-Sands
Gressingham Beck
Hornby
Low Bentham
High Bentham
Wenning
Clapham
Austwick
Clapham Beck
Austwick Beck
Fen Beck
IRISH SEA
Hest Bank
Lancaster Canal
Claughton Beck
Hindburn
Roeburn
Keasden Beck
MORECAMBE
River Lune
Denny Beck
Artle Beck
Bull Beck
Torrisholme
Goodber Beck
Whitray Beck
Kettles Beck
LANCASTER
Foxdale Beck
Heysham
Scotforth
Udale Beck
Overton Dyke
Aldcliffe
Conder
Lune Estuary
N
0
10km
NY 00 SD

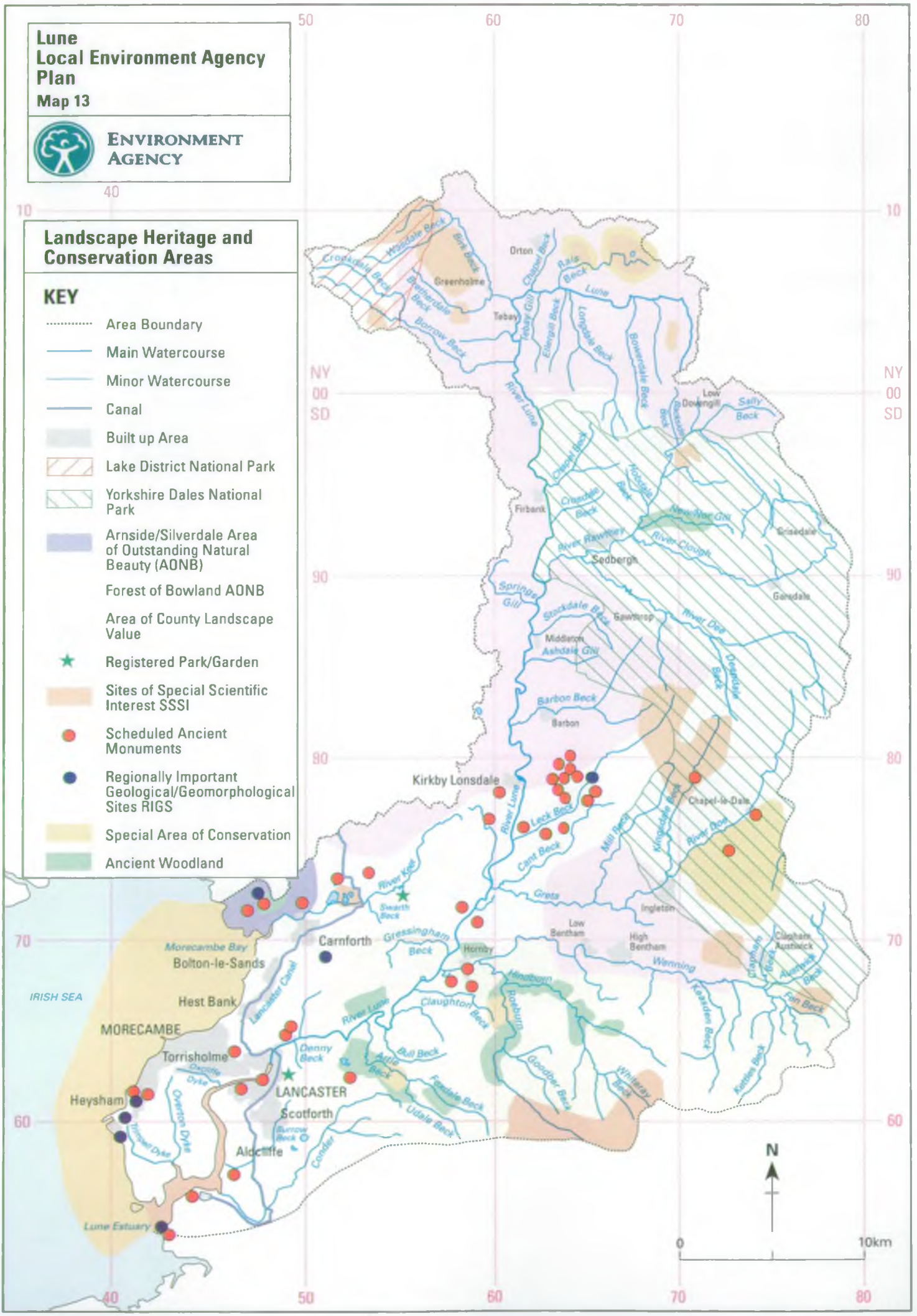
Lune
Local Environment Agency Plan
Map 13

ENVIRONMENT AGENCY

Landscape Heritage and Conservation Areas

KEY

- Area Boundary
- Main Watercourse
- Minor Watercourse
- Canal
- Built up Area
- Lake District National Park
- Yorkshire Dales National Park
- Arnside/Silverdale Area of Outstanding Natural Beauty (AONB)
- Forest of Bowland AONB
- Area of County Landscape Value
- Registered Park/Garden
- Sites of Special Scientific Interest SSSI
- Scheduled Ancient Monuments
- Regionally Important Geological/Geomorphological Sites RIGS
- Special Area of Conservation
- Ancient Woodland



2.8 WILDLIFE, LANDSCAPE AND HERITAGE

General

The Environment Agency has a duty to conserve and improve the natural beauty of inland and coastal waters and associated land. The Agency also has to consider the need to protect and conserve buildings and objects of historic interest associated with the aquatic environment. Nationally important sites are included, as well as local sites of value.

Opportunities for improvement are achieved by the Agency working with Local Authorities and developers and in work undertaken as part of the Agency's capital and maintenance programmes.

Local Perspective

The River Lune is one of the largest rivers in the north west of England and is quite unusual as it remains in a relatively undeveloped, pristine condition. This is reflected in the vast range of wildlife the area supports, and in turn its many designations for specific species and habitats. Together with Morecambe Bay it forms an area not only of local significance but is also of great regional, national and international importance. (See map 13)

One can see that the area has a diverse range of landscape types. They are predominantly rural landscapes and much valued. One can see from the landscape map that over three quarters of the area has some sort of designation for its beauty. This includes two national parks (the Lake District and Yorkshire Dales) and two Areas of Outstanding Natural Beauty (Forest of Bowland and Arnside/Silverdale). Other areas are designated as areas of county landscape value. Although much of the area has some form of designation to protect its landscape very little of this is wild land that will be self maintaining. Most of its farmed and so changes in farming practices, grants, subsidies etc will have major consequences for the area's landscape.

The Lune area encompasses a wide variety of habitats, and this is reflected in the associated rich wildlife resource. English Nature and 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. For each area there is a description of the areas and its character. The River Lune flows through seven of these character areas. The landscape of the area is thus very diverse comprising rugged and dramatic high outcrops of sandstone and limestone and a low fertile coastal plain. The rocky outcrops have been eroded by glaciers to give them their steep sided valleys, while the coastal plain was formed by deposition from the retreating glaciers.

The River Lune rises in the north east of the area and flows west. The steep sided, rounded hills of the Howgill Fells Character Area are to the south. These fells are composed of acidic sandstones and siltstones which outcrops in places. Within the Howgill and Birkbeck Fells area there are many sites designated as Special Areas of Conservation (SAC) and Sites of Special Scientific Interest (SSSI). This upland area is also an important breeding area for many wading birds, including redshank and curlew. The area is heavily grazed by sheep and is dominated by poor acidic grassland with smaller patches of over grazed heather and blanket bog. Many fast flowing streams with deeply incised valleys flow from this area into the Lune valley.

In contrast on the north side of the valley are the Orton Fells Character Area which are composed of limestone. On the tops of these hills are dramatic scars and limestone pavements. On the lower ground there are many flower rich meadows and areas of bright green improved pasture on the more fertile soils. Here there are few surface rivers, as limestone allows water to drain through it easily. In both areas woodland is sparse and trees are mainly found on the lower slopes in proximity to villages and farmhouses. Fields are divided by dry stone walls which use the stone native to that area.

At Tebay the river then heads south in a steep sided valley with Lake District Fells to the west and the Pennines to the east.. It joined by Borrow Beck, a tributary that drains the Shap Fells. It shares this valley with same major communication lines namely the M6 motorway and the main West Coast Intercity railway line. North of Sedbergh where the motorway and railway line leave the Lune valley the River becomes the boundary for the Yorkshire Dales National Park which is to the east. The Lune continues south through a distinct river valley with a widening flood plain towards Kirby Lonsdale. The valley is well wooded compared to the rest of the area. To the west are the low, gently rounded foothills of the Lake District. The area drained by the River Lune is very asymmetrical being in places only a mile wide to the west of the River Lune but about 12 miles wide to the east.

To the east is the large scale upland landscape of high, exposed moorland dissected by often deep valleys or dales of the Yorkshire Dales Character Area. The predominant rock here is carboniferous limestone. This is overlain by a sequence of sedimentary sandstone and shales, which are then overlain by Millstone Grit, which caps some of the highest peaks.. This gives rise to the typically stepped profiles of the dale sides. Population of the area has always been low and concentrated in the Dales. The Dales are sheltered valleys each with their own distinctive character. The field patterns are generally smaller and more irregular compared to the wilder high moorland. The whole area is farmed, but because of the relatively high altitude, poor climate and rocky nature of the area, this has been limited to grazing and hay cutting. This is a system that has undergone very little change and as a result there is a strong sense of continuity with the past. Grazing is chiefly by sheep with small herds of cattle. This has given rise to the many stone built cattle barns which are dotted on the hillsides and are very characteristic of this area. The meadows in the valley bottoms are often very species rich and of great landscape and ecological value.

In the uplands where the more acidic rocks are exposed the scenery is of heather moorland and acidic grassland. However, it is where the limestone outcrops, particularly around the 724 metre high summit of Ingleborough, that occurs some of the best examples of "karst" (limestone) scenery in Britain occur.

Within the Lune area there are many outcrops, scars, pavements, gorges and one of the most extensive cave systems in Europe. The cave systems often take much of the surface waters leaving rivers only in the bottom of the dales or where the rocks are less permeable.

The River Lune meanders south on its large flood plain in its distinct valley on the edge of the Dales. The river valley land use is predominantly of improved pasture with fields divided by walls in the upper areas and hedges lower down. The river flows through Kirby Lonsdale. Here four character areas meet: The South Cumbria Low Fells, The Yorkshire Dales, The Bowland Fringe and the Morecambe Bay Limestones.

Only a small part of the Morecambe Limestones, which are to the west of the River Lune, are in this area. The Bowland Fringe is a transitional landscape between the uplands of the Bowland Fells and The Yorkshire Dales and the relatively flat and low lying Morecambe Coast and The Lune Estuary Character Area. The Bowland Fells Character Area is formed from hard Millstone Grit which forms a large wild and windswept plateau dominated by blanket bog and heather moorland. This plateau is incised by many steep sided cloughs and valleys with fast flowing streams. These valleys merge into this Bowland Fringe which supports a rich mosaic of unimproved hay meadows and lush pasture, broadleaved woodlands, parkland, marshes, flushes and streams. There are many small picturesque villages and isolated stone farmhouses. The stone villages are characterised by village greens, stone boundary walls and narrow streets. In the lower areas walls are

replaced by hedges and the villages get larger with a mixture of building styles not all of which are native to the area.

The area has never been densely populated but has a long history of settlement. In places like the Dales because the pace of change has been so slow many historic features still survive, some of which are still in use. There are numerous prehistoric enclosures in the area, the majority of which are on the fells. The course of an old Roman road is found on the lower slopes of the eastern valley side and there are Roman forts at Lancaster and Burrow. There is also a Norman castle at Lancaster and numerous motte and bailey structures along the length of the river at Halton, Hornby, Arkholme, and Kirby Lonsdale. There are Medieval halls and moated sites found throughout the area and many numerous halls and manor houses of a later date In the Pennine Fringe Area there are many modest country houses surrounded by formal parkland. Old bridges such as Devils Bridge at Kirby Lonsdale form a major feature along the river. However, little is generally known of the total archaeological interest within the riparian zone.

The River Lune continues south west from Kirby Lonsdale in its rural valley and ever increasing flood plain between the Bowland Fringe and Morecambe Bay Limestones. The River Lune below the A65 at Kirkby Lonsdale to approximately the confluence with Oxcliffe Dyke, just downstream of Lancaster, is designated as a County Biological Heritage Site for its rivers and streams, birds, mammals, invertebrates, flowering plants and ferns, fish and bryophytes.

The M6 marks the start of the last character area: the Morecambe Coast and The Lune Estuary. This area is underlain by limestone and sandstone which outcrops at the coast in low promontories. Elsewhere they are covered by thick glacial deposits of sand, gravel, clay and alluvial material. North and east of Lancaster and Morecambe there many drumlins and eskers forming a hummocky landscape. The low lying coastal strip was once an area of extensive freshwater fens, saltmarshes and raised bogs. These have largely been drained, saltmarsh reclaimed, sea walls built and the area turned into lush green pasture grazed by sheep and cattle. On the seaward side of the seawall, however, there are still extensive areas of ungrazed saltmarsh, which is relatively uncommon in North West England, and intertidal muds and sands. The Lune Estuary downstream from Oxcliffe Dyke is a SSSI and is included in the candidate SAC for Morecambe Bay. The Estuary forms a major link in the chain of estuaries along the west coast of Britain used by birds on migration between the breeding grounds in the far north and the wintering grounds further south.

