EA-Anglian LEAPs Box 3

local environment agency plan

Grimsby/Ancholme LEAP

March 2000

ENVIRONMENT AGENCY

ORIGINAL COVER WITH MAP OF AREA

Key Facts

Total Area 1100 km²
Population *(Approximate)* 220,000

Main Towns (indicative populations):

Grimsby	91,000
Cleethorpes	35,000
Brigg	6,000
Barton	9,500
Humberston	5,500
Immingham	11,000
Waltham	6,300
Winterton	5,400
Broughton	5,000
Market Rasen	3,500

Environment Agency Organisation:

Anglian Region (Northern Area) Area Office at Lincoln.	Tel. No. (01522) 513100
Catchment Office (Lincolnshire) Manby	Tel No. (01507) 328102

Water Utility Companies
Anglian Water Services Limited

Internal Drainage Boards: Ancholme, North East Lindsey, Lindsey Marsh Consortium (Louth, Alford & Skegness)
Length of Statutory Main River: 249 km
Length of Navigable River: 33 km
Length of Course Fishery: 73 km
Length of Trout Fishery: 14 km
Length of Tidal Defence: 42 km

Water Quality

Biological Quality Grades 1999		Chemical Quality Grades 1999	
Grade length of river	(km)	Grade length of river	(km)
'very good'	5.9	'very good'	0
'good'	67.8	'good'	50.6
'fairly good'	36.7	'fairly good'	72.5
'fair'	25.8	'fair'	28
'poor'	19.3	'poor'	5.5
'bad'	5.9	'bad'	4.8

Integrated Pollution Control Authorisation Sites: 32

Sites of Special Scientific Interest: 35

Waste Management Facilities:

Licensed Landfill Sites	30
Licensed Transfer Stations	18
Licensed Treatment Plants	2
Licensed Scrap yards	14

Water Resources

Annual rainfall		625 mm
Total licensed abstraction	Groundwater	86,870 TCMA
	Surface water	40,062 TCMA

FOREWORD

The Environment Agency was established to protect, monitor and improve the environment in its broadest sense – ultimately contributing to the worldwide goal of sustainable development. We have become one of the most powerful environmental regulators in the world. By exerting our influence on the regulation of air, land and water, we have a unique opportunity to look at our environment in an integrated and holistic manner.

Local Environment Agency Plans (LEAPs) set out a vision for the quality of the environment in a particular area and how that may be achieved through appropriate management. The Plans focus particularly on issues that have been raised through our consultation with the local communities affected. Many of these issues and other opportunities for improvement cannot be tackled by the Agency alone, so the Plan also acts as a platform for partnership with other interested parties.

Whilst the Vision, by its very nature, is not constrained by the practicalities of budgets and resources, the Activity Plans set out our firm proposals for the delivery of real improvements to the local environment – as steps towards achieving that Vision. Consequently, LEAPs are becoming one of the cornerstones to how the Agency plans its business.

We hope that you will find this document useful and informative. Readers' opinions and suggestions are, as always, welcomed. We look forward to working with you to make this Plan a reality.

Ron Linfield
Northern Area Manager

CONTENTS

VISION

The Grimsby/Ancholme LEAP provides a position statement on the current state of the area's environment, and describes the major issues which affect its environmental, economic and social wellbeing.

Our aim is to improve the local environment and support development whilst considering social and economic interests. The LEAP provides the opportunity to demonstrate that environment protection and improvement need not compromise wealth generation, and can bring social benefits which significantly enhance our quality of life.

To achieve this objective the Environment Agency will operate openly and in consultation with local communities, creating strong partnerships with the common goal of protecting and developing the Grimsby/Ancholme catchment for this and future generations.

More specifically, we aim to:

- ensure the water resources of the Northern Chalk Aquifer are managed in a sustainable manner and are protected from over-abstraction and pollution
- improve the quality of rivers for the benefit of all users
- use initiatives such as Biodiversity Action Plans to realise opportunities for improving conservation
- reduce emissions of potentially harmful releases to the environment from those processes we regulate along the Humber Bank
- raise public awareness of the sustainable use of resources, particularly in terms of waste minimisation, water conservation and energy reduction.

1.0 THE ENVIRONMENT AGENCY

Our aims are:

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

We will do this by:

- being open and consulting others about our work
- basing our decisions around sound science and research
- valuing and developing our employees
- being efficient and businesslike in all we do

The Environment Agency has a wide range of duties and powers relating to different aspects of environmental management. These, together with those areas in which we have an interest, but no powers, are described in Appendices 1 and 2. We are required and guided by Government to use these duties and powers in order to help achieve the objective of sustainable development. The Brundtland Commission defined sustainable development as *" development that meets the needs of the present without compromising the ability of future generations to meet their own needs"*.

At the heart of sustainable development lies the integration of human and environmental needs- the creation of the Agency itself was in part a recognition of the need to take a more integrated and longer-term view of environmental management at a national level. We aim to reflect this in the way we work and in the decisions we make.

Taking a long-term perspective requires us to anticipate risks and encourage precaution, particularly where environmental impacts may be long-term or irreversible. We must also educate and inform society as a whole, as well as carry out our prevention and enforcement activities, in order to ensure continuing protection and enhancement of the environment. One of the key outcomes of the United Nations Rio "Earth Summit" in 1992 was agreement by governments that, in order to solve global environmental problems, local action is crucial: we must **think globally but act locally.**

1.1 Local Environment Agency Plans

We are committed to a programme of Local Environment Agency Plans (LEAPs) - local agendas of integrated action for environmental improvement. LEAPs help us to identify, assess, prioritise and solve local environmental issues related to our functions, taking into account the views of our local customers. This allows us to deploy our resources to best effect, thus optimising local environmental benefits.

The LEAP process involves a number of stages:

i) Draft LEAP

The publication of the Grimsby/Ancholme Draft LEAP (June 1999) marked the start of a three month period of formal consultation, enabling external organisations and the general public to work with us in planning the future of the local environment (Section 1.2).

ii) LEAP

The LEAP, which takes into account the views expressed during the consultation process, is a 5 year plan identifying actions, costs and timescales for both the Agency and its partners to resolve the identified issues. Where appropriate, agreed actions are incorporated into the Agency's annual Business Plan.

iii) Annual Review

We will monitor the actions undertaken throughout the year and will report on progress in an Annual Review. This will also identify additional actions needed to maintain progress in the light of any changes in the LEAP area, and remove or amend actions where they are no longer appropriate. After five years, or sooner if required, we will carry out a major review, and produce a new LEAP Consultation Draft re-identifying the key issues and required future actions.

1.2 The consultation process

The Agency has undertaken rigorous consultation in the development of the Grimsby/Ancholme LEAP.

A pre-consultation meeting was held with a number of key organisations, as well as our customer consultative committee – the Lincolnshire Area Environment Group (AEG) - so that their views could be taken into consideration at an early stage.

Copies of the Draft LEAP, published in June 1999, were sent to a range of organisations and individuals, including representatives of industry, local authorities, environmental groups, sport and recreation groups and any other local groups with an interest in the Plan area. They were invited to comment on the Draft LEAP, expressing their views on the issues and options, and on how the development of strategies and plans should be progressed. A Draft LEAP was also sent to all parish councils in the area.

In October 1999, a well-attended meeting at the Briggate Lodge, Brigg allowed representatives from industry, local authorities, parish councils, environmental groups, recreational groups and other local interest groups to discuss the Plan in more depth.

Results of the consultation

Comments were received from 33 organisations and individuals (Appendix 4). These have been summarised in a 'Statement of Consultation' which has already been sent to respondees and key partners.

The comments received were generally supportive of the LEAP. We received several helpful suggestions and were asked a number of questions about the Plan area. All comments were thoroughly discussed and where appropriate these are reflected in the LEAP. Key points raised by the consultation period included concerns over:

♦ local water resources

Local issues include low water levels in aquifers and the impacts of water abstraction. Many of these issues are being addressed in partnership with Anglian Water Services Ltd. In addition, the Government recently carried out a consultation on abstraction licences which recommends that licences should be time-limited and reviewed on a regular basis, and that licences which have not been used for a certain amount of time should be revoked. The Agency may have these powers in the future.

♦ development of winter storage areas on farms

The environmental impacts of winter water take are often ignored, but need to be considered in the development of storage areas in order to avoid conflicts with ecological interests. We aim to strike a balance between the needs of the abstractors and those of the environment.

♦ eutrophication of the area's watercourses

The precise causes of eutrophication are often unclear. Nitrates are being addressed through MAFF's Nitrate Vulnerable Zones scheme and Agency officer visits to farms, as well as specific pollution prevention initiatives. The construction of buffer zones on certain riparian areas may help to alleviate this problem, and provide other benefits such as the prevention of river bank destabilisation.

♦ waste disposal

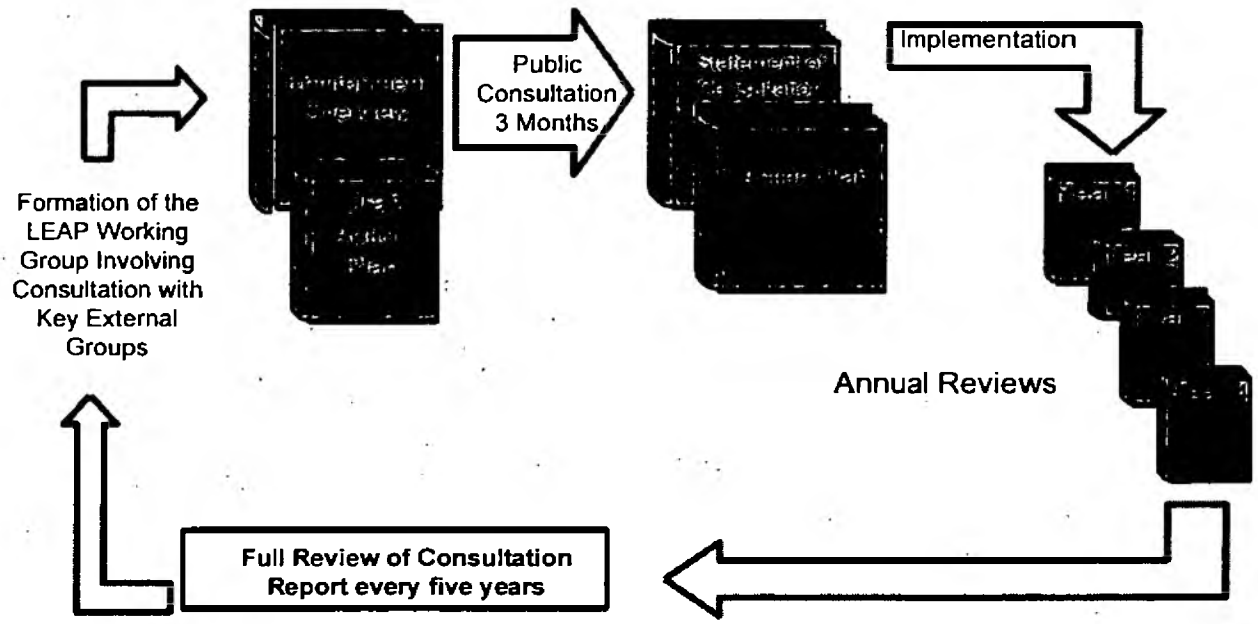
Fly-tipping and illegal tyre disposal are particular problems. The Agency, in partnership with the North and North East Lincolnshire Councils, will be participating in a joint fly-tipping initiative to combat local problems, and will take stringent measures to minimise the disposal of unacceptable waste at other sites.

In addition, several organisations, including the Hawk and Owl Trust, English Nature, West Lindsey District Council and North East Lincolnshire Council, expressed a wish to increase their partnership with the Agency. These opportunities for greater partnership are welcomed.

The responses to the Draft LEAP were of great value in the development of this document, and many of the actions and issues involved have been amended as a direct result of the consultation process. We have, for example, incorporated a section on archaeology, and many useful details on the local area were welcomed. Other revisions to the Draft LEAP are the inclusion of a new issue on the degradation of recreational access in the Plan area, whilst Issues 5a and 5c (meeting target flood defence standards) have been merged for the sake of brevity.

It is hoped that the resulting proposals in this Plan will identify the appropriate actions to resolve many of the issues, setting them into a five-year timetable. Progress will be monitored and reported on through Annual Reviews until a full review of the LEAP takes place in five years time.

The LEAP Process



Note:- This five year implementation period will be reduced if necessary.

LEAP Team

Irven Forbes	Team Leader
Richard Kisby	Development Planning and LEAPs
Debbie Rosen	LEAPs Officer
Phil Young	Environment Protection
Chris Noble	Flood Defence
Paul Hyatt	Fisheries, Ecology and Recreation
Mike Hutchinson	Water Resources

2.0 THE GRIMSBY/ANCHOLME LEAP AREA

2.1 Overview

The Grimsby/Ancholme LEAP area is located in the north of the old Lincolnshire County, bounded to the north by the Humber Estuary. The area includes the rivers that drain off the Chalk Wolds across the coastal plain into the Humber, the largest of which are the Laceby Beck/River Freshney system, the East Halton/Skitter Beck and the River Ancholme. The River Ancholme is by far the largest of the area's watercourses, with its most distant source at Tealby flowing some 50km to its outfall at South Ferriby. Its tributaries rise in the Lincolnshire Limestone outcrop to the west and the Chalk Wolds to the east.

The area contains contrasting landscapes and degrees of urbanisation/development. The Chalk Wolds are an Area of Outstanding Natural Beauty. They rise some 168m above sea level and consist of rolling countryside with upland rivers, streams and springs. To the east, industrial development along the South Humber Bank has brought economic prosperity to the area, dominating the floodplain. Together with the major Cleethorpes and Grimsby conurbation, its development has been facilitated by proximity to the North Sea (a major route for trade with Europe and beyond) and the fishing and food industry. Meanwhile, to the west of the Wolds lies the broad clay vale of the Ancholme Valley, a predominantly rural area, the main population centres being the market towns of Brigg and Market Rasen and a small part of Scunthorpe at the western extreme.

Tree and woodland cover is sparse other than around the edges of the area, for example Twigmore and Willoughby Woods, Far Wood and Broughton Alder Wood (Sites of Special Scientific Interest or SSSIs). Despite the industrialised Humber Bank, the vast majority of land use is agricultural. Productive soils support cereals, potatoes, sugar beet and vegetables. Large fresh- and saltwater marshes and meadows abundant with wildlife would once have dominated the Ancholme Valley, but these have been reclaimed for agricultural use through drainage and the development of field systems. Extensive tidal defences constructed to protect the low-lying area of land to the north of Grimsby have allowed further agricultural and, more recently, industrial development. This is supported by drainage systems with lowland water being pumped into watercourses such as the Buck Beck and Stallingborough North Beck.

2.2 Water resources

The catchment's average annual rainfall (625mm) supports two significant aquifers, the Lincolnshire Limestone and the Northern Chalk. The chalk aquifer is regionally important in terms of public water supply and industrial demand from the Humber Bank (met from both direct abstraction and public supplies). This aquifer is heavily abstracted and there are concerns over impacts on the interests of abstractors and the fisheries and habitats which rely upon chalk springflows, especially following periods of low rainfall. The Lincolnshire Limestone aquifer, which forms the western boundary of the area, yields less water than the Chalk but provides base flow to the River Ancholme and meets demand for public water supply, industry, agriculture and spray irrigation.

The aquifers are supplemented by two major water resource developments which import water into the area. The Covenham Reservoir is fed from the River Lud/Louth Canal and Great Eau system, whilst the Cadney Reservoir is fed from the Trent-Witham-Ancholme River Transfer Scheme. Both aquifers are considered fully committed and no additional water abstraction can be licensed. However, with the introduction of water demand initiatives, such as metering and leakage control, the combination of groundwater and surface water resources from outside the catchment should

meet forecasted demands.

2.3 Biodiversity

Habitat diversity along river channels and adjacent corridors in the Plan area is relatively poor. Past modifications to rivers and steams for land drainage, and for navigation purposes on the Ancholme, have resulted in uniform channel structure, and a subsequent loss of diverse plant communities and natural fenland habitat. This is reflected by poor biodiversity levels although, paradoxically, fish populations in the Ancholme remain excellent. Low flows in most watercourses due to low annual rainfall and abstraction, however, exacerbate any ecological impacts. Many of the area's watercourses - most notably the Rivers Ancholme and Freshney - also suffer from nutrient enrichment. This causes prolific plant growth which affects dissolved oxygen levels and dependent flora and fauna. These nutrients originate primarily from agricultural land, sewage treatment works and surface water run-off from roads.

A few isolated lengths of watercourse of conservation value remain, such as the spring-fed streams and flushes which emerge from the Chalk Wolds to form tributaries to the Rivers Ancholme and Rase, such as at Elsham Marsh and Wrawby Moor SSSI. These contain lengths of rapid flow with riffle and pool systems supporting valuable rich chalk stream fauna. The flooded and abandoned clay pits on the coast at Barrow and Barton, now a designated SSSI, support large stands of reedbeds and, notably, the rare Wainscot moths and a wintering Bittern population. Immediately adjacent to these are the internationally important Humber Flats and Marshes RAMSAR/SPA sites which support waders and wildfowl.

