

GA-ANGLIAN LEAP

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local environment agency plan

WELLAND ACTION PLAN JANUARY 1998



ENVIRONMENT AGENCY

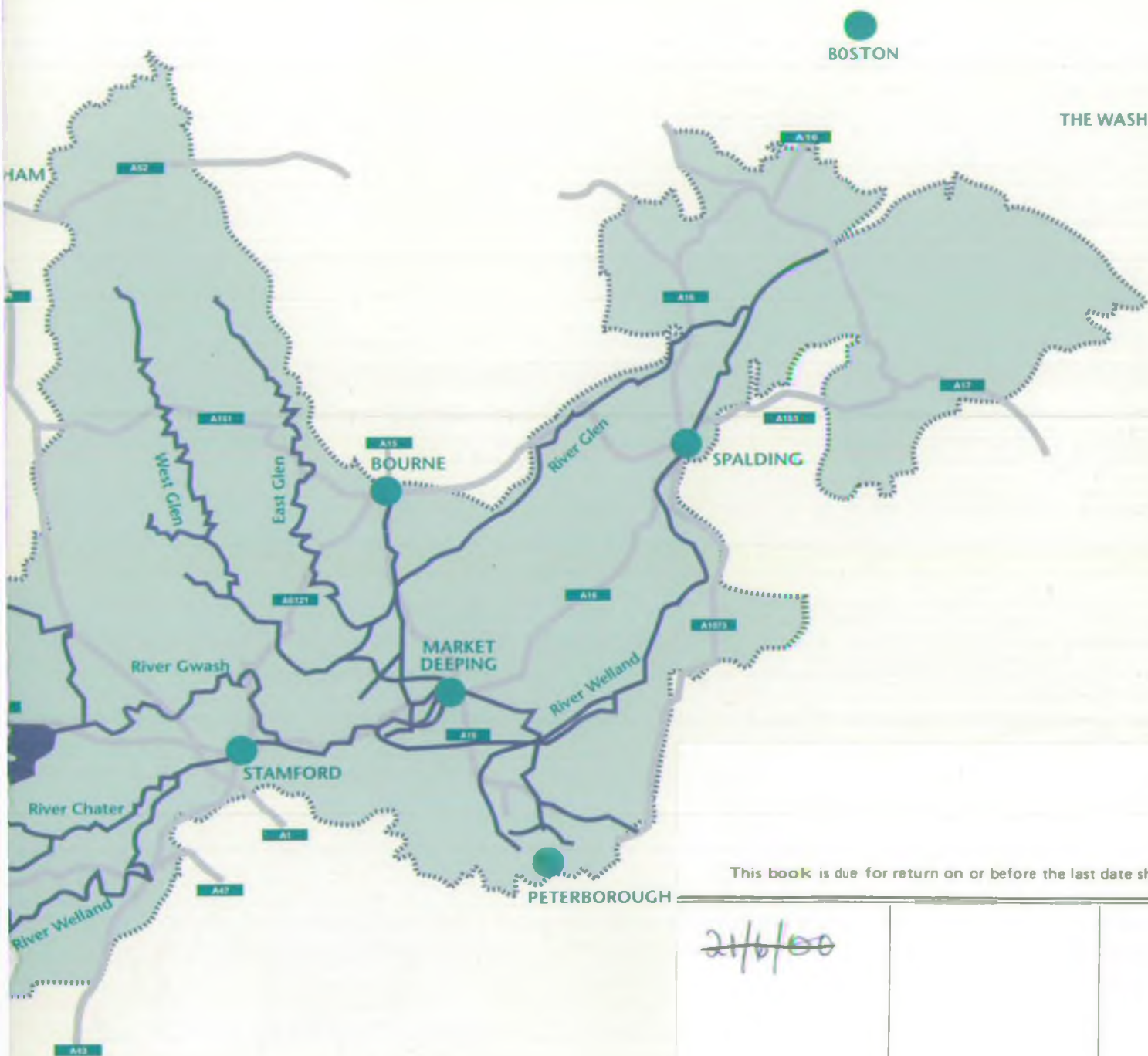
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ENVIRONMENT
AGENCY



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KEY FACTS

SUMMARY

Total Area	1656 km ²
Population	125,000 (approximate)

MAIN TOWNS AND POPULATIONS:

Market Harborough	17,069
Stamford	18,627
Spalding	21,111

ENVIRONMENT AGENCY ORGANIZATIONS:

Anglia Region (Northern Area) Area Office at Lincoln.
Catchment Offices (Welland & Nene) Spalding and Kettering

WATER UTILITY COMPANIES

Anglian Water Services Limited, Severn-Trent Water Limited

INTERNAL DRAINAGE BOARDS

Welland and Deepings, South Holland, North Level

Length of Statutory Main River:	413 km
Length of Navigable River:	75 km
Length of Course Fishery:	448 km
Length of Trout Fishery:	250 km
Length of Embanked Fluvial River:	90 km
Length of Embanked Tidal River:	22 km
Length of Sea Defence:	33 km
Area of land below sea level:	430 km ²

FLOOD STORAGE RESERVOIRS:

