



Environmental Overview of Central Area 2001



ENVIRONMENT
AGENCY

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Introduction to Central Area

Our Central Area is defined by the natural boundaries of five river catchments; the Alt, Douglas, Lune, Ribble and Wyre. The coastline is an important area for tourism and wildlife. It forms our Western boundary from Warton Sands in the north to Crosby in the south.

It encompasses the tourist towns of Morecambe, Blackpool, Lytham St Annes and Southport which contrasts with the wildlife rich estuaries of the Ribble and Morecambe bay. Near the coast are also the ports of Lancaster, Fleetwood and Preston.

The flatlands of the coastal plain then rise into the scenic hill country of the Bowland fells and in the Northeast the Yorkshire Dales National Park.

The Southeastern side of our area follows the chain of East Lancashire towns, including Colne, Burnley, Accrington and Blackburn that developed in size during the industrial revolution.

This leaves the Southwestern boundary that is much more developed and includes Preston, Wigan, Kirkby and the top of Liverpool.

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1.1 Air quality

Introduction

One of the main problems with dealing with air quality is that mostly you cannot see it. However there was a time in the 1950's when thick smogs were common and this led to new laws to make sure that air is clean and safe. This was mainly achieved by reducing the use of coal as a fuel to heat homes. Today the main sources of gases that may cause air pollution come from traffic and industry; both of these are regulated to prevent pollution.

Over recent years there has also been growing concern that industrial activity has led to changes in the atmosphere that can cause long term problems such as acid rain and climate change.

Responsible Organisations

Department of Environment, Transport and the Regions:

The Department of the Environment, Transport and the Regions set the policy framework for managing atmospheric quality to make sure that air is clean and safe. The major policies and programmes relating to air quality are:

- The National Air Quality Strategy;
- UK Climate Change Programme.

The Department of the Environment, Transport and the Regions also fund the national network of monitoring stations, the results of which are published on the Internet at www.aeat.co.uk/netcen/airqual/.

Local Authorities

Local Authorities assess the air quality of their area. They have a duty to work towards meeting the national air quality standards for seven of the eight key air pollutants. The Local Authority will designate areas that fail to meet national objectives as Air Quality Management Areas. The Local Authority will then take action in these areas to make sure that air quality is improved.

Environment Agency

Our main contribution to making sure that air is clean and safe is to regulate major industry.

We operate a system called Integrated Pollution Prevention Control. This system regulates the potentially most polluting industrial processes. This will contribute to making sure that air is clean and safe by setting limits on the amount of substances that the industry can release to the atmosphere.

To demonstrate that we are regulating industry in an open and fair manner we place information relating to Integrated Pollution Prevention Control on a public register.

The Health and Safety Executive

The Health and Safety Executive regulates the nuclear industry by issuing site licences and monitoring their operations.

National view on Air Quality

Local Authorities are required to conduct a review and assessment of local air quality. This needs to consider how

local air quality meets the air quality objectives set out in the National Air Quality Strategy. There are objectives set for the eight main air pollutants, see table 1.1.1.

The Government's national indicator for reporting air quality is the number of days of moderate or high air pollution. The Government reports on the results collected from the National Automated Monitoring Networks, which in 1999 had 34 urban sites and 14 rural sites. The networks monitor five key air pollutants; particles (PM₁₀), ozone, sulphur dioxide, nitrogen dioxide and carbon monoxide. If the level of one of these pollutants exceeds national standards at one of the monitoring sites then it is recorded as a day of moderate or high air pollution.



The number of days of moderate or high air pollution



Figure 1.1.1. Source DETR 2000

In 1999 there were 30 days of moderate or high air pollution at urban sites compared to 48 days per site in 1993 when the system was started, see figure 1.1.1. In urban areas it is particles and gases from traffic that appears to be causing the majority of air pollution. Whilst in rural areas ozone is the main cause of air pollution, although traffic can be a significant contributor too.

Local view on Air Quality

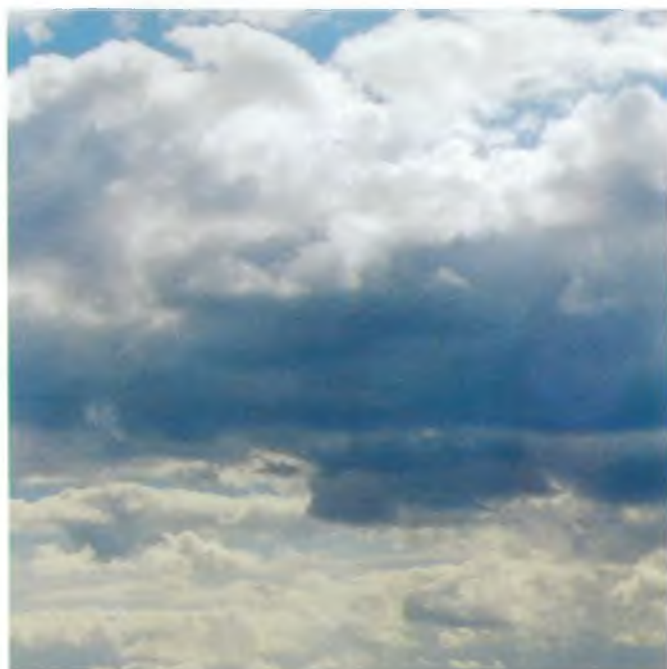
Within Central Area there are no automatic air quality monitoring stations connected to the national network,

Substances monitored for the National Air Quality Strategy

Pollutant	Main source of release to air	Main effects
Benzene	Traffic and Industry	Can cause cancer
Carbon monoxide	Traffic	Toxic gas
Lead	Traffic	Toxic particles
Nitrogen dioxide	Traffic, Power stations, Industry	Irritant with a possible link to asthma. May damage plants
PM ₁₀	Diesel vehicles, Industry, Power stations, Quarries	Can cause lung damage
Sulphur dioxide	Power stations, Industry	Associated with asthma, damages plants, buildings
Ozone	Not released to air directly, but formed when other air pollutants mix in sunlight	Irritant with a possible link to lung problems, can damage plants

Table 1.1. Source Environment Agency 1998

so information on the level of individual gases is variable for specific locations. However, all the Local Authorities in Central Area do carry out monitoring of air quality and are producing an Air Quality Review and Assessment as part of their obligation to the National Air Quality Strategy. If air quality is not meeting national standards for the key eight air pollutants then they will need to declare Air Quality Management Areas to resolve this problem. So far it looks like there will be no air quality management areas declared by Local Authorities within Central Area, suggesting that air quality is generally good. Results of the Local Authority Air Quality Reviews and assessments will be published on the DETR website in 2001.



We regulate and monitor emissions from 25 different industrial sites in Central Area, see table 1.2. We provide information on these processes and their emissions to Local Authorities to support their review and assessment of local air quality.

We will make sure that releases to air from the industrial processes that we regulate will ensure that local air quality meets national objectives. However, the whole burden of meeting national air quality objectives will not be placed on industry, where industry is not the major source of the pollutant.

The 25 industrial sites that the Environment Agency regulates and monitors for emissions to air in Central Area

Local Authority	Company
Blackburn	St Regis Paper Co Ltd
Blackburn	ICI Acrylics
Blackpool	Depuy CMW
Burnley	William Blythe Ltd
Chorley	Royal Ordnance Ltd
Fylde	BNFL
Hyndburn	William Bythe Ltd
Hyndburn	NIPA Laboratories Ltd
Knowsley	BICC Rod & Wire
Knowsley	Rentokill
Knowsley	Kodak
Lancaster	Transco
Lancaster	Acordis Acetate Chemicals
Lancaster	Lancaster Basalt Ltd
Lancaster	British Energy Ltd
Lancaster	Solrec Ltd
Lancaster	Joseph Storey & Co Ltd
Preston	BNFL
Ribble Valley	Castle Cement
Ribble Valley	ICI Chemicals and Polymers
Rosendale	Fort James UK Ltd
West Lancashire	RODCOL Ltd
Wigan	Heinz Ltd
Wyre	European Vinyls Corporation Ltd
Wyre	ICI Chemicals & Polymers Ltd

Table 1.2

Within Central Area we monitor releases to air from the industrial processes that we regulate. Figure 1.1.2 describes the amounts of these substances that were released to air in 1998.

Release of Key Air Quality substances from Environment Agency regulated sites in Central Area for 1998.
(Tonnes of pollutant emitted.)

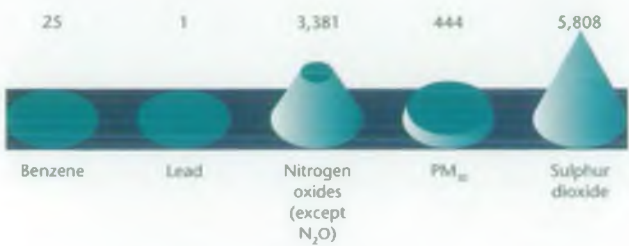


Figure 1.1.2. Source Environment Agency 2000

Air Quality and Road Transport

Improvements in air quality have been achieved to some extent by setting stricter standards for emissions from cars and lorries. These improvements have been possible due to new technology such as unleaded petrol and catalytic converters. These new stricter standards are enforced by the MOT certificate system. However the sheer growth in the number of vehicles on the roads has led to predictions that the trend for less emissions from traffic will halt in the near future, possibly 2005 for nitrogen dioxide.

For further Information:

www.aeat.co.uk/netcen/airqual



1.2 Climate Change

Introduction

There now appears to be a consensus that climate change will happen. It is predicted that this will mean winters become warmer and wetter whilst summers become warmer and drier. Storms will be more frequent and occur with greater force and sea levels will rise. Predictions do vary but it is expected that by the year 2050 the Northwest will be between 1°C and 2.5°C warmer with sea level rises of between 12cm and 67cm. (Dr Simon Shackley 2000)

There are broadly three issues that relate to dealing with climate change:

1. Reducing the emissions of gases that contribute to climate change;
2. Predicting and understanding the likely impacts on the environment and society due to climate change;
3. Taking action to respond to the impacts of climate change.

Responsible Organisations

The Government

The Government is committed to tackling climate change. The Kyoto Protocol has a legally binding target to reduce emissions of six greenhouse gases by 12.5% of their 1990 level by 2012. The Department of the Environment, Transport and the Regions (DETR) is expected to publish its consultation on the Government's Draft Climate Change Programme in February 2001 that will detail actions to reduce emissions of greenhouse gases.

The Environment Agency

We contribute to addressing climate change by:

- quantifying and reducing greenhouse gas emissions from major industry and landfill sites;
- monitoring and measuring changes to the natural environment;
- responding to impacts on the environment such as rising sea-levels, the expected greater intensity and duration of storms, water stress and the protection of wildlife habitats.

Sustainability North West

Sustainability North West chairs the North West Climate Change Group, which is investigating climate change within the region.

Local Authorities

Lancashire County Council is taking part in the Government's Councils for Climate Protection Campaign which is piloting methodologies for dealing with climate change at the local level.



National view on Climate Change

It is considered that climate change is the result of the increased release of certain gasses into the air since the industrial revolution. The UK Government agreed in 1997 at Kyoto to reduce levels of six greenhouse gasses in an attempt to reduce the rate of climate change. The six key greenhouse gases are:

- Carbon dioxide – from energy production and use, eg. transport, industry and homes.
- Methane – from natural wetlands, burning of fossil fuels, agriculture and degradation of waste at landfill tips.
- Nitrous oxides – from agriculture, industry and transport.
- Hydrofluorocarbons (HFC) – from refrigeration and air conditioning.
- Perfluorocarbons (PFC) – from the manufacture of electronics.
- Sulphur hexafluoride (SF₆) – from electrical insulation.

The graph below, figure 1.2.1 demonstrates a downward trend in greenhouse gas emissions. A main reason for this downward trend was the switch from coal fired power stations to other energy sources. Much more work needs to be done on monitoring greenhouse gas levels and on developing methods to further reduce their levels.

UK Emissions of greenhouse gases: 1990-2012

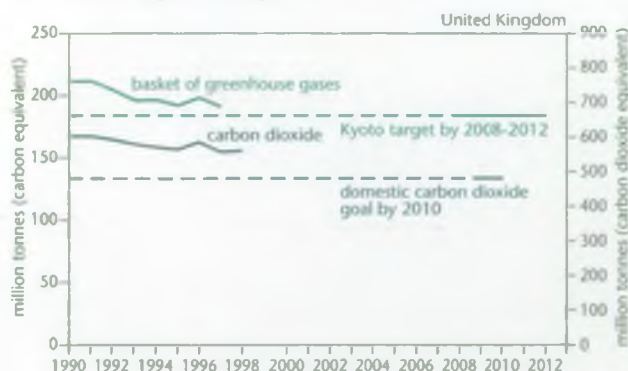


Figure 1.2.1. Source DETR 2000: NET CEN



Local view on Climate Change

The North West Climate Change Group, led by Sustainability North West has produced an inventory of the emissions of the six greenhouse gasses for the Northwest region, see figure 1.2.2.

Greenhouse gases, tonnes emitted, all sources in the Northwest 1995 baseline



Figure 1.2.2. Source ARIC 2000

Contributing to regional levels of greenhouse gases are the emissions from industrial processes that we regulate in Central Area, Figure 1.2.3 describes the amount of these gases that were released in 1998.

Emissions from industrial processes (in Central Area) regulated by the Environment Agency in tonnes for 1998

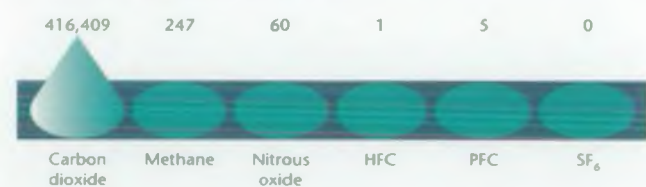


Figure 1.2.3. Source Environment Agency 2000

Further Information:


www.snw.org.uk/climate

www.doc.mmu.ac.uk/aric

www.detr.gov.uk www.la21net.com



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2.1 Water availability and demand

Introduction

Water is of vital importance for use at home and at work. We often take it for granted that when we turn on the tap a supply of clean water is there for us to use as we want. It can feel that water is freely available so we often use it wastefully without thinking of the consequences.

There is only so much water in our environment for us to use. In Central Area water is taken from rivers, reservoirs and groundwaters stored in aquifers. Water is taken for public and private water supplies, industry, agriculture and maintaining wetlands for wildlife.

We need to manage how water is taken out of the environment. If we take too much water too quickly or at the wrong time of year we can cause environmental problems, for example if we take water out of a river it means there is less water in the river for the plants and animals that live there. So much water can be taken out of rivers that fish can no longer swim to traditional spawning grounds, or at other times of the year fish eggs may dry out.

Rivers that suffer from low water levels are more at risk from pollution. This is because there is less water to dilute the effect of the polluting chemicals.

Responsible Organisations

Environment Agency

We are required to balance the needs of the natural environment against the community's demand for water. We have legal powers to do this by gathering information on water levels in the environment and regulating the amount of water that can be taken out of rivers, reservoirs and groundwater.

To achieve this we need to know how much water is in the environment, how much of this water wildlife needs to survive and flourish and how much water is left that can be taken out for use by people at home and in business.

We regulate the amount of water that is taken out of rivers, reservoirs or groundwaters by issuing and enforcing licences called Abstraction Licences. These Abstraction Licences limit the total amount and rate at which water can be taken out of the environment. Whilst all licences have a set limit for the amount of water that can be taken out of the environment per year not all licences have an expiry date. This means some licence holders can continue to take out water for the foreseeable future. This could lead to a situation where the environment suffers. As part of the abstraction licensing review, that is currently taking place, it is likely that most new and many existing licences will be time limited.

Catchment Abstraction Management Strategies (CAMS)

Catchment Abstraction Management Strategies will be the shared strategies for the sustainable management of water resources within a river catchment. They will describe the availability of water resources and abstraction licensing practices within a catchment. They will also set out the strategies to be employed within the catchment to address any over abstraction problems and to manage the water resources in a more sustainable way. Catchment Abstraction Management Strategies will be developed through a process of stakeholder consultation and will complement Local Environment Agency Plans. These started production in April 2000 and will be produced on a six-year cycle.

North West Water Ltd

It is the responsibility of the water company to provide treated water for homes and businesses. In Central Area the main water company is North West Water Ltd although parts of the Ribble and Lune catchments are also served by Yorkshire Water. The water companies must have a licence that is issued and enforced by the Environment Agency to take water from rivers, reservoirs and groundwater.

The Office of Water Services (Ofwat)

The Office of Water Services is the economic regulator of water companies. It ensures that companies give good quality, efficient service and can finance the proper conduct of their functions.

Ofwat carries out a periodic review every five years of water company plans and prices. It sets the price limits on what companies can charge their customers.

Ofwat reviews the company's performance on reducing leakage, sets leakage targets and checks that these targets are met.

Local view on water availability

Within Central Area water is taken from surface waters (rivers and reservoirs) and groundwaters.

Surface waters (rivers and reservoirs)

The Central Area consists of five river catchments. The main rivers are the Alt, Douglas, Lune, Ribble and Wyre. Water is taken out of all of these rivers, by varying amounts and for varying purposes. In the higher parts of the catchment water tends to be taken out of rivers and reservoirs for the public water supply and to supply local industry. The main reservoirs include:

- Rivington complex with a storage capacity of 16,497ML;
- Burnley reservoirs with a storage capacity of 4,158ML;

- Pendle reservoirs with a storage capacity of 2,456ML.

Water is also taken from the Rivers Alt, Crossens and Douglas for mainly agricultural purposes and is often applied to the land by spray irrigation. Figure 2.1.1 gives an indication of the amount of surface water abstracted and how this relates to the amount of water that is actually licensed to be abstracted.

Water abstracted from surface waters in Central Area

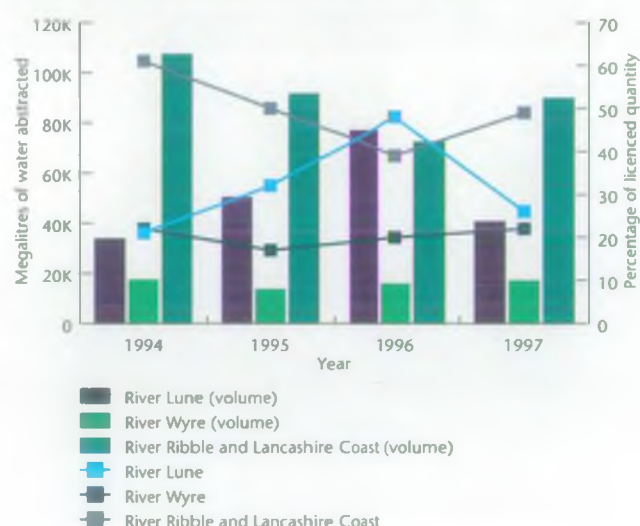


Figure 2.1.1. Source Environment Agency 2000

Groundwaters

The Liverpool/Ormskirk aquifer, in the Alt/Crossens catchment, has been heavily used in the past for public water supply and industrial purposes. This demand has declined and currently the level of water in the aquifer is high leading to many springs re-appearing at ground level. This aquifer is particularly vulnerable to pollution from farming and industrial practices.

The Rufford aquifer, in the Alt/Crossens catchment, is heavily used for spray irrigation and public water supply, so much so that no new abstraction licences are being issued.

The Fylde aquifer, that underlies the Lune, Ribble and Wyre catchments, is heavily used to provide water for public water supply. There are also a number of industrial

users in the Preston area. No new licences are being issued due to the current high level of use.

Figure 2.1.2 gives an indication of the amount of groundwater actually abstracted and how this relates to the amount of water that is licensed for abstraction.

Water abstracted from groundwaters in Central Area

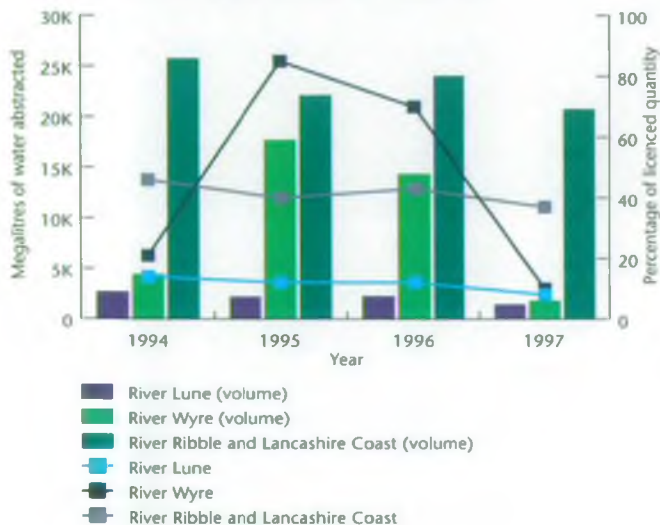


Figure 2.1.2. Source Environment Agency 2000

The Lancashire Conjunctive Use Scheme (LCUS)

To help manage the amount of water in the area the Lancashire Conjunctive Use Scheme (LCUS) was developed by North West Water in the late 1970s. This links a number of water sources together so that water can be moved to where it is most needed.