2.4 Water quality

Water quality, which is monitored against targets set by the Agency and by legislation, is influenced by surface water run-off from agricultural and industrial areas. River quality surveys nonetheless indicate a steady improvement since the 1980s, and the chemical quality of watercourses in the Plan area is generally good to fair (only 6% are poor quality). The ability to augment during periods of low flow helps to reduce the impacts of eutrophication and saline intrusion into the Ancholme through the tidal structure at South Ferriby.

Apart from lengths of the Laceby Beck, which fail its targets for reasons associated with eutrophic conditions, three other watercourses notably fail to meet their targets:

- the Skitter/East Halton Beck system is affected by ammonia, probably from agriculture and small industries.
- the River Freshney is affected by various factors including leachate from the Macaulay Lane former landfill site.
- the Old River Ancholme is affected by organic pollutants, possibly from farms or from surface water drainage.

The quality of groundwater in the catchment is generally good. Agricultural activities in the southern part of the catchment might, however, have increased nitrate concentrations in surface and groundwaters. Nitrate contributes to eutrophication and at elevated levels the water undertaker (Anglian Water Services Ltd.) must reduce its concentrations when it is intended for drinking water. The Government has designated parts of this catchment as Nitrate Sensitive Areas. Farmers within these areas have a statutory obligation to comply with action programmes based on the MAFF Code of Good Agricultural Practice for the Protection of Water. This means, for example, that fertiliser applications must be determined by crop uptake, timing in relation to

crop growth, soil conditions etc. Reductions in ground and surface water nitrate levels should result.

Groundwater is also at risk of contamination from the inappropriate disposal of agricultural waste products (such as pesticides and slurry) and fuel spillages (such as aviation fuel from the Kirton Lindsey MoD site). We are working to ensure that the proposed development of the Macaulay Lane landfill site does not contaminate the chalk aquifer below.

2.5 Flood defences

Fluvial and tidal flood defence standards in the Plan area generally meet indicative target levels. However, there are several long-term concerns, which are currently subject to proposed flood defence improvement schemes. These include:

- the River Rase upstream of Market Rasen. We are proposing to raise standards by improving the indicative standard of defence from 1:10[1] year to 1:75 year.

- the River Freshney at Freshney Bog and along the Ancholme at Brigg, where we are hoping to provide protection to a 1:100 year standard.

Some concerns have been voiced regarding existing flood defence standards along rural lengths of the Ancholme. Improvement works by the Agency cannot be justified using current cost/benefit criteria, but a study to investigate alternative means of funding works in the Ancholme Valley is underway. The Agency aims to minimise the risk to people and property by continuing to discourage future development away from such areas.

There are also some isolated shortfalls in the tidal defences, which protect agricultural land. These are being resolved through a tidal defence strategy, which we have developed for the Humber Estuary as a whole. Lengths between Winteringham and South Ferriby have been improved over the last 12 months as part of our Urgent Works Programme and future works between Immingham and Grimsby are scheduled.

2.6 Waste management

Landfill continues to be the major waste disposal route in the Plan area, with two large sites at Immingham and Winterton. These accept a combination of household, commercial and industrial wastes. A third landfill site at Roxby takes inert and domestic waste, both local and from Manchester. A number of factories along the Humber Bank also have their own "in-house" industrial waste landfills.

In the search for a more sustainable approach towards waste disposal, innovative schemes are underway for developing soil substitutes from waste materials, establishing wild flower banks on waste peat/compost products, and comparing tree growth rates in different soil substrates. At Winterton Landfill, methane (produced by the normal anaerobic breakdown of waste materials) is being recovered and used in electricity generation schemes. It is estimated that this electricity is sufficient to power 5,000 to 7,000 local homes. Similar schemes could be established at Immingham and Roxby Landfills. Recycling of household waste is actively encouraged at Civic

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[1] The Flood Defence Standard describes the level of protection given by reference to the return frequency of a flood event which would overtop the defence. The 1:10 year standard means that the likelihood of such a flood level being exceeded has a 10% risk of occurring in any one year.

Amenity sites within the area which can accept paper, glass bottles, cans, plastics, textiles, oil, car batteries and scrap metal. Licensed waste transfer stations and metal recycling facilities also contribute to the recycling of cardboard, wood, concrete, brick rubble, scrap metal and vehicle batteries.

Fly-tipping and the burning of waste are ongoing issues, especially in urban areas such as Grimsby.

2.7 Recreation

Water-based recreation is growing, with activities focused along the Humber Bank and Ancholme Valley. Facilities include footpaths, marinas and watersports areas. Angling is still a popular activity. The Ancholme is an important fishery and there are growing numbers of recreational fishing lakes, whilst trout are stocked at Toft Newton reservoir (near Market Rasen). Recreation on the River Ancholme, a designated navigation, has benefited from a range of recent improvements. The ongoing restoration of Harlam Hill Lock will soon be complete, extending it by some 4kms.

2.8 Air quality

Emissions to the atmosphere from industrial processes are regulated by the Agency to minimise their environmental impacts. Along the South Humber Bank, 32 processes are regulated by Integrated Pollution Control authorisations. These include combustion, oil refining, chemical procedures and incineration. All emissions meet the prescribed standards set in their authorisations and no release breaching Environmental Quality Standards is permitted. Less polluting emissions are regulated by local authorities who have overall responsibility for managing air quality. Emissions from road traffic, for example, can have a wide range of environmental effects and react with other pollutants to form smog.

Our understanding of local air quality standards is nonetheless hampered by the lack of monitoring stations, and proposals for new industrial developments in the Plan area may raise public concern in the future.

3.0 ACTIVITY PLANS

In September 1997, the Environment Agency produced a document entitled 'An Environmental Strategy for the Millennium and Beyond'. This was essentially based upon the need to take an integrated approach to environmental management. In producing this Plan we have used the Strategy to group the local issues and show how LEAPs integrate action for local environmental improvement.

Our principal and immediate environmental concerns are:

- Managing our water resources
- Enhancing biodiversity
- Managing our freshwater fisheries



- Delivering integrated river -basin management
- Conserving the land
- Managing waste



- Regulating major industries
- Improving air quality
- Addressing climate change



These symbols are used throughout the LEAP to highlight the major concerns involved with each issue.

For each issue we have specified:

- An overall objective
- Responsible parties
- Proposed actions
- A proposed timetable
- Estimated costs (where possible)

3.1 LEAP ISSUES

1. Managing Our WATER RESOURCES

1a Groundwater abstraction from the Northern Chalk Aquifer at times exceeds available resources.

1b Water quality of the Lower Ancholme is adversely affected by saline intrusion.

2. Enhancing BIODIVERSITY

2a There has been a significant reduction in the area of river and wetland habitats and associated species.

2b The introduction of invasive alien plant and animal species threats local ecological diversity.

3. Managing Our FRESHWATER FISHERIES

3a Fish biomass and species diversity fall below target levels in some watercourses.

4. Delivering INTEGRATED RIVER-BASIN MANAGEMENT

4a Members of the public place themselves in danger by swimming in the River Ancholme.

4b Inadequate local sewerage systems in some villages result in localised pollution and may have public health implications.

4c Development on contaminated land has the potential to pollute, but provides the opportunity to clean up existing problems.

4d Nitrate concentrations in ground- and surface water exceed, or are expected to exceed, 50 mg/l.

4e Groundwater resources are threatened by pollution incidents.

4f Routine chemical and biological monitoring indicates poor water quality in a number of watercourses.

4g Nutrient enrichment of watercourses affects water quality, flora and fauna and other uses of water such as navigation, amenity and fishing. River Ecosystem quality targets can be compromised.

5. Conserving the LAND

5a Standards of flood protection on lengths of river systems do not meet target standards.

5b At some locations our flood warning target of two hours prior notice are not met.

6. Managing WASTE

6a The illegal disposal of waste poses a risk to health and safety.

6b The storage and illegal fly-tipping of tyres is a pollution risk.

6c The aesthetic quality of some lengths of urban watercourses are poor.

New Issue

Recreational facilities have become degraded in places within the Plan area.

7. Regulating MAJOR INDUSTRIES

8. Improving AIR QUALITY

9. Addressing CLIMATE CHANGE

The following points should also be noted:

- Our everyday work commits substantial resources to monitoring and managing the environment. This work is explained briefly in Appendix 2.
- The Issues and Actions are not presented in any order of priority.
- Proposed Actions have been costed where possible, however, in some cases Actions are covered by routine Agency costs, or are still to be established (TBE).

1. Managing our WATER RESOURCES

Agency Operational and Strategic Actions are to:

- demand a more efficient use of water by the water companies and by industry in general;
- encourage a more efficient use of water by the public and a change in public attitude to water usage;
- promote "best practice" and will work with others in specifying technical approaches or standard methodologies in relation to water resource issues of relevance to the Agency;
- promote the development and sale of low-water usage domestic appliances, supported by legislative changes, if necessary;
- demand reductions in leakage by the water companies before considering any cases for investment in new reservoirs;
- support the imposition of compulsory selective metering where water supplies are under stress and where meters are economically sensible to install;
- support the voluntary acceptance of water meters when accompanied by other water-saving incentives for the Customer;
- vigorously apply our Groundwater Protection Policy to ensure that the quality and use of our groundwaters is improved;
- examine water transfer schemes carefully to ensure that no environmental damage would result from their introduction;
- not approve the exploitation of new environmental resources until water saving measures have been introduced;
- implement the current programme of alleviating low-flow rivers as quickly as possible;
- seek new legislative powers to reform the use of 'licences of right' to extract water from the environment;
- seek new powers to facilitate the inter-basin transfer of water, and for the open and transparent provision of plans and information relating to such schemes in order to broaden the public debate on these important issues;
- ensure that the practical limitations arising from water supply and treatment are fully considered by providing planning authorities with all information relevant to new housing or industrial developments;
- ensure that the UK's experience and needs are reflected in the scientific and technical discussions within the development of the EC's *Water Framework Directive*;
- ensure that all environmental needs are fully taken into account within the next Asset Management Plans (AMPs) negotiations with the water companies;
- research into more efficient methods for the management of water, and into the potential risks for the aquatic environment arising from its mis-management.

Issue 1a Groundwater abstraction from the Northern Chalk Aquifer at times exceeds available resources

The Lincolnshire chalk aquifer is the main groundwater source in the Plan area, providing important supplies for public water, industry, agriculture and spray irrigation. The aquifer is heavily abstracted in all but above average recharge years and its resources are insufficient to enable all licence holders to abstract water to their full entitlement. Although actual abstraction levels are below the total licensed water quantity, there may still be impacts on river baseflows, blow wells and other groundwater-dependent features. In addition, saline water can migrate into the aquifer.

During periods of average and below average rainfall, this can affect water quality and the fishery and conservation interests that rely upon chalk springflows. Fisheries surveys indicate the desired standard for fisheries is not met for a number of watercourses in the Plan area. The reasons are unclear and require further investigation, but low flows due to a combination of drought and increased abstraction demands may be a contributing factor.

In 1995, we entered into a water management agreement with Anglian Water Services Ltd. (AWS), the largest abstractor in the area. This allows for variations in the actual water quantity abstracted according to the 'health' of the aquifer, in order to minimise saline intrusion and benefit dependent watercourses.

The aquifer is currently managed with the assistance of a groundwater model, which provides an understanding of the relationship between rainfall, recharge, groundwater levels, saline intrusion, river flows and water abstraction.

Achieving the right balance between abstraction and the needs of the environment is nonetheless hampered by a poor understanding of the relationships between river and groundwater flow, the ecological health of a river and its physical characteristics. The long term ecological implications of the groundwater resource situation are unclear, partly due to a lack of data, and we are addressing this issue through the development of the LIFE methodology (Lotic-invertebrate Index for Flow Evaluation).

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD	COMMENTS/ESTIMATED COSTS
	Lead	Other		00/ 01/ 02/ 04/ Future 01 02 03 05	
Ensure proper management of the Chalk Aquifer and apply a balance between all uses and the environment.	Agency	AWS	Renewal of the Water Management Agreement with AWS when the current agreement ends (31/3/00).	* *	Agreement to be made by 31/3/00, and associated actions will be ongoing. Staff costs involved in the management of this agreement are estimated at £3-4k per year.
	Agency		Review and further develop the groundwater model for the aquifer.	* * * *	This should achieve a better understanding of the aquifer/surface water system and improved water resource management. Costs - £750k over 3-4 years.
	Agency AWS		Install and licence augmentation borehole adjacent to the Laceby Beck, and monitor river flow and ecology.	* update	An augmentation borehole already installed adjacent to the Laceby Beck will support the river downstream of the borehole during times of low flow. The licence is currently being determined and monitoring will be carried out by the Agency.
	Agency	AWS	Carry out further investigations on low flow rivers. Install river support borehole(s) as appropriate.	* * * * * move up 1 Costs. →	This issue is awaiting clarification from AWS on Asset Management Plan 3 (AMP3). The timetable of works is to be agreed between Agency and AWS, and costs are dependent upon AMP3 money.
	Agency	WRc IFE External Contractor n.b-. not yet agreed: scoping study project board to meet in Feb/March	Apply "LIFE" methodology study when available.	* * * * *	The Scoping Study has been completed and a National Development project is to be undertaken in 2000/early 2001. This will allow better assessment of the flow needs of a watercourse and assist in achieving the right balance between abstraction and environmental protection. Provisional hydroecological targets could be set as an interim measure, but these may need to be revised in the light of ongoing development. Costs TBE.
	Agency		Undertake HABSCORE[2] study of suitable watercourses as part of field investigations.	*	This will provide additional data on the flows needed to maintain fish populations, and will be linked to LIFE studies where feasible. Costs - £1K.

[2] HABSCORE is a system for measuring and evaluating stream salmonid features. HABSCORE requires information from three sources relating to site specific habitat features, catchment features and the observed salmonid populations at a site.

Ongoing National Initiatives

We have actively contributed to the Government's review of the abstraction licence system and the revision of the Water Resources Act 1991. The proposed changes provide us with additional tools to manage water resources, including measures to strengthen protection for wildlife and important habitats, and a duty to ensure that sites which come under the Habitats Directive are not adversely affected by new abstraction licences or variations to existing ones.

Issue 1b Water quality of the Lower Ancholme is adversely affected by saline intrusion

The River Ancholme is used extensively for abstraction by industry and agriculture and for public water supply. It can be augmented by the Trent-Witham-Ancholme (TWA) River Transfer Scheme, which helps to support a variety of water uses within the Plan area, in addition to maintaining river levels and minimum flows. Saline intrusion can, however, affect water quality and the increased salinity can also result in ecological changes, namely a loss of salt-intolerant species and dominance of salt-tolerant or brackish water species.

On the lower reaches of the Ancholme, saline water can migrate upstream during periods of low flow. The primary source of this salinity is thought to be the lock operations of the tidal structure at South Ferriby.

We have already improved water quality to a large extent. The lock doors were replaced in early 1998, and a second bubble curtain (perforated pipework located on the channel bed through which air is pumped) and drainage controls have been installed. These works cost in the region of £400K, and were undertaken in a way that will minimise saline intrusion.

We currently manage saline intrusion on the Ancholme at South Ferriby by:
- transferring saline water from the lock/sluices into the West Drain
- management of residual flows
- lock operation procedures
- use of bubble curtains
- monitoring water quality up- and downstream of the tidal structure.

However, the inputs, outputs and flows of the Ancholme are not sufficiently understood to enable us to manage river flows, river transfers and the upstream migration of saline water efficiently. Further understanding of flows in the River Ancholme is needed to manage saline intrusion and associated impacts on water quality and river ecology.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD					COMMENTS/ESTIMATED COSTS
	Lead	Other		00/01	01/02	02/03	04/05	Future	
Further understand and manage flows within the Ancholme to minimise saline intrusion.	Agency		Carry out a hydrological review of flows, discharges and abstractions to/from the Ancholme to improve our management of the existing resource and to better define the current extent of the saline intrusion problem.	*	*				Costs are estimated at £20k (based upon the £50k for the Trent-Witham-Ancholme Naturalisation).
	Agency		Maintain a river gauging station on the Lower Ancholme for collection of additional data.	*	*	*	*	*	This was installed at Broughton Bridge as a result of the previous Catchment Management Plan. Costs - £2k p.a. (staff costs and maintenance).
	Agency		Use routine biological data as monitor of salinity.	*	*	*	*	*	A continuous data-run is available (1985 to present) and an Agency report is currently being produced. Routine Agency work and costs.

2 Enhancing BIODIVERSITY

Agency Operational and Strategic Actions are to:

- play a full part in implementing the EC *Habitats Directive*;
- play a full and active part in delivering the UK's Biodiversity Action Plan by acting as the 'contact point' for twelve species of aquatic animals and plants, and by acting as the 'lead partner', either singly or in collaboration with others, for ten of them;
- ensure that all aspects of the Biodiversity Action Plan are incorporated into the Agency's guidance and become part of its Local Environment Agency Plans;
- implement a series of projects, in partnership with local conservation groups, to deliver biodiversity targets at specific sites;
- allocate specific resources to conservation projects aimed at increasing biodiversity;
- control eutrophication, where feasible, in order to enhance biodiversity;
- improve the management of wetlands for conservation purposes;
- use and promote best environmental practice for the protection and restoration of river habitats;
- develop and set conservation criteria for all of the Agency's environmental licensing activities;
- implement specific projects to restore habitats in rivers and lakes, increase the area of reedbeds and other water plants, and improve river banks;
- ensure that there is no deterioration in the quality of the aquatic environment in particular, and deliver significant improvements in river and still water quality by tackling diffuse pollution of them;
- carry out research into the management of species in the aquatic environment in order to meet fully all Biodiversity Action Plan targets.