Morecambe Bay is designated a SSSI and Special Protection Area (SPA). It is a Wetland of International Importance - a Ramsar site. These designations recognise the importance of the area for migratory and breeding wildfowl and waders, which depend on the expanses of mudflats and saltmarsh. The saltmarshes support a variety of plant communities and a number of uncommon plant species and provide roosting sites for birds at high tide. The mudflats are exposed for considerable periods of time between the tides and are rich in invertebrate life, providing extensive feeding grounds for waders and wildfowl.

The coastal plain is the only area of substantial urban development including Lancaster, an historic city with many fine sandstone buildings, Morecambe, a holiday resort and the historic village of Heysham. In the industrial area to the south of Heysham, a large port has developed and a large nuclear power station has been built.

The River Keer is a relatively small catchment running from south east of Hutton Roof to Carnforth and out into Morecambe Bay. The catchment is predominantly rural, most land use being improved grazing pasture and small commercial forestry.

The Lancaster Canal is designated a County Biological Heritage Site for its floral communities and forms an important wildlife corridor.

The River Conder is another small catchment running from the north of Quernmore, south to Galgate and eastwards to Conder Green and out into the Lune estuary. This rural catchment is dominated by improved grazing pasture.

Issues arising:

Issue 1 The protection and restoration of existing and degraded important habitat types and their associated species, to protect and increase biodiversity.

Issue 16 The lack of knowledge of archaeological and historical interest within the riparian zones.

2.9 WATER ABSTRACTION

It is the Agency's responsibility to assess, plan and conserve water resources. The Environment Act 1995 reinforced the duty under the Water Resources Act 1991 which describes the duty to ensure that measures are taken towards the conservation, redistribution, augmentation and proper use of water resources, whilst at the same time conserving and enhancing the environment. The Act requires the Agency to make arrangements with water and sewerage undertakers and statutory water companies to secure the proper management and operation of water resources and associated work.

Water resources strategic aims:

- To plan for the sustainable development of water resources, develop criteria to assess the reasonable needs of abstractors and of the environment
- To collect validate and store hydrometric data and water environment data in order to asses water resources.
- To apply a nationally consistent approach to abstraction licence determination, charging , policy and enforcement.
- To implement a consistent approach to the resolution of inherent problems caused by authorised abstractions (Low flows River Conder)
- To work with other functions and external bodies to protect the quality of our water resources.

In order to achieve these aims, the Agency will continue to ensure the effective management of the resource by the development and implementation of regional water resources strategies and the implementation of licensing policies.

Water Resources

Groundwater and surface water together make up the water resources of the catchment. This resource is used as a source of potable water or for other uses. However, the resources must be protected in terms of quality and quantity by achieving a balance between the rights of abstractors and other lawful users of the waters and the needs of the environment.

Where there are valid requirements for water abstraction and competition with other river uses there is a need to strike a balance between the various interests to secure optimum development of resources . Such management is achievable through licensing through abstraction licences which specify the quantities of water which may be abstracted. Abstractors are charged for the right to use water in accordance with a tariff based on factors such as licensed quantity, source, season of abstraction and category of use. Licensing procedures are used to manage both surface and groundwater.

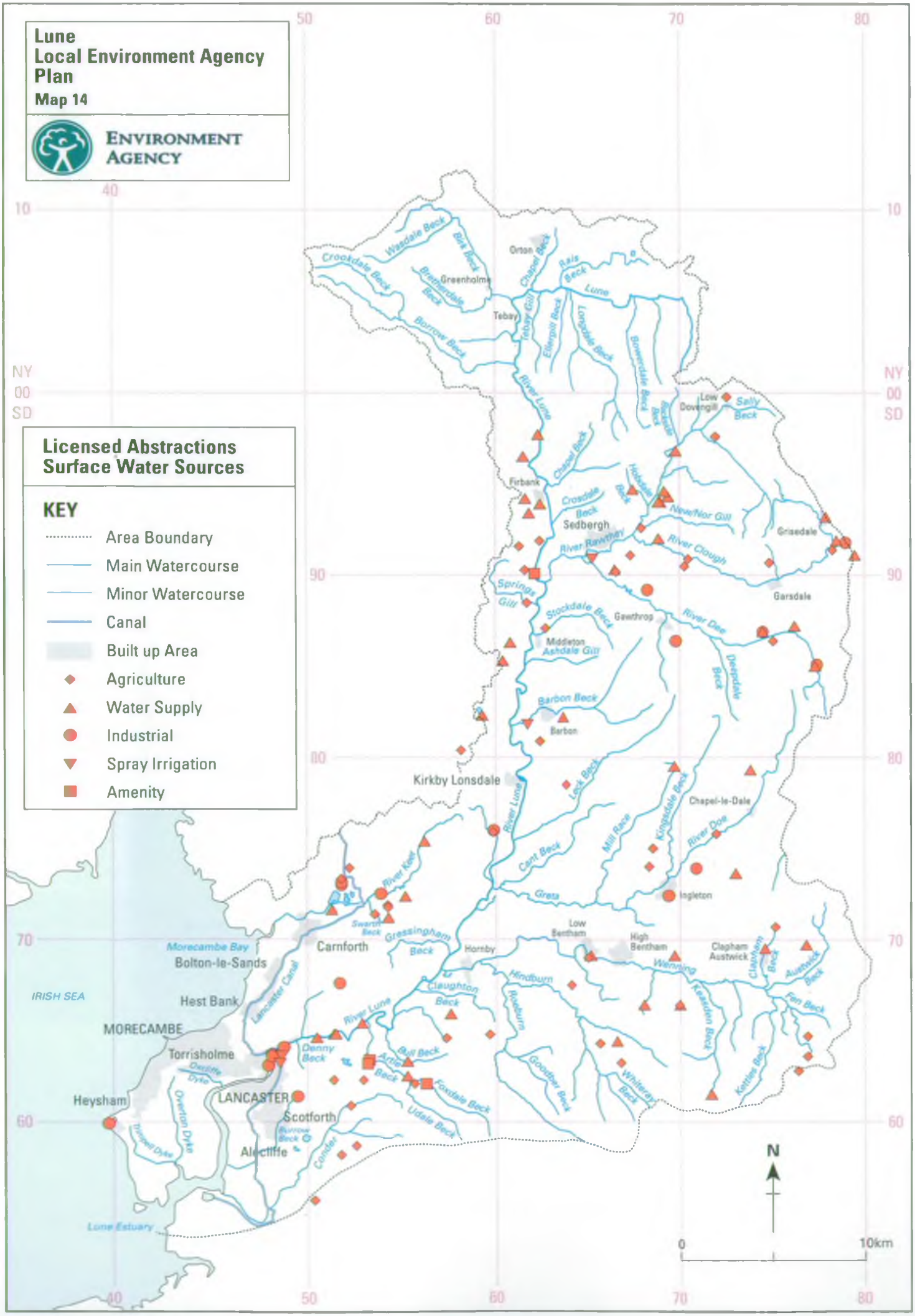
Public Water Supply

The surface waters of the Lune catchment are primarily used for public water supply mainly to supply the Lancaster area, the Fylde and north Preston areas. The supply of potable water is the sole responsibility of North West Water Ltd and Yorkshire Water .

The earliest developments for public water supply was surface water abstraction from the Lune at Caton which feeds Langthwaite reservoir which supplies the Lancaster area.

Lune
Local Environment Agency Plan
Map 14

ENVIRONMENT AGENCY



The major water supply network in the Lune/Wyre catchment is the Lancashire Conjunctive Use Scheme (LCUS), which was commissioned in the mid/late 1970s.

The LCUS comprises a number of diverse sources, both within and outside the Lune catchment as listed below:

Stocks Reservoir (Ribble catchment)
Barnacre Reservoir, with associated intakes
River abstraction from the River Wyre at Garstang
River abstraction from River Lune transfer to river Wyre
Groundwater abstraction from the Fylde aquifer

When there is insufficient water in the Wyre to satisfy abstraction requirements, water may be available in the Lune and can be transferred via pipeline to the Wyre at Abbeystead for re-abstraction at Garstang, There are residual flow conditions on both the Lune and the Wyre to protect the rivers. The abstraction licence from the river Lune specifies that abstraction will not take place when the flow in the Lune falls below 365Ml/d. This is measured at Skerton weir in Lancaster.

Surface Water Abstractions (Non-Public Water Supply)

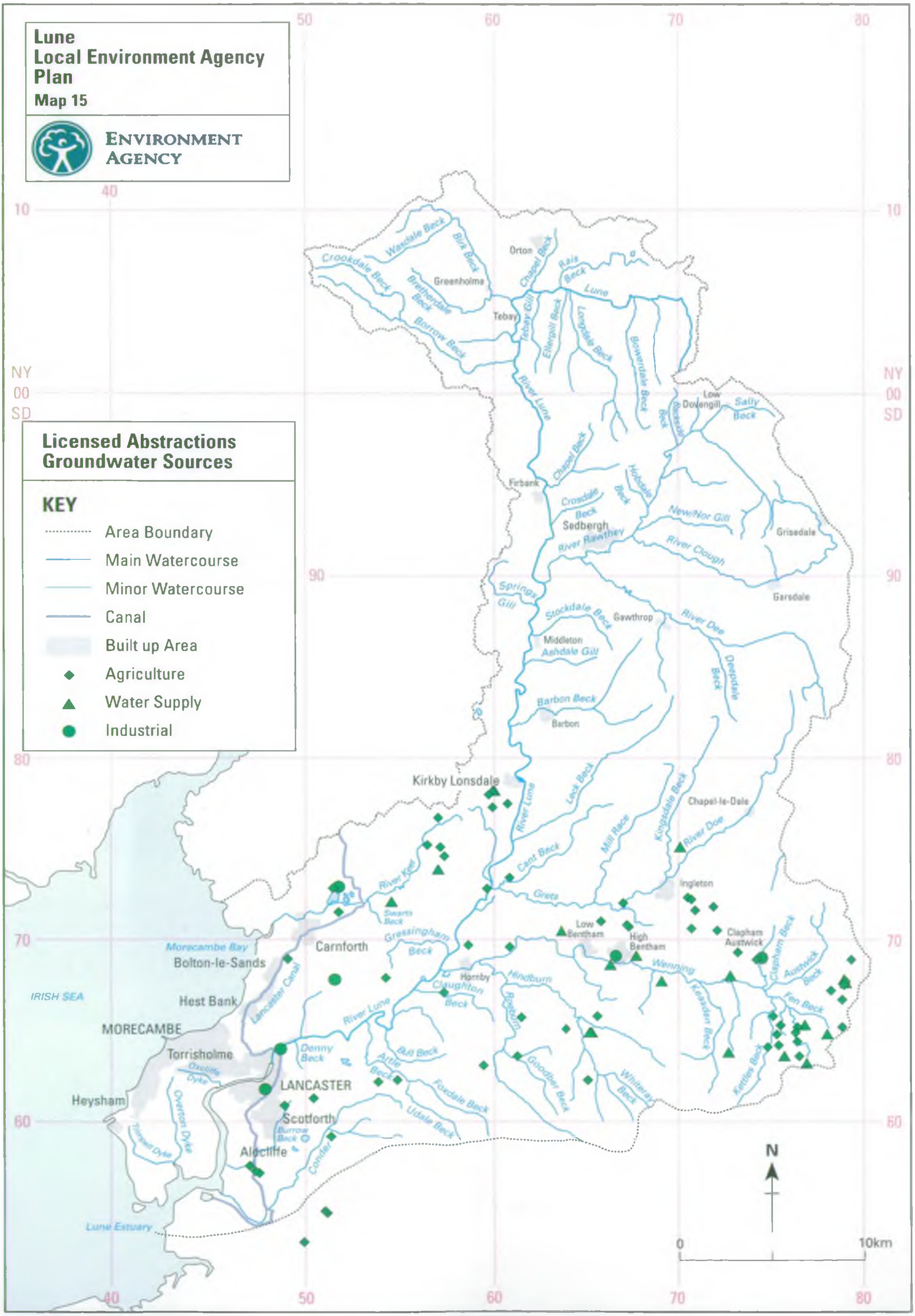
There is limited abstraction from the river Lune and its tributaries for industry, agriculture and fish farming purposes.

The Lancaster canal flows through the Lune catchment in the north/south direction with abstraction from the River Conder to supply the Glasson branch of the canal. This intake has the ability to abstract the total flow of the river causing critical low flow conditions in the River Conder downstream of the point of abstraction.

Water Use	**Surface Water Annual Licensed Quantities**	
	%	**Megalitres (Ml)**
Domestic/Agriculture	11.76	16,946
Industrial	16.73	24,099
Spray Irrigation	0.03	12
Amenity	0.90	1307
Water Supply	70.58	101,674
	Total	144,038

There is one major tidal abstraction from the Heysham Dock by Nuclear Electric for industrial - cooling purposes at Heysham Nuclear Power Stations.