The Lancashire Conjunctive Use Scheme comprises

- Stocks reservoir (Ribble catchment);
- Barnacre reservoir (Wyre catchment);
- River Wyre;
- River Lune;
- Groundwater from the Fylde aquifer (Lune, Ribble and Wyre catchments).



Factors affecting our ability to manage water resources to meet the demands of people and wildlife

Forecasting demand for water for public water supplies, industry, agriculture and the environment is quite complex, as they all have different volumes and growth rates. There is also potential for reduction in demand as more efficient use is made through better process management and improved technology. Broadly speaking people's personal water use is expected to rise, but leakage control and demand management should counteract this.

We are producing a National Water Resources Strategy in December 2000 and Regional Strategies in January 2001, which will address all water users (public water supply, agriculture, industry, environment, and private abstractors) for the next 25 years.

Loss of water

North West Water currently supply about 1950 Ml/d to their customers. Current total losses, including leakage from distribution mains and local supply pipes, is around 490 Ml/d. Ofwat's target for 2000 is 465 Ml/d.

North West Water Ltd as part of their responsibilities to reduce waste of water, are committed to a programme of leakage reduction from their supply pipes. Their success in committing significant effort and resources to this programme is reflected in Lancashire where they have reduced water loss through leakage from 132 megalitres a day in 1996 to 83 megalitres a day in 1999, see figure 2.1.3.

Water supplied and lost in Lancashire

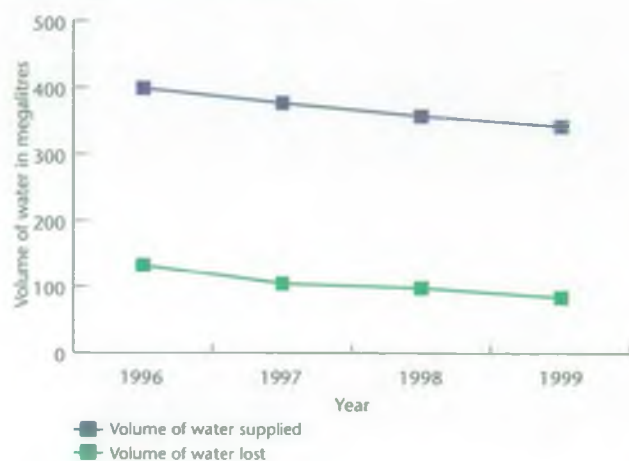


Figure 2.1.3. Source Environment Agency 2000

We encourage all abstractors to use water efficiently and reduce waste. We currently have a trial project called SWEL, Sustainable Water use in East Lancashire, that gives businesses advice on how to manage water better on their site. This will help to reduce water use and reduce the risks from flooding and pollution incidents.

Low river flows

Historical rights that allow businesses to take water out of rivers and groundwaters has led to some stretches of rivers in Central Area suffering low water flows, under certain circumstances. This can be damaging to the environment.

British Waterways has historic rights to take water from rivers for use in canals. Locally this has caused low flows in the Rivers Conder and Calder as water is diverted into the Lancaster Canal.

The River Douglas in the Wigan area has suffered low flow problems when water is diverted into the Leeds and Liverpool Canal.

In the Ribble catchment the Rivers Brennand and Whitendale suffer low water levels due to water being taken from them by North West Water Ltd and used for the public water supply.

Within the Wyre catchment several rivers have stretches that suffer from low flows due to the amount of water taken out of the Fylde aquifer.

Extreme weather conditions

Extreme weather conditions can lead to droughts and water becomes in short supply. The Water Resources Act 1991 allows for drought orders and permits for dealing with these drought situations. The pre-requisite for these orders and permits is an exceptional shortage of rain, and as a result of this a serious deficiency of water supplies exists or is threatened.

Drought Orders are the means by which we and/or a water company can apply to the Secretary of State for the imposition of restrictions in the uses of water. These orders may also allow for the abstraction of water outside of existing licence conditions. Drought Permits is the mechanism by which we (with the consent of the local Navigation Authority), if applicable, permits a Water Company to abstract water outside of the normal terms of an Abstraction Licence.



2.2 River water quality

Introduction

Rivers and waterways have historically been at the heart of the development of Britain's towns and cities, providing as they do essential water supplies, communication routes, and defensive boundaries. Whilst some rivers have remained unscathed by adjacent development, for many the pressure of urban and industrial expansion has resulted in a systematic deterioration in water quality.

The consequences of this water pollution are less diverse river habitats that support fewer species of aquatic plants and animals. Pollution has left some rivers contaminated, discoloured and barren, destroying their amenity and economic value as well as their natural populations.

Today this trend is being reversed through the implementation of systems of control and regulation developed by the Environment Agency. The controls have been developed from National and European legislation and are specifically designed to limit discharges of pollution through the regulation of industrial and agricultural practises.

The rewards of this new environmental regulation have been an improvement in river water quality across the region and a beneficial knock on effect for local wildlife. As rivers become cleaner animal and plant populations flourish. Fish such as salmon and trout have returned to spawning grounds in the industrial heartland of Lancashire, whilst rare species such as the otter have returned to their previous homelands in the rural parts of the Rivers Lune and Ribble.

Responsible Organisations

The Environment Agency

We aim to make sure that rivers are clean and safe for people and wildlife. Rivers are at risk from pollution from wastewaters that are deliberately put into rivers and from pollution incidents that can happen anywhere at any time.

It is a legal requirement to gain consent from the Environment Agency before anyone can put wastewater or trade effluent back into a river or watercourse. This is how we regulate industrial sites and wastewater treatment works. A consent sets limits on the amount of substances that can enter the river.

To make sure that this regulation is firm and fair all main rivers and tributaries are set River Water Quality Targets. These rivers are closely monitored and any that do not meet their target are investigated. Any organisation found to be breaking the limits set on its consent risks being prosecuted.

However, not all river pollution is due to wastewater that is deliberately returned to the river. As water drains through land and into rivers it can pick up chemicals such as fertilisers and pesticides from farmland or oil from road drains. Also chemicals can be badly stored and handled, which can then lead to them being washed into drains or directly into streams and rivers. We will investigate significant pollution incidents and prosecute offenders. We also help farms and industry to prevent pollution by offering good practice advice on the storage and use of chemicals.

To prevent pollution and to make sure that rivers continue to improve we advise North West Water Ltd on the investments that are required to improve the sewerage network. This process is known as Asset Management Plans (AMP) and also involves the Department of Transport, Environment and the Regions and the Office of Water Services (Ofwat).

North West Water Ltd

North West Water Ltd is responsible for the sewerage network and wastewater treatment works. It has a responsibility to meet the requirements of its consents. It also has a continual investment programme to upgrade the sewerage network and wastewater treatment works that will lead to environmental improvements. Over recent years there have been targets for meeting legal requirements and achieving environmental improvements.

Office of Water Services (Ofwat)

Ofwat aims to make sure there is a balance between environmental improvements and the cost to customers. Ofwat also advise the Secretary of State for the Environment on the value for money offered by North West Water Ltd investment programme.

National view on river water quality

There are a variety of methods for recording river water quality. The Government, as an indicator of progress towards sustainable development, uses the General Quality Assessment (GQA) method. This allows for comparisons of the river water quality in our area with the national average, see figure 2.2.1. The GQA systems rates river water quality on a five point scale from A, which represents very good river water quality to F, which represents bad river water quality.

River water quality (GQA Chemistry 1999)

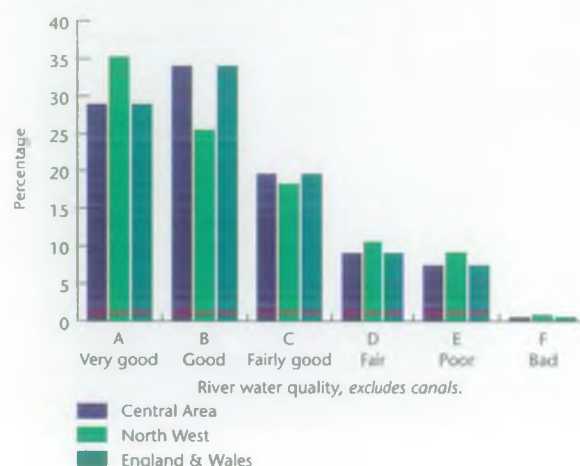


Figure 2.2.1. Source Environment Agency 2000 (internal)

Local view on river water quality

Past records can be used to demonstrate the massive improvements that have been achieved in river water quality within Central Area. Figure 2.2.2 demonstrates that longer stretches of river are now classed as good water quality whilst smaller stretches are classed bad.

River water quality (GQA Chemistry 1999) in Central Area, excludes canals

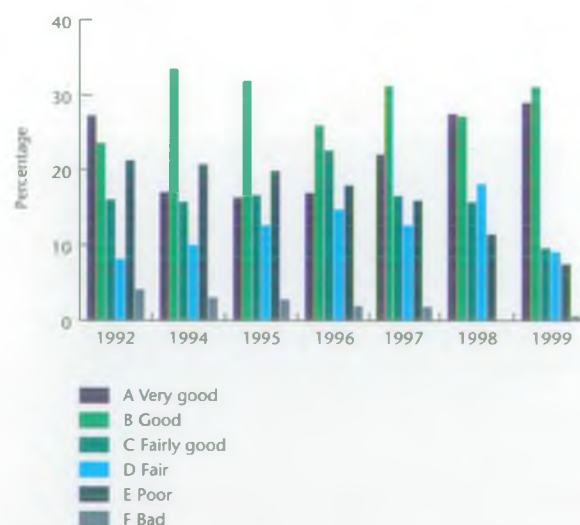


Figure 2.2.2. Source Environment Agency 2000 (internal)

Whilst overall water quality has improved over time the graphs do not give a very good picture of how river water quality varies over Central Area. Map 2 in Appendix 6 gives a pictorial representation of river water quality and as can be seen the rivers in the rural uplands of Central Area, the Lune and Upper Ribble, have the best water quality. Whilst the Rivers Alt and Douglas suffer poorer water quality in the more industrialised southern part of our area. This is also borne out in figure 2.2.3.

River water quality in Central Area (GQA Chemistry 1999)

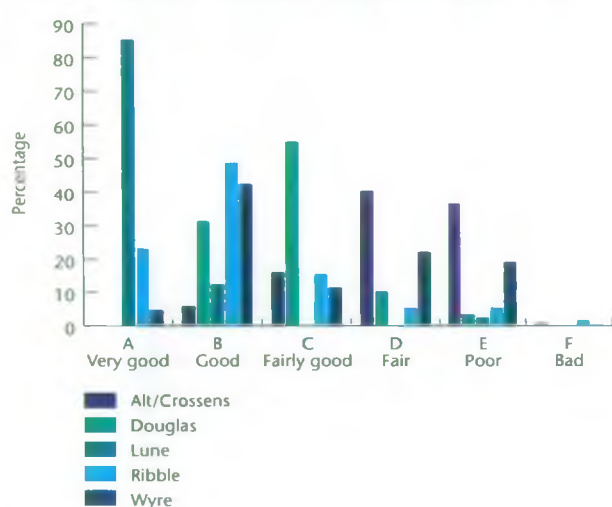


Figure 2.2.3. Source Environment Agency 2000 (internal)

Factors affecting river water quality

Whilst river water quality is improving, we aim to make sure rivers are clean and safe for people, and we want to see continued improvement. To do this a second system is used to plan improvements to rivers. This system is known as the River Ecosystem Assessment and this is used to give each stretch of river a River Quality Objective. The top River Quality Objective is a stretch of river that has water of very good quality (RE1) and is suitable for all fish, such as salmon and sea trout. The lowest River Quality Objective that would be set is one where water is of fair water quality (RE4), suitable for coarse fish such as roach.

Whilst river water quality is generally good and improving some stretches of river fail to comply with their River Quality Objectives, see figure 2.2.4.

Compliance with river quality objectives 1999

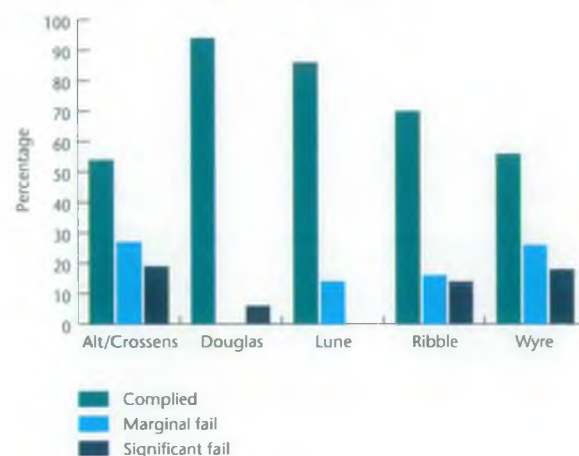


Figure 2.2.4. Source Environment Agency 2000 (internal)

Rivers fail to meet river water quality objectives for a number of reasons. Using this system helps us to identify stretches of rivers that are suffering poor water quality and to seek solutions for this. There are also a number of European Directives that support improving river water quality. These include the Dangerous Substances Directive, the Urban Wastewater Treatment Directive, the Freshwater Fisheries Directive, the Bathing Waters Directive, The Surface Water Abstraction Directive and the Shellfish Waters Directive.

Within Central Area the main obstacles to improved water quality are discharges from the sewerage network, discharges from industry and pollution incidents relating to industry and agriculture.

Discharges from industry have to be consented to by the Environment Agency, so it is possible to plan improvements that will result in better water quality. In recent years improvements have been made, or are planned for 20 wastewater treatment works in Central Area. Much of these improvements have been driven by the Urban Wastewater Directive and the Bathing Waters Directive and have been targeted at treatment works on the coasts and estuaries, such as Morecambe, Fleetwood, Blackpool and Preston, see Appendix 1 for a complete list.

Much of the sewerage network is old and due to new developments is struggling to cope with the amount of

wastewater that flows through them today. Particularly storm overflows discharge much more frequently than they used to, causing water quality problems. In Preston alone 94 of these storm overflows will be upgraded over the next five years. Table 2.2.1 gives an indication of the scale of the problem in Central Area and Appendix 2 gives a more detailed list.

New development of towns and industrial estates has led to more water quality problems caused by people connecting machinery to the wrong sewer. This leads to contaminated water going directly into streams, Appendix 3 contains a list of locations suffering from these problems. Oil and chemicals being poured down drains also cause water pollution. This can be deliberate or accidental. We will investigate these cases of water pollution and if appropriate we will prosecute offenders. Within nine months in the year 2000 Central Area Officers conducted 14 successful prosecutions related to water pollution incidents and issued a further six cautions.

In the rural parts of our area farming has also caused some water quality problems. In the Lune and Ribble Valleys where sheep farming is common sheep dip has found its way into streams. Whereas on the lowlands of the Lune, Ribble and Wyre estuaries where arable and dairy farming is more usual there have been problems related to

fertilisers, spreading wastes on land and pesticides, see Appendix 4.

Within rural areas there are also local water quality problems due to houses not being connected to the main sewerage network. Wastewater from these houses drains into ditches and streams without the sewage being treated correctly or at all in some instances. The worst case is probably in Singleton in the Wyre catchment, where sewage from most of the houses in the village drains into an open stream without treatment, but there are cases spread throughout Central Area, see Appendix 5.

East Lancashire has a particular problem with abandoned mines. Stretches of rivers feeding the Calder, Darwen and Douglas suffer minewater pollution, which can also lead to the water being given a tell-tale orange tint.



Storm overflows in Central Area, 2000

LEAP	Number of combined storm overflows	Number of unsatisfactory combined storm overflow	Number of unsatisfactory storm overflows to be rectified by 2005
Alt/Crossens	79	30	Target is to resolve all by 2005
Douglas	160	60	Target is to resolve all by 2005
Lune	60	21	Target is to resolve all by 2005
Ribble	350	101	Target is to resolve all by 2005, but 25 still need a planned resolution
Wyre	60	24	Target is to resolve all by 2005

Table 2.2.1



2.3 Estuary and bathing water quality

Introduction

The western boundary of Central Area is formed by the coastline of the Irish Sea, from Hightown in the South to Warton Sands in the North. The coastal waters are very important to the tourist industry, which is a major source of employment in the area and for wildlife. The main tourism centres are based around Southport, Lytham St Annes, Blackpool and Morecambe. The two major estuaries in the area, are the Ribble and the Lune (including Morecambe Bay), both are designated as RAMSAR sites, in recognition of their international importance for wildlife.

Responsible Organisations

The Environment Agency

We are responsible for controlling discharges to estuarine and coastal waters, for monitoring marine water quality for three miles offshore and taking the lead in any marine pollution incidents in estuary waters. We also monitor compliance with the European Bathing Waters Directive.

The Centre for Environment, Fisheries and Aquaculture Science (CEFAS), is an executive agency of the Ministry of Agriculture, Fisheries and Food (MAFF). Its responsibilities include monitoring commercial fisheries for contaminants, prevention of the gathering and sale for human consumption of contaminated shellfish and the regulation of disposal of sewage sludge and dredging at sea.

The Maritime and Coastguard Agency promotes and enforces maritime safety, including minimising pollution risks from ships. The Marine Pollution Control Unit provides a rapid response to major offshore oil spills.

Onshore, Local Authorities have responsibility of co-ordinating a response.

The Department of Trade and Industry (DTI) licenses and regulates oil and gas exploration and production operations in offshore water.

North West Water Ltd

North West Water Ltd is responsible for water supply, the sewerage network and wastewater treatment works. It has a responsibility to meet the requirements of its consents. It also has a continual investment programme to upgrade the sewerage network and wastewater treatment works that will lead to environmental improvements. Over recent years there have been targets for meeting legal requirements and achieving environmental improvements.

Office of Water Services (Ofwat)

Ofwat aims to make sure there is a balance between environmental improvements and the cost to customers. Ofwat also advise the Secretary of State for the Environment on the value for money offered by North West Waters Ltd investment programme.

North West Bathing Water Forum

The Forum was set up in September 1999. It is a partnership of many different organisations who are dedicated to ensuring that the North West's bathing waters meet the EC Bathing Waters Directive. The Forum holds an Annual Conference to inform interested parties and reports on progress. The Forum Steering Group meets approximately six times a year.



Local view on Estuary and Bathing Water Quality

The three estuaries in Central Area are classed as Good to Fair water quality. Whilst coastal waters have become cleaner there is still a problem with some beaches failing to comply with the EC Bathing Waters Directive.

Estuary water quality in Central Area

Estuary	Estuary Water Quality 98/99
Alt estuary and coastal waters	Fair
Lune and Wyre estuaries and coastal waters	Good
Ribble estuary and coastal waters	Good

Table 2.3.1. Source Environment Agency 2000

In the year 2000 456 out of 480 bathing waters in England and Wales complied with the European standards. This represents 95% compliance nationally.

The year 2000 has seen the best results ever recorded in the North West for bathing water compliance with 29 out of 37 official bathing water sites complying with European standards. This represents 78.4% of the North West bathing waters meeting European standards, an 8% improvement on 1999 results.

The North West’s results are someway off the legal requirement to achieve 95% compliance, with some sites still inconsistent.

In Central Area, 10 out of 14 sites (71%) complied in 2000 compared with 7 out of 14 (50%) in 1999, this represents a major improvement.