Issue 2a **There has been a significant reduction in the area of river and wetland habitats and associated species**

The river and wetland habitats in the Plan area can support a wide variety of common as well as rare species such as otter, bittern and various species of wading birds, but these habitats are dependent on water input from surface and groundwaters and are also susceptible to changes in water quality.

Human influence over the last three hundred years has had a profound effect upon the wetland habitats of the Ancholme Valley. Serious attempts to drain the marshes and low fens began in 1635 but as late as 1830, 5-6,000 acres were still flooded each winter. Over the last century, intensive agriculture has resulted in the land being fully drained to increase its productivity and economic value. One consequence of this has been the loss of environmentally important wetland habitat and associated flora and fauna. Canalisation and flood defence works have widened and straightened river channels, and the construction of embankments has reduced the frequency of inundation of wetland habitat. This in turn has reduced the ecological value of river channels and banksides. Fauna and flora that were historically present, including brown trout, are often absent or only occur in isolated stretches of river.

Chalk stream, fen, reedbed and wet grassland are listed as 'high priority' habitats in the UK Biodiversity Action Plan, and the maintenance and creation of such habitats will be a significant factor in the success of Local Biodiversity Action Plans. We are a designated contact point for chalk river habitats and a number of river and wetland species including otter, water vole and the Atlantic Stream Crayfish.

(i) General habitat enhancement

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD					COMMENTS/ESTIMATED COSTS
	Lead	Other		00/01	01/02	02/03	04/05	Future	
Increase the area of, and species associated with, river and wetland habitats.	County BAP Groups Agency	Land-owners	Continue to participate in the development and implementation of local BAPs for river and wetland species and habitats.	*	*	*	*	*	This should focus conservation works to benefit threatened areas. Routine Agency work and costs.
	EN Agency RSBP WT FWAG CA LAs	Land-owners	Help protect existing areas of wetland habitat.	*	*	*	*	*	Routine Agency work and costs.
	EN Agency RSPB WT FWAG CA LAs		Create new areas of wetland habitat where opportunities arise during both routine maintenance and capital works, such as through the restoration of floodplain.	*	*	*	*	*	Routine Agency work and costs. A scheme to raise the standard of flood defence on the River Rase at Market Rasen will involve the creation of two flood storage areas designed to maximise the potential for habitat creation. Another scheme on the River Freshney is likely to involve the creation of a more formal storage facility at Freshney Bog, with the potential to increase the nature conservation potential of this Site Nature Conservation Interest.
	Agency IDBs		Introduce habitat enhancements, including formation of wet berms (a flat part on the side of an embankment) where opportunities arise during both routine maintenance and capital works.	*	*	*	*	*	Revetment and re-profiling of Ancholme embankment is ongoing.

(ii) Chalk rivers

Chalk streams or rivers form a valuable conservation and amenity resource throughout the Plan area. The term 'chalk rivers' describes all watercourses dominated by groundwater discharge from chalk geology. This produces a distinctive hydrochemistry and flow regime, creating characteristic assemblages of plants and animals.

Chalk rivers in the Plan area include lengths of the Laceby, Barrow, East Halton, Keelby and Skitter Becks and the River Rase. Some of these watercourses have been dredged and suffer from low flows (Issue 1a). Fish species that were historically present, such as brown trout, are often absent or only occur in isolated river stretches.

We aim to maintain and protect good sections of chalk river, and to restore low quality stretches. We are the lead organisation for the National Habitat Action Plan on chalk rivers and we have commissioned contractors to assess the nature conservation value and potential for restoration of the chalk rivers in Lincolnshire which are not SSSIs or candidate SACs.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD					COMMENTS/ESTIMATED COSTS
	Lead	Other		00/ 01	01/ 02	02/ 03	04/ 05	Future	
Ascertain the habitat requirements of chalk river fish populations.	Agency		Undertake HABSCORE study of suitable watercourses as part of field investigations.	*					This will ascertain the habitat available to brown trout and the population that currently exists in that habitat. Work will be linked to LIFE studies where feasible. Costs – £1k
Define and identify chalk rivers in the plan area.	Agency	County BAP group EN WT	Undertake study of the Northern Chalk watercourses.	*					This will help to produce a definitive list of chalk rivers in the Plan area. It will also assist in identifying the ecology of chalk watercourses and the management required to conserve and enhance them. Completion of this initial study is imminent.
Maintain, protect and enhance this habitat.	Agency CT EN	Land-owners FWAG	Identify and develop a strategy for the enhancement and restoration of lengths of watercourse.	*	*	*			These actions will utilise the results of the above study.
	Agency CT EN	Land-owners FWAG	Carry out enhancement and restoration projects to achieve BAP targets.				*	* *	

(iii) Water vole

The water vole is found in lowland areas near water throughout the Plan area. Once common and widespread, this species has suffered a significant decline. Disturbance of riparian habitats, predation by mink and water pollution have meant that the lower reaches of rivers become unsuitable for habitation. Consequently, water vole populations have become discontinuous and vulnerable.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD					COMMENTS/ESTIMATED COSTS
	Lead	Other		00/01	01/02	02/03	04/05	Future	
Maintain and enhance water vole populations in the catchment	Agency IDBs EN WT	Land-owners Local Planning Authority	Maintain and enhance wetland habitat that is conducive to the survival of the water vole and create new suitable habitat.	*	*	*	*	*	This will take place where funding opportunities arise.
	Agency		Carry out surveys to assess changes to distribution and factors which impact on water vole populations.	*	*	*			Regular (5 yearly) catchment-based distribution surveys are carried out at set sites. Annual intensive surveys are also carried out at two sites in Plan area. Routine Agency work and costs.

(iv) Otter

Surveys indicate that the otter, which was once widespread in the Plan area, has undergone a rapid decline since the 1950s. Contributing factors include disturbance, the destruction of waterside vegetation and bankside habitat features, river engineering works, insufficient prey associated with poor water quality and road deaths. A survey to assess otter distribution within the catchment was completed in 1999 and further surveys will be carried out in future. Work to re-establish otter populations in the catchment through the provision of suitable habitat may help to improve the situation.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD					COMMENTS/ESTIMATED COSTS
	Lead	Other		00/01	01/02	02/03	04/05	Future	
Continue to assess the otter distribution in the plan area.	Agency		Carry out further surveys to assess changes to distribution of the otter.					*	This should provide a more comprehensive understanding of otter populations in the Plan area. Routine Agency work and costs.
Develop sustainable otter populations in the plan area.	Agency IDBs Land-owners EN WT	LAs	Carry out habitat enhancement and creation, including the construction of two artificial otter holts, along and adjacent to watercourses.	*	*	*	*	*	Works are undertaken where funding opportunities arise. These could also aid in the conservation of other wildlife.

Issue 2b The introduction of invasive alien plant and animal species threatens local ecological diversity

Many introduced plant species, such as Giant Hogweed, Japanese Knotweed and Himalayan Balsam are invasive and threaten native plant communities. Sale through garden centres is thought to be responsible for the spread of certain alien species. The spread of some invasive plant species may be at a stage where control is still feasible and this should be undertaken wherever possible.

Introduced fauna, such as American Mink, Signal Crayfish and the Chinese Mitten Crab can also have impacts on native populations through predation, competition or disease. Our Biology Section is heavily involved in the national project for the control of Signal Crayfish. This species can carry "crayfish plague", which is particularly virulent among the native crayfish population (*Austropotambiuspallipes*), and competes with it for food and habitat. Habitat modification and management of rivers are also contributing to the decline in populations.

It is important to appreciate that no single organisation can tackle this issue due to practicalities and resource implications. Instead, partnerships with a number of organisations are required.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD					COMMENTS/ESTIMATED COSTS
	Lead	Other		00/01	01/02	02/03	04/05	Future	
Control and contain the spread of alien species along watercourses.	Agency LAs IDBs Land-owners		Identify sites where alien invasives have become established.	*	*	*	*	*	Agency Biology section staff are BASIS registered to provide advice on control of invasive weeds. All of this work is covered by routine Agency work and costs.
	Agency LAs IDBs		Undertake a baseline assessment of their distribution, leading to a catchment-based strategic approach to their control.					*	

3. Managing Our FRESHWATER FISHERIES

Agency Operational and Strategic Actions are to:

- secure a more robust funding base for fisheries management by improved marketing and the setting of fair charges to anglers;
- review the economic basis of fisheries management;
- introduce a standard fisheries classification scheme;
- monitor every river fisheries over a five year rolling cycle;
- restore spawning grounds for freshwater fish;
- implement a programme of minimum acceptable flows for rivers;
- develop specific longer-term strategies for salmon, trout and coarse fisheries;
- reduce poaching to a minimum and bring rod licence evasion to under 10%;
- consider the likely costs and benefits of fixed penalty fine schemes for rod licence offences;
- consider the desirability of introducing mandatory rod licence display systems;
- research into the factors which affect the viability of our unique freshwater fisheries populations.

Issue 3a **Fish biomass and species diversity fall below expected levels in some watercourses**

Fisheries surveys indicate that the desired standard for fisheries is not being achieved for a number of watercourses in the Plan area, such as the Ancholme tributaries, River Rase, River Freshney and Laceby Beck. The reasons for this require further investigation, but probable limiting factors include low flows, poor habitat and impoundments. Insufficient data relating to other watercourses makes the assessment of fisheries in the Plan area difficult.

Low flows occur due to drought and increased abstraction demands. The headwaters of the Freshney, for example, are a chalk stream that once reportedly supported a native brown trout population but now suffers from low flows. Coupled with eutrophication (Issue 4g) and the lack of variation in river gradient, this results in excessive plant growth during hot periods, low dissolved oxygen levels, siltation and poor habitat.

Flood defence works and canalisation have meanwhile involved channel widening, dredging and the construction of embankments, resulting in poor, uniform habitats.

The river systems within the Plan area also have a number of locks and weirs. Changes in flow rates above such impoundments can lead to siltation, which can reduce the diversity of invertebrate populations and cover the naturally occurring gravels required by some fish species for spawning. The locks and weirs also limit migration, which increases mortality rates and reduces the rate at which stretches of river are repopulated following pollution or low flows.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD					COMMENTS/ESTIMATED COSTS
	Lead	Other		00/ 01	01/ 02	02/ 03	04/ 05	Future	
Investigate fish biomass and diversity that fall below expected levels.	Agency		Carry out routine fisheries surveys to monitor this issue on the Ancholme tributaries, Laceby Beck, and Rivers Rase and Freshney.	*		*		*	Costs – £15k
Assess impact of low flow on fisheries.	Agency		Undertake HABSCORE assessment of Laceby Beck.	*					Costs - £1k
Improve habitats for fish populations.	Agency		Possible installation of fisheries habitat improvements where opportunities arise in conjunction with local flood defence projects, such as the River Rase Improvement scheme.					*	Some habitat enhancement works, including the re-profiling of riverbanks, have already been completed through the Agency's Ancholme Initiative. Costs TBE
Reduce the impact of barriers to fish migration.	Agency		Undertake an assessment within the Plan area to plan works that mitigate for impoundments.		*				Costs - £1k

4. Delivering INTEGRATED RIVER-BASIN MANAGEMENT

Agency Operational and Strategic Actions are to:

- manage river-basins in an integrated way, via Local Environment Agency Plans;
- ensure that all waters are of sustainable quality for their different uses;
- deliver a continual improvement in overall water quality;
- provide effective flood defence;
- provide an effective flood warning system;
- increase the numbers of rivers and still waters capable of supporting viable fisheries;
- enhance and conserve inland navigations, as national assets of environmental, economic, social and recreational value;
- secure the most appropriate legislation, management systems and financial arrangements to ensure the sustainability of our navigational waters;
- work with others to improve and develop inland waterways as an integrated network;
- improve river habitat quality, as measured by river habitat surveys;
- improve wetland management;
- improve riverside landscapes;
- improve bathing water quality;
- improve estuarine waters for shellfisheries;
- increase the number of Agency-owned sites available for public recreation;
- work with local authorities to maximise the conservation and recreational use and value of our river-basins.

Issue 4a Members of the public place themselves in danger by swimming in the River Ancholme

During warm periods and school holidays, children jump into watercourses from structures and bridges, and swim in the rivers. This is a particular problem along the River Ancholme. There are inherent dangers from weeds, underwater structures and debris, as well as undercurrents which can endanger even the strongest swimmers, plus health risks associated with waterborne illnesses such as Weil's disease. Such individuals put their own lives at risk and can cause an obstruction to boat traffic using the navigation.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD					COMMENTS/ESTIMATED COSTS
	Lead	Other		00/01	01/02	02/03	04/05	Future	
Continue to publicise the dangers of swimming in rivers to the public.	Agency	LAs Schools	Continue public relations and identify specific areas where the problem is most severe.	*	*	*	*	*	Costs – £1K

Issue 4b Inadequate local sewerage systems in some villages result in localised pollution and may have public health implications

Traditionally, sewage treatment in rural areas has relied heavily upon individual septic tanks. Overflow from these tanks is designed to drain into the soil via a below-ground soakaway. In poorly drained areas with clay soils or high water tables, tanks were normally drained to the nearest watercourse. Where these ran through the centre of villages, pollution, smells and public health concerns, especially during periods of dry weather and low dilution flows, meant that the watercourses were piped-in and buried. The piped watercourse became known as the 'village drain' or the local council-maintained 'sewer'.

Current legislation allows applications to AWS for the provision of first time sewerage schemes, which are assessed against certain technical and economic criteria. Where a duty exists to provide a sewerage scheme, the expenditure is planned.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD					COMMENTS/ESTIMATED COSTS
	Lead	Other		00/01	01/02	02/03	04/05	Future	
Improve inadequate local sewerage systems.	AWS	Agency	Requisition of first-time sewerage schemes for affected villages:						AWS are in control of the budgets and plans for these schemes.
			•Brigg Road, South Kelsey	*					Commissioning of the new sewerage system will be underway shortly.
			•Kirby cum Osgodby, Market Rasen					*	The application has been accepted and is being appraised.
			•Coopers Lane, Laceby					*	The application has been received and is being assessed.

Issue 4c **Development on contaminated land has potential to pollute, but provides the opportunity to clean up existing problems**

In general, contaminated land includes any site where non-natural materials have been introduced and are present in the ground. Virtually all the land in the UK does, however, contain traces of man-made materials as a result of, for example, former industrial practices such as gas production or the manufacture and storage of chemicals.. These practices may have been acceptable under less stringent legislation, but the affected areas now need to be cleaned up for their safe use in the future, without pollution or risk to human health.

New legislation (Section 57 of the Environment Act 1995) has introduced a legal definition of contaminated land, focussing on sites that could cause problems. This should be implemented in early 2000, providing a new legal framework for dealing with contaminated land, and giving the Agency new powers that complement those of the Local Authorities.

We favour the re-use of contaminated land over the development of greenfield sites, provided that pollution is not caused. Many contaminated sites have been cleaned up with the help of derelict land grants, but problems occur where the site owner is not known, or where the resale value of the cleaned-up site is less than the probable remediation costs. A number of sites in the Plan area are seriously contaminated.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD	COMMENTS/ESTIMATED COSTS
	Lead	Other		00/ 01/ 02/ 04/ Future 01 02 03 05	
Identify and remediate sites which fall under the definition of contaminated land.	LAs	Agency	Identify sites.	*	Local authorities are to identify relevant sites. Information is needed from a number of sources, including the Agency. Routine Agency work and costs.
	LAs	Agency	Issue remediation notices.	*	Establish appropriate person and serve remediation notices. Routine Agency work and costs.
	LAs	Agency	Remediate sites:	*	This is to be funded by the appropriate person, or, where they cannot be identified, by other funds.
			•Normanby Park, Scunthorpe	*	Reclamation of the site has recently begun. This should reduce calcite pollution and high pH levels emanating from the site into the Winterton Beck. Blast furnace slag and other contaminated waste will be removed to the Conesby Quarry landfill as the site is reclaimed.
			•Waters Edge (the Britag Site)	*	This area was previously occupied by an agro-chemical works. The resultant contamination threatens to pollute the Humber Estuary and the underlying chalk aquifer. Funding is currently being sought for its remediation.
			•Macaulay Lane, Grimsby	*	A bentonite cut-off wall has already been installed around the northern and eastern boundaries of this former landfill site to prevent leachate migrating into the River Freshney and other surface waters. The issue is ongoing and we are in discussion with the developer and interested parties concerning the foundation works and the potential for groundwater pollution.
			•Grimsby Former Gasworks	* *	Originally a coal gasification works, this site was redeveloped as a gas service centre in 1975 which was then demolished in 1998. A proposal for redevelopment of this site is under consideration. Some remediation work has been done to remove the source of contamination and work will continue so that the site is suitable for its proposed use as industrial units. As with Macaulay Lane, discussions with the developer and interested parties concerning the piling/foundation works of the development and the potential for groundwater pollution are continuing.