Crowland & Cowbit Washes, Medbourne, Great Easton, Little Bowden, Braybrooke

WATER QUALITY

Biological Quality Grades 1996	Chemical Quality Grades 1995
Grade length of river (km)	Grade length of river (km)
'very good'	143.4
'good'	125
'fairly good'	54
'fair'	4.5
'poor'	0
'bad'	2
Interim	2.5

INTEGRATED POLLUTION CONTROL

AUTHORISATION SITES:

Castle Cement, Ketton; Tungstone Batteries, Market Harborough

SITES OF SPECIAL SCIENTIFIC INTEREST: 56

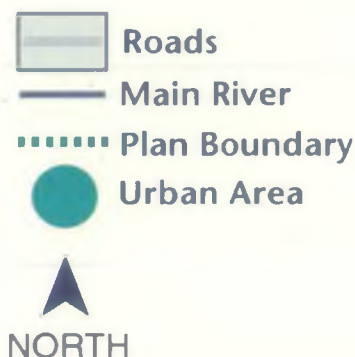
SCHEDULED ANCIENT MONUMENTS: 130

WASTE MANAGEMENT

Licensed Landfill Sites	12
Licensed Transfer Stations	4
Licensed Treatment Plant	3
Licensed Scrap yards	11

WATER RESOURCE AVAILABILITY

Groundwater:	Water resources from the Lincolnshire the major aquifer are fully committed. Some water may be available locally from the extensive gravel deposits north of Peterborough.
Surface Water:	There is no availability of water for summer use, some is available for Winter Storage Reservoir purposes.



EXECUTIVE SUMMARY

This Action Plan provides a blueprint for the future of the Welland Plan area which extends from the headwaters of the Welland near Market Harborough in Leicestershire to the Wash Estuary along the Lincolnshire coastline. The Environment Agency, in partnership with relevant organisations, will use this Plan to ensure that improvements to the local environment are achieved and that good progress is made towards our vision.

Principal sources of water in the Plan area are the River Welland, Rutland Water Reservoir (which takes much of its water from the River Nene) and the Southern Lincolnshire Limestone aquifer. Water resources are of particular concern to us at the moment due to the recent drought conditions and the subsequent pressure on rivers, wetlands and groundwaters - key issues in the Plan area reflect this.

The quality of water in the Welland is generally good and surveys indicate that current quality is better than at any time since the early 1980s. However, the Welland suffers with the consequences of low flow and nutrient enrichment, which cause excess algae and weed growth resulting in water quality problems at a number of sites. Groundwater quality is generally good, although local groundwater pollution incidents do occur, the most serious of these being contamination of part of the Lincolnshire Limestone aquifer around Helpston, caused by leachate from a closed landfill site.

The eastern part of the Plan area around the Fens, has a long and complex history of land drainage and flood protection. Whilst much of the area is below the level of the highest tides, the provision of effective tidal and fluvial defences by the Agency and the provision of efficient land drainage by ourselves and the Internal Drainage Boards means that flood defence is not a key issue. There are, however, a number of villages upstream of Stamford where the existing flood defence standards are below standard of service targets; the discharge of flood waters from the Welland into its tidal channel and ultimately the Wash is also compromised by the siltation of the river outfalls.

Over the centuries, the Fens have been subject to land reclamation and extensive land drainage which has created some of the most productive agricultural land in the country. As a consequence, most of the original wetlands and associated habitats have been lost - confining remaining wildlife to smaller and smaller sites. More habitats are needed to sustain these remnant populations, and in association with our partner organisations we will strive to conserve and enhance habitat diversity through the implementation of habitat improvement schemes.

The construction of Rutland Water has created a major wetland site which is of significant conservation importance nationally, and of international importance for migratory wildfowl. The ecological balance of Rutland Water is now threatened by its eutrophic state, prompting English Nature, Anglian Water and ourselves to develop an Action Plan to deal with this issue. Rutland Water is also locally valued for its recreational value, with trout fishing, sailing, cycling and windsurfing being particularly popular activities.

Many of the issues identified in the Plan, relating to the sustainable use of resources, biodiversity, the illegal disposal of waste and the recreational use of the water environment, will be addressed and resolved through a partnership approach between ourselves, local authorities, organisations and individuals. These are covered in the 'Protection through Partnership' section of the Plan.

The Activity Plan in Section 4 establishes a timetable of actions to resolve the issues identified.

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Anglian LEAP Doc
The Welland Action Plan

Comments:-

1. Para 2.4 Flood Defence.
The map 'Existing Standards of Flood Defence' is illegible due to the choice of colours for the various river categories.
2. Issues:-
 - '1a' 'Flood Flow measurement' must be reviewed as a matter of urgency with the lessons learnt from April 1998 floods.
 - '2' The document is drafted such as to give the expectation that where 'flood defences are below current target standards' that works will be undertaken to raise standards. This is of course not necessarily so.
 - '3' Clear relationship between the benefits of trying to maintain a 'flood' channel in low flow conditions and the costs not addressed.
 - '18' Raising of water levels needs to be managed in a holistic manner.
 - 'P2' When considering run off from development account must take account of:-
 - i) immediate mitigation for the development.
 - ii) reviewed on a catchment basis.
 - iii) checked for extreme events.