Compliance with European Bathing Water standards in Central Area

River Catchment	Bathing Water	2000	1999	1998	1997
Alt/Crossens	Formby	PASS	PASS	PASS	PASS
Alt/Crossens	Ainsdale	PASS	FAIL	PASS	FAIL
Alt/Crossens	Southport	PASS	FAIL	PASS	FAIL
Ribble	St. Annes	PASS	FAIL	FAIL	FAIL
Ribble	St. Annes North	FAIL	FAIL	FAIL	FAIL
Wyre	Blackpool South	PASS	FAIL	FAIL	FAIL
Wyre	Blackpool Central	PASS	FAIL	FAIL	FAIL
Wyre	Blackpool North	PASS	FAIL	FAIL	FAIL
Wyre	Bispham	FAIL	PASS	PASS	PASS
Wyre	Cleveleys	PASS	PASS	PASS	FAIL
Wyre	Fleetwood	PASS	PASS	PASS	FAIL
Lune	Heysham	FAIL	PASS	PASS	FAIL
Lune	Morecambe South	FAIL	PASS	FAIL	PASS
Lune	Morecambe North	PASS	PASS	PASS	PASS

Table 2.3.2

Factors affecting Bathing Waters quality

Enormous efforts have been made to improve Fylde Coast bathing waters over the past decade, including investment so far approaching £350 million by North West Water Ltd. The initial phase of improvement schemes to the sewerage network were completed in the mid 1990s, however, these have proved to be insufficient to achieve compliance with European Bathing Water standards. This was unexpected and a comprehensive programme of further improvement schemes and investigation was quickly put in place. The second phase of improvement schemes became fully operational in the summer 2000. Parts of the third phase, a £56 million investment to fund storm sewage management and additional treatment in the Ribble catchment, is intended to deliver consistent compliance and will start to come on stream in 2001.



The Alt/Crossens LEAP Area

There are three designated Bathing Waters in the Alt/Crossens area, these are at Formby, Ainsdale and Southport. All three sites complied with the directive standards in 2000.

However, storm conditions in the Ribble remain a risk factor although there are plans for new storm management facilities at Southport and Wigan sewage works. These will be largely in place for the 2001 bathing season, whilst further ultraviolet disinfection will be introduced at Wigan Wastewater Treatment Works by September 2002 and Skelmersdale Wastewater Treatment Works by March 2004.

Many sewer overflows in the Preston Area are to be improved in the next two to three years, which will further assist in improving bathing water quality.

Special attention is also being paid to a surface water outfall near Pontins holiday camp that may be contaminated by wrong connections in a local housing estate.

The Ribble LEAP Area

The Ribble LEAP area has two designated Bathing Waters. St Anne's complied with the directive for the first time ever. Whilst St Anne's North failed to comply, improvements have been maintained in overall bathing water quality which was established between 1998 and 1999. Excellent results in dry weather are spoiled by poorer results in wet weather and this may have been a factor in the results for these two beaches.

Storm conditions in the Ribble remain a factor and plans are in hand for new storm management facilities at Southport and Wigan sewage works. These will be largely in place for the 2001 bathing season, whilst further ultraviolet disinfection will be introduced at Wigan Wastewater Treatment Works by September 2002 and Skelmersdale Wastewater Treatment Works by March 2004.

Many sewer overflows in the Preston Area are to be improved in the next two to three years, which will further assist in improving quality.



Lune LEAP Area

There are three designated Bathing Waters in the Lune LEAP area. Morecambe North Bathing Water has shown steady improvement over the last four-five years, but Bathing Waters at Morecambe South and Heysham have a patchy compliance history that is cause for concern.

A major study has been completed and substantial improvements in the sewerage network, including installation of ultraviolet disinfection at a number of locations around the Bay, is to be undertaken in the next three to four years. Lancaster Wastewater Treatment Works, the closest major works to Heysham, has already benefited from upgrading to allow secondary treatment of sewage.

The effect that the large bird populations in Morecambe Bay may have on Bathing Water quality is also being investigated.

Wyre LEAP Area

Cleveleys and Fleetwood passed the Bathing Water standards confirming their recently improved performance.

The three main Blackpool sites all passed the Bathing Water standards in 2000, this is the first time this has ever occurred. We cannot guarantee that they will always pass, as there are still risk factors, which we don't fully understand.

This year survey work at Blackpool has included intensive 24-hour surveys, a helicopter surf zone survey and dye tracing. Further work has been done to identify any unknown or forgotten pipes under the beach, and to sample water held in the sand. Additionally, boreholes have been drilled to monitor groundwater movement and quality. All of these will provide more information, enabling the Bathing Water Forum for the area to work towards a long-term solution for Blackpool's beaches.

The failure at Bispham Bathing Water in 2000 is unusual, as this site regularly complies with the standards.

The underlying quality has not changed and we would expect the site to comply in the future.





2.4 Waterside recreation and access

Responsible Organisations

Environment Agency

We have a duty to promote the recreational use of rivers, coastal waters and associated land. Our main contribution is to protect and improve the environment so that people can feel safe and confident whilst taking part in recreational activities.



We provide opportunities for people to fish as a sport and hobby. We manage two-day tickets for fisheries on the River Lune (at Halton and Skerton) and on the River Ribble (at Milton). We also lease fisheries on The Sluice, near Southport to an angling club on the understanding that day tickets are available. We have developed low disabled angling platforms in this area for anglers in wheelchairs. We also manage several picnic sites and footpaths and work closely with other organisations to improve public access to riverbanks. One of our roles is to facilitate good relationships between anglers, walkers, cyclists, canoeists and boat owners. We also work to make sure that the enjoyment of people does not mean undue damage and disturbance to the environment and wildlife.

British Waterways

British Waterways is a public corporation responsible for a 2000 miles, 200 year old network of canals and rivers on behalf of the people of the United Kingdom. Approximately 500 miles of this network is in the North West of England.

Their aim is to take care of our canals and rivers in a way that will provide the greatest benefit and enjoyment for the people who use them now and in the future. Their work includes making sure canals are safe places for people to enjoy; maintaining structures such as locks, bridges, aqueducts and towpaths as well as the waterways themselves. British Waterways is providing services and facilities for people who use our canals. It also earns income from a wide range of waterway-related businesses to invest in the future of the waterways.

British Canoe Union

The British Canoe Union is the UK governing body, recognised by the Sports Council, for the sport and recreation of canoeing. There are approximately 40 British Canoe Union affiliated clubs within Central Area.

Ramblers Association and Bridleways Association

The Ramblers Association is the main voluntary organisation promoting informal recreation in the countryside, with well over a thousand members in Lancashire. The Bridleways Association works and lobbies to improve access for horseriders.

Local Authorities

The Highways Authority, for much of Central Area is Lancashire County Council, which has the responsibility to manage footpaths and bridleways.

The length of river that is available in Central Area

Catchment	Length of main river (km)	Length of river fished (approx % of main river)		Length of river designated as a European freshwater fishery in km (includes canals)		Length of river failing European designated freshwater fishery in km (includes canals)		Number of rod licences sold		Minimum economic value of salmon fisheries (based on £7k per rod fish)
		S&ST	C&T	S&ST	C&T	S&ST	C&T	S&ST	C&T	
Alt/Crossens	124	0	30%	0	24	0	0	853	13338	0
Douglas	193	0	33%	6	1	0	0	2941	54367	0
Lune	317	95%	5%	308	35	0	0	3028	13764	£7.1m
Ribble	465	55%	85%	213	29	0	0	9557	82056	£3.7m
Wyre	166	35%	65%	103	42	30	0	3108	30063	£0.93m

Table 2.4.1. S&ST= Salmon & Sea trout, C= Coarse fish, T= Trout

Local view on waterside recreation and access

Within Central Area the vast improvement in river water quality now means that much of our rivers support good populations of fish. To give everyone an opportunity to fish we provide a wide range of information on where and how to fish, including a **Rivercall phoneline 0891 500 999**. We are very active in providing and improving facilities for anglers, including improving access for the disabled. We also run a programme of Urban Fisheries Development Projects to improve angling opportunities in areas of high population.

The Section on Freshwater Fisheries describes the type and abundance of fish in Central Area. Table 2.4.1 gives an indication of the length of river that is available to be fished in Central Area. The River Lune and Ribble are particularly good for salmon and sea trout. Coarse fishing is also possible in parts of the lower Lune. The River Ribble and Wyre along with stretches of River Alt and Douglas provide excellent coarse fishing. There is also coarse fishing along the Leeds-Liverpool and Lancaster Canals. There are also numerous lakes and commercial fishing ponds. Hence the benefit of offering the Rivercall line to help direct people to specific locations.

The number of rod licences sold gives an indication of how popular fishing is in Central Area. Although the pie charts, figure 2.4.1, represent where the licences were purchased rather than where people actually fish.

Coarse fish rod licences sold in Central Area (1999)
(value shown is number of licences sold each catchment)

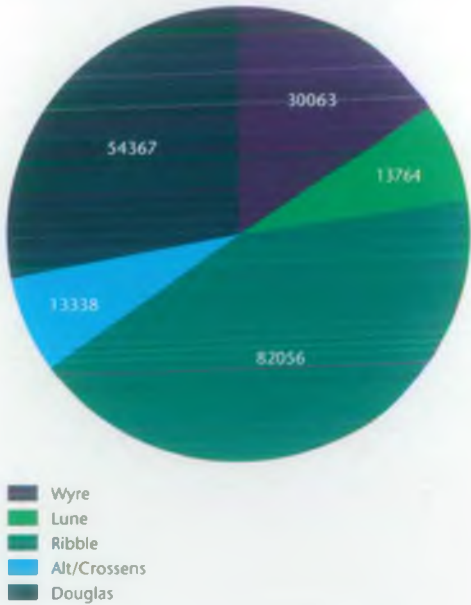


Figure 2.4.1. Source Environment Agency2000 (internal)

Salmon fish rod licences sold in Central Area (1999)
(value shown is number of licences sold each catchment)

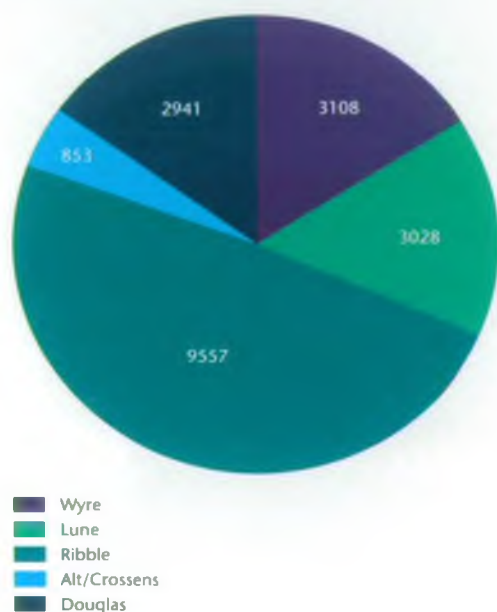


Figure 2.4.1. Source Environment Agency 2000 (internal)

We own fishing rights, which we use to provide affordable fishing for everyone. As mentioned earlier this includes the management of two-day tickets for fisheries at Skerton and Halton. We are investigating ways to encourage people to take up fishing in cities and towns. In East Lancashire we are working to produce an angling strategy that will build on current work, including regenerating Platts Lodge to provide urban fishing in Accrington and training youth workers in Burnley in the sport of angling. In Liverpool we have worked with Liverpool City Council to improve a series of Park Lakes offering affordable and sustainable local fishing. All of these improvements involve working in partnership with other organisations for them to be successful.

Whilst we want to encourage people to enjoy fishing it is important that we protect fish and fish stocks. We provide information on how to handle fish safely and promote catch and release for migratory fish. We have also introduced a bylaw on the River Lune that limits the amount of fish that can be killed by anglers with rod and line to four salmon a season.

We promote access to the waterside for walkers, and where possible provide access that is suitable for wheelchairs and pushchairs. We are currently involved in supporting the

creation of Scorton's Millennium Way along the River Wyre. This includes display boards to provide information on the walk and local wildlife. Providing these types of information boards is one of the ways we give people the opportunity to learn about their environment. Other good examples where we have incorporated access and information include Lanes End picnic sites that has excellent views over the Lune estuary and the safe haven pond on the River Lune in Lancaster.

To encourage interest in the environment we produce various publications along with a national magazine for anglers called 'Catch'. This is distributed with The Angling Times and is also available from our offices.

Opportunities to enjoy cycling, walking, boating, canoeing and angling exist along the canals in Central Area. Access to the canal towpath can be gained from the 280 bridges along the Leeds and Liverpool Canal and the 114 bridges along the Lancaster Canal in Central Area. One of the key Millennium Commission projects is their support for British Waterways to develop the Ribble Link. This will allow boats to cross the Ribble Estuary and go from the Lancaster Canal and into the Leeds to Liverpool Canal.

Factors affecting waterside recreation and access

Conflict of encouraging people to enjoy their environment without damaging it

When people visit rivers and walk along waterside footpaths they wear away a little of the path. This can lead to paths becoming very muddy and as people try to avoid this, the path can become wider and wider. There will of course also be wear and tear on stiles, gates and furniture such as benches. All footpaths and recreational sites need to be maintained to keep them in good order and there are pressures on budgets that pay for this work. Whilst this type of damage is unintentional there is a surprising amount of wilful damage ranging from vandalism, to dropping litter and dog fouling.

When walking, cycling or boating there is always the possibility of disturbing wildlife. It is important to be aware of where you are and adhere to any local constraints to avoid areas that have sensitive wildlife. In the past the problems of using lead weights and leaving fishing lines behind caused problems to wildlife. New bylaws mean that splitshot which is non-toxic is used as weights and prevents one of these problems. The problems of leaving fishing lines behind is only improved by encouraging anglers, and teaching new anglers, to follow a good code of practice.

The theft of fish from both still waters and rivers is also a problem, with some coarse fish being worth several hundred pounds each, a lucrative market has developed. Salmon poaching too is prevalent and those caught face stiff penalties with two recent offenders receiving custodial sentences of 3 and 15 months. The piechart, figure 2.4.2, below gives a breakdown of the types of offences that occurred within Central Area in the year 2000.

Number of offences in Central Area 2000

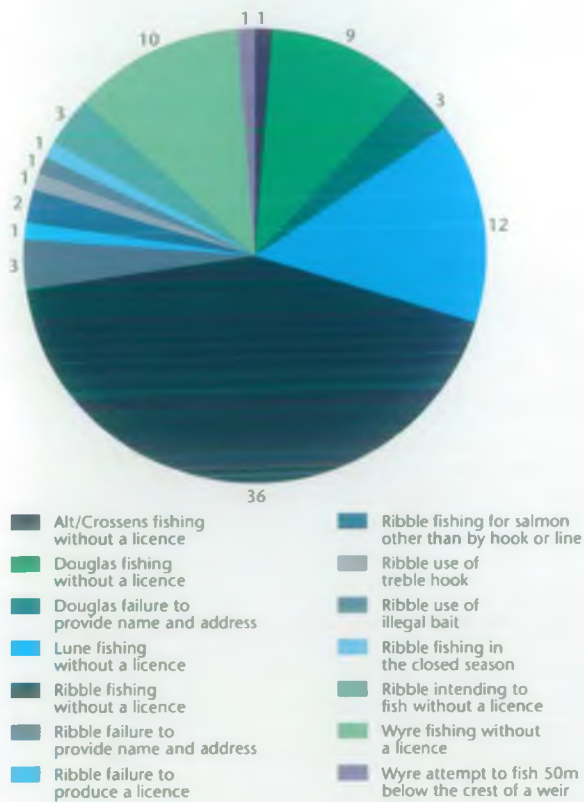


Figure 2.4.2. Source Environment Agency 2000 (internal)

The conviction of these offenders led to a total of £4,774 of fines being issued by the courts, along with total costs of £4,025.

Conflict between different groups of people

Different people have different needs for their sports and enjoyment of the environment. There can be conflicts between anglers, canoeists and ramblers that want to use the same stretch of riverbank and water for their sports. Our responsibility is to act as mediator between conflicting users to find an acceptable solution.

Encouraging recreation for all

We would like to encourage opportunities for everyone to enjoy their environment. This relies on proactive work to target under-represented groups and this takes up more resources, such as staff time and funding, than general promotional work.





2.5 Flood defence

Introduction – Flooding and flood storage

The amount of water in a river varies, occasionally there is so much water in the river that the water overflows the banks and floods. The land that actually floods is known as the floodplain.



Whilst flooding is a natural process, it can cause people problems. This is because the floodplain is now often used either as farmland or land that has been developed for homes and industry. As floodwater surges over land it can damage crops, property and business and in extreme cases harm to people.

The difficulty is that the more the floodplain is developed the greater damage a flood causes and more importantly, developments often mean that the floodplain will flood more often. This is because more rainwater gets into rivers more quickly when it hits hard surfaces, such as tarmac and roofs. Also more developments includes drains which allow rain water to enter rivers much more directly, so the river swells more quickly and then floods causing more damage as there are more homes and industry in the flood plain. This is a vicious circle, so we need to influence where and how new developments are built to reduce the risk of flooding.

Similarly we need to consider how to protect the coast, and developments along the coast, from tidal flooding and storms. Which could become more common as a result of climate change.

Whilst floods cannot always be avoided, flooding can be prepared for, which we endeavour to do by providing timely and effective warnings. This is dealt with in the subsequent section on Flood Warning.

Responsible Organisations

UK Government

Government policy for flood and coastal defence is set out by the Ministry for Agriculture, Fisheries and Food (MAFF) in its *Strategy for flood and coastal defence for England and Wales* (MAFF & Welsh Office, 1997). To address management and control issues around flood risk in November 1999 the Government via MAFF issued High Level Targets. These were directed at flood and coastal defence operating authorities together with an elaboration of our flood

defence supervisory duty. In April 2000, the Department of Environment, Transport and the Regions (DETR) published a first draft of new planning policy guidance *Planning Policy Guidance Note 25: Development and Flood Risk*.

Environment Agency

We have a supervisory duty for all matters relating to flood defence. Our remit is to reduce the risks of flooding from rivers and the sea, to people, property and the natural environment. Consequently, we have a major role in the planning and construction of flood defences and the operation of a flood warning service. We also regulate activities that affect the drainage of land and act to control new developments so that they do not increase the risk of flooding to an area.

The essential elements of our flood defence strategy are:

- efficient and effective monitoring and flood warning systems to minimise impacts of flood events;
- maintenance, or improvement, of the net storage capacity within main rivers, critical watercourses and floodplains;
- maintenance, or improvement, of coastal defence in the context established in Shoreline Management Plans;
- identification of floodplain and then control of development in the floodplain;
- integrated management of the river catchment such that rainwater seeps into rivers, and other watercourses, at a rate that reduces the risk of floods.

Local Authorities (LAs)

Local Authorities, as operating authorities for watercourses, are empowered by statute to address land drainage problems.

European Union

The Water Framework Directive (WFD), developed by the European Union, is the most significant piece of water quality legislation to be developed for at least 20 years and was adopted by the UK Government in 2000.



Local view of Flood Defences

Flood Defence – Maintenance

In some locations, river maintenance in the form of dredging, weed cutting and tree maintenance is carried out to ensure the free flow of water and lessen flood risk. This work is done only where it is essential to protect life and property, or as part of a previous commitment to benefit agricultural land. Any necessary work is timed to minimise impact on wildlife, migratory or breeding fish being an example. Where practicable, our maintenance works and flood defence schemes adopt a 'soft' engineering approach, such as willow raddling, and incorporates wildlife features to the river bank and bed.

Whilst we have permissive powers to undertake river maintenance work, the ultimate responsibility for the upkeep of a watercourse rests with the owner of the riverbank. Erosion control of existing river channels is not part of our maintenance activity unless flood defences are threatened.

Flood Defence – Improvements

The need for improved flood defences at Glasson Dock has been acknowledged in recent years as an important aid for securing its long-term viability. The design and build contract was let at the end of 2000 for The Glasson Dock Improvement Scheme and the first phase of the work has begun on site. When complete the works will alleviate coastal flooding along a 2.8km length of the Lune Estuary to a one in one hundred year storm standard of protection.

Other flood alleviation schemes are planned during 2000/2001. Walton-le-Dale flood alleviation scheme, comprising channel improvement works, will be in progress during 2001. A design and build contract for Pendle Water at Barrowford is expected to be let in early 2001, with funding contributions due from Lancashire County Council and Pendle Borough Council. At Pendle Water, at Lomeshaye, a flood alleviation scheme should be completed in early 2001. In Fylde, channel improvement works at Liggard Brook and Main Drain was completed by 2000.

Feasibility studies into various schemes were progressed in 2000/2001 involving Lower Lancaster, Altmouth pumping station and Walverdon Water at Nelson.

Arising from the Easter Floods Action Plan, there is a substantial programme of improvement works in progress, which should ensure reliable operation of river gauge stations associated with flood warning zones. Flood defence improvements expertise also contributes to multi-functional schemes, which address LEAP issues and support community development.