(See map 14)


Lune
Local Environment Agency Plan
Map 15
ENVIRONMENT AGENCY
Licensed Abstractions Groundwater Sources
KEY
Area Boundary
Main Watercourse
Minor Watercourse
Canal
Built up Area
Agriculture
Water Supply
Industrial
Orton
Greenholme
Tebay
Crookdale Beck
Wasdale Beck
Birk Beck
Bretherdale Beck
Borrow Beck
Chapel Beck
Rais Beck
Lune
Tebay Gill
Ellergill Beck
Longdale Beck
Bowderdale Beck
River Lune
Low Dovengill
Sally Beck
Chapel Beck
Firbank
Crosdale Beck
Hobdale Beck
Sedbergh
River Rawthey
New/Nor Gill
River Clough
Grisedale
Garsdale
Springs Gill
Stockdale Beck
Gawthrop
River Dee
Middleton
Ashdale Gill
Deepdale Beck
Barbon Beck
Barbon
Kirkby Lonsdale
Leck Beck
Kingsdale Beck
Chapel-le-Dale
Mill Race
River Doe
Cant Beck
Greta
Ingleton
River Keer
Swarth Beck
Gressingham Beck
Low Bentham
High Bentham
Clapham
Austwick
Clapham Beck
Austwick Beck
Wenning
Keasden Beck
Fen Beck
Kettles Beck
Hornby
Claughton Beck
Hindburn
Roeburn
Goodber Beck
Whitray Beck
Bull Beck
Artle Beck
Foxdale Beck
Udale Beck
Denny Beck
River Lune
Morecambe Bay
Carnforth
Bolton-le-Sands
IRISH SEA
Hest Bank
Lancaster Canal
MORECAMBE
Torrisholme
Heysham
Overton Dyke
LANCASTER
Scotforth
Burrow Beck
Aldcliffe
Conder
Lune Estuary
N
0
10km
NY
00
SD
10
40
50
60
70
80
90

Groundwater Abstractions

Groundwater may be abstracted from water bearing strata (aquifers) by means of wells or boreholes, or by making use of naturally occurring springs.

The Lune area has numerous small sources which are used for domestic and agricultural purposes.

The only major abstractions from groundwater are for industrial purposes in the Lancaster area adjacent to the River Lune.

(See map 15)

Water Use	Groundwater Annual Licensed Quantities	
	%	Megalitres (Ml)
Domestic/Agriculture	13.23	1241
Industrial	83.47	7830
Spray Irrigation	------	------
Amenity	------	------
Water Supply	3.30	310
	Total	9381

Geology and Hydrogeology

The Lune area encompasses rocks of diverse age and type. The oldest rocks, comprising siltstones and sandstones of Silurian and Devonian age, occur to the north west of the area. These pre-Carboniferous basement beds form the south eastern flank of the Lake District dome. Being generally hard and resistant to erosion, they produce marked relief; structurally they tend to be intensely folded and faulted. In hydrogeological terms these rocks may be considered to be effectively impermeable, except for some limited groundwater storage and movement in shallow fractured/weathered zones. Although classed as non-aquifer, they support numerous small scale private water supplies (springs) within the area.(see map 16)

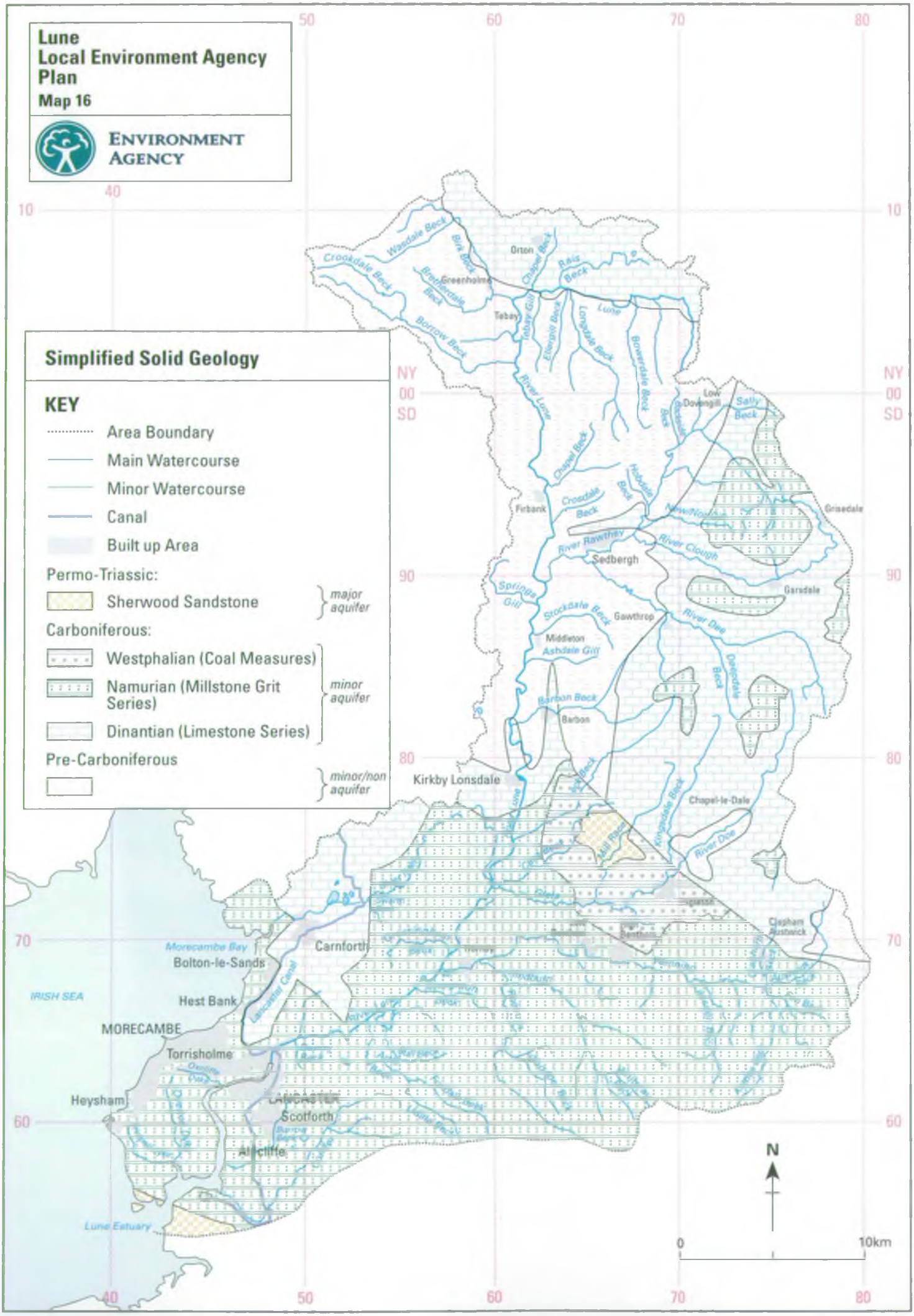
These are overlain by Carboniferous Limestone Series (Dinantian) strata; thick limestones interbedded with shales and sandstones. The more massive limestone units often show well developed karstic features Groundwater movement is entirely by fissure flow. Locally this has been enhanced by solution weathering, giving rise to rapid and complex flows. As such they are generally highly vulnerable to pollution. Discharges from the limestones often provide significant albeit 'flashy' contributions to surface waters.

The limestones are important mineral reserves which are quarried for aggregate.

Younger Millstone Grit Series (Namurian) strata are present in isolated areas to the east and extensively in the southern half of the catchment. These are represented by an alternating sequence of shales/mudstones and sandstones/grits. The sandstones act as individual aquifer units, separated by the low permeability

Lune
Local Environment Agency Plan
Map 16

ENVIRONMENT AGENCY



shales/mudstones and often disturbed by folding and faulting. The sandstones are exploited for private water supplies in areas remote from the mains water system.

A small basin of Coal Measures (Westphalian) rocks occurs in the centre of the catchment. Like the Namurian, these comprise mudstones interbedded with (albeit thinner) sandstones, as well as coal seams.

All of the Carboniferous sequence is defined as being *minor aquifer*

The youngest rocks of the catchment are the Permo-Triassic Sherwood Sandstones. These are present as an isolated block surrounded by the Westphalian basin referred to above, and in the extreme south. The latter is the northern tip of the Fylde aquifer, which extends down into the Wyre catchment where it is heavily exploited for public and industrial water supply. The Sherwood Sandstone is classed as a *major aquifer*.

It has been identified that the Fylde Aquifer is under stress and a restriction has been imposed on any additional abstraction from it pending the findings of a groundwater resources study.

The geomorphology of the area has been strongly influenced by glaciation. The higher ground (formed by the Carboniferous and pre-Carboniferous strata) is essentially drift-free, with the exception of localised development of peat deposits. In contrast, the lower lying areas are largely covered by glacial deposits, comprising predominantly till (boulder clay). Alluvium is present within the flood plain of the Lune and its tributaries.

Where thick permeable gravels are present the drift represent minor aquifers as well as providing baseflow to watercourses. They have been extensively worked for aggregates around Carnforth. In contrast, significant thicknesses of low permeability glacial till will inhibit groundwater recharge to deeper aquifers whilst affording protection from pollution by mans activities. (See map 17)

Groundwater

The Agency seeks to ensure the protection of groundwater resources by the delineation of groundwater protection zones and the implementation of these in conjunction with the Agency's Groundwater Protection Policy (G.P.P.). The policy deals with the concepts of the vulnerability and risk to groundwater from a range of human activities. It considers both source and resource protection, i.e. protection of the area which drains to the abstraction point and protection for the total area of the aquifer irrespective of abstractions.

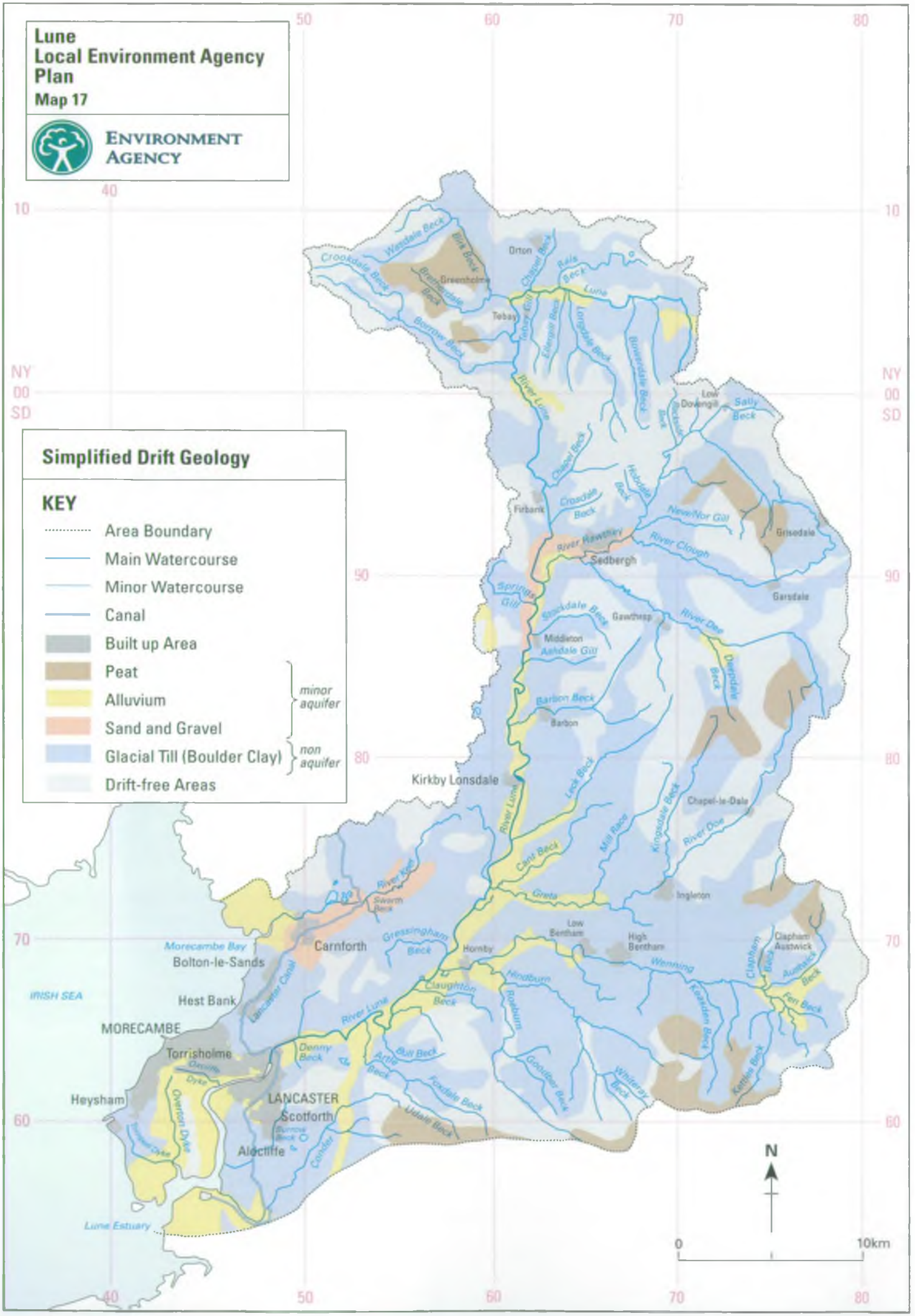
Groundwater resource Objectives

In dealing with new applications involving groundwater abstractions, the following objectives will be pursued:

- To manage resources to safeguard water supplies.
- To manage groundwater resources sustainably to meet future demand
- To protect aquifers from over-commitment and ensure groundwater abstraction does not have and unacceptable effect on surface waters and related environmental interests.
- To ensure the best utilisation of water resources without detriment to related environmental interests.

Lune
Local Environment Agency Plan
Map 17

ENVIRONMENT AGENCY



Groundwater protection Objectives.

Groundwater is a vital resource and under particular threat from the effects of human activity. Once polluted groundwater is often difficult and very expensive to remediate. Therefore preventing groundwater contamination is a major objective. This would include identifying major groundwater abstractions which require a source protection zone and including them in the rolling programme .

Environmental Considerations

The Agency has a role in implementing the European Habitats Directive. The Directive's objective is to maintain, and, where necessary, restore favourable conservation status in respect of designated areas, which comprise Special protection Areas (SPAs), and Special Areas of Conservation (SACs), and Sites of Special Scientific Interest (SSSIs).

There will be a requirement for the Agency to review Abstraction Licences affecting designated sites between 1998 and 2004, and ensure that it uses its powers to contribute to conservation objectives of these sites.