Issue 4d Nitrate concentrations in ground and surface water exceed, or are expected to exceed, the EC Drinking Water Standard

The Lincolnshire Limestone and Northern Chalk aquifers provide major supplies of public water. The Limestone aquifer outcrops in a north-south line along the western boundary of Lincolnshire, with the outcrop becoming more extensive towards the south of the county. The major chalk aquifer outcrop occurs in the north-east of the county, forming the North Lincolnshire Wolds. Groundwater is highly vulnerable to diffuse sources of pollution where any outcrops occur.

Certain practices, predominantly agriculturally related, have led to high concentrations of nitrate in groundwaters. High levels of nitrate have been associated with health concerns. To ensure nitrate levels in water do not exceed the 50 mg/l limit specified in the EC Drinking Water Directive, the water supply companies blend high nitrate water with low nitrate water or treat it by other means as necessary.

The Ministry of Agriculture, Fisheries and Food has operated the voluntary Nitrate Sensitive Areas (NSA) scheme since 1990. Initially, 10 Pilot Areas were designated as NSAs and a further 22 areas have been established since 1994 under the EC Agri-Environment Regulation. This LEAP covers the North Lincolnshire Wolds NSA. Farmers are compensated for making changes to their farming systems that go substantially beyond Good Agricultural Practice to achieve reductions in nitrate levels. The scheme was closed to new applicants in 1998 following the Government's comprehensive Spending Review in order to release funds for other priority areas.

In March 1996, in accordance with the EC Nitrate Directive, the Government designated 68 Nitrate Vulnerable Zones (NVZs) in England and Wales. These are areas where nitrate concentrations in water exceeded, or were expected to exceed, the 50mg/l limit. All 32 NSAs are within Nitrate Vulnerable Zones, and the mandatory NVZ Action Programme measures now apply. This LEAP covers the North Lincolnshire Wolds NVZ.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD					COMMENTS/ESTIMATED COSTS
	Lead	Other		00/01	01/02	02/03	04/05	Future	
Achieve compliance with EC Nitrate Directive.	Farmers		Farmers to achieve compliance through statutory instrument: "The Action Programme for Nitrate Vulnerable Zones (England and Wales) Regulations 1998"	*	*	*	*	*	Since December 1998, farmers in these zones have been required to comply with a set of statutory Action Programme measures (largely based on Good Agricultural Practice) to reduce nitrate leaching from their land
	Agency		Assess individual farmers compliance with the NVZ Regulations Action Programme.	*	*	*	*	*	We are responsible for assessing farmer's compliance with the NVZ regulations. Costs - £14k p.a. (1 f.t.e.) plus £6k technical support.

Issue 4e Groundwater resources are threatened by pollution incidents

The groundwater resources of the Lincolnshire Limestone and Wolds are used extensively for public water supply. Contamination can result in significant expenditure by the responsible party, and investigation may require the drilling of a large number of monitoring boreholes and an extended period of water sample analysis. This, in addition to the cost of any clean-up works, possible legal expenses and fines, results in a potentially large bill which could have been avoided through appropriate pollution prevention measures.

Two significant pollution incidents have impacted on groundwater in the Plan area:

- Hydrocarbon leakage from Kirton Lindsey MOD site has caused significant local contamination of groundwater. This could impact upon water abstracted for public supply. Removal of the spilled material is difficult and considerable costs have been incurred by the MoD. Investigation and monitoring is ongoing, whilst pollution prevention measures at the base have been reviewed as a result of this incident.

- Inappropriate disposal of agricultural products can cause significant groundwater contamination. Groundwater from one of the two Anglian Water Services' public water supply (PWS) stations at Goxhill, which abstract water from the underlying chalk aquifer, has been shown to have herbicide concentrations which exceed the EC Drinking Water standard. A chalk pit used for the disposal of agricultural waste upgradient of the PWS borehole has been identified as the most likely source of contamination. Although the groundwater from the other PWS station meets the required standard following blending, abstraction at the impacted station has ceased.

Concentrated industrial development in parts of the Plan area may also pose an increased risk of pollution incidents in the future. Significant pollution incidents have already occurred at a number of sites, including Killingholme Airfield and the industrial estates at Elsham Wold, Wilton Road (Humberston), Manby Road (Immingham) and Kiln Lane (Stallingborough).

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD					COMMENTS/ESTIMATED COSTS
	Lead	Other		00/ 01	01/ 02	02/ 03	04/ 05	Future	
Protect groundwater resources from pollution incidents.	Agency	Site owners	Reduce the number of pollution incidents through pollution prevention initiatives and IPC authorisations.	*	*	*	*	*	This should reduce pollution incidents and associated costs in the future. Routine Agency work and costs.
Promote pollution prevention through the planning process.	LAs	Agency	Incorporate pollution prevention measures into the infrastructure of development.	*	*	*	*	*	As above.
Implement and achieve compliance with 1998 Groundwater Regulations.	Agency	Farmers/ other landowners	Assess and authorise existing sites where activities are covered by these regulations	*					This is ongoing for deemed authorisations. Costs - £16k (1f.t.e.)
	Agency		Identify sites/activities requiring authorisation and encourage applications/serve notices.	*	*	*	*	*	This is ongoing. There is potential for another f.t.e within the Agency's Environment Protection function to carry out these enforcement inspections. Costs – £14k p.a.
			Enforcement and inspection of authorised sites to monitor compliance.	*	*	*	*	*	This is ongoing. Additional DETR/GIA funding is to be made available for enforcement and pollution prevention
			Requisite surveillance of authorised sites and groundwater quality with respect to List I and II substances.	*	*	*	*	*	As above.
Kirton Lindsey MoD site:	Agency	MoD	Ensure appropriate monitoring of groundwater.	*	*				Routine Agency work and costs.
	Agency	MoD	Maintain close liaison with MoD consultants and regularly review monitoring data.	*	*				Routine Agency work and costs.
	MoD	Agency	Undertake additional works as necessary dependent upon results of monitoring.	*	*				May or may not occur with costs dependent upon action taken.
Goxhill PWS borehole: Ensure water from the source meets the required EC Drinking Water Quality Standard.	AWS	Agency	Reduce the potential for further migration of polluted water by installing a treatment plant at the sourceworks to remove contaminant.					*	AWS have deferred this action until after the AMP3 period.

Ongoing National Initiatives:

Groundwater Regulations implemented in 1999 will help reduce the risk of groundwater pollution by bringing a wider range of potentially polluting substances under our control. These include pesticides, sheep dip, solvents, hydrocarbons, mercury, cadmium and cyanide.

Issue 4f **Routine chemical and biological monitoring indicates poor water quality in a number of watercourses**

We use two principal schemes for managing and reporting on river quality: the General Quality Assessment (GQA) scheme and the Water Quality Objectives (WQO) scheme.

The GQA scheme is used to make periodic assessments of the quality of river water on key stretches (i.e. those which receive significant discharges or have significant flow) in order to monitor geographical and temporal trends in terms of general chemistry and biology. We are also developing a means of assessing watercourses in terms of nutrient content and aesthetic value.

The WQO scheme establishes clear quality targets to provide a commonly agreed planning framework for regulatory bodies and dischargers alike. The scheme, which is still under development, considers the different uses of a river stretch, including that of River Ecosystem.

The River Ecosystem (RE) category considers the chemical quality requirements of different types of aquatic ecosystem. Each stretch of river is assigned a target RE class called a River Quality Objective (RQO), which represents the level of water quality that a river should achieve in order to be suitable for its agreed uses. Until WQOs are formally established, we will use RQOs to set discharge consents and in undertaking other water quality planning activities.

The River Ecosystem Classification Scheme

RQO class	Class description
RE1	Water of very good quality suitable for all fish species.
RE2	Water of good quality suitable for all fish species.
RE3	Water of fair quality suitable for high class coarse fish populations.
RE4	Water of fair quality suitable for coarse fish populations.
RE5	Water of poor quality which is likely to limit coarse fish poopulations.

Biological quality targets are set locally, based on land-use related parameters.

A number of river stretches in the Plan area fail to achieve their chemical RE target class, either marginally or significantly (Map 1).

Statistically Significant Failures

(i) Skitter Beck/East Halton Beck

This river system drains a predominantly agricultural area north of Grimsby. Its catchment also includes the South Humberside Airport and the redundant North Killingholme airfield. Downstream of Ulceby, the Beck has failed its RE Target, probably due to ammonia contamination from industry (including the Killingholme Airfield Industrial Estate) and agriculture. Upstream, biological water quality is poor due to a combination of low flows and surface water run-off.

A pollution prevention survey of the airfield and surrounding area was undertaken in 1999, and

significant pollution sources have been identified and removed. We will, however, continue to monitor water quality.

(ii) Laceby Beck /River Freshney

The headwaters of the Freshney are a "chalk stream" which once reportedly supported a native brown trout population but today suffers from low flows. Downstream of Laceby, it is ponded and a weir in Grimsby maintains its level whilst preventing saline incursion. The lower stretches suffer excessive weed growth in summer months and attract litter (Issue 6c).

Upstream lengths of this watercourse fail biological water quality targets, whilst downstream of Littlecoates road bridge it fails both chemical and biological targets. These failures are associated with low flows, eutrophication (Issue 4g), intermittent discharges from sewer overflows and leachate pollution from the Macaulay Lane landfill site (Issue 4c).

(iii) Old River Ancholme

The Old River Ancholme follows the course of the old river downstream of Brigg, receiving inputs from surrounding agricultural land and Brigg Sewage Treatment Works.

The length between Brigg and Worlaby fails both chemical and biological targets. The reason for this failure is uncertain - we know that the quality of sewage effluent from Brigg STW meets its consent standards. Biological data suggests the presence of organic pollutants, possibly farm-related or from surface water drainage.

(iv) New Cut Drain

The New Cut Drain in Grimsby serves a predominantly industrial and residential catchment with a large proportion of hardstanding drainage. The drain outfalls into the Humber, adjacent to the Pyewipe Waste Water Treatment Works. It has little amenity value. In the past, high biological oxygen demand (BOD) has caused a failure of water quality.

Work to desludge the Drain was completed at the end of 1996 and has led to marked improvements in water quality samples, which now comfortably meet biological targets. Once the failed samples fall out of the 3 year data set considered in meeting the RE target, the watercourse will become compliant. No further action is intended other than ongoing monitoring.

Other Failures

(v) Land Drain

The Land Drain is a typical long, straight fenland drain with a symmetrical channel. As with the Old Ancholme, it drains a predominantly agricultural area which includes the edge of the Chalk Wolds escarpment. The watercourse has suffered from saline intrusion in the past but this has been largely overcome by a change in water management downstream.

The Land Drain marginally fails to meet its chemical quality target and intermittently fails its biological target by a large degree. The reasons for this are unclear, but organic pollutants, possibly linked to agriculture, are evident.

(vi) Caddle Beck

The Caddle Beck flows from Keelby eastward toward the coast, and ultimately into the Stallingborough Main Drain. The upper sections of the Beck demonstrate poor biological water quality with intermittent and sometimes catastrophic failures. The cause of these failures is uncertain but sewage discharges may be a contributing factor.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD					COMMENTS/ESTIMATED COSTS
	Lead	Other		00/01	01/02	02/03	04/05	Future	
Improve water quality in failing stretches.	Agency		Identify sources and nature of pollution using routine monitoring programme and intensive survey work. Monitor and advise on remediation for failures against targets (Skitter/East Halton Beck, Laceby Beck, Winterton Beck, Middle Rase, Land Drain, Old River Ancholme & Caddle Beck).	*	*	*	*	*	Routine Agency work and costs.
Laceby Beck/ River Freshney:	AWS	Agency	Install an augmentation borehole adjacent to the Laceby Beck with which to support the river downstream of the borehole during times of low flow. Monitor river flow and ecology.	*					The borehole has been installed and the licence under which it will operate is being determined. Monitoring will be carried out under Agency routine work and costs.
	NELC		Complete the Macaulay Lane former landfill site leachate cut-off wall.	*					NELC are in control of the budget and plan.
	AWS	Agency	Improve sewerage at Laceby as part of the AMP3 river quality program.					*	This action is scheduled for completion by 2005. AWS are in control of the budget and plan.
Old River Ancholme:	Agency AWS		Undertake a joint project including review of inputs to Brigg STW, toxicity testing of the river and farm catchment assessment.	*	*	*			Costs - below £10k.
Land Drain:	Agency		Undertake an initial review of the Land Drain catchment area in order to identify possible polluting sources.	*	*	*			Costs - below £10k.
Caddle Beck:	AWS		Carry out scheduled improvements to Keelby STW as part of AMP3 river quality programme.					*	Action is scheduled for completion by 2005. These will ensure that the STW complies with the new consent, alongside improvements to panels, storm tanks and edge protection. AWS are in control of the budget and plan.

Marginal Failures

Marginal water quality failures (where we are statistically uncertain as to whether a failure really exists) are those which cannot be related to effluent discharges or specific pollution sources. They may be due to low flows (1995-97), eutrophic effects or other factors:

Watercourse	Stretch
Skitter/East Halton Becks	Headwaters to Ulceby Station
Laceby Beck	Welbeck Springs to Laceby STW
Rase (Bully Hill)	Rase South Branch
Winterton Beck	B1430 road bridge to Humber
Rase	Market Rasen STW to Ancholme
Ancholme	North Kelsey Beck to Coal Dyke End
Ancholme	Coal Dyke End to Saxby Pump
Land Drain	Headwaters to East Drain
Easr Drain/East Weir Dyke	Old Ancholme to Humber

Routine monitoring will continue and action will be taken should these failures change from marginal to significant.

ISSUE 4g Nutrient enrichment of watercourses affects water quality, flora and fauna and other uses of water, such as navigation, amenity and fishing. River Ecosystem quality targets can be compromised

Our 1997 Environmental Strategy highlighted the need to address the environmental impacts and risks associated with eutrophication. Eutrophication occurs where human activities increase the nutrient content of water, giving rise to adverse effects on its ecology and use. The enrichment of waters by inorganic plant nutrients results in the production of algae and/or other aquatic plants. This affects water quality and dissolved oxygen levels, and disturbs the balance of organisms present. Such changes may be harmful to aquatic life, leading to reduced biological diversity, excessive weed growth and algal blooms, and may also interfere with water uses. Possible sources of these inorganic plant nutrients include agriculture (fertilisers) and waste water (domestic, detergents and industry).

The EC Urban Waste Water Treatment Directive (UWWTD) specifies minimum standards for sewage treatment and collection. We are responsible for making sure that discharges receive the level of treatment specified in the Directive. Watercourses that directly or indirectly receive qualifying discharges (from those works serving populations greater than 10,000) and fulfil certain criteria set out in DETR guidance can also be designated as Sensitive Areas (Eutrophic) or SA(E)s. This requires phosphate removal to directive standards at implicated Sewage Treatment Works, unless it can be demonstrated that such removal would have no effect on eutrophication.

The freshwater sections of the Laceby Beck/River Freshney and the New and Old River Ancholmes are particularly affected by eutrophication. Problems with duckweed growth on the River Ancholme have been particularly acute, making angling difficult and causing boat engines to overheat due to blocked cooling inlets.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD					COMMENTS/ESTIMATED COSTS
	Lead	Other		00/01	01/02	02/03	04/05	Future	
Reduce nutrient enrichment (PO_4) and consequent effects on ecology.	Agency	AWS MAFF Landowner	Monitor effects of point and non-point nutrient inputs on aquatic ecology. Input data to UWWTD.	*	*	*	*	*	Routine Agency work and costs.
River Ancholme: Address water quality problems due to nutrient enrichment.	Agency		Undertake a feasibility study of the installation of a floating reed raft to improve water quality and provide habitat enhancement.					*	Costs TBE.

Ongoing national initiatives:

We will be addressing this issue, and investigating further ways to reduce eutrophication, through a new National Eutrophication Strategy (currently out for consultation). This document considers phosphates, nitrates, and diffuse and point source pollution.

5. Conserving the LAND

Agency Operational and Strategic Actions are to:

- influence the Town and Country Planning Systems to prevent inappropriate developments in areas at risk of flooding and increasing flood risk elsewhere;
- implement the Flood and Coastal Defence policy as advised by MAFF and the Welsh Office;
- secure an adequate level of investment in flood defence;
- provide flood plain surveys to local planning authorities;
- discourage inappropriate development in flood plains;
- work with nature to reduce coastal flooding;
- develop new methods to survey and manage flood defences;
- report regularly on the state of flood defences;
- identify the state and extent of the problem of soil erosion;
- develop a soil erosion alleviation strategy, including guidance on best practice;
- work with local authorities to identify, and report on the extent of, contaminated land;
- regulate identified 'special' contaminated land sites effectively;
- research into the specific risks and remediation needs of contaminated land;
- measure the effectiveness of steps taken to reduce nitrates in designated nitrate vulnerable zones;
- develop methods for monitoring the 'state' and quality of soil with respect to its potential pollution.