Factors affecting Flood Defences in Central Area

Development in the Floodplain

We are responsible under Section 105 of the Water Resources Act 1991 for producing maps showing the location and extent of areas at risk from flooding. These Indicative Floodplain Maps were made available in a major national update in late 1999. The Indicative Maps show natural floodplain areas, where flooding is known to have occurred or may occur once in one hundred years (ie. a 1% chance in any one year). For tidal flooding, one in two hundred years (ie. a 0.5% chance in any one year). Continued improvement is made with further modelling of the river basin, from the programme of Section 105 surveys, which improves definition of the flood risk envelope. The Section 105 work for Central Area is currently programmed to be completed in 2005. The Indicative Maps were made accessible via the Internet in December 2000 on our website (www.environment-agency.gov.uk) which, of course, has helped to raise public awareness.

At Regional level, we seek the inclusion of policies within local authority development plans which:

- help protect floodplains and restrict development which would lead to unacceptable increased risk of flooding;
- protect existing or proposed flood defences and our ability to carry out flood control works and maintenance activities; and
- deter developments that affect the capability of the coast to form a natural sea defence.

We actively exercise a formal development control role on planning applications which may influence flood risk, as well as in seeking to influence, less formally, the approach of local planning authorities through its professional contacts.

For Central Area, the forthcoming *Policy Planning Guidance note 25*, should particularly help to mitigate flood risk

associated with new development and strengthen our hand as a statutory consultee for planning applications. The impact of the 1998 Easter floods in the Midlands, and those of Autumn 2000, are prime examples of the consequences of ignoring the advice that we give, (and that of our predecessor organisations). However, one benefit of the impact of recent floods has been that it has raised awareness about the need for controlling development in the floodplain.

We have been active in promoting more sustainable solutions for urban drainage within new development. The issue of formal design guidance, *Sustainable Urban Drainage Systems – design manual for England and Wales (CIRIA C522)*, launched in August 2000, together with a forthcoming *Best Practice Guidance*, will further help our efforts in Central Area to disseminate appropriate practice.

Culverting of Watercourses

Rivers and streams are important wildlife corridors. Developments to land can include breaking the natural line of the river and putting it into pipes, called culverts. As the river disappears into the pipe and goes underground it can isolate and cause harm to wildlife.

To prevent harm and damage to wildlife we seek to have culverted watercourses restored to open channels where practicable and roundly endorse the June 2000 publication of *Watercourses in the Community: A guide to sustainable watercourse management in the urban environment* (Scottish Environment Protection Agency (SEPA) 2000).

All culverting is subject to Land Drainage Consent under the Water Resources Act 1991 or Land Drainage Act 1991. Normally this will only be approved if there is no practical alternative and if the detrimental effects of culverting were deemed to be minor. In all cases, some form of works is required to provide some benefit to wildlife to compensate for the loss of the natural line of the river caused by the culvert. In 1999 we issued a policy statement and technical guidance regarding culverts. In Central Area we have taken the initiative to progress a draft enforcement protocol, one

of the first of its kind, for assured co-ordination between the Local Authorities and ourselves.

Climate Change, Flood Defence and Ecological Sustainability

For the long term, one of the key implications of climate change for Central Area is increased winter rainfall, coupled with a tendency for increased storminess, which will increase incidence of flooding.

With forecasted rise in sea level, more frequent storm surge tides are also likely to bring about more frequent coastal flooding. Already details of the 2001 United Nations Intergovernmental Panel for Climate Change report point to more severe future global impacts than was considered likely in the mid-1990s. An indication of the current trend of change in seasonal rainfall regime; the ratio of winter to summer rainfall, and which is possibly a manifestation of climate change, is given in the graph below.

Annual rainfall over time

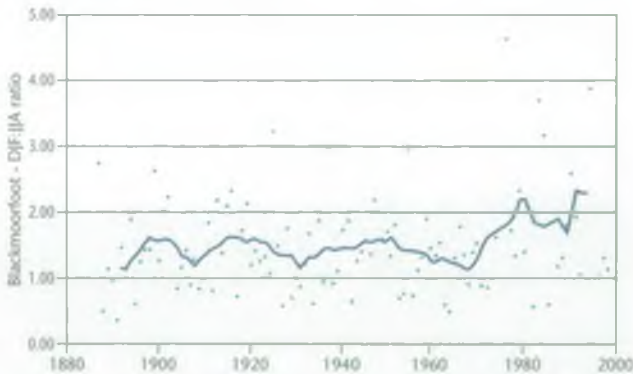


Figure 2.5.1. Source: Burt, 1999

Agricultural land management is increasingly seen as important for influencing both potential short term and long term flood risk. Storm events can provoke soil erosion, which affects the capacity of watercourses and flood risk. On just one tributary of the River Wye, in the Borders, English Nature has estimated that nearly half a million tons of soil a year are being swept off the land. This, of course, can impact on flood defence as well as

river ecology. Our flood defence strategic planning team is developing systems for the holistic management of catchments and coastal areas in order to deliver ecologically sustainable flood defences.

In the context of flood defence, ecological sustainability means that any new development must not exacerbate flood risk and that flood defence measures should minimise material inputs, both at the time of provision and for the future, at a level which does not exceed the natural capacity for renewal. In addition, any potential socio-economic and biological impacts of flood defence projects and maintenance should be identified, evaluated and minimised with the local community duly involved as practicable.





2.6 Flood warning

Introduction

We took over responsibility for disseminating flood warnings from the police in September 1996. We provide a free 24 hour 365 days per year flood warning service.

We issue many flood warnings each year to properties at risk from flooding from rivers or the sea. However, by their nature, severe events occur infrequently, and their timing is unpredictable, so it is critical that an efficient flood warning system is maintained.



Responsible Organisations

The Environment Agency

We take the lead role in forecasting and warning for flooding from rivers and the sea. We disseminate warnings to the general public, the media and professional partners like Local Authorities, the Police and Utilities. However, other organisations have an active role in providing and responding to flood events with whom we liaise closely.

We are in daily contact with the Met Office who provide us with detailed weather forecasts, especially at times of severe weather. Constant weather radar data is used to forecast high river levels and the impact of high tides.

To ensure that the flood warnings issued are understood we liaise closely with Local Authorities and the emergency services. Lancashire County Council's emergency planning unit may help co-ordinate the response of all operational bodies in times of severe events. We also pass all warnings to the coastguard who may need to respond during times of flood and the gas, electric and water companies.

Local Authorities

Local Authorities are responsible for organising sand bagging to protect properties and roads, to organise public evacuations and operate emergency rest centres. These activities are all part of the emergency plan that is co-ordinated for Lancashire by Lancashire County Council.

Police

The Police are responsible for promoting public safety taking particular responsibility to erect emergency road signs and where necessary to close roads.

National View on Flood Warning System

Nationally we provide a four-stage Flood Warning service:



This is a general early alert to all properties at risk from flooding from rivers or the sea. These messages are passed to professional partners and local media.



Where we are able to do so, flood warnings are provided for designated flood warning areas. These messages are passed to professional partners and local media and also direct to properties at risk by an automated telephone system.



Should the situation deteriorate we can issue severe flood warnings to those areas that are able to receive Flood Warnings.



When the threat of flooding has passed we will issue an all clear to all areas at risk from flooding from rivers or the sea.

Floodline

We also operate a 24 hour free phone service called **Floodline on 0845 988 1188**, to offer public information on the risks of floods.

In the year 2000 £2 million pounds was spent on a national television, radio and advertising campaign to raise awareness to the new Flood Warning system and Floodline. This also involved local promotion with Bay Radio at the Trafford centre, Blackpool Sea Life Centre and ASDA in Wigan.



Local view on Flood Warning

In Central Area there are 11 designated flood warning areas, as shown in the table 2.5.1. People in the designated Flood Warning Areas receive a warning two hours before a

flood. This warning is delivered by automatic voice messaging service over the telephone.

Designated flood warning areas in Central Area

River	Designated Flood Warning Area	Number of Properties
Lune	Hornby	39
Lune	Skerton Pool, Lancaster	111
Lune	Lancaster	850
Wyre	Scorton	52
Wyre	Garstang	103
Wyre	St Michael's	357
Ribble	Low Moor, Clitheroe	30
Ribble	Ribchester	31
Ribble	Walton le Dale, Preston	603
Yarrow	Croston	359
Douglas	Wigan	82

Table 2.5.1

Further information can be found in detail in our Local Flood Warning Plan and the Flood Warning Service Strategy which can be viewed at our office.


Factors affecting Flood Warning

We measure the performance of the Flood Warning Service as stated in the Flood Warning Service Strategy. The Benchmark used is the level of service originally provided by the Agency in 1996. Since 1996 two new areas have benefited from being designated as formal Flood Warning Areas.

We offer a general flood watch service for all areas at risk from flooding from rivers and the sea. We also offer a four-stage warning service for those areas where we are able to do so.

In order to provide a four-stage service the following must be in place; we must be able to accurately measure (in real time) actual rainfall in an area and the current river level at key positions along the relevant river. We must also develop river models to simulate flow conditions in order to predict times when flooding may occur.

**ENVIRONMENT
AGENCY**



3.1 Brownfield sites

Introduction

The North West's long industrial history has left a legacy of contamination and derelict land, these areas are known as brownfield sites. They can present risks to human health, surface water, ground water, wildlife, buildings and underground services.

Approximately 25% of derelict land in England is to be found within this region (Environment Agency North West Regional Contaminated Land Strategy September 1999). Pressures to protect greenbelts and greenfield sites from development have led to a greater emphasis on bringing brownfield sites back into beneficial use. It is unsustainable to leave large areas of land damaged and unable to provide for our land use requirements.

Bringing contaminated land back into beneficial use helps conserve the land as a resource and this reduces pressure on greenfield sites, with the additional benefits of conserving agricultural land and natural habitats. There are many stakeholders with an interest in the development of derelict and contaminated land; ranging from national and regional government through to industry and the general public. We are working with other stakeholders in a positive role towards achieving such redevelopment.

A new contaminated land regime came into effect on the 1 April 2000 under Part IIA of the Environmental Protection Act 1990. This provides ourselves and Local Authorities with powers to address the legacy of historically contaminated land that exists in England. Under this regime Local Authorities are responsible for the identification of possible contaminated land, as well as securing appropriate levels of remediation from the 'appropriate person' responsible for the contamination.

They are charged with a duty to document and publish their strategy for the proactive identification of contaminated land. If an authority identifies that a site is likely to be contaminated, and that it is a potential 'special site', we will take on the inspection work, and follow through on remediation if necessary.

Special sites are certain types of contaminated land that we are deemed to have the appropriate experience for dealing with. Since the Local Authorities have the lead role to play in identifying land as contaminated, they initially control the rate at which we can deal with sites under this new regime. We will also contribute to remediation of non-special sites by provision of site-specific guidance or through its existing role as a Statutory Consultee under the planning regime.



Responsible Organisations

Environment Agency

Our aims in dealing with contaminated land under Part IIA involve:

- working with Local Authorities to identify and report on the extent of contaminated land;

- regulating identified 'special sites' effectively;
- researching into the specific risks and remediation needs of contaminated land;
- preparing the national report on the State of Contaminated Land.

We will also provide advice to local planning authorities on applications to develop contaminated or potentially contaminating sites, as well as advising developers and consultants on the adequacy of investigations and remedial works.

The expertise concentrated within the contaminated land area and groundwater regional teams is often consulted on internally in situations concerning the pollution of controlled waters.

We have access to funds, internally or from the DETR, which we can use to manage projects, or contribute to the remediation of sites where there is no possibility of recovering remediation costs from a third party and contamination presents a threat to controlled waters.

Local Authorities

Local Authorities take the lead on the implementation of the new Part IIA contaminated land regime, as described above. As the Local Planning Authority they are also responsible for ensuring that any redevelopment of contaminated land includes the necessary investigation and remediation of contaminated land, where appropriate.

North West Regional Assembly

The North West Regional Assembly is responsible for reviewing the Regional Planning Guidance, which should provide an overall framework that considers the environmental consequences of a land-use strategy. The review process provides the region with an important opportunity to address existing environmental problems, which should include consideration of the significance of contamination at a regional level and the need to encourage early consultation on specific developments.

North West Development Agency (NWDA)

The NWDA was formally established on 1 April 1999. It is charged with accelerating economic and social regeneration and significantly improving the competitiveness of the region. The NWDA controls a major source of funding for reclamation of derelict land.



Local view on brownfield sites

Our area mainly comprises Lancashire, extending north and east into Cumbria and the Yorkshire Dales and south into Merseyside. The Irish Sea coastline has several sites with Site of Special Scientific Interest (SSSI) and RAMSAR status. The coastal towns of Blackpool, Southport, Morecambe, Cleveleys, Fleetwood and Lytham St. Anne's are traditional holiday destinations. The European Union has determined that the quality of beaches on this coast needs to be improved. Morecambe Bay is a popular tourist destination and is also home to a nuclear power station and chemical complex at Heysham. There is also a history of chemical manufacturing in the Cleveleys area.

There is a strong industrial heritage in East Lancashire based on the production of cotton. The cotton industry utilised water for production and transportation purposes. Consequently, the cotton mills and subsidiary bleach and dye works developed in the vicinity of local rivers and canals.

The Lancashire Coal Field historically supported a thriving coal mining industry, numerous power stations and manufacturing industries. Development along the major

waterways and the coal field is evident in the Ribble Valley from Preston east through Blackburn, Burnley, Nelson and Colne and the conurbations around Wigan and Skelmersdale.

The historical international trade routes were through Liverpool to the south and the Fylde coast ports such as Preston and Heysham.

There are large areas of Ministry of Defence land and many sites that were used for the production of munitions during World War II. There is a history of aeronautical industry at Salmesbury and Warton, and automobile manufacture around Leyland.

Radioactive slag from the smelting of tin is commonly encountered around Bootle, on the border of Central Area and South Area, where it was used historically for constructing building foundations. It has also been found across other parts of Merseyside and into West Lancashire.

The Derelict Land Survey for 1993 showed that approximately 25% of derelict land in England is located in this region.

Section 57 of the Environment Act 1995 introduces a specific definition of contaminated land. This new legislation focuses on sites that could cause problems in their current use. It is difficult to estimate exactly how many sites this covers, but our initial estimate is that there may be between 5,000 and 20,000 'problem sites'.

Grant aid for redevelopment

Local Authorities have been able to obtain funds for the investigation and remediation of contaminated sites from the DETR Contaminated Land Funding Pool through the Supplementary Credit Approval scheme since 1990. The government granted the Environment Agency access to the DETR funding pool through the Capital Projects programme in 1997.

The DETR has now confirmed that we will have shared access, with Local Authorities, to funding available for investigation and remedial works on contaminated land. We are able to access this funding through the application

for additional Grant in Aid (GiA). This additional GiA forms part of the DETR Supplementary Credit Approval (SCA) fund which is available to Local Authorities.

Effects on the environment due to the brownfield sites in Central Area

Contaminated land can have various impacts on the environment and human health. Risks to humans can arise due to ingestion, inhalation, and dermal contact with contaminated soils. The mobility of contaminants in soils is an important factor to consider, and therefore sites that are contaminated may pose threats to off-site receptors as well as to future occupiers of contaminated sites. The risk of contamination of controlled waters, including groundwater, must also be considered.

Parts of Central Area are underlain by major and minor aquifers, which are important groundwater resources and need to be protected from pollution. There are also surface watercourses, which need to be protected from contamination. Contaminated land, if not satisfactorily remediated, can also impact on developments by means of its inherent chemical characteristics and potential for damage to buildings and services.



3.2 Waste management

Responsible organisations

Environment Agency

Our responsibility is three-fold. Our primary function is the regulation and enforcement of waste management activities. We are also responsible for the promotion of waste reduction to businesses. Lastly we collect, make available and publish information and data to the public and various interested parties.

One of our fundamental goals under our new 'vision' is to contribute to a better quality of life. We specifically aim to tackle waste from two directions; the first is through businesses. We aim to help create a 'greener' business world through such opportunities as Green Business Park initiatives, the new Integrated Pollution Prevention Control (IPPC) Regulations and through encouraging the implementation of waste minimisation and Environmental Management Systems (EMS).

The second part of our vision is a commitment to the 'wiser, sustainable use of natural resources'. It is our intention to tackle the problem at source, if we use less we will throw less away. And if we as a society make something then we must look at whether we can extend its working life, or whether it can be reused for something else, if not the product should be easy to recycle.

Local Authorities

Local Waste Collection Authority

In Central Area the Local Waste Collection Authority responsible for collecting householder waste on a regular basis, are mainly district councils. They can collect small amounts of industrial and commercial waste eg. waste from a market.

Waste Disposal Authority

A local authority charged with providing disposal sites to which it directs the Local Waste Collection Authorities for the disposal of their controlled waste, and with providing civic amenity facilities.

Waste Planning Authority

A local authority responsible for the granting of planning permissions for strategic waste sites such as Landfills. This is dealt with on a county basis where there is both a County and a District Council spilt. Their responsibility is to ensure that there is adequate land made available for current and future waste disposal and that disposal of the waste should be as close as possible to where it arises.

Government

The Department of Environment Transport and the Regions (DETR), is the main government department responsible for waste management. Although other departments have involvement (Ministry of Agriculture Food & Fisheries and Department of Trade and Industry). The DETR are responsible for encouraging voluntary action, introducing, monitoring and amending various legislative and economic instruments to encourage and enforce the safer and more sustainable management of the waste we all generate.

Waste Management Industry run the waste management facilities and are therefore fundamental in the type of facilities that operate and also the speed of change towards new options and finding new markets for secondary products.

Businesses and Householders are the primary source of waste and therefore have a role to dispose of waste responsibly and legally. There is also support for them to

cut down on the amount of waste they produce and advice is available for reusing and recycling their waste.

Local view on waste management

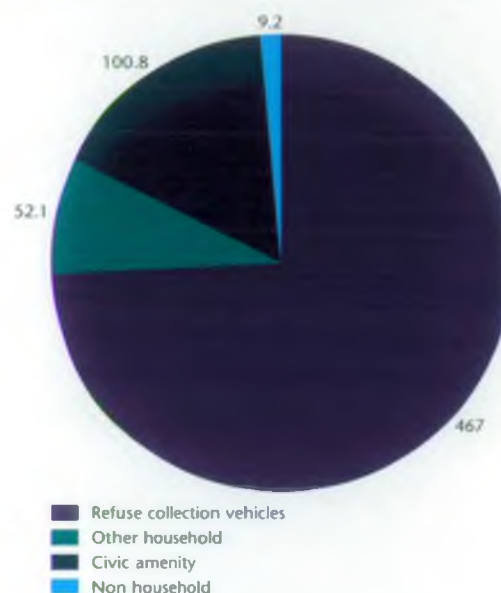
This report gives a local view on municipal, commercial and industrial waste produced in Central Area. Lancashire County Council is the Waste Planning Authority for the vast majority of Central Area, so most of the information available is for the County.

Municipal Waste

For the year 1998 to 1999 six hundred and twenty nine thousand tonnes of municipal waste was collected in Lancashire. This is mainly the waste that is collected from people's homes by refuse collection vehicles, see figure 3.2.1. The vast majority of this waste goes to landfill sites within the county although some is recycled, see figure 3.2.1.



Municipal waste collection in Lancashire 1998/99



Municipal waste disposal in Lancashire 1998/99

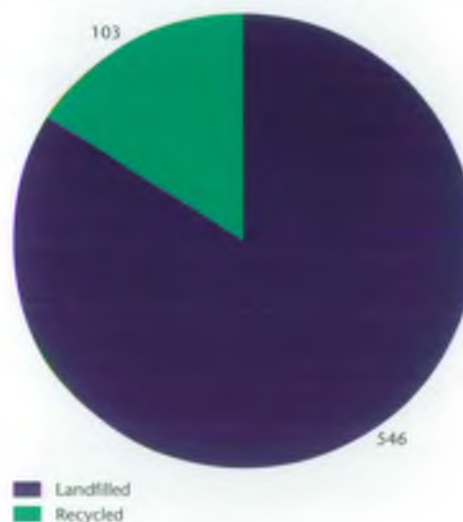


Figure 3.2.1. Source Environment Agency 2000

Commercial and Industrial Waste

The picture for the destination of commercial and industrial waste in Lancashire is slightly different, see figure 3.2.2. Although the most commonly used option for disposal is still landfill a greater range of alternatives are utilised. Whilst 47% of this waste is tipped at Landfills, 23% is usefully recycled.