There are a variety of pressures on the plants and animals of the environment. It is essential to undertake monitoring to assess the current state of ecosystems in order to know how to best direct resources, and assess the impact or potential future impacts of water abstractions. This will help to support the protection of wetlands by achieving a better understanding between the interaction of groundwater abstractions on surface water wetlands and low flows.

An integrated approach to protecting and enhancing biodiversity is required by reducing pollution, improving habitats and maintaining river flows within the natural carrying capacity of ecosystems

Future Demand

Water is one of our most valuable natural resources, everybody should ensure that each drop is used wisely and not wasted. There are increasing pressures on the water environment, from the water companies for public supply, agriculture and industry. It is the role of the Environment Agency to ensure that the balance between the needs of the natural water environment and the demands for water are achieved and maintained.

This increase in pressure on the water environment has resulted in the need to promote demand management. In addition there is the requirement to promote the reduction of leakage from distribution systems by water companies and waste of water by industry and in the home.

Future increases in urban development in the catchment and increases in industrial activity can have a significant impact on future demands for water, therefore the Agency, help to promote water efficiency and waste minimisation throughout the catchment.

If we can reduce the 'waste' of water and use it more efficiently at home and in the work place there could be a reduction in the amount of water abstracted from groundwater, rivers and reservoirs. This is particularly important during times of drought when the rivers are under particular pressure from naturally lower flows and higher demands during the hot weather.

It is essential that everything is done to reduce the level of water lost through leaking pipes. North West Water are committed to reducing total leakage by 250 Ml/d (millions of litres per day) company wide by 1999/2000. This is similar to the quantities abstracted through the Lune - Wyre transfer, as part of the LCUS.

The successful implementation of demand management will ensure the proper use of the water environment and the protection of the natural water environment and the wildlife which lives there.

Issue Arising :

Issue 3 Low flows within the catchment adversely affecting wildlife due to historic rights of abstraction.

2.10 WASTE MANAGEMENT

Background

The Agency has specific responsibility for the regulation of waste management activities including the supervision of licensed sites, exempt activities, carriers of controlled waste, movements of hazardous waste and shipments of imported waste.

Sites that treat, keep or dispose of waste need to have a waste management licence, unless they have a specific exemption. In recent years this licensing of such activities has become increasingly complex, particularly for landfill sites accepting a wide range of wastes.

Landfilling of wastes has potential for affecting the environment and having a detrimental impact on our health and our quality of life. To ensure that the effects of landfill sites are kept to a minimum many sites will require complex engineering work. The Agency has staff who can supply the necessary engineering expertise needed to provide effective assessment of these sites and to ensure that the site operator meets their responsibilities for safeguarding the environment, health and amenity.

The Agency maintains a public register of all licensed and registered exempt sites in addition to which comprehensive records of all known closed landfilling activities are held. The information in such registers is available for the public at the area office.

Data on closed landfill sites enables the Environment Agency to act as a consultee to Local Authorities, consultants, solicitors and members of the public for any potential threat posed by landfill gas escaping from a site. Closed landfill sites are classified as contaminated land and under forthcoming legislation the Environment Agency may be given responsibility for certain areas of contaminated land which will be deemed "special sites", closed landfill sites seem likely to fall into this category.

There is a certain amount of unauthorised activity within the Lune catchment e.g. fly tipping. The Agency has a team of highly trained staff specifically dedicated to regulating such activities by applying the full range of legal powers available. Investigation of unauthorised activities may ultimately lead to prosecution of offenders through the courts. One such example of successful enforcement work has been at Over Kellet, where unsightly deposits of waste were accumulating at Oaken Head Farm and at the land adjacent to the Redwell Inn. Leachates from these waste deposits were posing threats of pollution to Gressingham Beck. The current owners of the site have agreed to provide site clean up and hence remove any pollution risks. The Agency also has responsibility for enforcing the more stringent legislation relating to hazardous waste and is responsible for the 'cradle to grave' monitoring of such material. Waste imports and exports to and from Lancashire are also regulated.

Anyone who carries waste as part of their business will need to register as a waste carrier. The agency holds a register of all such carriers of waste and at present there are upwards of 2350 registered carriers in the Lancashire Area.

Other Organisations Role In Waste

There are three other bodies with a specific remit for the controlling of waste related activities: Planning Authorities, the Environmental Health Department and Customs and Excise. In addition, the Waste Disposal Authority have responsibility for arranging for the disposal of waste collected from households.

The Planning Authority is responsible for granting planning permission - a pre-requisite for The Agency issuing a Waste Management Licence. This establishes the principal of using the land for waste management activities. This is usually a County Council issue as waste planning is of strategic importance within the

County. However, scrap yards are dealt with by the Local Planning Authority. When Unitary Authoritics are established from 1st April 1998 they may adopt responsibility for strategic planning matters including waste management.

Environmental Heath Departments also have some responsibility for waste management activities. They are involved in regulating the incineration of waste if the quantity of waste to be incinerated is between 50kg and one tonne per hour, otherwise it is the responsibility of the Environment Agency.

From 1st October 1996, Customs and Excise became more directly involved in waste management activities in that they are now responsible for collecting the new landfill tax which came into force in October 1996. This adds a tax burden to the cost of landfilling of between £2 and £7 per tonne depending on the type of waste concerned. It is the governments intention that such taxation will make landfilling wastes less attractive and so will encourage the production of less waste and the re-use or re-cycling of that waste which is produced. Not all Landfill Tax money needs to return to the treasury. Mechanisms are in place so that a percentage may be spent on environmental improvements to the locality. This can cover a wide range of areas from educational programmes to litter campaigns.

Waste Management Options

The Environment Agency seeks to ensure that best practisc is used in all areas of waste management. At present 95% of waste within the area is sent to landfill potentially giving rise to the problems of pollution, land use and nuisance. Our aim is to ensure that, wherever feasible, more sustainable waste management practises are used and wherever practicable wastes should be diverted away from landfill.

The Agency recognises the approach outlined in the government's white paper 'Making Waste Work' which sets out guidance on the way that waste should be dealt with in the future. The white paper has four main objectives:-

(i) To reduce the amount of waste that society produces.
(ii) To make the best use of the waste that society produces.
(iii) To minimise the risks of immediate and future environmental pollution and harm to human health.
(iv) To increase the proportion of waste managed by options towards the top of the waste hierarchy.

Special Waste

Special waste is that sub-set of waste which because of the hazards associated with it is considered to be so intractable to manage that it requires additional controls. These controls, a cradle to grave system of consignment notes, are implemented by the Special Waste Regulations 1996 and the Amendment Regulations 1996. These regulations have implemented in British law the EC Directive on hazardous waste (91/689/EEC).

The regulations require that, prior to the wastes movement, the consignors of special waste must complete a multi-part paper record or consignment note. This documentation describes the waste, where and how it is produced and where it is to be taken. Each person in the chain of consignor, carrier and manager of the special waste is required to complete part of the consignment note and to keep a copy of it for their records. A copy of the consignment note is sent to the Agency office in whose area the waste is to be managed. It is from the Agency's records that all information and movements of special waste are monitored.

Solrec Limited Heysham

Approximately 50,000 tonnes/annum of wastes are received by the site for processing. The waste mainly consists of solvents from the manufacture, supply and use of paints, inks, pharmaceutical and fine chemicals and the solvent is either recovered for re-use or processed into a secondary liquid fuel which is burned in a cement kiln. See also section 2.3

Salt Ayre Landfill

The main types of special waste deposited at Salt Ayre are asbestos, distillation residues and a plastisol waste stream. The asbestos waste arises from households, commercial and industrial sources, the distillation residues are from the recovery of solvents at Solrec and the plastisol waste from Forbo Kingfisher in Lancaster.

UK Fats and Proteins at Nightingale Hall want to burn tallow from the BSE cull at its plant instead of fuel. Residents are opposed to it and it has been highlighted in the press.

Proposed Landfill Site at Ellel Quarry. Local resident action group - STAG are opposing it and it has been highlighted in the press. The Agency are carrying out a feasibility desk study , but it may require some site investigation work.

(Landfill Sites are shown on map 18)

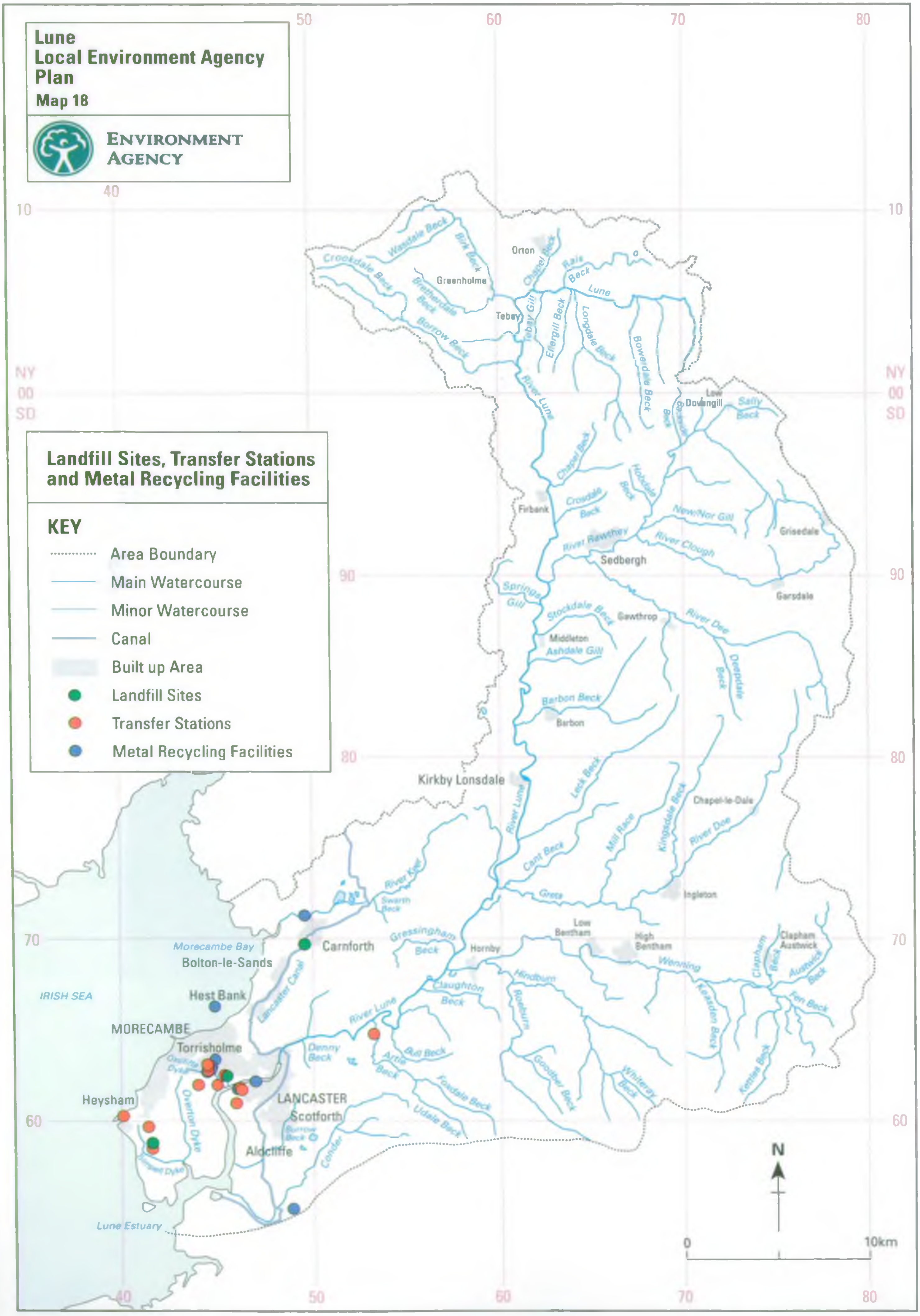
Imported Waste

In May 1994 the EC Regulation (259/93) on movements within, into and out of the European Community was implemented. This was further reinforced in UK law with the Transfrontier Shipment of Waste Regulations 1994.

International trade in waste has been common place for many years. Lancashire has three active ports at Heysham, Fleetwood and Glasson Dock and all have been known to handle waste. Of the waste imported through these ports some remain in Lancashire for treatment or disposal and some is transported on to other counties for subsequent treatment or disposal. Waste may also enter the UK at other ports and be transported onward to Lancashire for recovery or disposal.

The regulations are applicable to all wastes. The level of control is determined by the hazardous nature of the waste and whether the waste is for disposal or recovery. Waste for recovery is categorised using three lists; red, amber and green and, as the colour implies, green list waste going for recovery has the least controls. Amber list wastes and red list wastes require greater controls. These controls include financial provision and a commitment to return the waste to the originator in the event that the waste cannot be processed in accordance with the regulations. Further controls on the movement of waste have been imposed by the United Kingdom Management Plan for Imports and Exports of Waste that came into force on 1 June 1996.