Issue 5a **Standards of flood protection on lengths of river systems do not meet target standards**

One of our principal aims is to reduce the risk of flooding in order to protect people and property. This can include the exclusion of development from the floodplain, the construction of raised defences and the provision of flood storage reservoirs. Flood defence improvements will normally only be carried out by the Agency if schemes meet specific cost/benefit, environmental and technical criteria. However, some risk of flooding always remains. Recent studies have identified flood defences that fall below current target standards at the following locations:

River Rase: High flows caused flooding of properties in 1981 and 1993. Investigations suggest that events greater than a 1 in 10 year return period may cause flooding in the future.

River Ancholme: Agricultural land alongside the Ancholme and its tributaries is at risk from flooding during events above a 1 in 5 year return period. Brigg, which has been identified as a major growth area in the North Lincolnshire Local Plan, is also at risk from higher return period events. A 1997 feasibility study concluded that, under MAFF's project appraisal guidelines, flood defence improvements to Brigg urban area could be justified but that improvements to agricultural areas could not.

River Freshney: A 1997 feasibility study identified some urban areas in Grimsby that are at risk of flooding from events greater than 1 in 20 year return period.

Buck Beck: In the late 1970s, Buck Beck underwent a comprehensive flood defence improvement scheme. This involved a new tidal outfall, embankment raising and bridge improvements, providing protection to a 1 in 100 year return period. Approximately 100 hectares of urban area within Cleethorpes and Humberston lie below the design flood level.

Buck Beck relies on gravity discharge to the North Sea during low tide periods and storage within the embanked channel during tide lock. Beach levels at and beyond the tidal outfall have risen by 500mm since the early 1980s, resulting in similar increases in retained water levels within the beck. The impact of the continued rise on the standard of protection against flooding is uncertain.

Barrow Beck: The flood defences along Barrow Beck protect a largely agricultural area. Barrow Beck discharges through a gravity outfall to the River Humber via Barrow Haven, a 1km long embanked tidal channel. Siltation within the tidal channel is increasing retained water levels in the Barrow Beck, thus impairing the drainage of adjacent low lying land.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD	COMMENTS/ESTIMATED COSTS
	Lead	Other		00/ 01/ 02/ 04/ Future 01 02 03 05	
Provide effective defence for people and property against flooding.	Agency	MAFF	Promote an improvement scheme to provide target standards of flood protection to Market, Middle and West Rasen.	* *	The first phase of a scheme to provide flood storage areas upstream of Market Rasen on both the north and south branches of the River Rase commenced in December 1999. These will restrict flow through Market, Middle and West Rasen to the existing channel capacity of the River Rase, and reduce the risk of river flooding in the urban areas from the current level of 1 in 10 years to less than 1 in 75 years. Provisions for habitat creation will also be included in the scheme. Total estimated costs - approaching £2 million.
	Agency	MAFF Other Partners	Complete funding review for Ancholme Valley improvements.	* *	Improvements would raise the standard of flood protection to agricultural areas and urban areas in Brigg. Funding from other partners would increase opportunities for environmental improvements.
	Agency	MAFF Other Partners	Promote works in Brigg and the Ancholme Valley in partnership with others.	* *	This is dependent on the results of the funding review. Without other partners, works are likely to be limited to improvements to protect urban areas. Estimated costs - £800k.
	Agency	MAFF	Promote works to improve flood defences on the River Freshney.	* *	The preferred option is an improvement scheme incorporating walls with embankment raising, together with flood storage on existing wetland habitat (Freshney Bog). This should increase the standard of protection to 1 in 100 years. The improvements will be included in the Agency's Capital Programme (subject to the necessary agreements and approvals). The storage areas could also provide opportunities for environmental enhancements. Estimated costs - £950k.
	Agency	MAFF	Carry out investigations to determine the impact of siltation on standards of service on Buck Beck and Barrow Beck. If necessary seek to promote improvements.	* *	Estimated costs - £10k for each watercourse.
	Agency		Undertake asset surveys to identify any other deficiencies in standards.	* * * * *	This will improve the understanding of current standards of flood defence. Costs – approximately £20k.

Issue 5b **At certain locations our flood warning target of two hours prior notice is not met**

Our role with respect to flood warning and forecasting is:

- to monitor rainfall, river and tidal conditions
- to forecast and monitor floods
- to interpret the impact of floods
- to take reasonable steps to alert those at risk.

Our aim is to give the public 2 hours prior notice of the likelihood of flooding. One of our corporate objectives is 'to improve the successful receipt of flood warnings to achieve a 80% success rate for property flood warnings where a flood forecasting system exists by the year 2001.'

To fulfil this, we must ensure:

- accurate and reliable hydrometric data on rainfall and river flows
- accurate and reliable forecasts of flood flows and levels
- clear assessments of flood defence standards, flooding thresholds and flood risk areas
- effective flood warning dissemination systems and methods to alert and warn the public when there is a risk of flooding
- flood warning plans and associated public information to ensure the public are aware of flood risks and flood warning arrangements.

The flood event of Easter 1998 has raised a number of questions, both nationally and locally. We need to address these with respect to our flood warning and dissemination procedures and related activities, such as the production of flood risk maps, Floodplain Policy and scheduled surveys of flood defence assets.

The Anglian Region Telemetry Scheme (ARTS) aims to rectify the inadequecies in the region's telemetry capability, particularly in the areas of flood warning and flood control. ARTS Phase 1 overhauled many previously existing telemetry outstations and provided new communication and computing systems onto which subsequent improvements could be built. Phase 2 includes the development of a flow forecasting model for many of the watercourses within the Plan area.

ARTS 3 includes the construction of 13 additional telemetry outstations to monitor river levels and sluice status within the Plan area, whilst ARTS 4 provides additional flow gauging sites throughout the Region, including one on the River Rase.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD	COMMENTS/ESTIMATED COSTS
	Lead	Other		00/ 01/ 02/ 04/ Future 01 02 03 05	
Provide an effective flood warning system to protect people and property.	Agency	MAFF	Adjust/improve flood forecasting through ARTS2	* *	This will improve the Agency's ability to predict water levels in watercourses in response to given tidal and rainfall conditions. Costs – £300k
	Agency		Complete planned improvements to telemetry systems through ARTS 3&4.	*	Work is programmed for completion by April 2000. The gauging site on the River Rase at Market Rasen has been constructed and is currently being commissioned. Costs TBE.
	Agency	County Council LAs Police	Improve/adjust flood warning dissemination plans.	* * * * *	Routine Agency work and costs.

Ongoing National Initiatives

A number of ongoing national initiatives are relevant to this issue:

- to review the Agency's policy on flood warning dissemination
- to review the effectiveness of the Agency's flood warning methods
- to improve inter-agency co-ordination of emergency flood planning
- to review technical developments to enhance flood forecasting and warning
- to review/implement the recommendations of the independent review of the Easter floods.

The Agency has also published an Action Plan for England and Wales, based upon the recommendations of an independent review.

Other associated actions to improve the management of flood events include:

- clarifying and developing operational procedures and responsibilities with other organisations
- reviewing the system of river patrols and field condition monitoring
- simplifying and improving Agency flood warning procedures
- reviewing the Anglian Region Telemetry System (ARTS)
- reviewing Flood Warning dissemination (5 year Plan)
- reviewing the programme to produce Section 105 flood risk maps.

6. Managing WASTE

Agency Operational and Strategic Actions are to:

- provide a high quality waste regulation service;
- develop an overall database of waste arisings and disposals;
- measure the effectiveness of taxation to reduce waste and to encourage its re-use and recycling;
- obtain information on fly-tipping and devise means of combating it;
- implement the 'producer responsibility' regulations;
- develop life-cycle assessment methodologies for dealing with waste;
- encourage and inspire industry to develop new and improved techniques for the management of special and other industrial wastes;
- ensure achievement of national waste strategy targets for the reduction of waste disposed of to landfill;
- ensure achievement of national targets for the recovery, recycling and composting of municipal waste;
- combat organised crime, at national and international level, involving the illegal trading in waste;
- research into the technical needs of successful waste management, including best practice and best practicable environmental options;
- secure high quality management of radioactive waste in industry;
- ensure that any proposals for solid radioactive waste disposal will provide the necessary high level of protection for man and the environment;
- commission research into the potential effects of wastes entering the environment, including the potential effects of radioactive wastes.

Issue 6a The illegal disposal of waste poses a risk to health and safety

Fly-tipping is the illegal deposition of waste on land not licensed to receive it. It can damage the environment and human health, and reduce the amenity value of an area. As fly-tipping increases, so do costs to the Agency, the taxpayer and the landowner of removing the illegal deposit. We aim to reduce the frequency of fly-tipping by adopting a proactive enforcement policy.

Most-fly tipping incidents involve household waste being dumped either by the householder or by those acting on their behalf. Anecdotal evidence suggests that fly-tipping has increased since the introduction of the landfill tax.

Waltham/Holten le Clay is a notable fly-tipping hot spot, where illegal waste disposal has occurred for a number of years. Over the past year, we have received several complaints about fly-tipping at the Waltham Airfield and are combatting this through surveillance initiatives.

The Agency has recently signed an agreement with the Local Government Association in response to fly-tipping in England and Wales. The 'Memorandum of Understanding' details who is responsible for different fly-tipping incidents and identifies the removal of fly-tipped litter/waste from public land and watercourses as the responsibility of the local authority. We will take enforcement action when fly-tipping activities are of a commercial scale, although the fly-tipping of large quantities of industrial waste is relatively infrequent.

However, if waste has been tipped onto private land it is the landowner's responsibility to deal with it. In addition, if the landowner does not take any measures to try and prevent tipping there may be a degree of legal culpability.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD					COMMENTS/ESTIMATED COSTS
	Lead	Other		00/01	01/02	02/03	04/05	Future	
Attempt to reduce the frequency of fly-tipping.	LAs Agency	CLA NFU FSB Railtrack BW NT Tidy Britain Group LGA	Undertake a joint initiative to combat the problem of fly-tipping on a local level.	*					The Local Fly-Tipping Stakeholder's Forum in March 2000 will aim to identify fly-tipping problems and create an initiative to reduce/resolve its frequency.

Issue 6b The storage and illegal fly tipping of tyres is a pollution risk

Each year, some 37 million tyres weighing 380,000 tonnes are discarded in the UK. The number of tyres in use is forecast to increase by as much as 60% by the year 2021. A proposed EC Directive on landfill management is meanwhile likely to ban the landfilling of whole tyres by 2003, and that of shredded tyres by 2006. Rising disposal costs also mean that metal recyclers are reluctant to accept tyres as part of the general scrap stream. Alternative disposal options include retreading, burning to produce energy, and crumbing to produce road and playing surfaces. Retreading is, however, reportedly in decline and the number crumbed represents only 10% of the total.

As a result, waste producers stockpile their used tyres, or vast numbers are illegally disposed of and we are concerned that illegal tyre dumping may increase. There is a real risk that these stockpiles will catch fire, releasing black smoke, volatile organic compounds, dioxins and polycyclic aromatic hydrocarbons to the atmosphere. Phenols, polycyclic aromatic hydrocarbons and metals can also leach into groundwaters and rivers. The tyre dumps themselves are eyesores that preclude beneficial land-use.

Illegal tyre disposal is a particular problem at the Hibaldstow airfield. The site is located on a Major Aquifer Catchment Zone of the Hibaldstow Public Water Supply Abstraction, and is therefore particularly sensitive. It poses a potential risk to the environment as well as harm to human health should a fire occur. The illegal storage of tyres at Hibaldstow Airfield began in 1989, by a company who claimed to be storing them prior to carrying out a recycling scheme. The former Humberside County Council licensed the activity as a waste disposal operation in October 1990. The original licence holder went into liquidation in 1991 and the licence was transferred to another party who built a plant to process/shred the tyres on site. It is estimated that over a million tyres were stored at the facility. The company continued to receive and process more tyres until 1992, when a fire destroyed the plant. The company then left responsibility and liabilities for the site to the landowners.

Since 1992, a large proporion of the tyres have been removed from the site and used as leachate drainage layers at landfill sites within the Plan area. However, approximately 80,000 mainly commercial (lorry) tyres remain on site.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD	COMMENTS/ESTIMATED COSTS
	Lead	Other		00/ 01/ 02/ 04/ Future 01 02 03 05	
Address the problem of illegal fly-tipping of tyres.	Agency LAs		Undertake a joint initiative to combat the problem of fly-tipped tyres on a local level.	*	A joint partnership between the Agency and North and North East Lincolnshire Councils has been formed to address the problem of fly-tipping of tyres and reduce its frequency.
	Land-owners		Remove tyres from Hibaldstow Airfield to a suitable waste disposal or recycling facility.	*	This will minimise risks to the environment, although the labour intensive nature of this action may make it financially prohibitive. Costs TBE.

Ongoing National Initiatives

A recent Agency report has looked into how this serious environmental threat should be tackled. It concludes that more effort is needed to increase the lifetime of tyres, to reduce environmental impacts during their use and to provide sustainable ways of recovering them as a resource at the end of their lives.

Issue 6c The aesthetic quality of some lengths of watercourse in urban areas is poor

In urban areas such as Grimsby (River Freshney) and Brigg (River Ancholme), the accumulation of litter along watercourses is visually and environmentally damaging. There is an added risk of flooding where the debris blocks culverts and weed screens.

Responsibility for litter clearance lies under 'riparian rights' based on common law. The recent agreement between the Agency and the Local Government Association in response to fly-tipping identifies removal of fly-tipped litter from watercourses, if on public land, as the responsibility of the local authority (Issue 6a). In the past we have joined local authorities and local groups in litter clearance initiatives and will continue to work in partnership to combat this problem.

Local communities are also concerned about excessive weed growth in river channels. We manage weed growth in Main Rivers according to flood defence needs. The method and timing for its removal aims to balance flood defence requirements with those of other river uses, including conservation interests.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD					COMMENTS/ESTIMATED COSTS
	Lead	Other		00/01	01/02	02/03	04/05	Future	
Address the problem of poor aesthetic quality of urban watercourses.	LAs		Carry out litter removal	*	*	*	*	*	All of this is ongoing under routine Agency work and costs.
	LA Agency		Increase public awareness and improve disposal facilities.	*	*	*	*	*	
	Agency		Remove large fly-tipped debris and carry out annual weed clearance initiatives.	*	*	*	*	*	
	Agency Drainage Authority		Consider "ad hoc" complaints on weed growth on a case-by-case basis.	*	*	*	*	*	

New issue **Recreational facilities have become degraded in places within the Plan area**

There are many uses and users of the River Ancholme, each with respective requirements. Whilst much success has been achieved in coordinating those involved through the Ancholme User Group, some problems still infringe on certain parties and their recreational expectations. These include:

- conflicts over anglers parking their cars in residential areas
- loss of recreational facility for anglers, boaters, walkers and other users due to bankside erosion and land-use pressures
- siltation of the River Ancholme upstream of Harlam Hill Lock, thus inhibiting navigation
- historical degeneration of infrastructure.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD					COMMENTS/ESTIMATED COSTS
	Lead	Other		00/01	01/02	02/03	04/05	Future	
Maintain waterway on sections of river upstream of Harlam Hill Lock which require localised dredging.	Agency		Undertake surveys to identify opportunities for improvement.					*	Costs TBE.
Improve recreational access and facilities.	Agency		Improvement options will be considered for erosion control where opportunities arise in conjunction with flood defence schemes, such as those in Brigg.	*					Costs TBE.
	Agency		Reorganise and improve boat moorings at South Ferriby.					*	Costs TBE.
Reduce conflicts between anglers and local residents.	Agency	SDAA	Undertake partnership to improve car parking facilities for anglers at Snitterby	*					Costs in the region of £500.
Invest in recreational infrastructure.	Agency		Repair/replace fence of the Agency moorings in Brigg	*					Costs TBE.

There are several other environmental concerns in the Plan area for which we have not identified any specific issues, but will remain mindful of.

7. Regulating MAJOR INDUSTRIES

Agency Operational and Strategic Actions are to:

- continue the efficient and effective delivery of Integrated Pollution Control;
- implement the requirements of the EC Directive on Integrated Pollution Prevention and Control;
- implement the relevant requirements of the Control of Major Accident Hazards Directive;
- develop practical working relationships with fellow regulators, particularly the Health and Safety Executive;
- develop pollution prevention control tools including projects relating regulation to emission, efficiency and economic benefits;
- encourage the use by industry of BS 7750/ ISO 14001 accreditation;
- encourage registration under the EU Eco-Management and Audit regulations;
- pay special attention to the needs of small and medium-sized enterprises;
- maintain and expand the Chemical Release Inventory;
- introduce Operator and Pollution Risk Appraisal;
- play a full and active part in the EU Network for the Implementation and Enforcement of Environmental Law;
- ensure that radioactive releases from nuclear sites which result in exposures to individual members of the public are well within accepted limits;
- ensure that the total potential impact of releases from nuclear sites are environmentally acceptable;
- develop and implement toxicity based consenting methods for releases from complex industrial sites;
- ensure improvements are made to the quality of discharges to estuarine and coastal waters;
- implement the requirements of the EC Urban Waste Water Treatment Directive;
- research into effective means of ensuring that disinfectant and sterilisation techniques are safe for the environment;
- develop and implement tools to assess risks, costs, benefits and options in relation to the major industrial pressures on the environment.