Commercial and industrial waste disposal in Lancashire in 1998/99

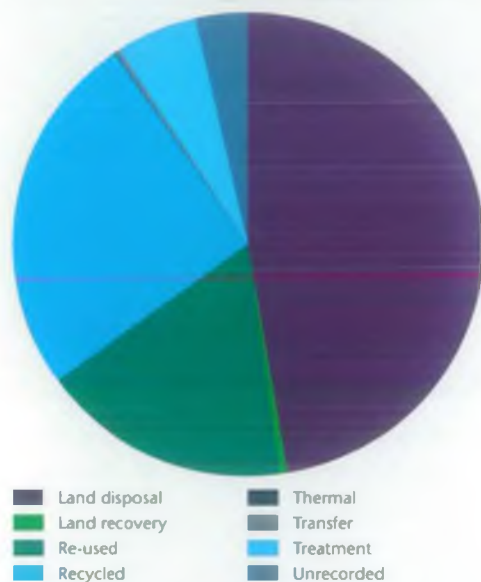


Figure 3.2.2. Source Environment Agency 2000

Waste Management Facilities

Central Area has a diverse range of waste management facilities that are broken down into various groups, see figure 3.2.3. A diverse range of management facilities is essential if we are to cut down on the amount of waste sent to landfill sites and are to put waste to more beneficial uses such as reusing and recycling.

Waste management options in Central Area

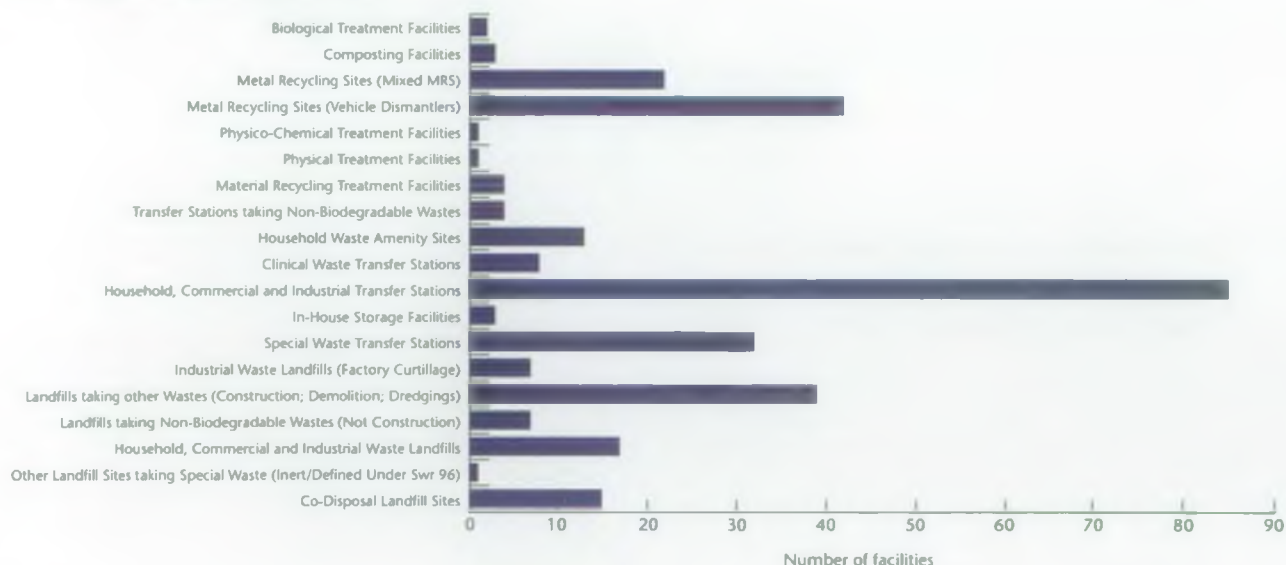


Figure 3.2.3. Source Environment Agency 2000

Hazardous Waste

Special waste is segregated from more general waste on the grounds that it presents a greater potential harm to human health. They are deemed hazardous due to their physical, biological and chemical properties. They may be toxic, flammable or otherwise hazardous. Due to its nature it has stricter control over its movements, making it easier to track.

Lancashire is a net importer of hazardous waste. According to 1998-1999 figures Lancashire produced 108 thousand tonnes, yet disposed of 161 thousand tonnes of hazardous waste. Although there seems to be a large disparity between the two figures, this can be explained by the vast majority of this waste stream being recycled. Over 70% of hazardous waste are disposed of in Lancashire by being recycled (mainly as secondary liquid fuels used in cement kilns).

Factors affecting waste management

There are a number of factors affecting waste management. These are financial and political.

A number of pieces of legislation use the 'polluter pays principle' to add costs to operations that are wasteful.

The landfill tax is a charge on companies for every tonne of waste they send to landfill. Whilst the Packaging Regulations obligate producers of packing waste to recover a percentage of it or face financial penalties.

Two new political drivers will also have a dramatic affect on waste disposal. The first, Integrated Pollution Prevention Control Regulations will require large manufacturing processers to minimise the amount of waste that they produce. The second is the Landfill Directive that sets targets that will reduce the amount of waste that can be tipped at landfill sites. This will have a fundamental effect on the future of waste disposal, as alternatives to landfill will have to be used. The principle requirements of the Landfill Directive can be seen in the box below.

Main requirements of the landfill directive

- targets for reduction of biodegradable municipal waste to landfill;
- banning co-disposal of hazardous and non-hazardous waste, and requiring separate landfills for hazardous, non-hazardous and inert wastes.
- banning landfill of tyres (by 2003 for whole tyres, 2006 for shredded tyres);
- banning landfill of liquid wastes, infectious clinical waste and certain types of hazardous waste (eg. explosive, highly flammable), all by 2001;
- provisions on the control, monitoring, reporting and closure of sites, which already form the backbone of waste management legislation in the UK.

Source: Government's Waste Strategy 2000

The other forces for change will be that final planning permission for landfill sites will become harder to get, squeezing supply and therefore further increasing the cost of using landfills.

Illegal Activity

The level of waste related incidents varies from year to year and as the accurate recording is only in its early stages there would appear to be no recognisable trend. In the financial year 1998/99 a total of 709 incidents were reported. Figure 3.2.4 shows the breakdown of these in terms of incident type. In the same financial year we brought a total of 76 prosecutions in Central Area, although because of time delays in the legal system some of these relate to incidents in previous years. As figure 3.2.4 shows the majority of notified incidents are from fly tipping. Local Authorities also deal with some incidents not reported here. We focus on the more serious offences but do work closely with Local Authorities on sharing information and good practice.

Illegal waste activities in Central Area 1998/99 (incidents notified)

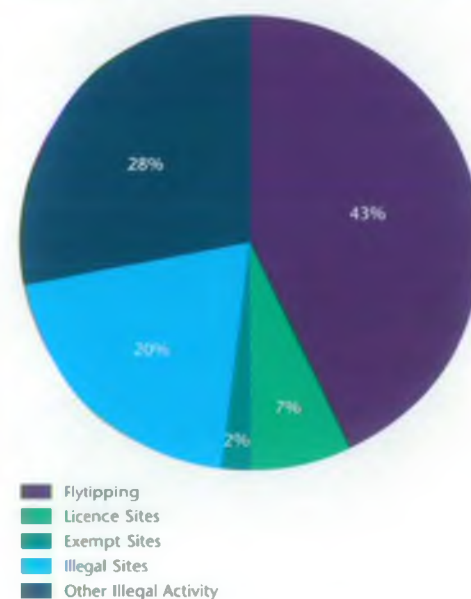


Figure 3.2.4. Source Environment Agency 2000



4. Wildlife

ENVIRONMENT AGENCY



4.1 Biodiversity

Responsible Organisations

The Environment Agency

Wildlife conservation is not our primary role, but we have a major part to play, creating a suitable environment by setting and enforcing environmental standards. We have important statutory conservation duties and significant obligations to the UK Biodiversity Action Plan in carrying out our regulatory and operational activities, and we actively promote and take part in habitat restoration projects.

Environment Agency activities that benefit wildlife

Our actions that help to create environmental conditions needed for wildlife to thrive include:

- regulating major industry to prevent pollution affecting air, land and sea;
- controlling water abstraction from surface and groundwater;
- controlling the exploitation and movement of fish stocks – preventing over-exploitation (eg. by netting or poaching), and the spread of disease and parasites;
- monitoring and assessing the chemical and biological quality of rivers, lakes and estuaries – to determine whether our environmental objectives and standards are being achieved;
- ensuring our flood and tidal defence works protect, and wherever possible, enhance riverine wetland and coastal habitats;
- advising planning authorities on how best to protect and enhance wetland habitats and, working with

developers, achieving local habitat improvements to offset previous losses;

- promoting the benefits of wildlife conservation through projects with partners and landowners;
- investing in research to understand better the requirements of species and habitats.

Policy Drivers

Among the key national and international drivers that will influence our actions are:

- **European and international:** Habitats and Birds Directives, Environmental Impact Assessment Directive, Strategic Environmental Impact Assessment Directive, Integrated Pollution Prevention and Control Directive, Water Framework Directive, and the Ramsar Convention.
- **UK:** UK Biodiversity Action Plan; Countryside and Rights of Way Act; Water Industry Investment Programmes, Rural and Urban White Papers; MAFF Fisheries legislative review recommendations; DETR Planning Policy Guidance revisions; and the DETR Abstraction Licence Review.

English Nature

English Nature acts as the Government's advisor on nature conservation. It promotes the conservation of England's wildlife and natural features by offering advice to various organisations, establishing and managing National and Marine Nature Reserves and designating the most important wildlife areas as Sites of Special Scientific Interest. English Nature also implements international conventions relating to the nature conservation and supports research.

Their work also supports people's education and enjoyment of England's nature.

The Wildlife Trusts

The Wildlife Trusts are the largest voluntary body in the UK that deal with all aspects of wildlife. It is made up of 47 independent charities. Within Central Area the main one is the Lancashire Wildlife Trust that manages over 30 nature reserves, works with 25 Local Authorities and over 100 schools to protect and promote peoples enjoyment of wildlife. Parts of the Lune catchment are covered by the Cumbrian Wildlife Trust.



What is Biodiversity?

'Biodiversity' is a technical term which has been brought into popular usage, and simply means 'the variety of life'. It is a convenient if ugly word to encompass the whole spectrum of life from viruses and bacteria through fungi to plants, birds, mammals, insects, fish and ourselves.

The Rio Summit in 1992 produced an agreed definition: "The variability among living organisms from all sources including... terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems."

This definition brings in more ideas, firstly it makes clear that it means more than simple preservation of species –

zoos can do that. It means maintaining whole communities of plants and animals. It also refers to 'diversity within species' this emphasises the importance of local varieties and populations.

'Biodiversity' is not just about rare and endangered species, it is also about looking after the common plants and animals of roadsides, wasteground and our everyday surroundings.

What about biodiversity in our area?

Coming down from the Earth Summit at Rio to the situation here, what is the state of Biodiversity locally? 'Locally' means the Central Area of the Environment Agency's North West Region; it covers most of Lancashire, and small areas of Cumbria, North Yorkshire, Merseyside and Greater Manchester – we use natural rather than local government boundaries as befits an environmental body.

Our local biodiversity reflects the same variety as other aspects of local life and achievement – we have everything from international level to underachieving. The stars are the 'Natura' sites. These are areas which have been put forward as the best examples of their kind in Europe. Most of our coast is designated – from Crosby to Lytham St Annes in the Ribble and Alt Estuaries Special Protection Area, with the Sefton Dunes Special Area for Conservation coming inland from it. Moving up the coast to Fleetwood the Morecambe Bay Special Area for Conservation and Special Protection Area covers the rest of our coast. Inland, Bowland and Ingleborough are also recognised as Special Protection Areas.

We have national recognition for large parts of the area as well; Bowland is officially an Area of Outstanding Natural Beauty and nearly half of the Yorkshire Dales National Park comes into the area. Large parts of the area are designated as Sites of Special Scientific Interest, and National Nature Reserves which are the national accolades.

Coming further down the scale we get the 'county players', County Biological Heritage Sites, Local Nature Reserves, and Sites of Biological Importance. The maps 5 and 6

in Appendix 6 show where these are located. More details are available from English Nature and the County Naturalist's Trusts.

The rest of the area is not designated, notified or acknowledged as significant, but this does not mean that it has no value. The Rio definition refers to 'living organisms from all sources'. Right at the bottom of the pile come those parts of our area which are in very poor condition, with very low plant and animal diversity; some are even contaminated by toxic materials, and large areas are covered with tarmac and concrete.

The task of maintaining and conserving the best and improving the rest is obviously vast and well beyond the capacity of any single body. We form partnerships with local government and voluntary bodies to pool resources and expertise, with lots of examples around the area. The most important factor in environmental protection and enhancement is for everyone to recognise its value and then make their contribution, however small. We are part of the biodiversity, and it is up to us what sort of place we want to live in.

Are Things Getting Better or Worse?

Confusingly but not surprisingly, the answer is both. We have a vast range of places and plants and animals; some are getting better, some are declining.

Water quality in our rivers and streams is steadily improving, with fish present in many rivers where they would have been inconceivable even 20 years ago. Air quality has vastly improved with the decline in coal fires – the Lancashire valleys no longer have a permanent smoke layer hanging over them and some previously derelict sites are now valued wildlife sites.

We are national champions for several plants and animals. In Central Area we are particularly concerned with the well being of otters, water voles, Freshwater Pearl Mussel and European White Clawed Crayfish.

Otters are slowly returning, especially in the north of the

area. We are working in partnership with the National Otter Project. This project seeks to co-ordinate survey work on otters to ensure that efforts are properly directed.

Surveys have shown that otters have come back very strongly throughout Cumbria and are spreading into the northern part of Lancashire. We are taking part in survey work and we will ensure that our works do not harm good otter habitat. Our biggest contribution to biodiversity has been to improve and maintain good water quality.

Water voles have been highlighted as a species that has declined dramatically in recent years. This little creature has been made a 'Biodiversity Action Species' and we have been working in partnership with County Wildlife Trusts throughout England and Wales surveying watercourses to find out how well water voles are existing. Initial results suggest that the situation is optimistic. Our work has covered North Merseyside and parts of West Lancashire; voles have been found at about half of the sites surveyed. Where urban sites have been examined voles have been found to be fairly common.

Our future surveys will cover the Douglas catchment, followed by the Fylde area. We aim to survey the whole of Central Area by the end of 2003. The surveys will give essential information about where water voles are located. We can then put schemes together to maintain or aid re-establishment of water voles.

Freshwater Pearl Mussels occur in a very few rivers in the country. They need a river with very soft and clean water. The River Ehen, near Egremont in Cumbria, has a good population as has one of the River Kent tributaries near Kendal. Freshwater Pearl Mussels can be found in a few other rivers in the north part of North West Region, but in numbers which are too low to support viable populations. The biodiversity process has stimulated further investigation and it now appears that they may be thinly spread throughout the Lune catchment, but in numbers too low to ensure their survival. The decline in this species is general throughout Western Europe and the underlying cause is unknown.

European White Clawed Crayfish are native to a number of North West rivers, where there is a high calcium content. This means those rivers which rise on limestone – in Cumbria the Rivers Eden, Kent and Leven; in Lancashire, the River Ribble and its tributaries. This species is very demanding in water quality and is particularly susceptible to sheep dip pollution. The other danger is that of crayfish plague. This is disease carried by the American Signal Crayfish, which is grown as an extra crop in some fish farms. The American species is immune to the disease, but the native species is very vulnerable. The Ribble stock has been devastated by the disease and we have collected a large number of uninfected animals to use for restocking later.

Biodiversity is always changing; certainly in terms of sites and places which have changed in detail. It is a matter of personal judgement whether some of these changes are 'good', 'bad' or simply a change of balance.

Useful Addresses and Contacts

Cumbria Wildlife Trust:

The Visitor Centre, Brockhole, Ecclerigg, Windermere, Cumbria. Tel: 01539 448280.

Lancashire Wildlife Trust:

Cuerden Park Wildlife Centre, Shady Lane, Bamber Bridge PR5 6AU. Tel: 01772 324129.

English Nature, Cumbria Team:

Juniper House, Murley Moss, Oxenholme Road, Kendal LA9 7RL. Tel: 01539 792800.

English Nature, North West Team:

Pier House, Wallgate, Wigan WN3 4AL.
Tel: 01942 820342.

English Nature, North and East Yorkshire Team:

Genesis 1, University Road, Heslington, York YO10 5ZQ.
Tel: 01904 435500.



4.2 Managing freshwater fisheries

Responsible Organisations

The Environment Agency

Our vision for fisheries is that all waters in England and Wales will be capable of sustaining healthy and thriving fish populations and everyone wishing to will have an opportunity to experience a diverse range of quality fishing.

We have a duty to ensure that rivers have the right quantity and quality of water to support healthy populations of fish. Fish populations are monitored regularly and stocking is controlled to ensure appropriate fish are introduced at suitable times and locations. It is a legal requirement to gain the consent of the Environment Agency before any fish can be introduced to rivers and still waters. Other laws are vigorously enforced particularly targeting poaching and ensuring people have rod licences. This is important as the fees from rod licences fund much of our fisheries work.

To give everyone an opportunity to fish we provide a wide range of information on where and how to fish, including a **Rivercall** phonenumber 0891 500 999. We are also active in providing and improving facilities for anglers, including improving access for the disabled. We run a programme of Urban Fisheries Development Projects to improve angling opportunities in areas of high population.

Fisheries Associations and Interest Groups

Within Central Area there are three thriving Fisheries Associations that play their part in improving rivers for fisheries interests by representing the views of their constituent Angling Clubs; the Ribble Fisheries Association, Lune & Wyre Fisheries Association and the Lancashire Fisheries Consultative.

In addition four groups are involved in improving fisheries habitat; the Ribble Catchment Conservation Trust, the Lune Habitat Group, the Wyre Rivers Trust and the Keer Regeneration Group. There are also two groups that are involved in stocking two of the areas' rivers with salmon. The Middleton Hatchery Group stock fish into the River Lune and the Hodder Hatchery Group stock fish into the River Hodder.



Description of freshwater fisheries in Central Area

The Alt/Crossens Catchment

River Alt

The River Alt is a coarse fish river, gradually improving in water quality. The Alt catchment was surveyed by electric fishing during 1996 and 1997. This highlighted the generally very poor state of the fish stocks. The majority of the sites surveyed contained either sticklebacks or no fish at all. Only the Downholland Brook system and the lowest two sites on the main river Alt contained major coarse fish species. These included pike, bream, roach, gudgeon and eels. As water quality improves, we will continue to stock the Alt with coarse fish.

Crossens Catchment

The catchment has, to the best of our knowledge never been surveyed by electric fishing due to its deep nature. The knowledge of the fish stocks is mainly restricted to evidence from angler's catches, fish kills and local knowledge. One site at Three Pools was assessed hydroacoustically and good fish numbers were found. The waters of the catchment are known to contain pike, roach, bream, tench, carp and perch.

The Douglas Catchment

The River Douglas

The River Douglas catchment was once a recognised salmon fishery. Now, due to poor water quality and obstructions to fish migration, parts of the river have no fish at all. Recently, coarse fish have returned in small numbers to the river at Poolstock and below Gathurst Weir. Anglers catch reports have been sporadic but generally improving. In the last survey of the catchment, 16 fish species were found including brown trout, chub, dace, roach, bream, perch, pike, tench, barbel, gudgeon, lamprey and eel.

The River Yarrow and Lostock

The River Yarrow and Tawd have small but improving populations of coarse fish. Rod catch reports from the River Yarrow have been good in recent years. The River Lostock not only has a good population of coarse fish but also supports some sea trout.

The Lune Catchment

The River Lune

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, a disease decimated the stocks and the populations have still not returned to pre-disease levels although rod catches still place it within the top five rivers in England and Wales.

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 fish and brown trout. Around the estuary and coast of the River Lune catchment there are commercial net fisheries for marine species such as mullet and sea bass.

The River Keer

The River Keer supports small populations of salmon, trout and sea trout. At one time these were good sized populations with catches of up to 1,000 sea trout per season, by 1996 the rod catch had dropped to just one sea trout in the season.

The River Conder

The River Conder also suffers from declining populations of salmon, sea trout and brown trout.