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Reservoirs

Rutland Reservoir is owned by Anglian Water Services Ltd and is the largest reservoir operated by that company. In conjunction with a number of other pumped storage reservoirs located in adjacent catchments it forms part of the Ruthamford water supply system which supplies water to domestic and industrial customers in this and adjacent catchments.

The Reservoir is formed by an impoundment on the Gwash valley and is filled via pipelines from an intake on the River Welland at Tinwell and from the River Nene at Wansford in the Upper Nene catchment.

Abstraction from the reservoir is licensed at 120,000 tcma. The licence includes a condition requiring discharge of water downstream of the reservoir of 1,600 tcma. There is some concern that this compensatory flow from the reservoir to the Gwash does not fulfil its "in-river needs" of the Gwash (**Issue 4**).

Eyebrook Reservoir to the south-west of Rutland Reservoir supplies water to Corby Steel works and Corby Power Station.

Gwash-Glen Transfer

To compensate against the potential impact on flows in the River Glen as a result of an increase in actual abstraction by AWS from the Southern Limestone aquifer (which provides a baseflow component to the Glens in places), an agreement exists between AWS and the Agency which provides for releases from Rutland Water for subsequent transfer to the River Glen.

The scheme was commissioned in 1991 with flows in the lower part of the West Glen and the main River Glen being augmented in summer periods of low flow by transfers of water from the River Gwash. Flows in the Gwash are supported by releases from Rutland Water at a rate of or at least equal to that subsequently transferred to the West Glen. This compensation flow is in addition to the discharge required from the reservoir normally.

The inadequacies of the existing hydrometric network relating to this transfer hamper its effective management which could adversely impact upon the environment (**Issues 1b and 19**).

Low flows as a consequence of the ongoing drought situation are causing particular difficulties for the Maxey Cut. During recent summers we have had to undertake several fish rescues in what is primarily a flood relief channel constructed to carry flows away from Market Deeping. The uncertainty of flow also impacts upon the reliability of local abstractions (**Issue 20**).

Groundwater

The principle aquifer in the Plan area is the Southern Lincolnshire Limestone which stretches from south of Stamford up to the east of Grantham and beyond. The water resources of this aquifer are fully committed to existing licence holders.

ISSUE 14

The stability of the Welland outfall channel and flood defences are threatened by the activities of large boats in the channels.

Background

The Welland's only port is at Fosdyke Bridge some 6 kms inland from it's outfall into the Wash. Up until 25 years ago it was home to a small shellfishing fleet and today it's main cargo is imported fertiliser. Ships larger than 58m in length have to be towed up the channel.

The Wash outfalls are mainly engineered channels with berms and flood banks on either side. The berms protect the flood banks as well as providing a working platform for maintenance and emergency works.

Damage to the banks and river channels is caused by boat wash, and occasionally in the immediate vicinity of the quay at Fosdyke by vessels whilst manoeuvring. This can lead to local irregularities in the bank which in turn give rise to eddies in the flow, promoting further scouring effects and accelerated bank instability. Efforts to retrieve the costs of emergency bank repairs from those responsible, have proved fruitless.

Options	Responsibility	Advantages	Disadvantages
<i>Develop and implement a strategy to ensure the safety of river channels and banks during the passage or manoeuvring of boats in the port approach channels and turning areas.</i>	<i>Port Authority Environment Agency DoT</i>	<i>Reduced risk of damage to river banks and associated risks.</i>	
<i>Establish responsibility for damage to channel, and where possible retrieve costs.</i>	<i>Port Authority Agency DoT</i>	<i>Reduced risk of damage to river banks and associated risks.</i>	

The Welland Plan area is home and workplace to approximately 125 000 people. It is a principally rural area of contrasting landscapes and has a long history of cultivation. To the west of the Plan area the headwaters of the River Welland and its tributaries lie within the rolling hills of the upper catchment, which then fall away as the Welland flows into the Fens and ultimately to the Wash. The rural communities are mostly based around the market towns of the area, such as Market Harborough, Oakham, Stamford and Spalding.

The characteristics and appearance of the Plan area have significantly altered over recent centuries through the creation of productive agricultural land and the development of, albeit limited, urban centres with their associated industry. This is nowhere more apparent than in the east, where the Fens have been successively drained to form some of the most productive agricultural land in the country. Another important manmade feature, and one that is a significant resource within the area in many ways, is that of the reservoir of Rutland Water. Built primarily to provide drinking water to the East Midlands, it is also a wildlife conservation area of international importance, and provides an important water based leisure amenity to the whole area.

The pressures from development and changing land use have led to increased demands for water and changes in the nature of land drainage, which cannot only increase the risk of flooding, but also alter the quality of water and impact on wildlife conservation. Further pressures are exerted by the increasing production of waste which must be disposed of safely and in a sustainable manner, whether to land, air or water. Our challenge is to balance the needs and expectations of those living and working in the Plan area with the need to protect the environment. These challenges will be addressed by implementing solutions to existing problems and by encouraging sustainable solutions to economic and community development.