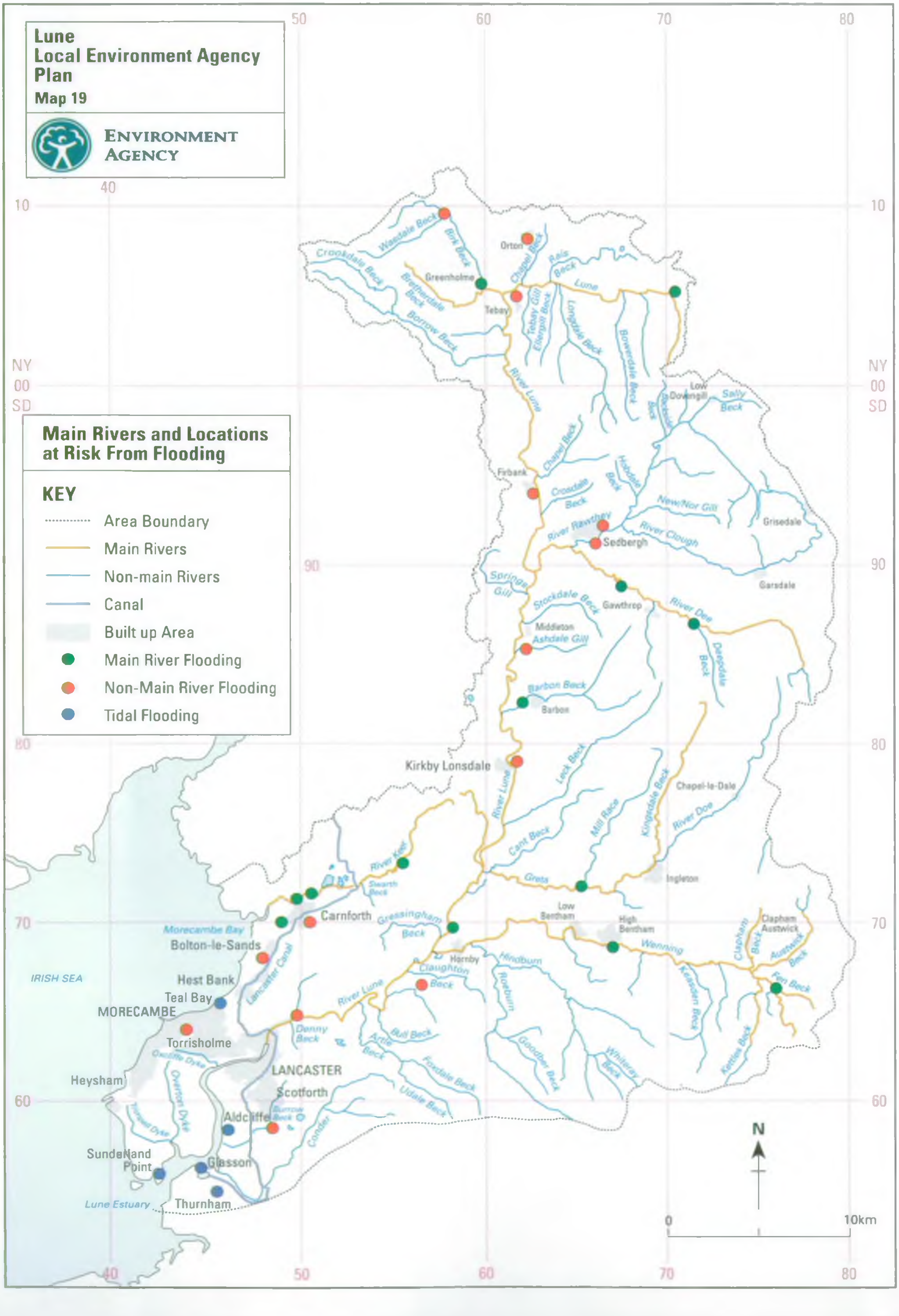
Imports of waste for recovery into Solrec Limited arise from Ireland. The wastes are either reprocessed into secondary liquid fuel or the solvent is recovered for re-use and are similar in nature to United Kingdom waste arisings.


Lune
Local Environment Agency
Plan
Map 18
Environment Agency
Landfill Sites, Transfer Stations and Metal Recycling Facilities
KEY
Area Boundary
Main Watercourse
Minor Watercourse
Canal
Built up Area
Landfill Sites
Transfer Stations
Metal Recycling Facilities
NY 00 SD
Orton
Greenholme
Tebay
Crookdale Beck
Wasdale Beck
Birk Beck
Bretherdale Beck
Borrow Beck
Tebay Gill
Chapel Beck
Rais Beck
Lune
Ellergill Beck
Longdale Beck
Bowderdale Beck
River Lune
Low Dowbangill
Sally Beck
Chapel Beck
Hobdale Beck
Crosdale Beck
Firbank
New/Nor Gill
Grisedale
River Rawthey
River Clough
Sedbergh
Garsdale
Springs Gill
Stockdale Beck
Gawthrop
River Dee
Middleton
Ashdale Gill
Deepdale Beck
Barbon Beck
Barbon
Kirkby Lonsdale
Leck Beck
Kingsdale Beck
Chapel-le-Dale
River Lune
Mill Race
River Doe
Cant Beck
River Keer
Swarth Beck
Greta
Ingleton
Morecambe Bay
Carnforth
Gressingham Beck
Hornby
Low Bentham
High Bentham
Clapham Austwick
Bolton-le-Sands
Wenning
Clapham Beck
Austwick Beck
IRISH SEA
Hest Bank
Lancaster Canal
Claughton Beck
Hindburn
Keasden Beck
Fen Beck
MORECAMBE
River Lune
Roeburn
Torrisholme
Denny Beck
Bull Beck
Artle Beck
Goodber Beck
Whitray Beck
Kettles Beck
Heysham
Overton Dyke
LANCASTER
Fosdale Beck
Scotforth
Udale Beck
Burrow Beck
Aldcliffe
Conder
Lune Estuary
N
0
10km

The ports at Heysham and Glasson Dock shall be monitored on a regular basis to ensure that waste is not stored on site for more than 48 hours, in accordance with Agency policy. We will not encourage the use of Glasson Dock for the importation of hazardous/special waste.

Issues Arising:

Issue 6	**Adverse impact of contaminated land on the environment**
Issue 13	**Adverse impacts of flytipping at Oxcliffe Marsh**
Issue 14	**Adverse impacts of land spreading of controlled waste in the Lancaster area**


Lune
Local Environment Agency Plan
Map 19
Environment Agency
Main Rivers and Locations at Risk From Flooding
KEY
Area Boundary
Main Rivers
Non-main Rivers
Canal
Built up Area
Main River Flooding
Non-Main River Flooding
Tidal Flooding
NY
00
SD
10
90
80
70
60
40
50
60
70
80
Orton
Greenholme
Tebay
Crookdale Beck
Wasdale Beck
Birk Beck
Bretherdale Beck
Borrow Beck
Chapel Beck
Rais Beck
Lune
Tebay Gill
Ellergill Beck
Longdale Beck
Bowderdale Beck
River Lune
Low Dovengill
Sally Beck
Chapel Beck
Firbank
Crosdale Beck
Hobdale Beck
New/Nor Gill
Grisedale
River Rawthey
Sedbergh
River Clough
Garsdale
Springs Gill
Stockdale Beck
Gawthrop
River Dee
Middleton
Ashdale Gill
Deepdale Beck
Barbon Beck
Barbon
Kirkby Lonsdale
Leck Beck
Kingsdale Beck
Chapel-le-Dale
River Doe
Mill Race
Cant Beck
Greta
Ingleton
River Keer
Swarth Beck
Carnforth
Gressingham Beck
Low Bentham
High Bentham
Wenning
Clapham Beck
Clapham
Austwick
Austwick Beck
Fen Beck
Morecambe Bay
Bolton-le-Sands
Lancaster Canal
Hornby
Hindburn
Claughton Beck
IRISH SEA
Hest Bank
Teal Bay
MORECAMBE
River Lune
Roeburn
Keasden Beck
Kettles Beck
Torrisholme
Denny Beck
Artle Beck
Bull Beck
Goodber Beck
Whitray Beck
Foxdale Beck
Heysham
LANCASTER
Scotforth
Overton Dyke
Udale Beck
Aldcliffe
Burrow Beck
Conder
Sunderland Point
Glasson
Thurnham
Lune Estuary
N
0
10km

2.11 AREA DRAINAGE, FLOODING AND FLOOD ALLEVIATION

The River Lune is one of the largest rivers in the North West of England, draining an area of 1223 sq km. From its source on Ravenstonedale Common in Cumbria, it flows west to Tebay, before turning south to its confluence with the Irish Sea immediately west of Lancaster, a distance of some 105 kilometres. There are fifty river tributaries under the Environment Agency's jurisdiction, contributing flows at various locations along this length, the major ones being the Rawthey and Wenning. The river system and flood plain areas are shown on map 19. The river is tidal to Skerton Weir at Lancaster, though exceptionally high tides do overtop the structure.

Apart from the urban conurbation around Lancaster, the area is mainly rural with small towns and villages. The lower and middle reaches are prone to flooding during the winter months affecting mainly agricultural land forming the natural floodplain. In August 1967 an extremely intense period of rainfall, which was centred on the Forest of Bowland caused severe flooding, historically known as the Wray disaster. Tributaries of the Wenning were worst affected, notably the River Roeburn, River Hindburn, Claughton Beck and Farleton Beck. Flood water carrying large quantities of debris, boulders and gravel demolished several houses and caused severe and extensive damage to farmland, livestock and infrastructure.

Lancaster and Morecambe are also at risk from tidal flooding, when strong westerly winds off the Irish Sea combine with the higher astronomic tidal surges. Lancaster City Council have completed the first stage of a project to improve the protection of riverside properties at St George's Quay in Lancaster, the second phase is programmed to be completed before the year 2000. They are also in the process of constructing defences along the sea front at Morecambe, in the form of off shore groynes, areas of beach and placing rock armouring along the promenade..

Farmland on the Estuary is protected by some 23 kilometres of tidal embankment. Schemes to improve tidal defences at Glasson and sea defences at Cockersands are at design stage and are currently programmed to start on site in 1999 and 2000 respectively. There are additional tidal protection works within the Agency's medium term plan (1998-2003) at lower Lancaster in partnership with Lancaster City Council.

As part of an ongoing programme, three surveys are scheduled within this catchment. These surveys will be undertaken as part of the Agency's duties under Section 105(2) of the Water Resources Act 1991 and will lead to the production of flood plain maps and associated information of flood risk matters. This information will be used to enable Local Planning Authorities to make informed and sound planning decisions on any proposed development. The Morecambe Bay Coastline Survey and Morecambe Coastal Frontage Survey are programmed within the recently updated Medium Term Plan, between 1998 and 2003. The remaining survey covering the length of river from the M6 motorway downstream falls outside of this time period.

A flood alleviation scheme designed to provide 1 in 80 year protection to Hornby, on the Wenning, was completed in May 1997, as a result of flooding which occurred in January 1995.

Flood Defence Standards of Service (Maintenance)

As an aid to decisions on priorities for works we have determined standards of service for flood defence maintenance based on land usage within the flood plain. Five "land use bands", have been established, based on the presence and concentration of certain features of land use. These include housing, commercial property, agriculture and transport networks. Such features are each allocated a financial value (based on potential losses resulting from flooding), which allows comparison of different features on the same basis.

Each land use band has a target for the maximum flood risk to which it should be exposed. The standards are expressed as a percentage that reflects the likelihood that during any year a flood event may occur which exceeds the amount for which protection is available, or should ideally be provided. For example, a standard of 2% means that, for any given year, the likelihood of flooding which significantly affects key land use features, is fifty to one or 2% in any one year.

A comparison of the target and actual standards of service allows improvement and maintenance works to be prioritised towards those rivers that do not meet their target standards.

STANDARDS OF SERVICE LAND USE BANDS AND TARGETS			
Land Use Band	Description of typical land use	Target standard of protection (return period in years)	
		Non Tidal	Tidal
A	Urban	1:50 - 1:100	1:100 - 1:200
B	Lower density urban	1:25 - 1:75	1:50 - 1:100
C	Isolated rural communities	1:10 - 1:50	1:10 - 1:75
D	Isolated properties/intensive farming	1:2.5 - 1:10	1:2.5 - 1:20
E	Low grade agricultural land	< 1:1	< 1:5

Maintenance Regime

The Agency does not own watercourses, except in a few specific locations where the Agency has a particular interest, for example, Broadraine Weir on the River Lune which has a Fisheries connection. The ultimate responsibility for the upkeep of a watercourse and any structures which may be contained within it rests with the person or persons on whose land the river is located (the riparian owner).

The Agency has permissive powers on Main River (see Map 19 for 'Main River' watercourses), to undertake works of maintenance and improvement and to construct new works according to available resources and priorities. Regular maintenance is essential if the river system is to operate to best advantage at times of high water levels. Such maintenance works may include vegetation control, repairs to earth embankments and other flood protection structures and the removal of obstructions and blockages, particularly fallen trees.

In 1996 within the LEAP area the Agency's allocation for maintenance works amounted to £136k with an additional contingency allowance for unplanned urgent works.

Of particular concern to riparian owners in the Lune catchment is the problem of bank erosion, which on occasions can result in a considerable loss of usable land and may even threaten the integrity of adjacent property. When this happens there is an expectation that the Agency can be persuaded to take corrective action, however, unless bank erosion is actually threatening the integrity of adjacent flood defences or is likely to exacerbate flooding in some other way, we do not have the legislative power to intervene.

Under those circumstances, riparian interests are often motivated to undertake remedial action themselves, however, it is important to stress that our consent for such works is a vital and legal pre-requisite in order to safeguard the overall regime of the river and its related environment.

In an effort to obtain a better understanding of the various processes which might contribute to erosion and accretion, we have commissioned a three year study within the Lune catchment to examine the various contributory factors including land use, drainage, climate change, agricultural stocking densities and the effects of river control structures. The study commenced in 1995 and has already pin-pointed a number of areas where traditional practices could be improved.