The Ribble Catchment

The River Ribble

The waters of the River Ribble catchment provide wide ranging facilities for game and coarse anglers as well as supporting commercial salmon, sea trout, and elver fisheries. Its main tributaries are the Rivers Hodder, Calder and Darwen.

The main River Ribble supports major game and coarse fisheries. The river is known to hold salmon, sea trout, brown trout, grayling, chub, barbel, roach, dace, carp, bream, pike, gudgeon, eel, and minor coarse fish species.

The most recent juvenile salmon survey indicated a decline in the status of juvenile salmon although the efficiency of the survey was reduced in main river sites. Trout numbers remained healthy. The river is stocked with brown trout by angling clubs to supplement the natural population for angling purposes. The estuary supports a commercial salmon and sea trout fishery as well as a sea fishery. The coarse fisheries of the lower river have suffered a decline in recent years, however rod catch reports suggest that the fishery is steadily improving again.

The River Hodder

The River Hodder supports an important migratory salmonid fishery, a regularly stocked brown trout fishery and is also fished for grayling. The tributaries of the Hodder are stocked with salmon by local angling clubs.



The River Calder

The River Calder has many barriers to fish migration; the most important of which is Padiham Weir, which effectively prevents the upstream migrations of all species of fish except eels. The only major tributary downstream of this weir is Sabden Brook. In 1996/7, trial stockings of salmon parr were made to Sabden Brook, Colne Water, Wycoller Water, Hyndburn Brook and Admergill Water (tributary of Pendle Water). Follow up surveys have shown good survival rates.

The 1993 stock assessment of the Calder catchment showed that brown trout are present mainly in the upper

reaches of Pendle Water, Colne Water, and the River Brun and in the Calder itself upstream of Burnley. Coarse fish were poorly represented although quantities have since been stocked from Leyland fish farm. The river is known to also contain roach, dace, chub, barbel, eels, grayling, sea trout and minor coarse fish species.

The River Darwen

The River Darwen Stock Assessment, carried out in 1996, showed that brown trout are present in the river above the town of Darwen and in Davyfield Brook with the rest of the catchment supporting only minor coarse fish species. However, the lower reaches of the river are known to contain coarse fish, which have probably migrated from the Ribble, and the river has since been stocked at Houghton Bottoms with roach, dace and chub from the Environment Agency Fish Farm at Leyland.

The Wyre Catchment

The River Wyre

The River Wyre supports stocks of Salmon and Sea trout, which are fished from Abbeystead downstream to the tidal limit. The rod catch has ranged from six to 401 since records began in 1905. The River Wyre also contains a coarse fishery between Churchtown Weir and Great Ecclestone.

The River Cocker

The River Cocker has a residual population of brown trout. The tidal barrier blocks entry to the river for migratory fish such as salmon and sea trout.

The Wyre estuary supports commercial net fisheries for marine fish such as mullet and bass. The Estuary and the surrounding area of Morecambe Bay also support mussel, cockle and shrimp fisheries.

State of Stillwaters and Canals

Three canals run through the area including the Leeds and Liverpool Canal, the Lancaster Canal and the Rufford Canal. There are also reservoirs, lakes and pools that have a fisheries interest.

Canals

Leeds and Liverpool, Rufford and the Lancaster canals provide coarse fishing both in the open countryside and in the heart of the urban environment. The canals are owned and managed by British Waterways (BW) who lease the fishing rights to various angling clubs. We work in partnership with BW and the angling clubs to protect and develop canal fisheries. They are known to contain roach, rudd, bream, tench, carp species, perch, pike, gudgeon, ruffe and minor coarse fish species.

Stillwaters of the Alt/Crossens

Larger waters such as the Leisure Lakes and the Liverpool City Park Lakes also provide opportunities for the leisure angler. In general there is a perceived shortage of stillwater fisheries on the Alt/Crossens catchment.

The waters of the Alt/Crossens catchment have potential for significant improvement through the partnership approach, which is already evident with Alt 2000, British Waterways and Liverpool City Council.

Stillwaters of the Ribble

There are many reservoirs and lakes which provide both coarse and trout fishing. Some of the larger reservoir fisheries include Stocks reservoir (on the Hodder), Cant Clough, Hurstwood, Swinden, Churn Clough, Coldwell, Walverden, Mitchells House, Ogden, Black Moss, Laneshaw (on the Calder), Grimsargh, Spade Mill (Ribble) and Roddlesworth, Earnsdale (on the Darwen). There are also dozens of small ponds and lodges which provide club and day ticket fishing mainly for coarse fish.

Stillwaters of the Douglas

Coarse angling is very popular on the Douglas catchment, in addition to many small coarse fisheries. Wigan Flashes, a series of large on-line lakes in the Wigan area, are very popular with coarse anglers. They are also nationally important for their breeding bird population.

Stillwaters of the Lune

There are several small 'put and take' trout fisheries in the catchment to supplement the river angling. There are fewer numbers of coarse fisheries, these are mostly commercially run.

Stillwaters of the Wyre

There are a good number of small coarse fisheries on the catchment, either run commercially or by angling clubs. The Fylde catchment is known for its farm ponds, the numbers of which have declined in the last decade, mostly due to development. For trout anglers, there are several large stillwaters adjacent to the river in the Garstang area.

Local view on freshwater fisheries

We carry out a rolling programme of electric fishing surveys on rivers to assess the quality of the fisheries.

Map 7 in Appendix 6 shows the densities of juvenile salmonids found through electric fishing surveys. The densities found are compared with results found in other catchments nationally and assigned a National Fisheries Classification (NFC) grade from (A) Excellent to (F) Fishless.

Salmonid fish density for each catchment in 1999 (Number of sites surveyed in brackets)

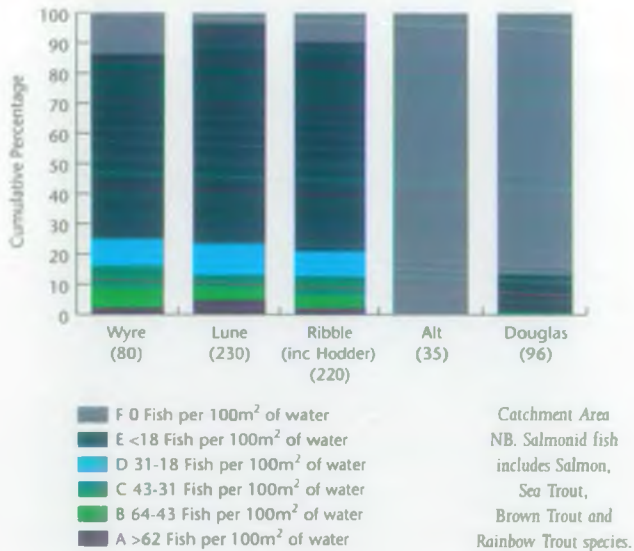


Figure 4.2.1. Source Environment Agency 2000 (internal)

In general, the highest densities of juvenile salmonids are found in the smaller upper tributaries of the Lune, Wyre, Hodder and Ribble. These densities decrease as each catchment is descended. Figure 4.2.1 shows the percentage of sites in each FNC grade for each catchment. Over 70% of sites sampled on the Lune, Wyre and Ribble were at densities less than Class D, either poor or fishless.

Map 8 in Appendix 6 shows the densities of coarse fish found through electric fishing surveys. The densities found are compared with results found in other catchments nationally and assigned a National Fisheries Classification (NFC) grade from (A) Excellent to (F) Fishless. The grades include the presence of eels in the salmonid rivers.

Coarse fish density for each catchment in 1999
(Number of sites surveyed in brackets)

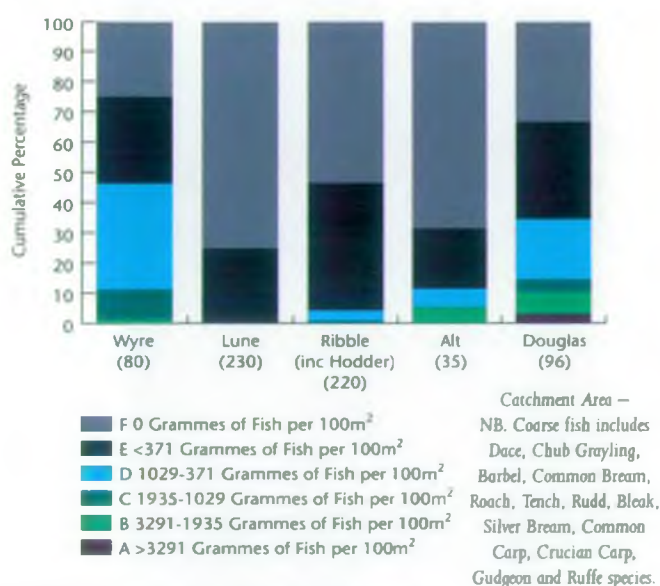


Figure 4.2.2. Source Environment Agency 2000 (internal)

The Rivers Alt, Douglas, Darwen, Calder and lower Ribble are the main coarse fish rivers although small coarse fisheries are found in the lower Lune and Wyre. The distribution of coarse fish is shown to be quite low, but this may be partly due to the inefficiency of the sampling method in deeper water. Figure 4.2.2 shows the percentage of sites in each NFC Class per catchment. The River Wyre and Douglas have the highest percentage of sites of Class C and above.

We record and analyse rod catch information from angler's rod catch returns. We also collate records of catches of these migratory species in the commercial nets of the Rivers Ribble and Lune. Figures 4.2.3 and 4.2.4 show the total number of salmon and sea trout caught by rod and net in Central Area (all catchments combined) for the period 1975 to 1998.

Rod and net catch data for salmon in Central Area, 1999

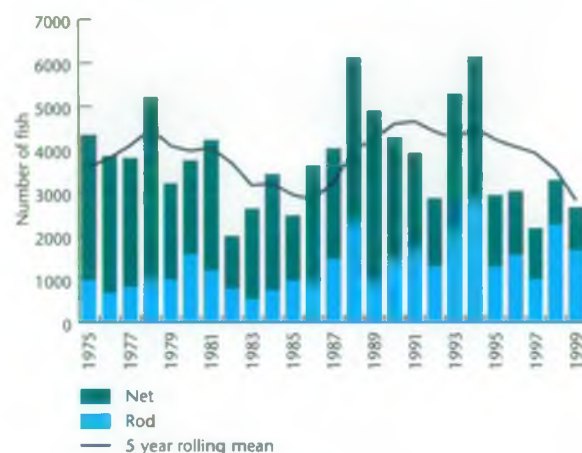


Figure 4.2.3. Source Environment Agency 2000 (internal)

The graphs indicate a cyclical trend in salmon catches with very good years in 1978, 1988 and 1994 separated by relatively poor years in 1982, 1992 and 1997. The catches of sea trout over the same period are more even.

Rod and net catch data for sea trout in Central Area, 1999

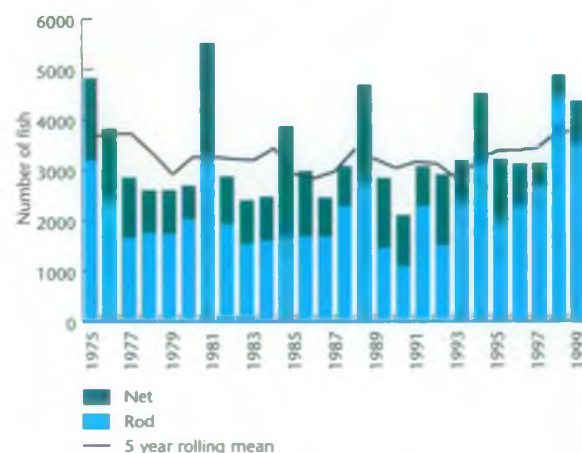


Figure 4.2.4. Source Environment Agency 2000 (internal)

Factors affecting freshwater fisheries

Poor water quality and pollution incidents

The major pressure that affects the health of fisheries in the rivers to the south of the area is the quality of the river water. The largest factor affecting river water quality is the sewerage network. This is being upgraded and has led to improvements in river water quality and consequently fish stocks. However, there are still areas where river water quality limits fish populations, particularly in the Rivers Alt, Calder, Darwen and Douglas.

Even when river water quality does support healthy fish populations, fish are susceptible to the effects of pollution incidents. Several tributaries of the Wyre, including Barton Brook, Westfield Brook, Sparring Brook and the Little Calder are unsuitable for salmon due to high ammonia levels that enter the river from nearby dairy farms.

Following a recent pollution incident a major fish kill occurred on the Leeds and Liverpool Canal in Blackburn. Despite concerted efforts by ourselves and British Waterways a large number of fish died. Following a successful prosecution, 1,300 bream and 1,300 roach were re-stocked with a further 1,300 perch to follow.

Low flows

Several rivers in the area suffer from low flows at particular times of the year, where the lack of water can affect the fish population. Rivers can become so low that fish are unable to swim freely along the river, this may prevent them returning to spawning grounds. Also as the river dries up, fish can become stranded in pools or eggs may dry out and die reducing the population.

The Rivers Brennand and Whitendale in the Ribble catchment suffer from low flows as North West Water Ltd abstracts water for the drinking supply; a joint project is planned to alleviate this. The River Calder in the Wyre catchment also suffers low flows as water is abstracted by British Waterways for the Lancaster canal.

Disruption of river beds

Fish use the riverbed partly as a place to forage for food and also as a place to lay their eggs. In many places riverbeds have been disrupted and become unsuitable places for fish, this reduces the size of the healthy fish population.

Riverbeds become disrupted for a number of reasons. In the Crossens area of the Alt catchment the drainage ditches are all pumped. These forced flows cause siltation of the riverbeds. Much of the River Wyre below Abbeystead reservoir has suffered from the siltation as the reservoir now intercepts gravels that were previously washed downstream. Along the Rivers Ribble and Lune, many of the riverbanks suffer severe erosion. As the soil is washed into the river it covers the gravels on the riverbed leaving them useless as spawning areas.

The poor state of river banks

River banks play an important role for fish, the plants provide shade, encourage wildlife that is food for fish, help hold the river bank together (preventing the problems associated with erosion) and can help lessen the effect of any pollutants that may run off the land and into the river. The River Lune is an example of a river where stretches of riverbank are damaged by a combination of fast flows during heavy rains and heavy grazing.

In the Alt/Crossens catchment poor fisheries habitat is likely to be the limiting factor in Downholland Brook, and is likely to be so throughout the catchment as water quality improves. Flood defence engineering works have been the major cause of loss of habitat. This is also true along sections of the River Wyre that were altered to provide a better level of flood defence.

The spreading of invasive weeds such as Japanese Knotweed, Himalayan Balsam and Giant Hogweed is a problem of much of the area. They take the place of native plants and leave the bank more vulnerable to erosion.

Disease and competition from other species

To encourage the development of sustainable fish populations for angling several rivers, particularly the Ribble and Lune, are stocked intentionally with fish. This is done legally with a licence from the Environment Agency. However, fish that are not native to the area also escape from lakes and reservoirs and this can cause problems. They can be of a size that predates the local fish population; also they can compete with fish that naturally occur in the river for food and territory.

Eutrophication

Eutrophication (excessive nutrients) affects many stillwaters in the Area, usually as a result of over stocking of fish. This can lead to the associated loss of aquatic vegetation and therefore degraded habitat. This is particularly prevalent in the park lakes of Liverpool where a wide-ranging project is underway aimed at the regeneration of the park lake environment.

The Lower Lune, Keer and Conder suffer from blanket weed, which can starve fish of oxygen.

Barriers to migration of fish

In many parts of the area water quality is now suitable to sustain healthy populations of fish and the limiting factor are the physical barriers that block the free movement of fish up and down the river.

There are major barriers on the River Calder at Padiham, River Darwen at Roach Bridge and Samlesbury Bottoms, the River Alt at Bull Bridge, the canal weirs on the Brock and Calder in the Wyre catchment and the Douglas catchment at Gathurst, Birkacre and Farington.



Appendices



**ENVIRONMENT
AGENCY**

Appendix 1

Improvements to Wastewater Treatment Works in Central Area

LEAP Area	Wastewater Treatment Works improved between 1995-2000	Wastewater Treatment Works to be improved between 2000-2005	Wastewater Treatment Works where further improvements are under negotiation	Drivers
Alt/Crossens		Bickerstaffe WwTW		Water Quality Objectives in Downholland Brook.
		Burscough WwTW		Water Quality Objectives in Boathouse Sluice. Excessive nutrients.
	Fazakerley WwTW		Fazakerley WwTW	Dangerous Substance Directive, Water Quality Objectives in the River Alt. Excessive nutrients.
		Hallsall WwTW		Water Quality Objectives in Barton Brook.
		Haskayne WwTW		Protect Water Quality Objectives in Chisnall Brook.
		Hillhouse WwTW		Water Quality Objectives in the River Alt. Excessive Nutrients.
		Mere Brow WwTW		Water Quality Objectives in Tarleton Runner.
	Southport WwTW, Improved treatment and provision of UV disinfection	Southport WwTW storm tanks		Bathing Waters Directive. Urban Wastewater Treatment Directive.
Douglas	Bispham Green WwTW			Local issue of poor water quality in a small ditch.
		Brindle WwTW		Water Quality Objectives in Slack Brook.

LEAP Area	Wastewater Treatment Works improved between 1995-2000	Wastewater Treatment Works to be improved between 2000-2005	Wastewater Treatment Works where further improvements are under negotiation	Drivers
Douglas (continued)		Chorley WwTW		Excessive nutrients. Urban Wastewater Treatment Directive.
		Croston WwTW		Protect Water Quality Objectives in the River Yarrow.
	Hesketh Bank WwTW, improved treatment and UV disinfection installed			Bathing Waters Directive. Urban Wastewater Treatment Directive.
	Horwich WwTW, Installation of phosphorus removal	Horwich WwTW		Water Quality Objectives in Pearl Brook and River Douglas.
		Leyland WwTW		Water Quality Objectives in River Lockstock. Excessive nutrients. Urban Wastewater Treatment Directive.
		Longton WwTW		Water Quality Objectives in Tarra Carr Gutter.
		Skelmersdale WwTW		Water Quality Objectives in River Douglas. Dangerous Substances Directive. Bathing Waters Directive. Shellfish Directive.
		Westhead WwTW		Water Quality Objectives in Eller Brook.
		Wigan WwTW	Wigan WwTW	Water Quality Objectives in River Douglas. Dangerous Substances Directive. Bathing Waters Directive. Shellfish Waters Directive.
Lune		Carnforth WwTW		Bathing Water Directive. Shellfish Waters Directive.

LEAP Area	Wastewater Treatment Works improved between 1995-2000	Wastewater Treatment Works to be improved between 2000-2005	Wastewater Treatment Works where further improvements are under negotiation	Drivers
Lune (continued)	New WwTW constructed at High Bentham	High Bentham WwTW		Water Quality Objectives in River Wenning.
		Galgate Outfall		Bathing Water Directive. Urban Waste Water Treatment Directive. Water Quality Objectives in River Conder. Shellfish Waters Directive.
		Glasson Outfall		Bathing Water Directive. Urban Waste Water Treatment Directive.
		Hest Bank WwTW		Bathing Waters Directive. Shellfish Waters Directive.
		Ingleton WwTW		Freshwater Fisheries Directive on the River Greta.
	Lancaster WwTW, secondary treatment installed	Lancaster WwTW addition of UV treatment		Bathing Waters Directive. Shellfish Directive. Urban Wastewater Treatment Directive.
			Middleton/Overton WwTW	
		Morecambe WwTW		Bathing Water Directive. Shellfish Waters Directive.
		Nether Kellet and Over Kellet WwTW		Local issues of poor water quality in Nether Beck.
		Orton WwTW		Protect water quality in Chapel Beck.
		Stodday WwTW		
Ribble	Barnoldswick WwTW, installation of phosphorus removal	Barnoldswick WwTW		Water Quality Objectives in Stock Beck.
	Blackburn WwTW, reduced ammonia discharges		Blackburn WwTW	Dangerous Substances Directive. Bathing Waters Directive.