This balance will be achieved through the conservation and protection of the quantity and quality of surface and ground waters, sustainable policies for waste disposal, Air Quality Management Plans, the provision of effective flood defences and by actively seeking opportunities for improving wildlife conservation and recreation.

Within the next 10 - 15 years we aim to achieve, in partnership with others, the following actions that are particularly relevant to the Welland Plan area:

- **Make progress towards sustainable management of water resources, particularly in the lower Welland reaches and the Glen catchment, which balances the competing demands of human needs with those of the environment;**
- **To maintain and improve water quality, particularly where water quality targets are not met;**
- **Develop a long term solution to the groundwater pollution at Helpston, which protects both the environment and groundwater resources; for the future and the water environment;**
- **Educate the public in the awareness of the sustainable use of resources, particularly in terms of waste minimisation, water conservation and energy reduction;**
- **To maintain the generally high standard of flood defences and where necessary improve levels of protection;**
- **Using initiatives such as the Biodiversity Action Plans, realise opportunities to improve the wildlife conservation value of the Plan area;**
- **Liaise with local authorities over the production of local Air Quality Management Plans.**

The successful future management of the area requires us to respond effectively to ever increasing pressures exerted on the environment to ensure its protection. We will reconcile the conflicting demands on the environment area and target resources where most needed.

It is through establishing strong links with local communities, working together with industry and agriculture, and increasing public awareness of the need to protect our environment, that this vision will become reality.

1.0 INTRODUCTION

1.1 THE ENVIRONMENT AGENCY

The Environment Agency was formed on 1 April 1996 and inherits the many and varied functional responsibilities of the National Rivers Authority, Her Majesty's Inspectorate of Pollution, the Waste Regulation Authorities, and some technical units of the Department of the Environment. Our principal aim is to protect and enhance the environment as a whole, in order to play our part in attaining the objective of sustainable development and to take a much wider view of environmental regulation and management than was possible for our predecessors. We have responsibility in England and Wales for:

- **Regulating industrial processes with the greatest polluting potential using a regime of integrated pollution control;**
- **Advising the Environment Secretary on the development of the Government's National Air Strategy, and providing guidance to local authorities on their local Air Quality Management Plans;**
- **Regulating the disposal of radioactive waste, including nuclear sites and the keeping and use of radioactive material;**
- **Regulating the treatment and disposal of controlled waste, involving waste management sites and carriers;**
- **Implementing the Government's National Waste Management Strategy in our waste regulation work;**
- **Preserving and improving the quality of rivers, estuaries and coastal waters through our pollution control powers, including effluent discharge consents and regulation of sewage works;**
- **Action to conserve and secure the proper use of water resources, including licensing water abstractions;**
- **Supervising all matters relating to flood defence; it also has powers to take certain flood defence measures as approved by Regional Flood Defence Committees;**
- **Conserving the water environment and promoting its use for recreation;**
- **Maintenance and improvement of salmon, trout, freshwater and eel fisheries, including issue of angling licences;**
- **Maintaining and improving non-marine navigation, including boat licensing;**
- **Providing independent and authoritative views on a wide range of environmental issues.**

1.2 THE LOCAL ENVIRONMENT AGENCY PLAN PROCESS

We have chosen to continue the concept of Catchment Management Planning which was developed by the former National Rivers Authority, to help achieve our aims. With the increased scope and responsibilities of the Agency, however, these Plans now embrace issues relating to air and waste within the Plan area, in addition to the water environment and are known as Local Environment Agency Plans (LEAPs). A LEAP will seek to identify and resolve problems within a catchment in an integrated way, developing a partnership approach, where appropriate, towards dealing with those problems. A LEAP involves the Agency working with local authorities, industry, commerce, water companies, the farming community, special interest groups and the general public. It promotes environmental awareness and describes real environmental improvements at the local level to meet the community's needs. This integrated approach will enable resources to be targeted where they are most needed.

This Action Plan outlines areas of work and investment proposed by ourselves and other responsible parties over the next 5 years and will form the basis for improvements to the environment in the Plan area. Progress against the Action Plan will be monitored and reported annually.



Foxton Locks

2.0 THE WELLAND PLAN AREA

2.1 INTRODUCTION

The Welland Plan area extends from the headwaters of the River Welland near Market Harborough in Leicestershire to the Wash Estuary along the Lincolnshire coastline. It includes the major towns of Oakham, Stamford, Spalding, Market Harborough and the northern fringe of Peterborough and spans across twelve District and County Council areas. The landscape of the area is one of significant contrasts. To the west of Bourne and Stamford the area is hilly, with the Welland's major tributaries such as the Chater and Gwash cutting steep valleys into the underlying Lias clay strata. To the east, the flat character of the Fens predominates, only broken by the occasional

'island' of higher land and banks constructed over the centuries as river and coastal defences. The Welland itself has a broad floodplain which narrows as the river cuts through the Limestone ridge which traverses this area along a line between Grantham, Stamford and beyond.