We regulate emissions to the atmosphere from industrial processes in order to minimise impacts on the environment. 32 processes are regulated through Integrated Pollution Control authorisations along the South Humber Bank. The concentration of industry and food manufacturing in this area is sufficiently high for the Agency to treat it as a Zone Of Industrial Pollution or ZIP. This is an area with a high density of industrial premises or processes that have potential to release material into the environment, but without an established specific issue. Work on the South Humberside ZIP is underway and an initial report is forthcoming.

All emissions currently meet the prescribed standards set in their authorisations and no release which will breach Environmental Quality Standards is permitted. Less polluting emissions, including those from road traffic, are regulated by local authorities who have overall responsibility for managing air quality (Issue 8).

Industrial processes regulated by the Agency will be subject to wider assessments to identify (and quantify if possible) any specific issues regarding air quality. We will also consider all processes present, including those regulated by local authorities.

8. Improving AIR QUALITY

Agency Operational and Strategic Actions are to:

- help the Government deliver its Air Quality Strategy;
- ensure emissions from the major industrial processes to the atmosphere are reduced;
- ensure specific emissions of sulphur dioxide and oxides of nitrogen, which contribute to acid rain, are reduced;
- discourage the use of solvents in industry, which contribute to the production of ozone, the major photochemical pollutant;
- set an example in reducing emissions from vehicles by reducing our own mileage and increasing the use of public transport.

The UK National Air Quality Strategy, the first of its kind in Europe, was published in March 1997. This fulfilled the requirements for national air quality under the Environment Act 1995, which extended the responsibilities of local authorities to monitor air quality in their areas and, where necessary, to draw up air quality management plans to mitigate against breaches of air quality standards. The Government endorsed the Strategy in July 1997 on the basis that it would be implemented in full but reviewed at the earliest opportunity.

Following consultation, the Government intends to produce a revised version of the National Air Quality Strategy based on clear standards and targets, which will itself be subject to consultation before it is finalised. It will be supported by a framework for local air quality management which will:

- require periodic review of air quality by all local authorities;
- provide for the establishment of Air Quality Management Areas in those places where air quality targets are unlikely to be met;
- place powers and obligations on local authorities and other relevant bodies to prepare plans for remedying air quality problems;
- secure the effective co-ordination of all activities which can influence air quality improvement in the most cost-effective manner and in those areas where it is most needed.

This may include traffic management planning in conjunction with the regulation of prescribed Part A and Part B processes. We regulate Part A processes (those prescribed for Integrated Pollution Control (IPC) which have the greatest potential for serious environmental pollution). Part B processes, regulated under the local authority air pollution control system, have less serious potential to pollute. We will be required to participate in the setting and achievement of such local standards and we are working closely with local authorities to manage air quality in the Plan area.

North East Lincolnshire Council have completed Stage 1 of their Air Quality Strategy by compiling an overview of air quality. We will continue to work closely with local authorities to fulfil the strategy and take action where necessary, Sharing our information and analysing the effects of emissions to the atmosphere from the industrial processes that we authorise.

OBJECTIVE	RESPONSIBILITY		ACTION	ACTION PERIOD	COMMENTS/ESTIMATED COSTS
	Lead	Other		00/ 01/ 02/ 04/ Future 01 02 03 05	
Deliver the National Air Quality Strategy in order to manage local air quality.	NELC		Complete Stage 2 of the Strategy - filling any gaps in current information.	*	Monitoring stations have already been set up in Immingham and Grimsby town centre to obtain additional data, especially on particulate matter, NO_x and SO_x.
	Agency		Complete report on the South Humberside ZIP.	*	This is due for completion in March 2000, and will be used to complete the review of air quality in North East Lincolnshire.
	LAs		Produce a Review and Assessment of Local Air Quality.	*	This is scheduled for completion in summer 2000.
	LAs		Implement Stage 3 of the Strategy - the identification of Air Quality Management Areas and Action Plans to address local air quality issues.	*	This will be undertaken if any Air Quality Management Areas are identified as a result of the above.

9. Addressing CLIMATE CHANGE

Agency Operational and Strategic Actions are to:

- help to ensure that the Government's greenhouse gas emission reduction targets are met;
- develop methods to improve our estimates of the emission of methane into the atmosphere from landfill sites;
- promote tax incentives to reduce energy production from burning fossil fuels;
- set an example by reducing our own energy and fossil fuel consumption;
- invest in research to predict the likely effects of climate change on the environment of England & Wales, and how to manage them;
- provide improved mapping of low lying coastal areas at risk from sea level changes;
- develop techniques to identify changes in plant life, using remote sensing techniques, to measure the effects of different weather patterns in sensitive areas;
- contribute our knowledge and expertise to national and international forums dealing with climate change.

Although there are currently no specific issues in the Plan area relating to climate change, global warming is expected to become more pronounced in the future. This would cause the rate of sea-level rise to increase, although the magnitude and timing of this increase is not yet clear. Climatic variability is also likely to rise, increasing the risk and frequency of flooding. We will consider the implications for our standards of tidal defences (see Humber Estuary Related Issues).

The Agency document *The Environment of England and Wales – A Snapshot* meanwhile indicates that waste treatment and disposal, including landfill, contributes about one third of the UK's total methane emissions to the atmosphere. Methane is a greenhouse gas that traps heat in the atmosphere, with a global warming potential 24 times higher than that of carbon dioxide. Electricity companies are now required by order to make arrangements to secure the availability of a specified amount of capacity from non fossil-fuel power stations (the Non-Fossil Fuel Obligation).

We are actively encouraging operators of landfill sites to collect and utilise methane for electricity generation in order to ensure that the Non-Fossil Fuel Obligation is fulfilled. At Winterton Landfill, methane (produced by the normal anaerobic breakdown of waste materials) is being recovered and used in electricity generation schemes. It is estimated that this electricity is sufficient to power 5,000 to 7,000 local homes. Similar schemes could be established at Immingham and Roxby Landfills.

3.2 Humber Estuary Related Issues

A number of issues in our Humber Action Plan have implications for the Grimsby/Ancholme LEAP area:

Cleethorpes Bathing Waters

Cleethorpes bathing beach proved compliant against the EC standard for bathing waters in the 1997 and 1998 seasons. In 1999 the beach continued to show a trend of improving quality but a small number of non-compliant samples caused the beach to fail the EC mandatory standards.

These failures have been investigated and there is evidence to suggest that Buck Beck, a local contaminated watercourse, and animal faeces on the beach may be causing the exceedances in bacteria concentrations at the designated sample point. A collaborative project between the Agency, AWS and North East Lincolnshire Council to confirm and ameliorate these impacts is ongoing.

Tidal Defences

Although standards of defence along the coastline between Winterton and Grimsby generally meet target standards, some isolated stretches do not.

The structural integrity of defences, coastal erosion, rising sea levels and the changing morphology of the Humber Estuary all have implications for flood defence. Because this length of coastline is an integral part of the whole Estuary, we will manage it in an integrated manner.

We are developing a long-term flood defence strategy for the whole of the Estuary. A number of actions have been initiated, notably an Estuary Shoreline Management Plan which will act as the basis for the decision making process, and an investigation into the geomorphology of the Estuary. This will provide a much better understanding of the processes that shape the Estuary.

In the short term, urgent works have recently been completed between Winteringham and South Ferriby, and further works are scheduled between Immingham and Grimsby.

Protection of Inter-Tidal Habitat

The estuary is renowned for its bird population, particularly during migratory passage and winter residence. The intertidal mud flats and marsh provide food, safe roosts and breeding sites. These are essential to maintaining the conservation status of the estuary and its important bird populations. We are actively seeking opportunities to enhance such habitats as part of our flood defence and conservation work.

Recreational Potential

There are real needs and opportunities to develop increased public access to the Estuary and its watercourse, to improve rights of way along adjoining river banks and to facilitate the enjoyment of the water environment. Recreational improvements should not adversely affect other interests such as conservation and landowners.

We are committed to improving recreational facilities on land we own and recognise this is best achieved through partnership, thus maximising funding opportunities. We also identify opportunities to enhance recreation within the capital programme for flood defence works.

4.0 A BETTER ENVIRONMENT THROUGH PARTNERSHIP

4.1 Introduction

The aim of this section is to highlight broader, long-term issues and to profile the types of partnership required to address them. Establishing close and responsive relationships with all sectors of the community is vital if we are to achieve a better environment for present and future generations.

Population and economic growth have increased the use of natural resources and waste production, whilst intensive farming, mineral extraction and urban development have impacted significantly on flora and fauna. Increasing demand for water to meet public and agricultural needs adds to these pressures.

Partnership basically involves a number of different interests willingly coming together, formally or informally, to achieve a common purpose. Partnerships are desirable because they provide accountability, reduce the duplication of work and allow the pooling of resources.

We are well placed to influence many of the activities affecting the environment through the Environment Act 1995 and other legislation. Our powers to deal with environmental concerns (Appendix 1) are, however, not comprehensive and in many areas we must work with others to protect the environment and minimise potential threats. We will continue to produce LEAPs to demonstrate and reinforce out commitment to integrated environmental management and partnership.

4.2 Environmental influences

Urban Development

Urban development can have a potentially adverse impact upon the environment, resulting in:

(i) increased risk/occurrence of flooding as a consequence of changes to surface water drainage.

(ii) increased risk to surface and groundwater quality from treated and untreated effluent discharges.

(iii) increased pressure upon sewerage infrastructure.

(iv) increased demand for water from industry and the public.

(v) loss of habitat due to land take.

(vi) increased waste production.

(vii) risk to air quality.

(viii) risk to flora and habitats as a consequence, directly or indirectly, of remedial flood defence works and/or water quality problems.

Responsibility for regulating changes in land-use lies with local planning authorities. The development plan process sets out the framework for land-use change and the implementation of development control. Local councils then decide on the location of new development, the redevelopment of existing areas and changes of land- or building-use. We liaise closely with planning authorities in our role as a consultee, along with developers, and advise on proposals relevant to the Agency. We will also continue to liaise with planning authorities in the development of air quality strategies and, where appropriate, Local Air Quality Management Plans.

We are also responsible for regulating the treatment, storage and disposal of industrial, household and commercial wastes. Nationwide, 70% of this is landfilled. Regardless of how well landfill sites are located and engineered, they still have the potential to pollute surface and groundwaters, soil and air. The adoption of the Landfill Directive in April 1999 means that it must be transposed into law by July 2001, leading to the progressive diversion of biodegradable waste from landfill. The Directive should result in a major shift in the way in which we approach the management of waste. Landfill will be reduced in favour of recycling, and incineration (with energy recovery facilities) will also increase.

There are 30 active and several closed landfill sites in the Plan area, some of which have caused pollution problems in the past or may do in the future. Recent proposals for new landfill sites in the Plan area, for example at Kirton Lindsey, have also raised public concern. This site will be subject to our extended public consultation process in order to allay these concerns and we will work to ensure that the site meets our environmental standards. We will continue to work with local authorities, advising them on strategic Local Waste Plans, and with site operators, to minimise the risks that landfill sites pose to the environment.

The following policy issues are particularly relevant to the Grimsby/Ancholme Plan area. We will encourage their inclusion in Local Authority Development Plans where appropriate:

Policies which:

- resist development that would adversely impact upon air quality;
- encourage the reclamation and re-use of contaminated land where appropriate remediation measures have been put in place;
- locate development in areas where adequate water resources are available or where it can be made available without detriment to the water environment;
- reduce demand for water;
- seek to protect floodplains and prevent development which would create an unacceptable increase in the risk of flooding on site or elsewhere;
- encourage developers to contribute positively towards reducing flood risk by reducing surface water runoff rates and utilising sustainable urban drainage techniques;
- prevent developments which would prejudice coastal defences;
- protect, enhance and restore river corridors and coastal margins;
- ensure that adequate foul and surface water drainage infrastructure is available to serve new developments;
- ensure that effective pollution prevention measures are incorporated within development schemes;
- retain, improve and restore public access where appropriate;
- promote water recreation and navigation whilst balancing recreational needs with nature conservation;
- seek to reduce the amount of waste created;
- ensure that the disposal of waste does not have an adverse effect on any watercourse or groundwater.

Agricultural land use

Economic and commercial pressures have resulted in agricultural practices that may affect the environment, both locally and on a wider scale:

(i) fertilisers, pesticides and farm-derived waste can impact on both surface and groundwater quality. Pesticide contamination requires expensive remediation and fertilizers contribute to nutrient enrichment, which affects the ecological balance of watercourses.

(ii) soil quality can be affected by pesticides, which may kill soil organisms, and farm machinery, which can compact and damage soil structure. Changing agricultural practices such as the removal of hedgerows have accelerated soil erosion and this can affect water quality by increasing sediment loading, depositing silt on gravel beds and blocking drainage pipes and culverts. Surface run-off can also carry pollutants into rivers.

(iii) river maintenance works and lowering of water levels to ensure effective land drainage have a marked effect upon flora and fauna.

(iv) water abstraction for irrigation affects both water levels and quality.

(v) ploughing of land close to watercourses can increase sediment run-off following periods of heavy rain. Outdoor pig rearing can also lead to a build-up of soil/sediments in rivers.

Genetically Modified Organisms

We have three principal interests in this subject:

- the safe regulation of their industrial use within contained systems
- safeguarding the environment, and aquatic areas in particular, with respect to the growing of GM crops for food
- the potential use of GM plants to decontaminate land as environmental tracers.

We endorse the precautionary approach of English Nature, and the properly conducted research into and testing of the use of GMOs.

In recognising the need for a sound regulatory system covering land, air and water we will continue to make our scientific expertise available to the government and other interested bodies.

In working to minimise potential risks involved, the Agency works with the agricultural community and other organisations such as MAFF, The Farming and Wildlife Advisory Group and the Countryside Agency to:

- encourage the adoption of initiatives such as the Code of Good Agricultural Practices for the protection of Water, Soil and Air
- promote stewardship schemes such as the creation of wet grassland to improve habitat diversity
- promote access to the countryside
- encourage the construction of winter storage reservoirs - as an alternative source of water for spray irrigation
- implement the new Groundwater Regulations to help prevent pollution of groundwater by controlling discharges or disposals of certain dangerous substances.

We will also:

- adopt more environmentally sensitive practices in our own flood defence and land drainage works
- be proactive in educational and awareness campaigns disseminating relevant literature to farmers, giving advice on how they can operate in a more environmentally friendly way.

Industrial Activity

Potentially polluting industrial emissions include:

(i) discharges made after treatment directly to surface and tidal waters.

(ii) effluent discharge to foul sewers.

(iii) discharges to the atmosphere.

(iv) discharges of wastes to landfill sites and sewage sludge to land.

(v) accidental spillages/discharges causing contamination of land and ultimately surface and groundwaters.

Water abstraction for industry from watercourses may also impact on downstream water quality.

Responsibility for monitoring and authorising these discharges lies with the Agency (which issues permissions and consents where appropriate), the sewerage undertaker and, in some cases, local authorities. We work with industry and commerce to pre-empt and minimise environmental risks, generally to our mutual benefit but using our enforcement powers where necessary.

Waste reduction practices provide industry and commerce with an opportunity to improve their business performance. Many individual companies have successfully introduced waste minimisation practices, and remove hazardous material (e.g. mercury in domestic batteries) from the waste stream. Similarly, improvements to Integrated Pollution Control (IPC) authorisations have considerably reduced environmental emissions along the South Humber Bank. We welcome the Waste Minimisation Act (1998), passed with the overall aim of reducing the amount of waste produced annually. This confers extensive powers on local authorities to assist in the reduction of commercial, industrial and household wastes.

We are under a duty to prevent or minimise emissions of all prescribed substances from industrial processes under the IPC system, and to render emissions from IPC processes harmless. Power stations are subject to Agency regulation as they are sources of sulphur dioxide (coal-fired stations only) and nitrogen oxides, as well as other pollutants, which potentially affect local air quality. The recently introduced EC Directive concerning Integrated Pollution Prevention and Control (IPPC) essentially consists of preventing, reducing and eliminating pollution, by prioritising pollution prevention at source and ensuring the prudent management of natural resources in compliance with the "polluter pays" principle. IPPC is similar to IPC, but it regulates more industrial sectors and takes more environmental concerns into account. The Agency welcomes IPPC as a more holistic approach to environmental management and regulation, and will continue to work in partnership with industry to achieve it.

At Flixborough, Fibrogen Ltd. are burning meat and bonemeal from cattle carcasses as a substitute fuel. Although this is in the Agency's Midland Region (Lower Trent and Erewash LEAP), there are concerns that the resulting emissions may impact on the Plan area. The process is authorised under IPC and uses the substitute fuel to reduce costs and increase process efficiency. The nature of the substitute fuel means that its use is contentious, requiring a more diverse consultation and commissioning/testing process. This process, and all other similar

applications, are addressed via the Substitute Fuels Protocol to ensure that environmental objectives are met. We therefore handle applications to use substitute fuels in a way that the public are reassured and the environment is protected.

In addition, within the Plan area a gas fired, water cooled power station has been proposed at Killingholme. We will work with local authorities and industry to ensure that such developments do not pose a risk to air quality, water resources or the local environment.