Perhaps the best example of this relates to the increasing use of "soft engineering" techniques such as tree planting and willow raddling, where progressive erosion is causing concern. Whereas traditional methods might have resorted to the use of blockstone pitching or even piling, tree planting, which is adequately fenced off to protect it from grazing livestock, can often produce equal results, with enhanced benefits in terms of the habitat which it creates in the longer term. In this connection substantial lengths of "soft engineering" works have recently been carried out in the Lune catchment and it is anticipated that this will become a significant feature of the Agency's maintenance programme in the future.

Emergency Response

At times of heavy rainfall and high tide the Agency's operational priorities are to check and operate water level control structures, and to clear debris and identified obstructions where possible. We also patrol and inspect defences, operate flood defence control structures, and carry out emergency repairs as needed.

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 (and Unitary Authorities) have Emergency Planning Officers who may become involved in more serious flood events.

Flood Warning

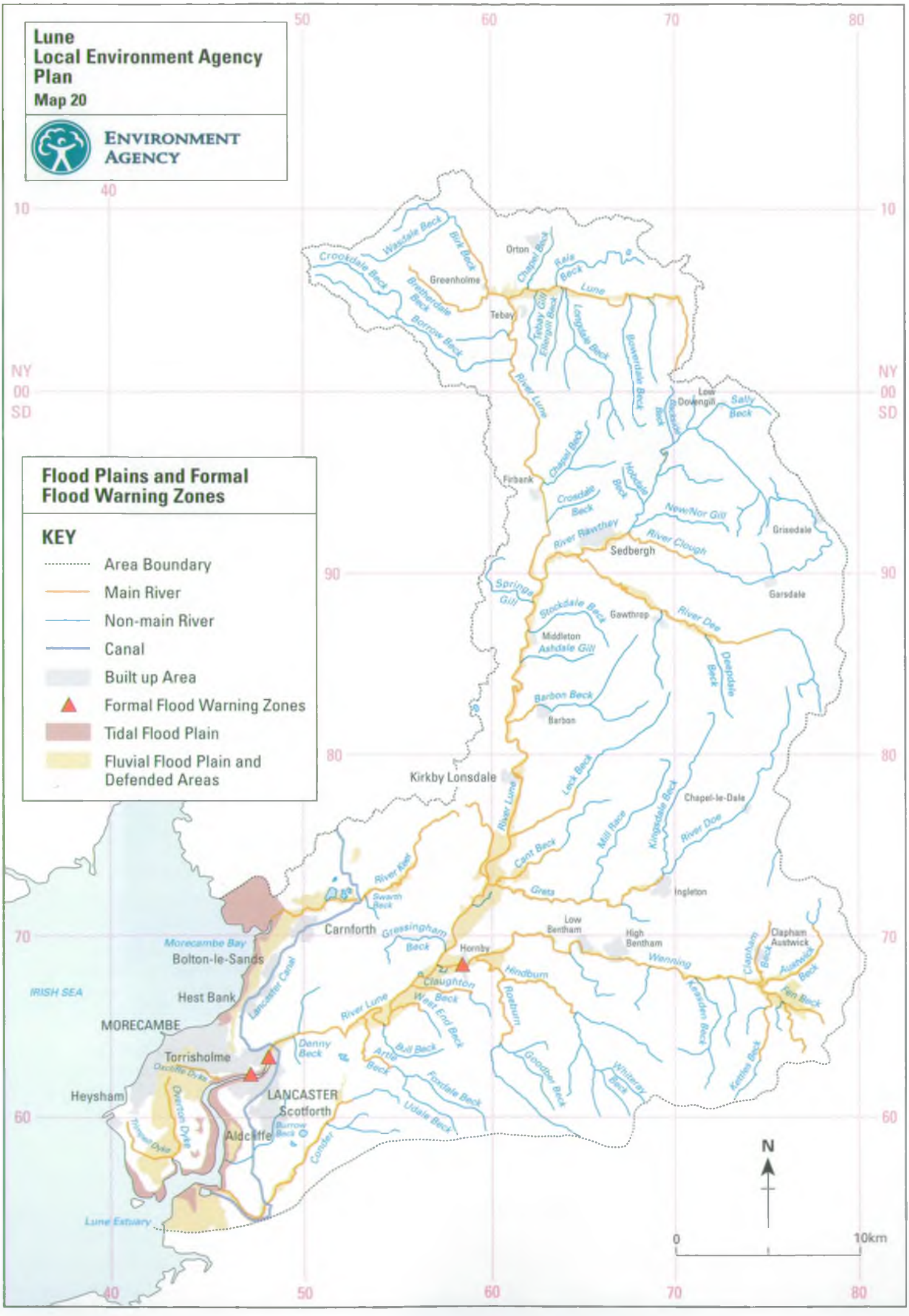
The Environment Agency takes the lead in the dissemination of Flood Warnings, but other organisations including the Local Authorities and the Police are also involved.

The Environment Agency have also identified sites most likely to suffer from flooding and have put into place systems to give people living in these areas advanced warnings. The Agency calls these sites Formal Flood Risk Zones. In the Lune catchment there are 3 such zones at Hornby, on the River Wenning, Skerton in Lancaster, on the River Lune, and the Castle Ward area of Lancaster also on the River Lune.(See map 20)

In providing the Core Flood Warning service, the Environment Agency makes use of Local Media (TV and Radio), a recorded message system (Flood call), Loud hailers and for the Flood Risk Zones above Automatic Voice Messaging. All of the above enable the Environment Agency to give the best possible Flood Warning Service to those who live in Formal Flood Risk Zones.

Lune
Local Environment Agency Plan
Map 20

ENVIRONMENT AGENCY



Tidal flood warnings through the 'Operation Neptune' arrangements agreed with Local Authorities and the Police are triggered when high tides are predicted. This is usually as a result of tidal surges . In such circumstances local occupants along the Lune Estuary and Morecambe are warned of potential flooding.

Flood call Message Service mentioned above is a free phone telephone number which is continually updated to provide the public with up to date Flood Warning Information. The telephone number is : 0645 881188

Indicative Standards of Protection and Scheme Selection

In developing proposals for existing defences "target standards of service" are often used where standards are expressed as the annual probability that a sea wall, flood bank or other flood defence infrastructure will encounter conditions more severe than those for which it was designed. The Ministry has drawn up indicative standards of protection and these are set out in the following table. The indicative standards of protection do not represent an entitlement to protection at a certain level but are intended as guidelines. In particular, indicative standards should not be regarded as synonymous with scheme objectives nor as a constraint on the generation of scheme options.

It is expected that, under most circumstances, the option with the greatest average benefit to cost ratio will represent the final choice. In some circumstances this option may fall short of the indicative standard of protection. If it does then examination of an option which would more closely approach the indicative standard of protection would be justified. This depends on the additional benefits generated by the additional cost of increasing the scale of the project. Provided this additional investment is robustly worthwhile in its own right an increase in scale for standards of protection reasons is considered justified.

Current land use	Indicative standard of protection (return period in years) Tidal	Non-tidal
High density urban containing significant amount of both residential and non-residential property	1:100 - 1:200	1:50 - 1:100
Medium density urban. Lower density than above, may also include some agricultural land.	1:50 - 1:200	1:25 - 1:100
Low density or rural communities with limited number of properties at risk. Highly productive agricultural land.	1:10 - 1:100	1:5 - 1:50
Generally arable farming with isolated properties. Medium productivity agricultural land.	1:2.5 - 1:20	1:2.5 - 1:10
Predominantly extensive grass with very Few properties at risk. Low productivity agricultural land.	< 1:5	< 1:1

Development Control

An Agency publication "Policy and Practice for the Protection of Floodplains" defines the controls which should be applied to any such proposed development. This ensures that the location of new properties are built above the predicted flood levels Natural floodplain areas are to be retained and where practicable restored in order to fulfil their natural functions.

Where development outside the floodplain would lead to an increase in predicted flood levels, then sufficient storage must be provided to attenuate the increased volume of run off, so maintaining existing levels of protection.

Issue Arising:

Issue 2 Locations at risk of flooding within the Lune area.

APPENDICES

APPENDIX 1

General Quality Assessment and Statutory Water Quality Objectives

The Agency uses two principal schemes for the reporting and management of river water quality: the General Quality Assessment (GQA) scheme and the Statutory Water Quality Objectives (WQOs) scheme. These schemes have replaced the National Water Council (NWC) water quality classification system used previously.

The GQA scheme is used to make periodic assessments of the quality of river water in order to monitor geographical and temporal trends. The scheme as presently envisaged will comprise four components - general chemistry, nutrients, aesthetics and biology - each providing a discrete "window" upon the quality of river stretches. The general chemistry and biology components of the GQA scheme are in current use. The remaining two windows are presently under consideration. A Biological Quality Objectives Scheme (BQO) is also now being considered.

The WQO scheme establishes clear quality targets to provide a commonly agreed planning framework for regulatory bodies and dischargers alike. The proposed WQO scheme is based upon the recognised uses to which a river stretch may be put. It was initially thought that these uses would include: River Ecosystem; Special Ecosystem; Abstraction for Potable Supply; Agricultural/Industrial Abstraction ; and Watersports. However, it is now thought that WQOs for all these uses may not be appropriate. The standards defining the five-tiered River Ecosystem (RE) use classes, which address the chemical quality requirements of different types of aquatic ecosystems, were introduced by *The Surface Waters (River Ecosystem) Classification Regulations 1994.* (Standards for the other uses are still under development). For each stretch of river, a target RE class will be assigned, including a date by which this level of water quality should be achieved. Until WQOs are formally established by legal notice served by the Secretary of State, and therefore exist on a statutory basis, they will be applied on a non-statutory basis through a translation of River Quality Objectives (RQOs) from NWC classes to appropriate RE classes and target dates.

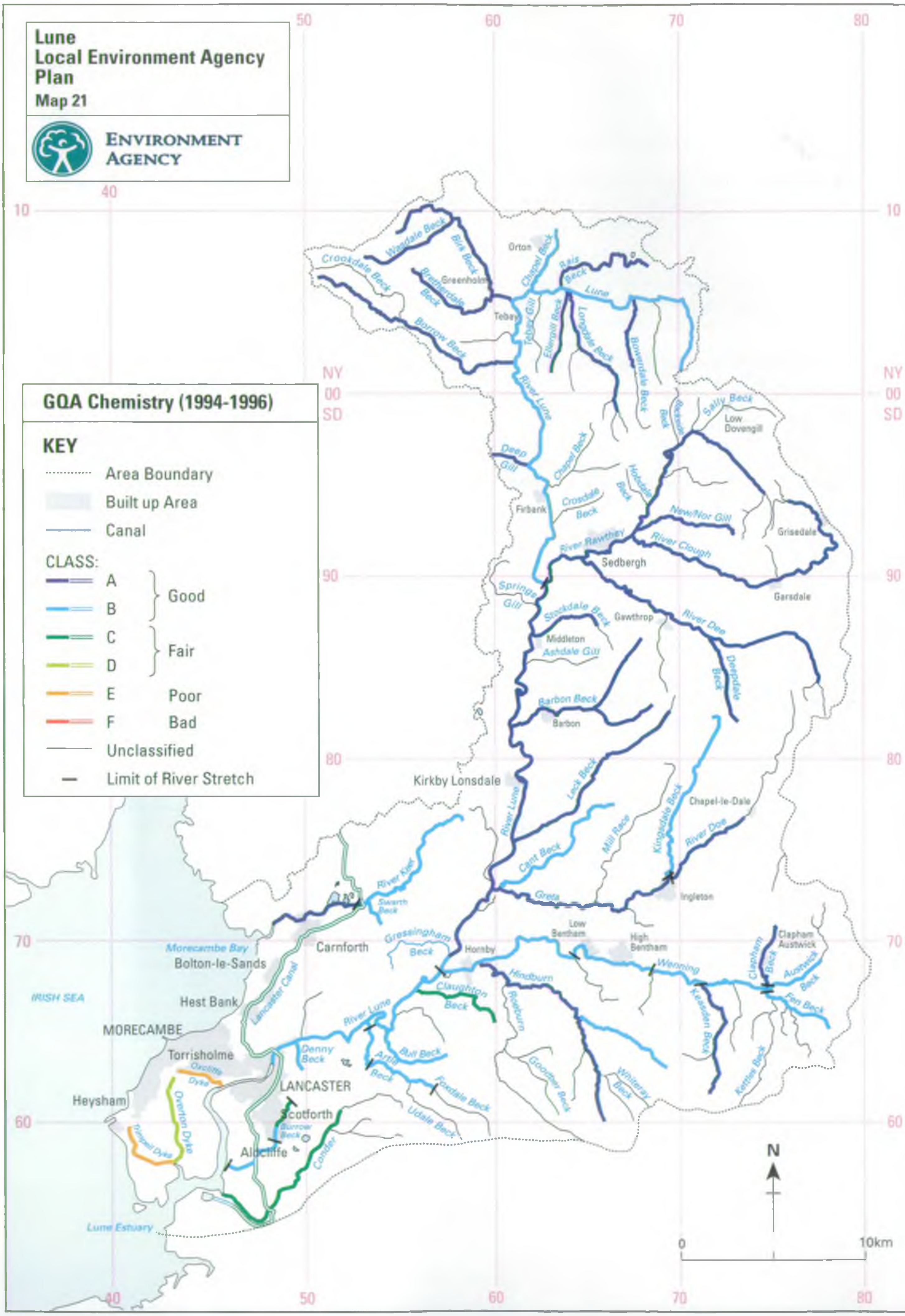
The GQA and WQO schemes are initially being applied only to Rivers and Canals. Schemes for other controlled waters are also under consideration.

Tidal Waters and Estuaries

Tidal Waters and Estuaries are presently still classified using the National Water Council (NWC) scheme which considers dissolved oxygen, aesthetic quality and biological quality and places water quality into one of four classes.