LEAP Area	Wastewater Treatment Works improved between 1995-2000	Wastewater Treatment Works to be improved between 2000-2005	Wastewater Treatment Works where further improvements are under negotiation	Drivers
Ribble (continued)	Burnley WwTW	Burnley WwTW		Water Quality Objectives in River Calder, Excessive nutrients. Urban Wastewater Treatment Directive.
		Chipping WwTW		Water Quality Objectives in Chipping Brook. Freshwater Fisheries Directive.
		Clitheroe WwTW		Water Quality Objectives in River Ribble. Excessive nutrients. Urban Wastewater Treatment Directive. Freshwater Fisheries Directive.
		Colne WwTW		Water Quality Objectives in Colne Water.
		Hellifield WwTW		Water Quality Objectives in Pan Beck.
		Horton-in-Ribblesdale		Protect Water Quality Objectives in River Ribble.
	Hyndburn WwTW	Hyndburn WwTW		Water Quality Objectives in River Calder. Excessive nutrients. Urban Wastewater Treatment Directive.
		Long Preston WwTW		Water quality in Long Preston Beck. Freshwater Fisheries Directive.
		Newchurch-in-Pendle WwTW		Protect water quality in Dinperley Clough.
	Preston WwTW, improving treatment, provision of UV disinfection			Bathing Waters Directive. Urban Wastewater Treatment Directive.

LEAP Area	Wastewater Treatment Works improved between 1995-2000	Wastewater Treatment Works to be improved between 2000-2005	Wastewater Treatment Works where further improvements are under negotiation	Drivers
Ribble (continued)	Settle WwTW, installation of phosphorus removal	Settle WwTW		Water Quality Objectives in River Ribble. Freshwater Fisheries Directive.
	Waddington WwTW			Protect Water Quality Objectives in Bashall Brook.
		Walton-Le-Dale WwTW		Protect water quality in River Ribble.
		Wilpshire STW		Water quality in Showley Brook.
Wyre		Barton WwTW		Water Quality Objectives in Barton Brook. Freshwater Fisheries Directive.
		Calder Vale WwTW		Water quality in River Calder. Freshwater Fisheries Directive.
		Garstang WwTW		Freshwater Fisheries Directive. Protect Water Quality Objectives in River Wyre.
		Forton WwTW		Water Quality Objectives in River Cocker.
Abandoned Hambleton WwTW and transferred operations to Fleetwood WwTW				Bathing Waters Directive. Urban Wastewater Treatment Directive.

LEAP Area	Wastewater Treatment Works improved between 1995-2000	Wastewater Treatment Works to be improved between 2000-2005	Wastewater Treatment Works where further improvements are under negotiation	Drivers
Wyre (continued)		Pilling WwTW		Water Quality Objectives at Broadfleet. Bathing Waters Directive. Urban Wastewater Treatment Directive. Shellfish Water Directive.
	Preesall WwTW improved treatment, installation of UV disinfection			Bathing Waters Directive. Urban Wastewater Treatment Directive.
		Weeton WwTW		Water Quality Objectives in Main Dyke.

Appendix 2

Unsatisfactory storm overflows

ALT/CROSSENS

Unsatisfactory Storm Overflows	Receiving Watercourse
Lulworth Road	Irish Sea
Saxon Road, Southport	Irish Sea
Weld Road	Irish Sea
Southport WwTW Storm Tank	Tidal Crossens Pool
Sherwoods Lane PS	River Alt via SW
Seagars Lane	
Coronation Road Stormwater PS	
Moor Lane, Crosby	
Morland Ave, Crosby	
The Bypass/Liverpool Road Jnc, C	
Liverpool Road	
Coronation Road, Crosby	
College Road/Eshe Road Jnc	
Rufford PS, Highsands Ave	Rufford Sluice
Jacksmere Lane PS	Black Brook
Burscough WwTW Storm Tank	Boathouse Sluice
Huyton Farm PS Huyton	River Alt via SW Sys
Heskin Lane PS	Hurlston Brook
Grange Yew Tree Park	Deys Brook
Rockwell Road	Deysbrook
Breck Road/Belmont Road	Fazakerley Brook
Alder Lane PS Knowsley	Alder Brook
Rufford Road, Southport	
Crowland Street, Southport	Three Pools and Fine Janes
Liverpool Road/Hall Lane	Whinny Brook
Bridge Road Jct Copy Lane	Moor Hey Brook
Haweswater Grove, Maghull	Maghull Brook
Dooley Drive, Netherton	Moor Hey Brook
Liverpool Road North	Drain
Hillhouse WwTW Storm Tank	Hey Cop Drain (River Alt)

DOUGLAS

Unsatisfactory Storm Overflows	Receiving Watercourse	Unsatisfactory Storm Overflows	Receiving Watercourse
Wigan WwTW Storm Tank	River Douglas	Near Irvines Farm MH B36	Ackhurst Brook
Near Railway, Derby Street	Abbey Brook	Pemberton Middle School	Close Brook
Leyland WwTW Storm Tank	River Lostock	Lodge Road, Orrell(MH A4)	Smithy Brook
Greenacres	Tributary of River Ribble	Rear of Lunar Caravans, Lostock	River Lostock
Fensway, Hutton	Tributary Mill Brook	Glencroft, Euxton	Ransnap Brook
Off Bridge Street, Wheelton	Kenyon Brook	Earls Way/Princess Way, Euxton	Chapel Brook
Horwich WwTW Inlet Overflow	Pearl Brook	Park Avenue, Euxton	Chapel Bk D/S Cul
Bradshaw Street, Wigan	River Douglas	D/S Eccleston Bridge	River Yarrow
Chestnut Avenue, Wigan	River Douglas	The Robin Hood, Mawdesley	Tributary Syd Brook
Adjacent Wagon and Horses Hotel	River Douglas	South Parkhall/Stocks Lane, Heskin	Syd Brook
Riverside Allotments, Great Acr	River Douglas	Billing/Ribblesford Road, Pember	Smithy Brook
Warrington Road	Culvert Tributary of Smithy Brook	Brook Lane, Charnock Richard	Tributary Syd Brook
Jn Billinge Road/Victoria Street	Culvert Tributary of Smithy Brook	Hewlett Avenue, Coppull	Tanyard Brook
Landgate Sewage PS	Park Brook	Weavers Brow, Limbrick, Heath	River Yarrow, Lostock Brook
Near Orrell House MH A42	Dean Brook	S.E. of Cowling Farm, Chorley	Clancutt Brook
Close Bk Relief Sewer	Uto Close Brook	Mavis Drive, Coppull	Clancutt Brook
Dean Wood SWO	Dean Brook	Adjacent to Gathurst PS	R. Douglas
Friday Street, Chorley	River Chor, Astley Park	Chorley Lower Works PS	River Yarrow
New Reed BR SWO, North Black MO	New Reed Brook	Alder Lane PS	River Douglas
Park Road, Wigan	Barley Brook Culvert	Stanley Grove	Tributary Mill Brook
Gidlow Lane/Pagefield Street, WI	Barley Brook Culvert	Eaves Green Road, Chorley	Tributary of River Yarrow
Chorley Road PS	River Douglas	Clover Road/Butterworth Brow, Chorley	SWS, to River Yarrow
Lydd Grovve PS, Copper Works Wood	River Chor	Near Heapey Road, Heapey	Black Brook
Woodhouse Lane PS	Leeds and Liverpool Canal	Cowling Brow, Chorley	Black Brook
Mill Lane, Appley Br	River Douglas	Clover Road, Chorley	River Yarrow
N.W Jct Woodhouse Lane, Wigan	River Douglas	Stanley Avenue	Tributary Mill Brook

DOUGLAS (continued)

Unsatisfactory Storm Overflows	Receiving Watercourse	Unsatisfactory Storm Overflows	Receiving Watercourse
Beech Hill Lane CSO	Ince Brook	MH K4 Fairfield Street	River Lostock
R/S Keats Avenue (Poolstock East)	Smithy Brook	Horwich WwTW Storm Tank	
R/S Baker Street, Adjacent Foot	Poolstock Brook	Wigan Road	Mill Brook
D/S Winstanley Road, Billinge	Smithy Brook	Harrisons Farm	River Douglas

LUNE

Unsatisfactory Storm Overflows	Receiving Watercourse
Lancaster WwTW Storm Tank	Lune Estuary
Sedburgh WwTW Inlet Overflow	River Rawthey
Halton West PS	River Lune
Halton East PS	River Lune
Mortar Pit Lofthse Hill, SEDBE	River Rawthey
Hest Bank WwTW Storm Tank	Hatlex Beck (Tidal)
Railway Crossing, Hest Bank	Morecambe Bay
Oxcliffe Road, PS	Lune Estuary
Bowerham/Scotforth CSO	Lune Estuary
Heysham Village, New C'way	Morecambe Bay
Overton Peddar-Far PS	Tributary of River Lune
Overton Garden Terrace PS	Tributary of River Lune
Overton Middle Pool PS	Tributary of River Lune
Greendales PS	Lades Pool
Chapel Beck, M.H. On Bridge, OR	Chapel Brook
Artle Beck Road	Artle Beck
Gardner Road, Warton	River Keer
Hagg Lane (Midland TCE) Mill H	River Keer
Thurtell Cottages, Caton	River Lune
Hope Tce, Crag Bank Road	Hope Beck
Artle Beck, Caton	Artle Beck

RIBBLE

Unsatisfactory Storm Overflows	Receiving Watercourse	Unsatisfactory Storm Overflows	Receiving Watercourse
Queens Park, Blackburn	Queens Pk Boat Lk	Beechwood Road, Cob Wall Bridge	River Blakewater
Pedders Lane	Chain Caul Culvert	Back Harwood Street, B'burn	River Blakewater Culv
Freckleton PS	Ribble Estuary	Philips Rd, Blackwood	River Blakewater Culv
Lytham Road, Warton PS	Wrea Brook	Witton Interceptor Sewer	River Blakewater
St Georges Road	River Ribble	Whalley Old Rd. B'burn	River Blakewater
Watery Lane PS, Preston	River Ribble	Thwaites Brewery Yard Sykes S	River Blakewater
Pedders Lane	River Ribble	Dickens Street, Blackburn	Queens Park Cul
Marsh Lane	River Ribble	Chester Street, Blackburn	Queens Park Cul
St. Pauls Road	River Ribble	Audley Range, Blackburn	Queens Pk Cul Sys
Albyn Street East	River Ribble	Culvert Street, Blackburn	Culv., Culvert St
Deepdale Road	River Ribble	Bolton Road, Blackburn	River Darwen
Ramsay Avenue	Eaves Brook	Blackburn WwTW Inlet Overflow	River Darwen/ Hole Brook
Cattle Market	Eaves Brook	Blackburn WwTW K Storm Tank	River Darwen/ Hole Brook
Lea Gate PS, Preston	Savick Brook	Manhole Z7 Cann Bridge	River Darwen
Watling Street Road	Eaves Brook	Field East Rv Darwen	River Darwen
Garstang Road Bridge	Savick Brook	Field West of Gas Wks	Boundary Brook
Victoria Road Near Jun	Eaves Brook	Factory Lane MH V21	Boundary Brook
Halsbury Street	River Ribble	Abbey Village PS	River Roddlesworth
West Strand	River Ribble	Osbaldeston PS Commons Lane	Roadside Drain
London Road	River Ribble	Bolton Road/Astley Street	River Darwen Via Culv
Percy Street	River Ribble	Cranberry Lane	River Darwen
Withnell Fold SDW	Whanes Brook	Footpath Near Cross Street	River Darwen Adj MH
Lower Brundhurst Farm	Un Named Stream	Yd Area Joiners Wkshop	River Darwen Adj MH
Preston New Road/ Yewtree Drive, Blackburn	Arley Brook	Taylor Street/Cochran Street, Darwen	River Darwen
Penwortham PS	River Ribble	Clarence Street	River Darwen
Riverside Penwortham	River Ribble	Queens Road	River Darwen
Watery Lane/Douglas Street		Belgrave Road	River Darwen
Frenchwood Knoll		Bottom of Hill Street, Baxenden	Woodnook Water
Watery Lane	Moorbrook Culvert	Manchester Road, Baxenden	Woodnook Water
Manch Road/James Street	River Ribble	Gisburn WwTW Inlet Overflow	River Ribble

RIBBLE (continued)

Unsatisfactory Storm Overflows	Receiving Watercourse	Unsatisfactory Storm Overflows	Receiving Watercourse
Thorntrees, Lea	River Ribble	Penny Bridge, Settle	River Ribble
Deepdale Road		Bridge End, Settle	Tributary River Ribble
Manch Rd/Frenchwood Avenue	River Ribble	Tinker Brook Sew. Sys.	Tinker Brook
George Street/Grayson Street	River Ribble	Rishton Sew. Sys.	Hyndburn Brook
Riversway		Oswaldtwistle Stw	White Ash Brook
Manchester Road/Selbourne Road	River Ribble	Near Coppy Clough Stw	River Hyndburn Tributary.
Bank Parade CSO, Preston	Tidal River Ribble	Land Adjacent to Holme Rd	Tributary Hyndburn Brk
Haslam Park South		Great Harwood Sewerage	Hyndburn Brook
Haslam Park North (Blackpool R)	Savick Brook	Damhead Br, Gisburn Road	Butts Beck
Watery Lane		Near Butts Beck Footpath	Butts Beck
Selbourne Street	River Ribble	Calf Hall Road	Calf Hall Beck
Station Road, Kirkham	Wrongway Brook	Regent Street	Swinden Clough
Infirmery Street, Blackburn	Leeds/L'pool Canal	Oxford Road/Hollins Road	Swinden Clough
Infirmery Road, Blackburn	Leeds/L'pool Canal	Brierfield On East, Embankment	Dis Culverted W/Course
Bolton Road, Int'cpr Sew Culverted	River Darwen	Sackville/Montague Street	Dis Pendle Water Via
Beechwood Road, Blackburn	River Blakewater	Rear Clitheroe Road (In Track)	Unnamed Trib
Gorse Street, River Blakewater	River Blakewater	Levant Mill Footbridge	Green Brook
Whalley Range/Wesley Street Black	River Blakewater	Crow Wood Farm SWO	River Calder
		Bath Street	Hendon Brook
		Former Brierfield ETW	Pendle Water
		Former Nelson ETW	Pendle Water
		Altham Outfall	River Calder
		Rear Perseverance Mill	Green Brook

WYRE

Unsatisfactory Storm Overflows Storm Overflows	Receiving Watercourse
Knott End PS	River Wyre Estuary
Poulton PS	River Wyre Estuary
Dock Street Overflow	River Wyre Estuary
Dock Street opposite Mount Street	River Wyre
Pilling Lane PS, Preesall	Sea Discharge
Cop Lane, Fleetwood	Copse Brook
Preesall WwTW Storm Tank	Wyre Estuary
Blackpool Old Road, Poulton	Horse Br W/Course
PS No2 Heys Street	Royles Bk Adjacent Station
Manhole G1, Holt Lane	Old Fld Carr Culvert
Blackpool Old Road	Horse Br W/Course
Beech Drive (Man E3)	Old Fld Carr Culvert
Chiltern Avenue, Poulton	Horse Bridge Dyke
Highcross Road, Poulton	Main Dyke
Old Field Carr Lane (MH F12)	Old Fld Carr Culvert
Hardhorn Road, Poulton	5m to Main Dyke
Revenswood Drive, Poulton	Horse Br W/Course
Hardhorn Road, Poulton	4m Long, Main Dyke
East of Council Office	River Wyre
Croston Road Relief Sewer	Smith Pool
Overflow 'C' Garstang	River Wyre
Overflow 'G' Catterall	River Wyre
Cop Lane, Fleetwood	Copse Brook
Preesall WwTW Storm Tank	Wyre Estuary

Appendix 3

Location of contaminated surface waters

LEAP	Location of contaminated surface waters
Alt/Crossens	Aintree Outfalls
	Alder Lane Outfall
	Blackgate Lane, Tarleton
	Chisleths Close, Burscough
	Croxteth Park at Culvert Outfall
	Deyes Brook at Golf Course Outfall
	Fazakerley/Tue Brook at Durley Road
	Fleetwood Park, Banks
	Formby Long Lane
	Hurlston Brook in Coronation Park
	Huyton Wetlands
	Just upstream of Stonebridge Lane on right bank of River Alt
	Lydiate Canal Bank
	Melling Marc Avenue Kirkby Industrial Estate, near Kirkby Brook
	Mill Brook, Knowsley Village
	Moorhey Brook at Culvert Outfall
	Near Pilling Lane, Lydiate
	Railway Bridge at Guinea Hall
	Salerno Drive
	Stocksbridge Village/Croxteth Park
	Sugar Brook at Lower Lane Skipton Avenue, Crossens, Southport
	Turnbridge Road, Maghull
	Weaver Avenue
	Waddicar Lane
	Willow Hey, Maghull

LEAP	Location of contaminated surface waters
Douglas	Clayton Brook, Montcliffe Drive, Chorley affecting the Leeds-Liverpool Canal
	Clovelly Drive, Newburgh affecting a tributary of the River Douglas
	Comet Road, Wigan affecting Close Brook
	Elnup Wood and at Crow Orchard, Shevington affecting Shevington Mill Brook and Almond Brook
	Gill Lane, Walmer Bridge affecting Walmer Brook
	Huntsfield affecting Carr Brook
	Killington Close, Wigan affecting Reed Brook
	Leyland affecting Bannister (Bow) Brook
	Littleton Grove, Standish affecting Bradley Brook
	Marus Bridge affecting Hawkley Bridge
	Miles Lane, Appley Bridge affecting Calico Brook
	North Dene, Parbold affecting the River Douglas
	Oxford Road, Orrell affecting Ackhurst Brook
	Park Avenue, Chorley affecting Chapel Brook.
	Penketh Place, Paxton Place, Paddock Road, New Church Farm and Houghtons Road, Skelmersdale affecting the River Tawd or tributaries of the River Tawd
	Roby Mill affecting Ayrefield Brook
	Sheldon Avenue, Standish affecting Bradley Brook
	Stoneygate Lane, Appley Bridge affecting Sprodley Brook
	Weaver Avenue, Burscough
	Windsor Drive, Brinscall affecting Brinscall Brook
Lune	Abbeystead Drive, Lancaster into Burrow Beck
	Gressingham Drive, Lancaster into Burrow Beck
	Kirkby Lonsdale town centre into River Lune
	Newlands Avenue, Lancaster into Burrow Beck
Ribble	Lammack and Beardwood Estates in Blackburn into Arley Brook
	Lower Manor Lane, Burnley into Pendle Water
	The Goit, Padiham into River Calder
	Norfolk Avenue, Hapton into Shaw Brook
	Parklands, Penwortham into River Ribble
	Reedley Allotments, Burnley into Leeds-Liverpool Canal
	Warton into Wrea Brook

LEAP	Location of contaminated surface waters
Wyre	Hillylaid Pool
	Main Dyke by Staining
	River Wyre by Garstang
	Royles Brook
	Thirleston Brook by Elswick

Appendix 4

Watercourses suffering from pollution due to farming activities

LEAP Area	Locations contributing to water quality problems
Alt/Crossens	General problems in the agricultural areas, particularly in the Crossens catchment
Douglas	Calico Brook
	Carr Brook
	Culbeck (Chapel) Brook
Lune	Bull Beck
	Cant Beck
	Cloughton Beck
	Fen Beck
	River Conder
	River Keer
	River Lune
	River Wenning
	Swarth Beck
Ribble	Langden Beck (Sheep dip)
	Rivers Lanshawe/Colne (Sheep dip)
	River Ribble, near Selsie (Sheep dip)
	Arley Brook River Hodder
	Croasdale Beck
	Greystoneley Brook
	Dow Brook
	Easington Brook
	Holden Beck
	Ings Beck Pool stream Deepdale Brook
	Langden Brook
	Liggard Brook and Main Drain
	River Loud

LEAP Area	Locations contributing to water quality problems
Ribble (continued)	Sabden Brook
	Skirden and Monument Beck
	Wigglesworth Beck Swanside Beck
	Wrea Brook
Wyre	Barton Brook
	Inskip Brook
	Lancaster Canal
	Potters Brook
	River Wyre
	Thistleton Brook
	Weeton Watercourse

Appendix 5

Locations where lack of connection to the main sewerage system is affecting water quality

LEAP Area	Locations contributing to water quality problems
Douglas	Drumacre Lane into Tarra Carr Gutter
	Top Locks Briars, Glover Bridge, Burscough Road, Dark Lane, Lathom and Ring 'o' Bells affecting Eller Brook
	Tunley Brook affecting Buckhow Brook
	Unidentified properties suspected of contributing to problems at Longton Brook
	Roby Mill, Little Hoole, Shore Road Tarleton and High Moor affecting Lower River Douglas
Lune	Green Lane affecting Oxcliffe Dyke
	Tunstall into Cant Beck
Ribble	Boltons Croft, Preston
	Bracewell, near Barnoldswick
	Deepdale Brook
	Foulridge and Salterforth, Colne
	Fulwood Row, Preston
	Hesketh Lane, Chipping
	Inglewhite Road, Longridge
	Leagram, Preston
	Moss Side, Lytham St Annes
	Mitton, near Blackburn
	Newton, Preston
	Paythorne and Withgil near Clitheroe
	Pendle Trading Estate, Chatburn
	Southfield, Burnley
	Thornley, near Preston
	Treales, near Preston
	Warton, near Preston
	West Bradford Road, Waddington

LEAP Area	Locations contributing to water quality problems
Ribble (continued)	Westby, Preston
	Worston Old Hall, The Byre
	Wrea Brook
Wyre	Bartle and Swill Brook affecting Swill Brook
	Catforth affecting Catforth Brook
	Forton affecting Potters Brook
	Half Penny Lane, Longridge affecting Blundell Brook
	Mains Lane, Little Singleton affecting Main Dyke
	Singleton Village, affecting tributary of Main Dyke

Appendix 6

Maps

- 1 Environment Agency, Central Area.
- 2 River water quality, GQA Chemistry (1999).
- 3 River Water Quality Objectives (1999).
- 4 Flood warning.
- 5 International biodiversity designations.
- 6 National biodiversity designations.
- 7 Salmonid fish density distribution throughout Central Area.
- 8 Coarse fish density distribution throughout Central Area.