Agriculture is the predominant economic activity and land use in the Plan area, with arable and fallow crops (wheat, barley, oilseed rape, field beans, root and horticultural crops) accounting for more than two thirds of the agricultural land. Grazing of cattle and sheep is also important, particularly in the west of the area and poultry farming is becoming increasingly significant.

2.2 HYDROLOGY AND WATER RESOURCES

The principal sources of surface water and groundwater in the Plan area are the River Welland, Rutland Water Reservoir and the Southern Lincolnshire Limestone aquifer. Some water is also available locally from the extensive gravel deposits north of Peterborough.

The Lincolnshire Limestone aquifer supports five significant public water supply abstractions, along with others for agricultural purposes. Extended periods of dry or drought conditions place this resource, and the watercourses it supports, under considerable stress, necessitating periodic augmentation of river flow in the Bourne Eau and the River Glen.

The upper river catchment contains two important reservoirs - Rutland Water, which takes its water from both the Welland and Nene, and Eyebrook Reservoir, which supplies some industrial uses in the town of Corby. Rutland Water is owned by Anglian Water Services (AWS) and is the largest reservoir operated by the company. In conjunction with a number of other pumped storage reservoirs located in adjacent catchments, it forms part of the water supply system which supplies water to domestic and industrial customers in this and adjacent catchments.



Stamford Walks



Duddington Bridge

2.0 THE WELLAND PLAN AREA

2.3 POLLUTION PREVENTION AND ENVIRONMENT QUALITY

WATER QUALITY

The quality of water in the Plan area is generally good to fair. Chemical and biological river quality surveys carried out for the years 1988-96 indicate that surface water quality within the Plan area is improving and that the current quality is better than at any time since the early 1980s. The headwaters of the Welland and its tributaries are generally unpolluted and as a result are able to support populations of native brown trout and grayling. Further downstream to the east of Market Deeping, the Welland suffers with the consequences of low flow and nutrient enrichment, which causes excess algal and weed growth (eutrophication). Rutland Water and the Grand Union Canal in the west of the Plan area also suffer from these problems.

Watercourses are used by man to dilute and dispose of domestic and trade sewage effluent, primarily after treatment, to reduce their harm to the environment. There are 81 public utility Sewage Treatment Works within the Plan area and a further 78 operated by private owners. Septic tanks are also widely used, particularly in the more remote rural areas where they must discharge to soakaway systems.

Groundwater quality within the Plan area is generally good, although local groundwater pollution incidents do occur. The most serious of these is the contamination of part of the Lincolnshire Limestone aquifer around Helpston by leachate from three closed landfill sites. At its most serious, groundwater contamination can threaten the continuity of public water supplies. When it does occur, it is both extremely difficult and expensive to remediate.

AIR QUALITY

Air quality in this predominantly rural area is relatively good and has been improving in recent years. Emissions from certain industrial processes are regulated by the Agency to minimise their impact on the environment.

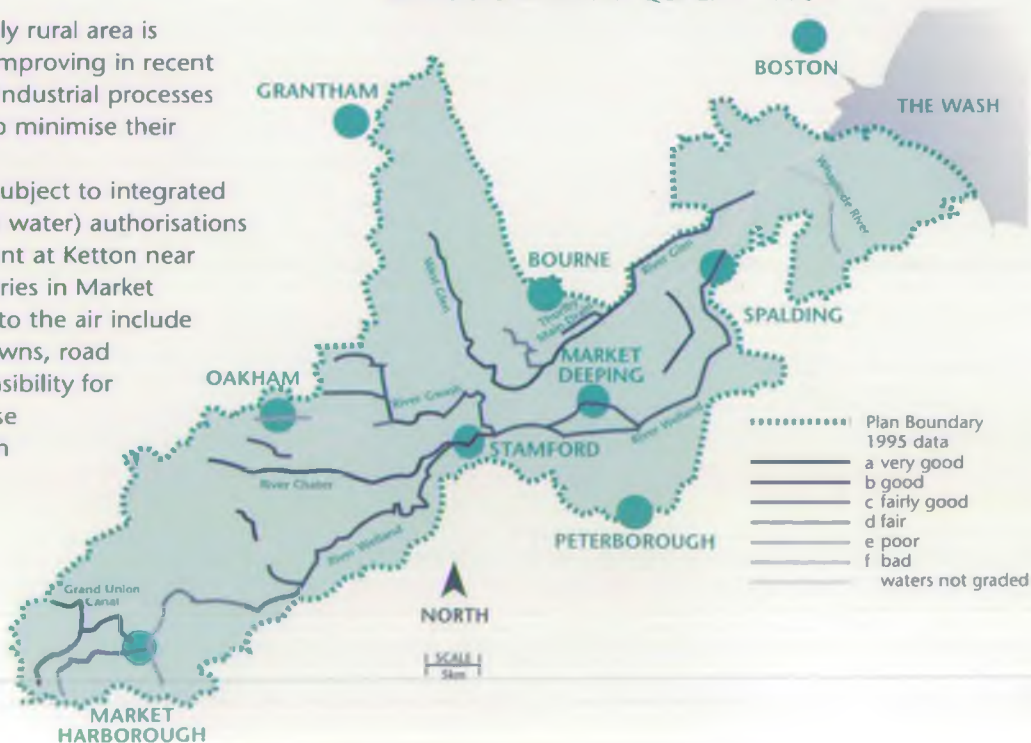
There are only two processes subject to integrated pollution control (air, land and water) authorisations from the Agency: Castle Cement at Ketton near Stamford and Tungstone Batteries in Market Harborough. Further releases to the air include those from the surrounding towns, road traffic and industry and responsibility for managing air quality from these sources lies predominantly with the local authorities.