General Quality Assessment (GQA)

Key stretches (i.e. stretches receiving significant discharges or stretches of significant flow) are routinely monitored at strategic sampling points. Maps 21 and 22 show the GQA 1996 chemical and 1995 biological classes for the rivers and canals in the Lune Area. Good quality watercourses are generally widely found in the upper parts of the area whilst there are poorer quality watercourses that are subject to various polluting inputs located in the more populated industrial parts of the area, e.g in the vicinity of Lancaster and Heysham. Summary water quality statistics are tabulated below.



Lune
Local Environment Agency
Plan
Map 21
ENVIRONMENT AGENCY
GQA Chemistry (1994-1996)
KEY
Area Boundary
Built up Area
Canal
CLASS:
A
B
Good
C
D
Fair
E
Poor
F
Bad
Unclassified
Limit of River Stretch
NY
SD
Orton
Greenholme
Tebay
Crookdale Beck
Wasdale Beck
Birk Beck
Bretherdale Beck
Borrow Beck
Chapel Beck
Tebay Gill
Rais Beck
Ellergill Beck
Longdale Beck
Lune
Bowderdale Beck
River Lune
Sally Beck
Low Dovengill
Deep Gill
Firbank
Crosdale Beck
Hobdale Beck
New/Nor Gill
Grisedale
River Rawthey
River Clough
Sedbergh
Garsdale
Springs Gill
Stockdale Beck
Gawthrop
River Dee
Middleton
Ashdale Gill
Deepdale Beck
Barbon Beck
Barbon
Kirkby Lonsdale
Leck Beck
Chapel-le-Dale
Kingsdale Beck
River Doe
Mill Race
Cant Beck
River Keer
Swarth Beck
Greta
Ingleton
Morecambe Bay
Carnforth
Bolton-le-Sands
Greesingham Beck
Hornby
Low Bentham
High Bentham
Clapham
Austwick
Clapham Beck
Austwick Beck
Wenning
Fen Beck
Keasden Beck
Hindburn
Roeburn
Claughton Beck
IRISH SEA
Hest Bank
Lancaster Canal
MORECAMBE
River Lune
Torrisholme
Denny Beck
Artle Beck
Bull Beck
Oxcliffe Dyke
LANCASTER
Foxdale Beck
Goodber Beck
Whitray Beck
Kettles Beck
Heysham
Overton Dyke
Scotforth
Burrow Beck
Udale Beck
Aldcliffe
Conder
Lune Estuary
N
0
10km

Rivers and Canals

A comparison of 1992 GQA classes (based on chemical data for the period 1990 to 1992) with 1996 GQA classes (based on chemical data for the period 1994 to 1996) and biological data for 1995 for the rivers and canals in the Lune area is shown here (water quality criteria for GQA classes are given in Appendix 3):

GQA Chemistry

GQA Class	km	km	%	%
Chemical	1992	1996	1992	1996
A Good	223.3	190.2	61.4	52.3
B Good	117.1	102.0	32.2	28.0
C Fair	21.1	64.0	5.8	17.6
D Fair	0.0	5.3	0.0	1.5
E Poor	2.4	2.4	0.7	0.7
F Bad	0.0	0.0	0.0	0.0
Total	363.9	363.9	100.0	100.0

As can be seen from the above table there has been a slight deterioration in overall water quality within the area since 1992 with the loss of around 13 % of good water quality. However, more than 80 % of the water in the area is presently considered to be of good quality.

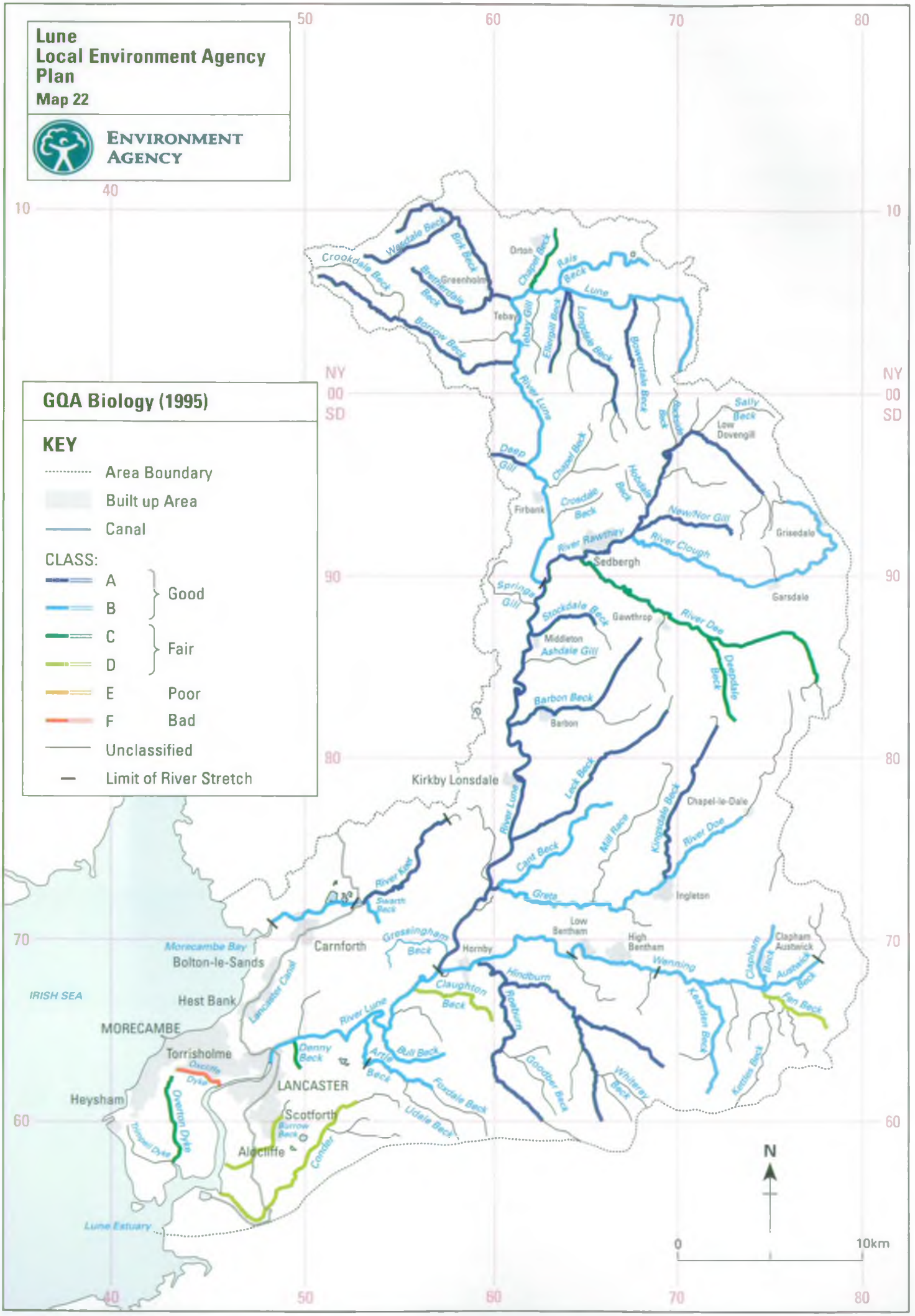
GQA Biology

GQA Class	km	%
Biological	1995	1995
a Excellent	141.4	45.2
b Good	121.2	38.8
c Fair	30.4	9.7
d Moderate	18.5	5.9
e Poor	0.0	0.0
f Bad	1.1	0.4
Total	312.6	100.0

Again, more than 80 % of the classified watercourses are presently biologically classified as having good water quality. (NB The total length of watercourse classified biologically is lower than the total length classified chemically because the Lancaster Canal is not biologically classified).

Lune
Local Environment Agency Plan
Map 22

ENVIRONMENT AGENCY



Lune Estuary

The 1995 classification of the Lune Estuary is shown below.

Watercourse	Reach	NWC Class 1995
Lune Estuary	Skerton Weir to Point of Lune (20.0 km)	A

Water quality criteria for the NWC estuarial classes are also given in Appendix 4. These classes have remained unchanged since the 1990 survey.

River Quality Objectives (RQOs) for the Lune Area

Although these objectives are non-statutory, they are presented here for informal consultation and comments are invited on their suitability. When the Secretary of State introduces statutory WQOs (currently being trialed nationally), further formal consultation will take place. Once in force the Agency and the Secretary of State are under a duty to exercise the powers conferred on them, under the water pollution provisions of the Water Resources Act 1991, to ensure the requirements of the Statutory WQOs are met, so far as it is practicable by the exercise of those powers to do so.

Until now the Environment Agency have been working towards the achievement of Long Term Objectives (LTOs) known as River Quality Objectives (RQOs) that were formulated by the former North West Water Authority.

These targets were originally set in 1979 following a public consultation procedure and they were set in terms of National Water Council (NWC) classes. In general terms the policy was to achieve at least class 2 water quality in rivers and canals by 2010 whilst preventing deterioration of watercourses of a higher standard. For tidal waters a similar aim was to achieve at least class B.

Although it does not necessarily follow that there is a fully neutral translation between the NWC and River Ecosystem classification schemes in all cases, for most stretches there is a degree of compatibility as described below:

NWC Class	River Ecosystem Class
1A	RE 1
1B	RE 2
2	RE 3 or RE 4
3	RE 5
4	-

Thus, to an extent the long term objectives are translations of the original objectives set in 1979. Significant (i.e. non-neutral) changes to this are listed below (section iv) and views on these are welcomed:

Changes to Water Quality Objectives set in 1979 (following November 1978 public consultation)

i) The length of classified river stretch in the following watercourses has been extended, eg up to river source, or remeasured :

Overton Dyke (0.5 km RE4 added)
River Greta (0.5 km RE1 added)
River Rawthey (0.5 km RE1 added)
Wasdale Beck (0.5 km RE1 added)
River Keer (3.0 km RE1 added)

ii) The following watercourses have been removed from the classification scheme:

Janson Pool (1.1 km removed)
Goodber Beck (1.1 km removed) #
Aspland Beck (0.8 km removed) #
Kettles Beck (4.2 km removed) #
Tebay Gill (0.6 km removed) #
Crookdale Beck (1.9 km removed) #
Fair Mile Beck (0.6 km removed) #
Chapel Beck (1.9 km removed) #
Needlehorse Gill (1.1 km removed) #
Wandale Beck (1.4 km removed) #
Cautley Home Beck (1.3 km removed) #
Crosshaw Beck (0.6 km removed) #
Middleton Hall (0.6 km removed) #
Whitteray Beck (0.5 km removed) #
Ashdale Gill (1.1 km removed) #
Mill Race (0.5 km removed) #
Austwick Beck (2.1 km removed) #
Roundthwaite Beck (0.3 km removed) #
Carlin Gill (2.6 km removed) #
Ellergill Beck (1.6 km removed) #
Crosdale Beck (1.5 km removed) #
Sally Beck (2.4 km removed) #
Backside Beck (1.6 km removed) #
Hubdale Beck (1.0 km removed) #
Springs Gill (0.4 km removed) #
Millhorse Gill (0.6 km removed) #

N.B. # = designated salmonid fisheries under the Freshwaters Fisheries Directive. Compliance is now assessed using samples taken from sampling points situated on major rivers downstream.

iii) The following stretches have been added to the classification scheme:

Burrow Beck (7.2 km RE2 added)
Bull Beck (1.6 km RE1 added)
River Doe (5.9 km RE1 added)

iv) Non- neutral translations:

Lancaster Canal. Original long term objectives were NWC class 1A. Objectives of RE2/RE3 are now proposed

River Ecosystem classes

Descriptions for the five River Ecosystem Classes are given below:

RE Class	Description
RE 1	Water of very good quality suitable for all fish species
RE 2	Water of good quality suitable for all fish species
RE 3	Water of fair quality suitable for high class coarse fish populations
RE 4	Water of fair quality suitable for coarse fish populations
RE 5	Water of poor quality which is likely to limit coarse fish populations
Waters not achieving class RE 5 are of bad	quality in which fish are unlikely to be present

Short to Medium term and Long term proposed ROOs for the Lune Area are tabulated below.