The Agency will work in partnership with industry to

- promote and implement waste reduction and minimisation processes
- encourage waste recovery techniques such as recycling, composting and energy production
- improve awareness of waste recycling/minimisation opportunities by publicity and education
- seek improvements in the quality of industrial emissions and reduce the risk of accidental discharges to the environment

Local Agenda 21

Local Agenda 21 is the global action plan for the 21st century produced at the Rio Earth Summit in 1992. It brings together economic, environmental and social concerns into a blueprint for a more sustainable way of life, recognising that environmental problems at all levels have their basis in local activities. It emphasises the need to "Think Globally, Act Locally". Local authorities were seen as the focus of promoting and encouraging local community action, and were charged with producing a Local Agenda 21.

In the UK, many Local Agenda 21 groups, including those in Lincolnshire, have been involved in the development of local state of the environment reports and sustainability indicators to help identify issues of importance in their area. These issues can then be developed into action plans and projects.

The Agency is obliged under statutory guidance on sustainable development to assist the Local Agenda 21 process by providing appropriate consultation with local communities involved in LA21 initiatives. We also seek to develop a close and responsive relationship with local communities, including LA21 groups, on matters related to our own functions.

In the Plan area, we are involved in the LA21 forums set up by County, District and Unitary Authorities, such as the Lincolnshire Environment Forum.

Education and Awareness

One of the ways in which we can bring about environmental improvement and protection is by enhancing public awareness through education. The Agency believes the environment should have an involvement in education at all levels and in all aspects of life, not just through schools and colleges.

Environmental education is central to furthering our commitment to sustainable development. It provides industry, commercial interests and the public with the awareness of, and hopefully impetus to, address environmental issues. We also hope to see environmental topics dovetail into the national curriculum and are committed to providing information to A-level and university students.

Our education strategy 'Green Shoots', which considers education into the next century, outlines the following actions:

- to help educate young people through teaching aids and other initiatives (such as our distribution of the CD Rom - 'Greener Futures' -to Junior Schools. This was created in partnership with Cambridgeshire County Council, the DETR and Peterborough Environment City Trust)
- to improve understanding of environmental issues through links with education, work placements and an awards scheme;
- to work with industry and produce marketing campaigns to promote prevention of pollution rather than its remediation;
- to foster public awareness of environmental issues to encourage responsibility for the environment and its challenges;
- to build on established and create new international relationships to further sustainable development.

Biodiversity Action Plans

In June 1992, at the Earth Summit in Rio, the Convention on Biological Diversity was signed by the United Kingdom and over 150 other countries. In response to this, "Biodiversity: The UK Action Plan" was launched in January 1994 providing guidance on the production of Local Biodiversity Action Plans. These aim to focus resources to conserve and enhance biodiversity by means of local partnerships, taking national and local priorities into account.

A local Biodiversity Action Plan is currently being prepared for the historic County of Lincolnshire (including North and North East Lincolnshire), co-ordinated by a Steering Group which includes local authorities, conservation organisations, statutory bodies and representatives of landowners and managers (CLA and NFU). Draft Plans have been drawn up for consultation, with input from a wide range of organisations and individuals, and it is anticipated that the BAP will be published in spring 2000. Delivering the biodiversity targets will require inputs from central and local government, conservation organisations, land managers, members of the public as well as ourselves.

The conservation of biodiversity will be a key indicator of the successful implementation of sustainable development in the area.

We will:

- support and encourage the development and implementation of Local Biodiversity Plans and assist in the identification of targets and priorities.

Archaeology

Archaeological remains are a finite and fragile resource. Our towns and countrysides contain numerous sites of national importance which have been designated as scheduled ancient monuments, and more remains are discovered continuously. Rivers, floodplains and estuaries are particularly rich in archaeological remains, as the waterlogged conditions can preserve organic materials such as wooden artifacts and timber. These waterlogged deposits may also contain traces of past environments, such as pollen grains and preserved plant fragments, the study of which can lead to a better understanding of environmental change in response to fluctuating sea-levels and climatic variations since the last Ice Age.

The Plan area has a rich archaeological heritage, and numerous wooden artifacts, metalwork and pottery have been found near to Brigg. In 1884, a trackway made up of long oak planks, which has been radiocarbon-dated to around 900 BC, was discovered at Island Carr. As the vale of the River Ancholme is at its narrowest point at Brigg, the track may have formed part of an early crossing.

The River Ancholme has also provided evidence of Bronze Age boats. Two craft were found in the mud on the river banks at Brigg in the late nineteenth century, probably dating from between 1000 and 750 BC. One of these, the "Brigg Boat", is almost 15 metres long and was hollowed out from the trunk of a massive oak tree. The other, the "Brigg Raft" was built from planks in a similar way to a number of boats discovered at Ferriby. Its broad, flat bottom and low sides made it suitable for the relatively still waters of the River Ancholme, which was probably a broad tidal estuary fringed by marshes.

Waterlogged deposits are, however, easily desiccated or damaged. This may occur through the over-abstraction of water (leading to a drop in groundwater levels), land drainage, industrial and agricultural pollution or major construction works including flood defence projects.

We will:

- consider the impact of all our duties and activities on archaeological sites through liaison with those who protect them (Local Planning Authorities, County Archaeologists and English Heritage).

- carry out work, where appropriate, to mitigate damage and maintain archaeological sites, for example through wetland management regimes.

5.0 FUTURE REVIEW AND MONITORING

The Environment Agency will be jointly responsible, with other organisations and individuals, for implementing this LEAP. Progress will be monitored and reported annually. The Annual Reviews will also examine and assess new issues as they arise, whilst the period between major revisions (and the production of a new LEAP) will be five years.

If you require any further information or wish to make any comments, please contact:

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LINCOLN
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APPENDIX 1
DUTIES, POWERS AND INTERESTS OF THE ENVIRONMENT AGENCY

The Environment Agency has a wide range of interests in the areas of water management, waste management and pollution prevention and control. Whilst many of these interests are supported by statutory duties and powers, much of our work is advisory with the relevant powers resting with other bodies such as Local Planning Authorities

We are often asked about the following areas, but are **not** responsible for:

- noise problems (except if it is to do with our work)
- litter (unless it is restricting the flow of a river)
- air pollution arising from vehicles, household areas, small businesses and small industry
- collecting waste in your local area
- planning permission
- environmental health
- food hygiene

These are all dealt with by your local authority who will contact us if necessary.

We are not responsible for the quality or supply of drinking water at the tap or for treating sewage waste, although we regulate discharges from sewers and sewage treatment works.

The following table summarises our duties, powers and interests and their relationship to land-use planning:

Agency Duty	The Agency has powers to:	The Agency has an interest (but no powers) in:	Partnership
Water Resources To conserve, redistribute, augment and secure the proper use of water resources.	• Grant or vary water abstraction and impoundment licences on application. • Revoke or vary existing licences to reinstate flows or levels to surfacewaters or groundwater which have become depleted as a result of abstraction, and are subject to a liability for compensation. • Secure the proper use of water resources through its role in water-resources planning, the assessment of reasonable need for abstractions and promotion of more efficient use of water resources. • Monitor and enforce abstraction and impoundment licence conditions.	• The more efficient use of water by water companies, developers industry, agriculture and the public and the introduction of water-efficiency measures and suitable design and layout of the infrastructure.	The Agency is committed to water-demand management and will work closely with water companies and developers, local authorities and relevant organisations to promote the efficient use of water. The Agency acknowledges that new resources may be needed in the future and supports a twin-track approach of planning for water resource development alongside the promotion of demand-management measures. The Agency seeks to influence planning decisions for new development by encouraging the inclusion of water-conservation measures in new properties, particularly in areas where water resources are under stress, and by ensuring that planning authorities allow for the lead time for resource development.
Flood Defence To exercise general supervision over all matters relating to flood defence throughout each catchment.	•Control, through Land Drainage consents, development or construction of a structure that would affect the flow of an ordinary watercourse (Water Resources Act, 1991 Section 109, Land Drainage Act, 1991 Section 23). •Produce flood risk maps for all main rivers under S105 of Water Resources Act 1991. •Undertake works to main rivers using permissive powers. •Issue flood warning relating to main river to the public, local authorities and the police.	•Granting of planning permission throughout a catchment but especially floodplains where development can significantly increase flood risk. This permission is granted by Local Planning Authorities. •Installation of surface water source control measures e.g. flood attenuation structures. •Supervising the maintenance of ordinary watercourses which is a Local Authority remit, but may impact on main rivers. •Installation of buffer zones which reduce flood risk and have significant environmental benefits.	As a statutory consultee on planning applications within main-river floodplains, the Agency offers advice based on knowledge of flood risk. It also advises on the environmental impacts or proposed floodplain development. The Agency will encourage best practice, including source-control measures and common standards, among Local Authorities and riparian owners to protect and enhance the environment. The Agency works with the civil authorities to prepare flood-warning dissemination plans and supports their endeavours to protect communities at risk.

Agency Duty	The Agency has powers to:	The Agency has an interest (but no powers) in:	Partnership
	•Consent mineral workings within 16 metres of main rivers.	•Urban and rural land use and measures that can reduce flood risk or the need for watercourse maintenance.	
Water Quality To monitor, protect, manage and, where possible, enhance the quality of all controlled waters including rivers, groundwaters, lakes, canals, estuaries and coastal waters through the prevention and control of pollution.	•Issue discharge consents to control pollution loads in controlled waters. •Regulate discharges to controlled waters in respect of water quality through the issue and enforcement of discharges consents. •Prosecute polluters and recover the costs of clean-up operations.	•The control of runoff from roads and highways. This is a Highway Agency duty. •The greater use of source-control measures to reduce pollution by surface water runoff. •Prevention and education campaigns to reduce pollution incidents.	The Agency will liaise with Local Authorities, developers, the Highways Agency, industry and agriculture to promote pollution prevention and the adoption of source-control measures. As a statutory consultee on planning applications, the Agency will advise Local Planning Authorities on the water-quality impact of proposed developments.
Air Quality The Agency has a duty to implement Part 1 of the Environment Protection Act 1990.	•Regulate the largest technically complex and potentially most polluting prescribed industrial processes such as refineries, chemical works and power stations including enforcement of, and guidance on, BATNEEC and BPEO. •Have regard to the government's National Air Quality Strategy when setting standards for the releases to air from industrial processes.	•The vast number of smaller industrial processes which are controlled by Local Authorities. •Control over vehicular emissions and transport planning.	The Agency provides data on IPC processes and advice on planning applications to Local Authorities. The Agency is willing to offer its technical experience to Local Authorities on the control of air pollution The Agency wishes to liaise with Local Authorities in the production of their Air Quality Management Plans. The Agency will advise and contribute to the government's National Air Quality Strategy
Radioactive Substances Under the Radioactive Substances Act 1993, to regulate the use of radioactive materials and the disposal of radioactive waste.	•To issue certificates to users of radioactive materials and disposers of radioactive waste, with an overall objective of protecting members of the public.	•The health effects of radiation.	The Agency will work with users of the radioactive materials to ensure that radioactive wastes are not unnecessarily created, and that they are safely and appropriately disposed of. The Agency will work with MAFF to ensure that the disposal of radioactive waste creates no unacceptable effects on the food chain.

Agency Duty	The Agency has powers to:	The Agency has an interest (but no powers) in:	Partnership
			The Agency will work with the Nuclear Installations Inspectorate to ensure adequate protection of workers and the public at nuclear sites. The Agency will work with the HSE on worker-protection issues at non-nuclear sites.
Waste Management The Agency has a duty to regulate the management of waste, including the treatment, storage, transport and disposal of controlled waste, to prevent pollution of the environment, harm to public health or detriment to local amenities.	•Vary waste management licence conditions. •Suspended and revoke licences. •Investigate and prosecute illegal waste management operations	•The siting and granting of planning permission for waste management facilities. This is conducted by the waste industry and Local Planning Authorities. The Agency, as a statutory consultee on planning applications, can advise on such matters.	The Agency will work with waste producers, the waste-management industry and local authorities to reduce the amount of waste produced, increase reuse and recycling and improve standards of disposal.
Contaminated Land To develop an integrated approach to the prevention and control of land contamination ensuring that remediation is proportionate to risks and cost-effective in terms of the economy and environment.	•Regulate the remediation of contaminated land designated as special sites. •Prevent future land contamination by means of its IPC, Water Quality and other statutory powers. •Report on the state of contaminated land.	•Securing with others, including Local Authorities, landowners and developers, the safe remediation of contaminated land.	The Agency supports land remediation and will promote this with developers and Local Authorities and other stakeholders.
Conservation To further conservation, wherever possible, when carrying out water-management functions; have regard to conservation when carrying out pollution-control functions; and promote the conservation of flora and fauna which are dependent on an aquatic environment.	•The Agency has no direct conservation powers, but uses its powers with regard to water management and pollution control to exploit opportunities for furthering and promoting conservation.	•The conservation impacts of new development. These are controlled by Local Planning Authorities. •Protection of specific sites or species (a function of English Nature). The Agency does, however, provide advice to Local Authorities and developers to protect the integrity of such sites or species. •Implementation of the UK Biodiversity Plan. It is the contact point certain species and habitats.	The Agency supports action to sustain or improve natural and man-made assets so that they are made available for the benefit of present and future generations. Many development schemes have significant implications for conservation. The Agency will work with developers, Local Authorities, conservation bodies and landowners to conserve and enhance biodiversity.

Agency Duty	The Agency has powers to:	The Agency has an interest (but no powers) in:	Partnership
Landscape To further landscape conservation and enhancement when carrying out water-management functions; have regard to the landscape when carrying out pollution-control functions; and promote the conservation and enhancement of the natural beauty of rivers and associated land.	•The Agency must further the conservation and enhancement of natural beauty when exercising its water-management powers and have regard to the landscape in exercising its pollution-control powers.	•The landscape impact of new development, particularly within river corridors. This is controlled by Local Planning Authorities.	The Agency produces River Landscape Assessments and Design Guidelines which it uses when working with Local Authorities and developers to conserve and enhance diverse river landscapes.
Archaeology To consider the impact of all of its regulatory, operational and advising activities upon archaeology and heritage, and implement mitigation and maintenance measures where appropriate.	•The Agency must promote its archaeological objectives though the exercise of its water-management and pollution-control powers and duties.	•Direct protection or management of sites or archaeological or heritage interest. This is carried out by LPAs, County Archaeologists and English Heritage.	The Agency will liaise with those organisations which have direct control over archaeological and heritage issues to assist in the conservation and maintenance of these interests.
Fisheries To maintain, improve and develop salmon, trout, freshwater and eel fisheries.	•Regulate fisheries by a system of licensing. •Make and enforce fisheries bylaws to prevent illegal fishing. •Promote the free passage of fish and consent fish passes. •Monitor fisheries and enforce measures to prevent fish-entrainment in abstractions. •Promote its fisheries duty by means of land-drainage consents, water abstraction applications and discharge applications.	•The determination of planning applications which could affect fisheries.	Many development schemes have significant implications for fisheries. The Agency will work with anglers, riparian owners, developers and Local Authorities to protect fisheries.
Recreation To promote rivers and water space for recreational use.	•The Agency contributes towards its recreation duty through the exercise of its statutory powers and duties in water management.	•Promotion of water sports. This is carried out by the Sports Council and other sports bodies.	

Agency Duty	The Agency has powers to:	The Agency has an interest (but no powers) in:	Partnership
Navigation To maintain (with others) the Ancholme navigation.	•Improve, conserve and operate the Ancholme navigation. •Regulate navigation by a system of licensing. •Enforce navigation legislation.		The Agency will work with British Waterways, the Ports and other navigation authorities and navigation users to improve the navigations generally as valuable environmental, recreational, commercial and heritage resources.

APPENDIX 2
THE ROUTINE WORK OF THE ENVIRONMENT AGENCY

On a day-to-day basis, the Agency carries out a huge environmental monitoring and regulatory operation, mainly to achieve statutory requirements and to balance the needs of people and the environment. We aim to:

- save, redistribute and improve river, lake, reservoir and underwater supplies
- prevent and control pollution of air and water
- reduce the risk of harm from contaminated land and bring it back into use
- make sure waste is dealt with safely and legally
- make sure radioactive materials are kept, used and disposed of safely
- make sure flood risks are not created or exacerbated.

Regulating the environment takes place through licensing. We manage licences for abstraction of water from rivers and boreholes, releases to air and water, the carrying and disposal of waste and to carry out work in, over, under or near a watercourse. Within the Plan area we manage over 360 water abstraction licences, 66 consents to discharge to water, 64 waste management licences, 32 authorisations under Integrated Pollution Control for processes which make releases to air and 52 permits for radioactive materials and waste.

We monitor the environment to ensure that pollution is controlled and resources are adequately protected. We regularly monitor the quantity and quality of rivers, estuaries and the sea and check emissions from the processes we regulate. Results are reported on a public register which can be inspected at the Agency's main offices. We run a 24-hour service for receiving reports of and responding to flooding and pollution incidents and emergencies in the air, water or on land. We also work with others to reduce the risk of harm from contamination and to bring land back into good use.

We work to minimise waste and prevent pollution through advice and education, including national campaigns, and through working with other environmental regulators. When necessary, we are prepared to enforce environmental legislation. Those who show little regard for the law and who cause blatant and persistent damage to the environment can expect to be prosecuted.

We also have the role of reducing risk to people and the environment from flooding by providing effective defences. Protecting life is our highest priority and we provide a flood forecasting and warning service and discourage development in flood-risk areas. We also manage 57 km of sea and tidal flood defences and aim to protect and improve the natural environment by promoting flood defences that work with nature.