Castle Cement, Ketton

At a global level, there are concerns including global warming, atmospheric ozone levels and acid rain which impact on us all. The main factors contributing to global warming are emissions from road transport, industrial and domestic energy combustion and methane emissions from agriculture. It is predicted that global warming will result in rising sea levels which may impact on both flood defence standards and land drainage within the Plan area. It could also result in a drier climate which would seriously impact on water resources and agriculture.

BIOLOGICAL WATER QUALITY 1995



2.0 THE WELLAND PLAN AREA

WASTE MANAGEMENT

There are currently 35 licensed waste management sites within the Plan area, including 12 landfill sites, waste transfer stations, civic amenity and recycling centres, recovery plants and metal recycling centres (scrapyards). The main operational landfill site for household, commercial and industrial waste is the Dogsthorpe landfill site operated by Shanks and McEwan Ltd, north of Peterborough. One other waste management activity, which reflects the influence of agriculture in the area, is the significant volume of vegetable processing waste which is spread onto farmland as a fertiliser/conditioner.

2.4 FLOOD DEFENCE

The Fens have a long, complex and fascinating history of land drainage and flood protection and today an area of some 430km² lies below the highest recorded sea level. Land drainage and flood defence is therefore of paramount importance.

To the east of Stamford and Bourne, the Welland and Glen flow through the low lying fen land, generally in embanked channels at a level often significantly above the surrounding land. There are no natural floodplains and flood defence is provided by embankments, supplemented with flood storage areas, notably Crowland and Cowbit Washes. The low lying Fens are drained by a network of channels and pumping stations maintained by three Internal Drainage Boards.

Tidal defences between Spalding and the Wash are provided by earth embankments which themselves are protected against erosion damage by stone protection within the channel. The sea defence frontage is also an earth bank which is afforded protection by the presence of a saltmarsh of varying width on the seaward side. The standard of protection offered by the existing tidal defences is 1 in 100 years or higher.

EXISTING STANDARDS OF FLOOD DEFENCE

Flood defences in centres of population such as Stamford and Market Harborough are provided by lengths of flood wall and embankment. Between these two population centres the Welland Valley is characterised by a fairly broad floodplain. The villages of Medbourne, Great Easton, Braybrooke and Little Bowden have a history of flooding and the defences here are provided by flood storage reservoirs sited upstream.



Embanked river channel



2.0 THE WELLAND PLAN AREA (see Appendix II for abbreviations and glossary)

2.5 NATURE CONSERVATION AND RECREATIONAL USE

As the landscape of the Plan area is divided into two distinct types, so too is the wildlife. The upper river valley was once famous for its grazing pastures. These, however, have increasingly been drained and brought into cultivation which has resulted in a landscape of straightened meanders, lost water meadows and scarce tree cover. Remnants of Rockingham Forest remain along the higher ground of the Welland valley where the land is unsuitable for cultivation. The surviving remnants of this ancient woodland form important habitats for invertebrates, plants, birds and mammals.

Rutland Reservoir, formed by an impoundment in the Gwash valley, is a major wetland area combining open water with a complex of wetland and lakeside habitats, including lagoons, marsh, meadows and mature woodland. The diversity and management of these habitats have made it one of the richest reservoir locations for migratory wildfowl in Britain and in recognition of this, Rutland Water has been designated a *SSSI, SPA and RAMSAR site. Ospreys have recently been released at Rutland Water by AWS in an effort to re-establish a breeding population. The conservation value of Rutland Water is threatened by nutrient enrichment of its waters which if not controlled will upset the ecosystem of the reservoir and its dependent flora and fauna.

Over the centuries, the Fens have been subjected to the process of land reclamation and extensive land drainage. This has created some of the most productive agricultural land in the country. However, some 97% of the original wetlands have been lost and Fenland species have been confined to smaller and smaller sites. Despite this, habitats still exist which provide a foothold for relict species. These include wetlands such as fen, marsh and reedbeds which support a range of wintering birds such as the hen harrier, reed warbler and bearded tit, and open water, where there are coarse fish populations, otters and water vole. More habitats are needed to sustain



Rutland Water

these populations for which the water environment is so important.

The Welland valley contains a rich heritage of historic and archaeological features, many, such as Harringworth viaduct, with links to the water environment – we have a duty to have a regard to these in all aspects of our work.

The amount of recreation within the Welland catchment is relatively low especially when compared with the use of the nearby Nene. Exceptions to this are Rutland Water and the river corridor through Stamford which are heavily used, particularly during the summer months. Although informal recreation takes place throughout the rest of the catchment, it is at a much lower level and is regulated by access restrictions and a lack of facilities.