River	Reach	Length	RQO short term	RQO long term	Present Status 1994-1996
LUNE	WENNING TO FWL AT SKERTON WEIR	14.4	RE2	RE1	COMPLYING WITH RE2 SIGNIFICANTLY FAILING TO MEET RE1
LUNE	RAWTHEY TO WENNING	27.5	RE1	RE1	COMPLYING WITH RE1
LUNE	QSL AT WEASDALE BECK TO RAWTHEY	27.6	RE1 (1998)	RE1	MARGINALLY FAILING TO MEET RE1
LANCASTER CANAL	U/S OF GLASSON DOCK TO LUNE EST	0.8	RE2	RE2	COMPLYING WITH RE2
LANCASTER CANAL	A6 HEST BANK TO U/S OF GLASSON DOCK	21.1	RE3	RE3	COMPLYING WITH RE3
LANCASTER CANAL	QSL HINCASTER TO A6 HEST BANK	24.6	RE3	RE3	COMPLYING WITH RE3
OVERTON DYKE	QSL AT B5273 TO FWL	5.3	RE5	RE4	COMPLYING WITH RE4
TRIMPELL DYKE	QSL TRIMPELL DYKE TO LADES POOL	1.3	RE5	RE4	SIGNIFICANTLY FAILING TO MEET RE4
CONDER	QSL CHURCH BR TO FWL(CONDER GREEN)	11.5	RE3	RE2	COMPLYING WITH RE3 SIGNIFICANTLY FAILING TO MEET RE2
BURROW BECK	SCOTFORTH TO LUNE	3.7	RE2	RE2	COMPLYING WITH RE2
BURROW BECK	QSL AT MOOR HOSPITAL TO SCOTFORTH	3.5	RE2 (1999)	RE2	MARGINALLY FAILING TO MEET RE2
OXCLIFFE DYKE	QSL AT WHITE LUND TO FWL	1.1	NO CLASS	RE4	COMPLYING WITH RE5 SIGNIFICANTLY FAILING TO MEET RE4
DENNY BECK	QSL DENNY BANK TO LUNE	0.6	RE2	RE2	COMPLYING WITH RE2
ARTLE BECK	CATON TO LUNE	0.7	RE2	RE2	COMPLYING WITH RE2
ARTLE BECK	QSL UDALE BR TO CATON	5.1	RE1 (1997)	RE1	MARGINALLY FAILING TO MEET RE1
BULL BECK	QSL TO LUNE	1.6	RE2	RE1	COMPLYING WITH RE2 SIGNIFICANTLY FAILING TO MEET RE1

CLAUGHTON BECK	QSL AT CLAUGHTON MOOR TO LUNE	3.3	RE3	RE1	MARGINALLY FAILING TO MEET RE3 SIGNIFICANTLY FAILING TO MEET RE1
WENNING	WENNINGTON TO LUNE	6.3	RE2	RE1	COMPLYING WITH RE2 MARGINALLY FAILING TO MEET RE1
WENNING	HIGH BENTHAM TO WENNINGTON	6	RE2	RE1	COMPLYING WITH RE2 SIGNIFICANTLY FAILING TO MEET RE1
WENNING	QSL HARDEN BR TO HIGH BENTHAM	11.6	RE2	RE1	COMPLYING WITH RE2 MARGINALLY FAILING TO MEET RE1
HINDBURN	QSL DALE BECK/RIDGE CLOUGH TO WENNING	13.7	RE1	RE1	COMPLYING WITH RE1
ROEBURN	QSL LARY SYKE TO HINDBURN	11.2	RE1	RE1	COMPLYING WITH RE1
CROSSDALE BECK	QSL LANE FOOT BR TO HINDBURN	2.2	RE2	RE1	COMPLYING WITH RE2 MARGINALLY FAILING TO MEET RE1
KEASDEN BECK	QSL KEASDEN HEAD TO WENNING	5	RE1	RE1	COMPLYING WITH RE1
CLAPHAM BECK	QSL INGLEBOROUGH LAKE TO WENNING	2.8	RE1	RE1	COMPLYING WITH RE1
FEN BECK	QSL LAWKLAND HALL TO WENNING	3.7	RE2	RE1	COMPLYING WITH RE2 SIGNIFICANTLY FAILING TO MEET RE1
GRETA	QSL KINGSDALE BECK TO LUNE	12.3	RE2	RE1	COMPLYING WITH RE1
CANT BECK	QSL THURLAND CASTLE TO GRETA	1.4	RE2	RE1	COMPLYING WITH RE2 SIGNIFICANTLY FAILING TO MEET RE1
KINGSDALE BECK	QSL KINGSDALE HEAD TO GRETA	7.8	RE1 (1997)	RE1	COMPLYING WITH RE2 MARGINALLY FAILING TO MEET RE1
DOE	QSL CHAPEL-LE-DALE TO GRETA	5.9	RE1	RE1	COMPLYING WITH RE1
LECK BECK (EASE GILL)	QSL OXFORD HOLE TO LUNE	9.6	RE1	RE1	COMPLYING WITH RE1
BARBON BECK(BARKIN BECK)	QSL SHORT GILL BR TO LUNE	8.3	RE1	RE1	COMPLYING WITH RE1
STOCKDALE BECK	QSL BROW GILL TO LUNE	0.6	RE1	RE1	COMPLYING WITH RE1
RAWTHEY	QSL RAWTHEY CLOUGH TO LUNE	21.3	RE1	RE1	COMPLYING WITH RE1
DEE	QSL HAZEL BOTTOM GILL TO RAWTHEY	18.3	RE1	RE1	COMPLYING WITH RE1
DEEPDALE BECK	QSL SCOW TO DEE	1.4	RE1	RE1	COMPLYING WITH RE1
CLOUGH	QSL GRISDALE BECK TO RAWTHEY	13.9	RE1	RE1	COMPLYING WITH RE1
NEW GILL	QSL PENNY FARM BR RAWTHEY	2.2	RE1	RE1	COMPLYING WITH RE1
DEEP GILL	QSL BECKFOOT BR TO LUNE	0.5	RE1	RE1	COMPLYING WITH RE1
BORROW BECK	QSL BORROW HEAD TO LUNE	9.1	RE1	RE1	COMPLYING WITH RE1
BIRK BECK	QSL BLEABECK BR TO LUNE	8.5	RE1	RE1	COMPLYING WITH RE1
BRETHERDALE BECK	QSL BRETHERDALE FORD TO BIRK BECK	3.6	RE1	RE1	COMPLYING WITH RE1
WASDALE BECK	QSL WASDALE BR TO BIRK BECK	2.4	RE1	RE1	COMPLYING WITH RE1
CHAPEL BECK	QSL COATFLAT BR TO LUNE	1.1	RE2	RE1	COMPLYING WITH RE2 MARGINALLY FAILING TO MEET RE1
RAIS BECK	QSL BARUGH BR TO LUNE	0.9	RE1	RE1	COMPLYING WITH RE1
ELLERGILL BECK	QSL RAW BUSK TO LUNE	3	RE1	RE1	COMPLYING WITH RE1
LONGDALE BECK	QSL UDALE BR TO LUNE	3.2	RE1	RE1	COMPLYING WITH RE1
BOWDERDALE BECK	QSL NY678047 TO LUNE	0.5	RE1	RE1	COMPLYING WITH RE1
KEER	CAPERNWRAY HALL TO FWL	4.5	RE2	RE1	COMPLYING WITH RE1
KEER	QSL KEER SIDE TO CAPERNWRAY HALL	6.2	RE1 (1999)	RE1	COMPLYING WITH RE2 MARGINALLY FAILING TO MEET RE1
SWARTH BECK	QSL KELLET PARK WOOD TO KEER	1.2	RE2	RE1	COMPLYING WITH RE2 MARGINALLY FAILING TO MEET RE1

APPENDIX 2

River Ecosystem Classification - Water Quality Criteria

Class	Dissolved Oxygen % saturation 10 percentile	BOD (ATU) mg/l 90 percentile	Total Ammonia mg N/l 90 percentile	Un-ionised Ammonia mg N/l 95 percentile	pH lower limit as 5 percentile; upper limit as 95 percentile	Hardness mg/l $Ca CO_3$	Dissolved Copper microg/l 95 percentile	Total Zinc microg/l 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	300 700 1000 2000
RE4	50	8.0	2.5		6.0 - 9.0	<10 >10 and <50 >50 and <100 >100	5 22 40 112	300 700 1000 2000
RE5	20	15.0	9.0					

APPENDIX 3
General Quality Assessment (GQA)
Chemical Grading for Rivers and Canals

Water Quality	Grade	Dissolved Oxygen (% saturation) 10 percentile	Biochemical Oxygen Demand (ATU) [1] mg/l 90 percentile	Ammonia (mg N/l) 90 percentile
Good	A	80	2.5	0.25
	B	70	4	0.6
Fair	C	60	6	1.3
	D	50	8	2.5
Poor	E	20	15	9.0
Bad[2]	F	-	-	-

[1] as suppressed by adding allyl thio-urea
[2] i.e. quality which does not meet the requirements of grade E in respect of one or more determinands

APPENDIX 4

National Water Council (NWC) Classification Scheme
Water Quality Classes for Estuaries

Description		Points awarded if the Estuary meets this description
Biological Quality (scores under a, b, c & d to be summed)		
a) Allows the passage to and from freshwater of all relevant species of migratory fish, when this is not prevented by physical barriers.		2
b) Supports a residential fish population which is broadly consistent with the physical and hydrographical conditions.		2
c) Supports a benthic community which is broadly consistent with the physical and hydrographical conditions.		2
d) Absence of substantial elevated levels from whatever source.		4
	Maximum number of points [sum a) to d)]	10
Aesthetic Quality (choose one of a) to d))		
a) Estuaries or zones of estuaries that either do not receive a significant polluting input or which receive inputs that do not cause significant aesthetic pollution.		10
b) Estuaries or zones of estuaries which receive inputs which cause a certain amount of pollution but do not seriously interfere with Estuary usage.		6
c) Estuaries or zones of estuaries which receive inputs which result in aesthetic pollution sufficiently serious to affect Estuary usage.		3
d) Estuaries or zones of estuaries which receive inputs which cause widespread public nuisance.		0
Water Quality (Score according to quality)		
Dissolved Oxygen exceeds the following saturation values:		
60%		10
40%		6
30%		5
20%		4
10%		3
below 10%		0
The points awarded under each of the headings of biological, aesthetic and water quality are summed.		
Waters are classified on the following scale:		
Class A Good Quality 24 to 30 points		
Class B Fair Quality 16 to 23 points		
Class C Poor Quality 9 to 15 points		
Class D Bad Quality 0 to 8 points		

APPENDIX 5

Glossary

Abstraction Licence
Licence to abstract water from a surface or underground source. The maximum annual, daily and hourly abstraction rates are set by the licence.

AMP2 - Asset Management Plan
The second set of Asset Management Plans produced by Water Companies. The Plans cover the Water Companies' known investment of existing and other obligations (such as the operation and maintenance of existing water and wastewater systems) for the 10 year period 1995 to 2005. The Environment Agency is involved in setting priorities for work necessary for environmental improvements within allowed expenditure limits. Prices are controlled by an independent regulator, the Director General of Water Services (OFWAT). AMP 3 follows as the next planning period.

AONB
Area of Outstanding Natural Beauty, notified by the Countryside Commission.

BOD
Biochemical Oxygen Demand. A measure of the polluting potential.

Coarse Fish
See FRESHWATER FISH, CYPRINIDS, SALMONIDS.

Consumptive Use
Water which is abstracted but not returned to the catchment, either because it evaporates (as in spray irrigation) or is exported for use in another catchment.

County Structure Plans
Statutory documents produced by County Councils outlining their strategy for development over a 10-15 year timescale.

Cyprinids
Fish of the carp family. (See also COARSE FISH, FRESHWATER FISH, SALMONIDS).

Effective Rainfall
Total rainfall minus direct evaporation and the water used by plants for transpiration. This is equivalent to the total resource of a catchment.

EIFAC
The European Inland Fisheries Advisory Commission. An Agency of the United Nations Food and Agriculture Organisation (FAO).

Fish Age
0+ - less than 1 year. >0+ - more than 1 year.

Flow Measurement Units

m3/s	Cubic metres per second
l/s	Litres per second
Ml/d	Megalitres per day. A megalitre is equivalent to a ten metre cube (approximates to a 4-bedroom detached house).
mg/d	Millions of gallons per day.

Flow Conversion Table

m3/s	Ml/d	mg/d
0.012	1	0.224
0.06	5	1.12
0.12	10	2.24
0.24	20	4.48
0.6	50	11.2
1.2	100	22.4

Freshwater Fish
For the purposes of the Salmon and Freshwater Fisheries Act 1975, fish other than salmon, brown trout, sea trout, rainbow trout and char (see also COARSE FISH, FRESHWATER FISH, SALMONIDS).

FWL
Freshwater Limit

Hectare
Unit of area 100m x 100m, equal to 2.471 acres.

Impoundment Reservoir
Surface water storage area formed by construction of a dam and supplied only by natural inflow from the upstream catchment.

List 1 Substances
Dangerous substances which are particularly hazardous on account of their toxicity, bioaccumulation potential and persistence and which require special controls. Environmental quality standards have been set by the EC.

List 2 Substances
Dangerous substances which are less hazardous than List 1 substances. Environmental quality standards are shortly to be introduced into UK law by regulations.

Local Nature Reserve
A nature reserve designated by a Local Authority, frequently owned or managed by a voluntary conservation organisation.

Local Plans
Statutory documents produced by Borough or City Councils to implement the development strategy set out in County Structure Plans. Specific land use allocations are identified.

LTA
Long term average

Main River
The Agency has permissive powers to carry out works of maintenance and improvement on these rivers.

National Nature Reserve
A nature reserve of national importance, designated and managed by English Nature.

Potable Water Supply
Water supplied for domestic use, including human consumption.

Pool: Riffle
A stretch of river with sections of shallow, fast-flowing water and deeper slow-moving pools.

Ramsar Site
A wetland site of international significance for conservation, notified under international treaty.

Redd
Spawning area.

SAC
Special Area of Conservation. A European legislation classification.

Salmonids
Fish classified by the Salmon and Freshwater Fisheries Act 1975 as belonging to the salmon family - salmon, brown trout and char. (Summer-spawning salmonid species such as grayling are classified by the Act as Freshwater Fish.) (See also COARSE FISH, FRESHWATER FISH, CYPRINIDS.)

SNCI
Site of Nature Conservation Interest. A site of local importance for wildlife or geology, identified by the County Wildlife Trust or the County Council.

SPA
Special Protection Area. A European legislation classification.

Spate Flows
Episodic fresh water flood flows.

SSSI
Site of Special Scientific Interest. A site designated by English Nature as being in need of protection to conserve its outstanding ecological or geological features. Land use and management operations within SSSIs are subject to control.

WwTW
Wastewater Treatment Works.

MANAGEMENT AND CONTACTS:

The Environment Agency delivers a service to its customers, with the emphasis on authority and accountability at the most local level possible. It aims to be cost-effective and efficient and to offer the best service and value for money.

Head Office is responsible for overall policy and relationships with national bodies including Government.

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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