Appendix 6 – Map 1

Environment Agency, Central Area



Appendix 6 – Map 2

River water quality, GQA Chemistry (1999)

Central Area
Environment Agency Plan
2001



ENVIRONMENT AGENCY

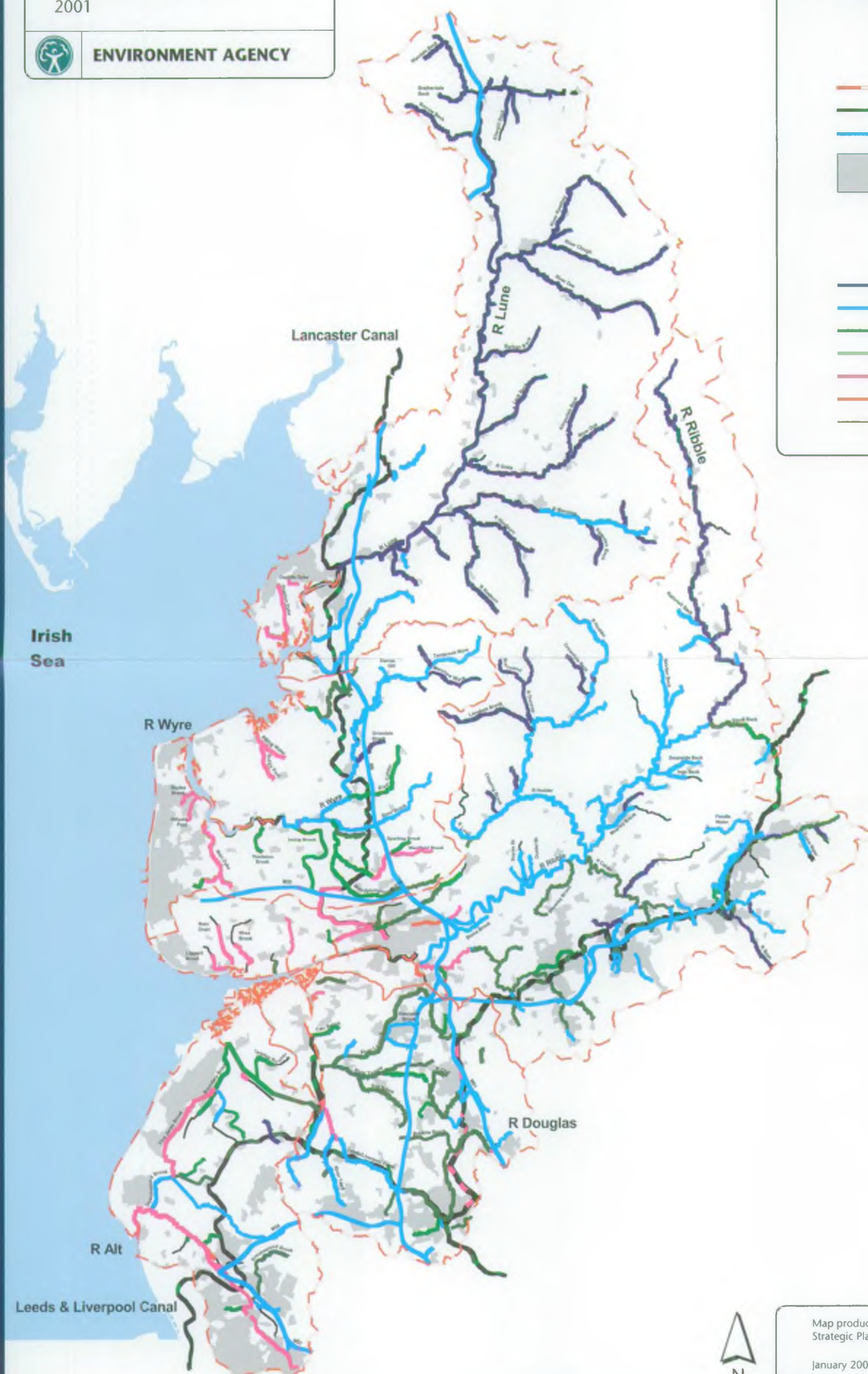
Water quality overview – GQA Chemistry (1999)

KEY

- Area Leap Boundary
- Canals
- Motorways
- Built Up Areas

Rivers

- A } Good
- B } Good
- C } Fair
- D } Fair
- E Poor
- F Bad
- Unclassified



Map produced by EA North West Region
Strategic Planning Department

January 2001

Appendix 6 – Map 3

River water quality objectives (1999)

Central Area
Environment Agency Plan
2001



ENVIRONMENT AGENCY

Compliance with river quality objectives (1999)

KEY

- Area Leap Boundary
- Canals
- Motorways
- Built Up Areas
- Compliant
- Marginal Failure
- Significant Failure
- River Ecosystem Objective
- Unclassified



Map produced by EA North West Region
Strategic Planning Department

January 2001

Appendix 6 – Map 4

Flood Warning

Central Area
Environment Agency Plan
2001



ENVIRONMENT AGENCY

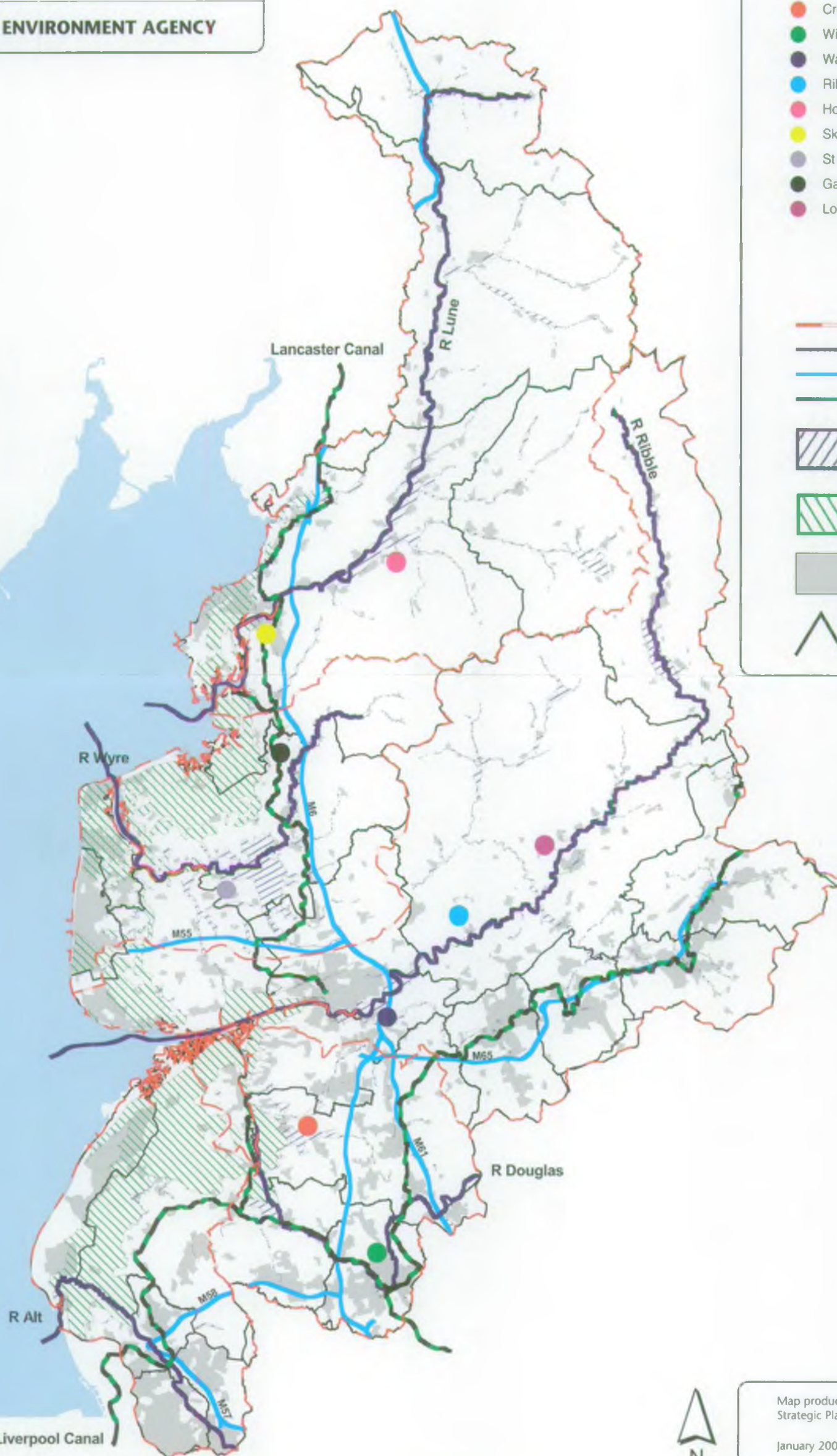
Flood risk areas within the Central Area

- Croston FW Area
- Wigan FW Area
- Walton-le-Dale FW Area
- Ribchester FW Area
- Hornby FW Area
- Skerton Pool & Lancaster FW Areas
- St Michael's FW Area
- Garstang & Scorton FW Areas
- Low Moor FW Area

KEY

- Leap Boundaries
- Main Rivers
- Motorways
- Canals
- Indicative Fluvial Flood Plain 2000
- Indicative Tidal Flood Plain 2000
- Built Up Areas
- L.A. Boundaries

Irish
Sea



Map produced by EA North West Region
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Appendix 6 – Map 5

International biodiversity designations

Central Area
Environment Agency Plan
2001



ENVIRONMENT AGENCY

KEY

- Leap Boundaries
- Main Rivers
- Motorways
- Canals
- Built Up Areas
- Special Area of Conservation
- Proposed Special Area of Conservation
- Ramsar/Special Protection Areas
- Ramsar Only
- Special Protection Areas Only

Irish
Sea



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Appendix 6 – Map 6

National biodiversity designations



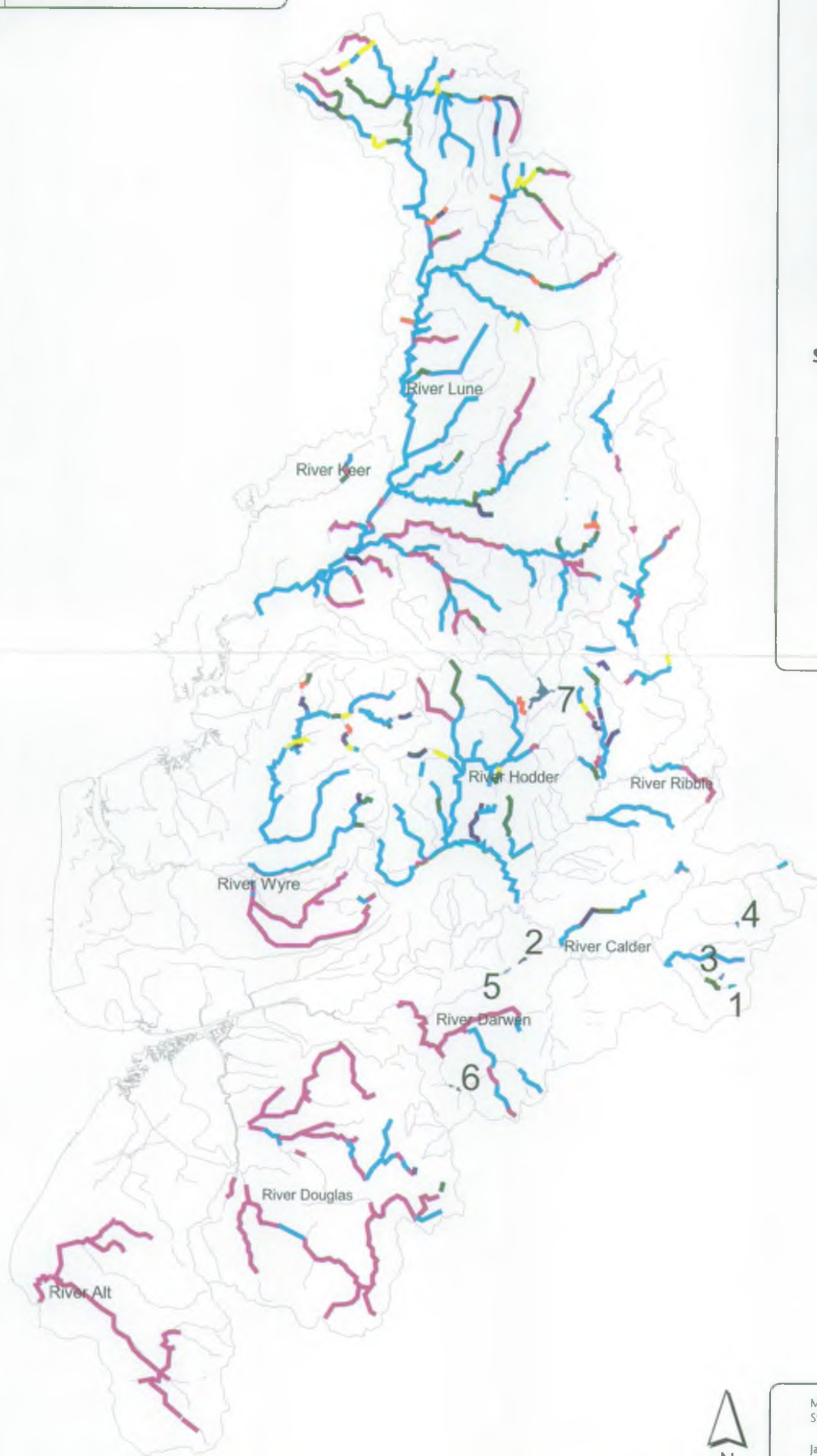
Appendix 6 – Map 7

Salmonid fish density distribution throughout Central Area

Central Area
Environment Agency Plan
2001



ENVIRONMENT AGENCY



A selection of water bodies containing salmonid fish

- | | |
|----------|--------------------------|
| 1 | Cant Clough Reservoir |
| 2 | Dean Clough Reservoir |
| 3 | Hurstwood Reservoir |
| 4 | Lower Coldwell Reservoir |
| 5 | Parsonage Reservoir |
| 6 | Roddlesworth Reservoir |
| 7 | Stocks Reservoir |

Salmonid densities No 100m²

- | | |
|--|---------|
| | A >62 |
| | B 62-43 |
| | C 43-31 |
| | D 31-18 |
| | E <18 |
| | F 0 |
| | Rivers |

LEAP Boundaries



Map produced by EA North West Region
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Appendix 6 – Map 8

Coarse fish density distribution throughout Central Area

Central Area
Environment Agency Plan
2001



ENVIRONMENT AGENCY

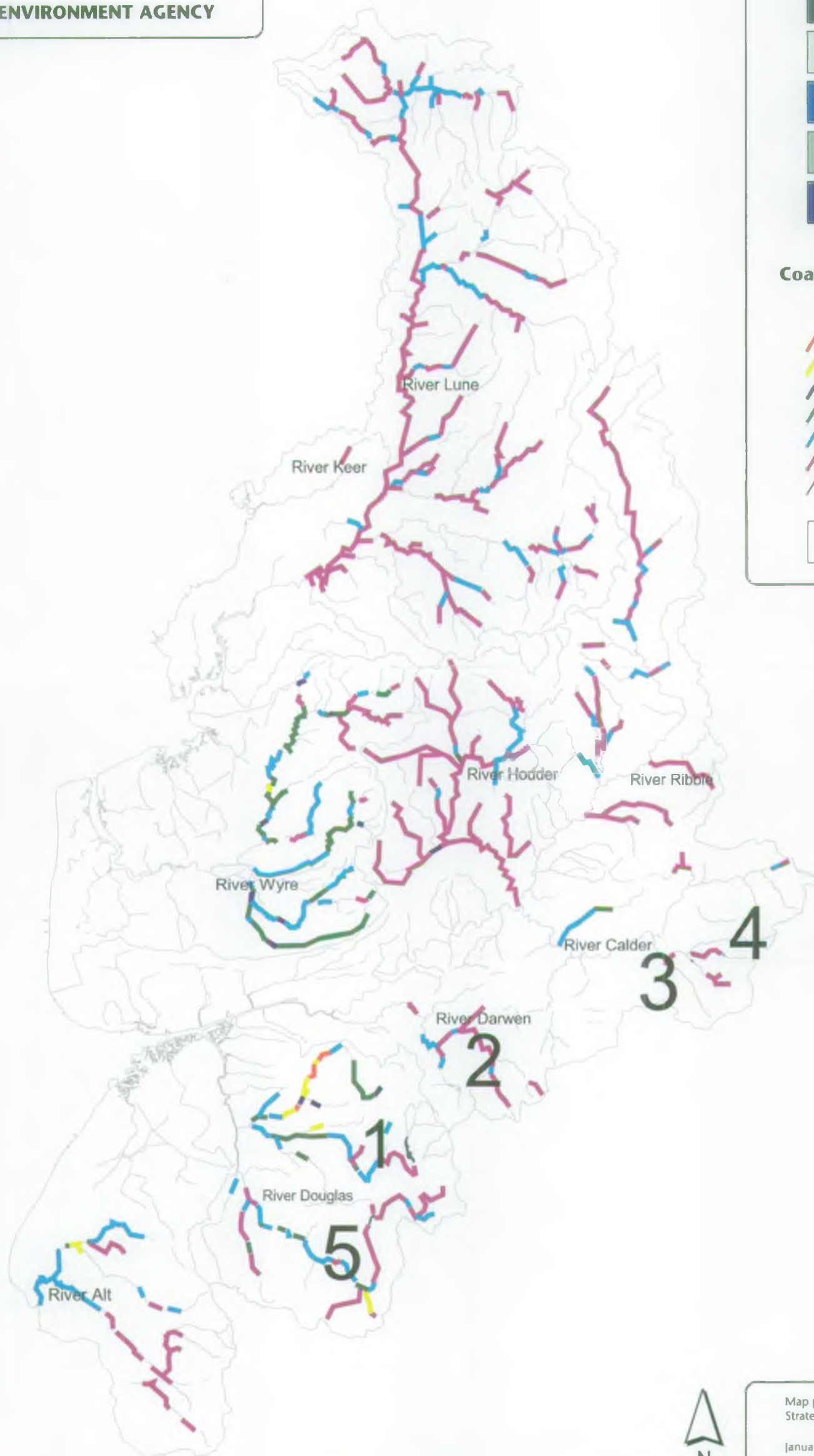
A selection of water bodies containing coarse fish and eels

- | | |
|----------|------------------------|
| 1 | Anglezarke Reservoir |
| 2 | Roddlesworth Reservoir |
| 3 | Rowley Lake |
| 4 | Swinden Reservoir |
| 5 | Worthington Lake |

Coarse fish densities g 100m²

- | | |
|--|-------------|
| | A >3291 |
| | B 3291-1935 |
| | C 1935-1029 |
| | D 1029-371 |
| | E <371 |
| | F 0 |
| | Rivers |

LEAP Boundaries



Map produced by EA North West Region
Strategic Planning Department

January 2001

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for reporting of



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on where to fish.

38
on flood risk.

0
pollution incidents.



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