Recreational fishing is a popular past-time along much of the Welland and its tributaries. Many of the tributaries hold populations of native brown trout as well as coarse fish, and trout are fished in the two major reservoirs of Eyebrook and Rutland Water. The Welland below Tallington is an important match fishing venue.



Harringworth viaduct

3.0 REVIEW OF THE CONSULTATION PROCESS

3.1 THE CONSULTATION PROCESS

The Agency has undertaken rigorous consultation in the development of the Welland LEAP:-

- November'96: a pre-consultation meeting was held with a number of key "partner" organisations, in order that their views could be taken into consideration at an early stage of the Plans formulation.
- June'97: the general public were invited (through the media and other means) to comment on the Plan in terms of the range and extent of uses and activities in the Plan area, to express views on the issues and options, and to comment on how the development of strategies and plans should be progressed.
- July '97: meetings were held at Spalding and Normanton to allow an invited audience, including representatives from industry, local authorities, parish councils, environmental groups, sport and recreational groups and other local groups with an interest in the Plan area, to discuss the details of the Plan in more depth.

In addition to this, during each of the development stages of the Plan, we have worked in close liaison with our customer consultative committee, the Area Environment Group.

We would like to acknowledge the help received from all organisations and their representatives who have contributed towards the development of this Action Plan.

We have recognised the links which exist between this and adjacent Plans and will work to ensure they are compatible. Catchment Management Plans for the adjacent Lower Witham (January 1996), Lower Nene (June 1994) and Upper Nene (August 1994) have already been produced. A Local Environment Agency Plan (LEAP) for the Upper Witham was produced in April 1997 and one for the Soar will be produced in 1998. It is our aim to have complete coverage of LEAPs by 1999.

LEAP TEAM

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Richard Kisby
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Project Leader
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Water Resources
Flood Defence
Waste Regulation
Integrated Pollution Control
Water Quality
Planning
Fisheries, Ecology & Recreation.

WELLAND & NENE AREA ENVIRONMENT GROUP (AEG) MEMBERS

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Hugh Fenton
Neville Roberts
Robin Murdock
Geoff Bibby
Russell Hole
Richard Harpur
Richard Hall
Adrian Colston

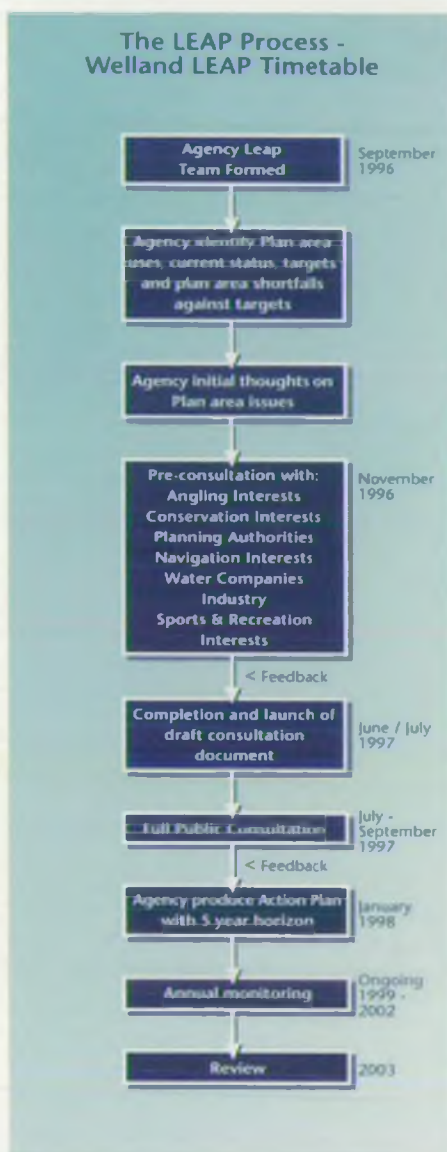
Womens Institute
Scott-Bader
Castle Cement
British Steel
National Federation of Anglers
Deeping St. James Angling Club
Country Landowners Association
English Nature
Northamptonshire Wildlife Trust /REPAC
South Holland DC
Kettering Borough Council
Northamptonshire County Council
Peterborough City Council/PECT
Daventry District Council
Environmental Services Association
Anglian Water Services
Association of Nene River Clubs
Stamford & District Tourism Association
Middle Level Commissioners
Welland & Nene LFDC
Council for the Protection of Rural England
Northamptonshire County Council

Tom Barker
Alex Gordon
Harry Graham
Richard Donoyou
Richard Scott-Herridge
Clive de Grey
Bob Markhall
Dennis Fisher
Frank Knights

Geoff Cave
David Riddington
Keith Allsop

David Scudamore

3.0 REVIEW OF THE CONSULTATION PROCESS



3.2 RESULTS OF CONSULTATION

Approximately 330 copies of the Consultation document were distributed during the consultation period. Comments were received from 18 organisations and individuals (See Appendix 1) and a summary of these comments is included in the Statement of Consultation which has been prepared and sent to consultees.