We are responsible for maintaining, improving and developing fisheries. We issue licences for rod angling and net fishing, and carry out improvements to fisheries by improving the habitat and fish stocks and providing advice to fishery owners. The Agency seeks to ensure that wildlife, landscape and archaeological heritage are protected in any work we carry out and also in work carried out by others.

Our principal aim for recreation is to protect, improve and promote the water environment for recreational use. We do this by protecting existing use and creating opportunities in the course of our work and by maximising the use of Agency owned sites for recreation.

APPENDIX 3
LINCOLNSHIRE AREA ENVIRONMENT GROUP (AEG) MEMBERS

Linda Clayton	Chairman
Darrell Barkworth	North Lincolnshire Council
Heather Bingley	Lincolnshire Trust for Nature Conservation
David Carnell	Inland Waterways Association
Jim Dodsworth	Lincolnshire County Council
James Epton	Lincolnshire Flood Defence Committee Chairman
Lewis James	RSPB
Fraser MacIntyre	Mid UK Recycling Ltd.
Roger Harvey	British Waterways
Marianne Overton	Institute of Biology
Tony Richards	Witham Joint Anglers Federation
John Rowley	Millennium Inorganic Chemicals
Keith Saveal	Novartis Grimsby
Bud Shields	East Lindsey District Council
Ed Smith	Anglian Water Services Ltd.
Christine Talbot	North Kesteven District Council
Rebecca Tibbetts	English Nature
Jack Turner	Lindsey Oil Refinery
Roger Wardle	Farming and Wildlife Advisory Group
Tom Wilson	Lincolnshire Anglers Consultative Committee

APPENDIX 4
ORGANISATIONS AND INDIVIDUALS WHO COMMENTED ON THE DRAFT LEAP

Public meeting responses

Peter Arbey (Roxby Parish Council)
Arthur Borrow (Hibaldstow Parish Council)
Keith Dye (Barrow Residents Association)
Bruce Gelsthorpe (Ancholme Internal Drainage Board)
David Jackson (CPRE)
Councillor Padley (Market Rasen Parish Council)
Tony Richards (Lincolnshire Anglers Consultative Committee)
Loretta Rivett (Osgodby Parish Council)
Mike Scorer (Scunthorpe Anglers Association)
Bud Shields (Lincolnshire AEG and Flood Defence Committee)
Jack Turner (Lindsey Oil Refinery)
Tom Wilson (Lincolnshire AEG)
Martin Wragg (North East Lincolnshire Council)

Written responses

Anglian Water
British Canoe Union
Linda Clayton
Coal Authority
Countryside Landowners Association
Campaign for the Protection of Rural England
East Anglian Waterways Association
English Nature
Forestry Commission
Hawk and Owl Trust
Inland Waterways Association
Lincolnshire Police
Lincolnshire Wildlife Trust
Ministry of Agriculture, Fisheries and Food
National Farmer's Union
North East Lincolnshire Council
North Lincolnshire Council Sites and Monuments Record Office
Hilary Van Smirren
Swallow Parish Council
West Lindsey District Council

APPENDIX 5
EC DIRECTIVES

In protecting the environment, and water quality in particular, we aim to apply the standards set by a number of EC Directives. Some of these are explained below.

EC Bathing Water Directive

The EC Directive on the quality of bathing water seeks to protect public health and the amenity value of popular bathing waters by reducing pollution. The Directive contains standards for 19 microbiological, physical and chemical parameters used to assess bathing water quality. Compliance with the Directive is mainly assessed through testing waters against standards for faecal indicator bacteria.

We are responsible for monitoring the quality of identified, popular bathing waters and providing the results to the DETR. They then decide whether the standards in the Directive have been met. Where identified waters fail to meet the Directive, we are responsible for identifying the sources of pollution that are causing the failures, and making sure that improvements are made. Our priority is to ensure compliance with the mandatory standards of the EC Directive, but we also seek compliance with guideline standards if this is achievable, taking the costs and benefits into account.

EC Dangerous Substances Directive

This EC directive relates to pollution caused by certain substances discharged to the aquatic environment. It aims to protect the water environment by controlling discharges containing harmful substances to rivers, estuaries and coastal waters.

The Directive describes two lists of compounds. List 1 contains substances regarded as particularly dangerous as they are toxic, persist in the environment and bioaccumulate. Discharges containing List 1 substances, such as sheep-dip, pesticides, solvents, hydrocarbons, mercury, cadmium and cyanide, are controlled through Environmental Quality Standards (EQSs) contained in Daughter Directives. List 2 contains substances which are considered less dangerous, but can nonetheless have a harmful effect on the water environment, such as heavy metals, ammonia and phosphorus. These are controlled by EQSs set by individual member states.

We are responsible for authorising, limiting and monitoring dangerous substances in discharges. We are also responsible for monitoring the quality of waters which receive discharges containing dangerous substances, and reporting the results to the DETR, who decide whether the standards in the Directive have been met. Where the standards are not met, we are responsible for identifying the sources of pollution and for making sure that improvements are made.

EC Freshwater Fish Directive

This is the EC Directive on the quality of waters needing protection or improvement in order to support fish life. It aims to ensure that the quality of designated stretches of water is suitable for supporting certain types of fish. The Directive contains two sets of quality standards. The first set protects cyprinid or coarse fish populations, e.g. roach and chub, whilst the second, stricter set of standards protect salmonids and game fish such as salmon and trout.

We are responsible for monitoring the quality of identified fisheries and reporting the results to

the DETR. They then decide whether the standards of the Directive have been met. Where the standards are not met, we are responsible for identifying sources of pollution and making sure that improvements are made.

EC Groundwater Directive (Groundwater Regulations 1999)

These regulations complete the implementation of the 1980 EC Groundwater Directive in England and Wales. The Directive aims to protect groundwater quality by preventing the discharge into groundwaters of List 1 substances, and by limiting the discharge of List 2 substances.

Anyone disposing of List 1 or 2 substances to land (unless they are covered by certain exclusions) must have written authorisation from us. These authorisations include conditions to minimise any environmental risks. If the risk to groundwater is considered too great, the application will be refused. No authorisation is required if the activity is already covered by a waste management licence, discharge consent or IPC authorisation.

Other activities that do not include disposal but may nonetheless cause a discharge of a listed substance to the ground must comply with approved codes of practice. These activities could include, for example, the storage and handling of hydrocarbons, solvents and other chemicals, animal carcass burial, use of sheep-dips and other pesticide and sewerage systems. If necessary, we may issue a notice to further control/prohibit the activity.

EC Urban Waste Water Treatment Directive

The EC Directive concerning urban wastewater treatment specifies minimum standards for sewage treatment and sewage collection systems. It specifies that secondary treatment must be provided for all discharges serving population equivalents greater than 2,000 to inland waters and estuaries, and greater than 10,000 to coastal waters. Discharges below these population equivalents receive appropriate treatment as defined by AMP2. This Directive also requires higher standards of treatment for discharges to sensitive areas. We are responsible for making sure that discharges receive the level of treatment specified in the directive.

Habitats Directive

The Agency has responsibilities under the Habitats Directive, which was adopted by the Council of European Communities in May 1992. The Directive aims to sustain European biodiversity and protect rare/threatened habitats and plant and animal species. These regulations apply to Special Areas of Conservation (SACs), which are primarily SSSIs (Sites of Special Scientific Interest, controlled by English Nature) and Special Protection Areas (SPAs), designated under the Birds Directive 1979.

Council Directive 96/61/EC Concerning Integrated Pollution Prevention and Control (IPPC)

The Directive essentially consists of preventing, reducing and eliminating pollution, by prioritising pollution prevention at source and ensuring the prudent management of natural resources in compliance with the "polluter pays" principle. The Agency welcomes IPPC as a more holistic approach to environmental management and regulation, and will continue to work in partnership with industry to achieve it.

The Directive refers to the integrated control and prevention of pollution from installations where the following activities (subject to certain capacity thresholds) are carried out:

•energy industries, e.g. power stations, oil and gas refineries
•production and processing of metals (ferrous and non-ferrous)
•mineral industries, e.g. cement and glass works
•chemical industries. e.g. organic, inorganic and pharmaceuticals
•waste management, e.g. landfill, installations disposing of or recovering hazardous waste, sewage sludge incinerators
•other activities, e.g. timber pulp production, slaughterhouses, food/milk processing, intensive pig/poultry units, organic solvent users, carbon production.

It has been implemented into UK law through the provisions of the Pollution Prevention and Control Act 1999, and covers emissions to all media (air, land and water), as well as heat, noise, vibration, energy efficiency, environmental accidents and site remediation. The introduction of supporting regulations will set out a Europe-wide policy to improve the standard of environmental protection. IPPC is similar to the IPC regime operated by the Agency since 1991, but it regulates more industrial sectors and takes more environmental concerns into account, such as energy conservation and returning sites to their original condition when activities cease.

APPENDIX 6
GLOSSARY AND ABBREVIATIONS

Abstraction Licence	A statutory document issued by the Environment Agency to permit removal of water from a source of supply. It can limit the quantity of water taken daily.
Agro-chemicals	Chemical substances used in agricultural production including fertilisers, herbicides, fungicides and insecticides.
Algae	Microscopic (sometimes larger) plants, which may be floating or attached. Algae occur in still and flowing water.
Ammonia	A chemical compound found in water, often as a result of pollution by sewage effluents. It is widely used to determine water quality. Ammonia detrimentally affects fish.
Asset Management Plans (AMP)	Means by which the water undertakers plan the work required and capital expenditure necessary for improvements and maintenance of the water supply, sewage treatment works and sewerage systems. AMPs cover a five-year period and are drawn up through consultation with the Environment Agency. They then have to be agreed by DETR and OFWAT. The second plan, AMP2, covers the years 1995-2000. AMP3 begins in 2000 and will run to 2005.
Base Flow	That part of the flow in a watercourse made up of groundwater and discharges. It sustains the watercourse in dry weather.
Bathing Water Directive	The EC directive concerning the quality of bathing water which seeks to protect public health and the amenity value of popular bathing waters by reducing pollution. The Directive contains standards for nineteen microbiological, physical and chemical parameters to assess bathing water quality. Compliance is assessed mainly by testing against standards for faecal indicator bacteria.
Biochemical Oxygen Demand (BOD)	A standard test which measures over 5 days the amount of oxygen taken up by aerobic bacteria to oxidise organic (and some inorganic) matter.
Biomass	Total quantity or weight of organisms in a given area or volume - e.g. fish biomass is measured as grammes per square metre (gm^{-2}).
Brundtland Report	Report of the 1987 World Commission on Environment and Development.
Buffer Zone (or Strip)	Strip of land 10-100m wide alongside rivers which is removed from intensive agricultural use and managed to provide appropriate habitat types.
Consent (Discharge)	A statutory document issued by the Environment Agency. It can authorise entry and indicate any limits and conditions on the discharge of an effluent to a Controlled Water. A land drainage consent is an approval for specified structural works in areas under Agency control.
Controlled Waste	Industrial, household and commercial waste, as defined in UK legislation. Controlled waste specifically excludes mine and quarry waste, wastes from premises used for agriculture, some sewage sludge and radioactive waste.
Countryside Stewardship Scheme	Scheme set up by the Countryside Commission in which landowners are grant-aided to manage their land in an environmentally sensitive manner.
Dangerous Substances	Substances defined by the European Commission as in need of special control. This is because they are toxic, accumulate and concentrate in plants and animals, or do not easily break down into less dangerous substances. List I substances are regarded as particularly dangerous as they persist in the environment and bio-accumulate. List II substances are considered less dangerous but can still have a harmful effect on the water environment. The EC Dangerous Substances Directive protects the water environment by controlling discharges that contain harmful substances to rivers, estuaries and coastal waters.

Demand Management	Activities to manage the amount of water required from a source of supply, including measures to control waste and/or to discourage use.
Diffuse Pollution	Pollution from widespread activities with no one discrete source, e.g. acid rain, pesticides, urban run-off etc.
Dissolved Oxygen (DO)	The amount of oxygen dissolved in water. Oxygen is vital for life so this measurement is an important, but highly variable, indicator of the 'health' of the water. It is used to classify waters.
Drought Order	Drought Orders are made by the Secretary of State upon application by the Environment Agency or a water undertaker (Water Company), under powers conferred by Act of Parliament, to meet deficiencies in the supply of water due to exceptional shortages of rain.
Ecosystem	A functioning, interacting system composed of one or more living organisms and their effective environment, in biological, chemical and physical sense.
Effluent	Liquid waste from industry, agriculture or sewage treatment plants.
Emission	A material which is expelled or released to the environment. Usually applied to gaseous or odorous discharges to the atmosphere.
Environmental Assessment	The process of evaluating the environmental pros and cons of proposals (often for civil engineering works). Formal Environmental Assessment is carried out and advertised under Statutory Instrument 1217.
Environmental Quality Standard (EQS)	The concentration of a substance which must not be exceeded if a specific use of the aquatic environment is to be maintained.
Eutrophic	A description of water which is rich in nutrients. At worst, such waters are sometimes beset with unsightly growths of algae.
Eutrophication	The enrichment of water by nutrients, especially nitrogen and/or phosphorous, which can cause accelerated growth of algae and high plant life, changes in ecological balance and deterioration in water quality.
Fish Biomass	A measure of the quality of a fishery as found in terms of surveys and weight by area (g/m^2).
Fish Pass	A device to permit fish to transverse structures within a river.
Flood Defence Standard	Where a defence is provided the Flood Defence Standard describes the level of protection given by reference to the return frequency of a flood event which would overtop the defence.
Flood Storage Reservoir	An area of land whose prime purpose is to receive and store flood flows, usually to prevent flooding of adjacent or valuable land.
Flood Plain	This includes all land adjacent to a watercourse over which water flows or would flow but for flood defences in times of flood.
Gas Migration	The movement of gas from the wastes within a landfill site to adjoining strata, or emission into the atmosphere.
Groundwater	May refer to all subsurface water as distinct from surface water. Generally groundwater is considered to be that water which is below the zone of saturation and contained within porous soil or rock stratum (aquifer).
Groundwater Protection Policy	Environment Agency policy which controls activities having the potential to pollute groundwater resources.
Groundwater Regulations 1999	These regulations complete the implementation of the 1980 EC Groundwater Directive in England and Wales. The directive aims to protect the quality of groundwater by preventing the discharge into groundwater of List I substances; and limit the discharge of substances in List II so as to prevent pollution.

HABSCORE	A system for measuring and evaluating stream salmonid features. HABSCORE requires information from three sources relating to site specific habitat features, catchment features and the observed salmonid populations at a site.
Hydrogeology	The study of the occurrence and movement of groundwater and the interaction with geology.
Hydrometric	The measurement of water.
Impermeable	Used to describe materials, natural or synthetic, which have the ability to resist the passage of fluid through them
Inert Waste	Category of waste which includes material which will either not decompose, or will decompose very slowly. Materials in this category would include waste from the construction industry such as hardcore, soil, stone and glass.
Internal Drainage Boards (IDBs)	Authorities responsible for dealing with land drainage within a district. They are primarily concemed with agricultural land drainage but also may be involved with water supply to their district for agricultural purposes.
Integrated Pollution Control	A system of pollution control that applies to the most potentially polluting or technologically complex industrial and other processes in UK. IPC deals with releases of all media (air, land and water) and uses the principles of BATNEEC and BPEO.
Landfill	The engineered deposit of waste into or onto land in such a way that pollution or harm to the environment is minimized or prevented. Restoration can provide land which may be used for another purpose.
Leachate	Liquor formed by the act of leaching from landfill sites.
Main River	Watercourses shown on the statutory 'Main River maps' held by Environment Agency and MAFF. The Agency has permissive powers to carry out works of maintenance and improvement on these rivers.
Minimum Residual Flow (MRF)	Target flow set locally and not legally defined.
Mitigation	Refers to the environmental impact of scheme development or operation and the actions which may be taken to reduce or ameliorate such impacts.
Nitrate Sensitive Areas	An area where nitrate concentrations in sources of public drinking water exceed, or are at risk of exceeding, the limit laid down in the 1980 EC drinking water directive, and where voluntary, compensated agricultural measures have been introduced as a means of reducing those levels.
Nitrate Vulnerable Zone (NVZ)	An area where nitrate concentrations in freshwaters exceed, or are at risk of exceeding, the limit of 50mg/l laid down in the 1991 EC Nitrate Directive, and where compulsory, uncompensated agricultural measures came into force in existing NVZs on 19 December 1998 as a means of reducing those levels.
Nutrient	Substance providing nourishment for plants and animals e.g. nitrogen, phosphorus.
Outfall	The point at which a river discharges to a downstream source, e.g. estuary or sea. It may also include an outfall structure to prevent seawaters backing up the system.
Putrescible Waste	Solid waste which will produce leachate when chemically and or biologically degraded.
Return Period	Refers to the frequency of a rainfall or flooding event. Flood events are described in terms of the frequency at which, on average, a certain severity of flow is exceeded. This frequency is usually expressed as a return period in years, e.g. 1 in 50 years.
Riparian Owner	Owner of riverbank and/or land adjacent to a river. Normally owns riverbed and rights to midline of channel.