The consultation process has given us a more comprehensive understanding of the issues and options presented in the Plan and of the public's concerns for the Plan area. The key messages and thoughts raised during the consultation process were:

- **Conservation** *Opportunities:* the use of grazed river banks, the use of Crowland/Cowbit Washes, Ox-bow lakes along the Welland; *Threats:* the impact of lowering groundwater levels on Seaton SSSI, increased recreational activity; the need to address the issue of invasive species from a wider perspective.

- **Planning** *Opportunities:* the protection of river corridors, habitat creation for Barn owls; *Threats:* the conversion of grassland to arable use.
- **Recreation** *Opportunities:* development of the navigation, use of redundant mineral workings; *Threats:* demands from conservation bodies.
- **Water Resources** Need for a sustainable strategy, can more water be retained within river channels (additional benefits for conservation).
- **Water Quality** Contamination of groundwater aquifer from industrial sources, sewerage problems in the village of Preston.

The range of responses to the Consultation Document and some of the conflicting points of view recorded have been of great value in the development of this Action Plan. They have influenced our perceptions of these issues which have been amended accordingly. It is our hope that the proposals set out in this plan will achieve a proper balance of the needs of all the uses of the environment and deliver real and lasting improvements.

4.0 ACTIVITY PLANS

This section sets out the issues identified during the development of this Plan and for each species:

- an overall objective;
- the action we propose;
- those organisations with a responsibility towards resolving the issue;
- the timescale of the proposed actions;
- an estimation of the costs involved (where possible).

It has to be recognised that for some of the issues identified, the solutions will be achieved within the timescale of this Plan (5 years), and for others it will take considerably longer. Proposed actions may be constrained by changing priorities of both the Agency and "interested parties" and by the availability of resources. All schemes promoted by ourselves are subject to strict cost benefit analysis before they are approved and in seeking the commitments from other organisations, we will seek to balance the interests of different users of the Plan area. Given these constraints, we expect the timescales denoted in the Plan will be accommodated.

(Please refer to the glossary and abbreviations – Appendix II)

4.1 INDEX OF ISSUES

- Issue 1a** The measurement of flows along a number of watercourses in the area is inadequate to effectively manage potential flood events.
- Issue 1b** The measurement of river flow on a number of watercourses in the Plan area is inadequate to properly measure low flows and effectively manage river transfers.
- Issue 2** The standard of flood defence at certain locations falls below current target standards.
- Issue 3** Siltation of river outfalls and tidal structures impact on flood defence standards and affect the navigational use of waterways in the catchment.(Cross reference Wash LEAP Issue 1.)
- Issue 4** There is concern that the current management of compensation flow from Rutland Water is not fulfilling the in-river needs of the River Gwash.
- Issue 5** The area of natural wet fenland habitat in the catchment has been reduced to less than 1% of historic level. (Cross reference Wash LEAP Issue 6.)
- Issue 6** Properties upstream of the tidal sluice at Surfleet are at risk of flooding during periods of tide lock.
- Issue 7** The introduction of invasive alien plant and animal species threaten the ecological stability and strength of our natural environment.
- Issue 8** The consent conditions for a number of STW discharges will not protect downstream water quality if significant development occurs within the catchment.
- Issue 9** Inadequate local sewerage systems in some villages result in localised pollution and/or public health problems.
- Issue 10** Nutrient enrichment of water bodies in the Plan area impacts on water quality and affects flora and fauna and other uses of water eg. navigation, amenity and fishing. River ecosystem quality targets can be compromised.
- Issue 11** Leachate from contaminated land near Helpston is affecting groundwater quality in the Lincolnshire Limestone aquifer.
- Issue 12a** Fish movement between river stretches is hampered by river control structures.
- Issue 12b** There is growing concern regarding the apparent decline in eel populations in rivers.
- Issue 13** The navigation potential of the catchment is currently being under utilised.
- Issue 14** The stability of the Welland outfall channel and flood defences are threatened by navigational activity. (Cross reference Wash LEAP Issue 3.)
- Issue 15** Routine biological and chemical monitoring has revealed a problem with water quality at a number of sites/stretches in the Plan area.
- Issue 16** Losses of water from certain stretches of the River Glen are inadequately understood; this impacts upon the effectiveness and operation of the River Gwash to River Glen river transfer scheme.
- Issue 17** Baseflows in some watercourses south of Bourne have been reduced by the sealing of 'wild' boreholes which are believed to have impacted on environmental and other uses.
- Issue 18** Land drainage and agricultural practices have significantly reduced habitat diversity within rivers and their flood plains.
- Issue 19** The demand for water from the lower Welland and Glen exceeds available river flows in dry summers.
- Issue 20** The uses of the Maxey Cut as a fishery and as a source of water for summer irrigation are not sustainable.
- Issue 21** Concern has been raised over local derogation/over commitment of resources within the Southern Limestone aquifer.
- Issue 22** The burning of wastes at cement and lime plants is of national and local concern.
- PROTECTION THROUGH PARTNERSHIP ISSUES**
- Issue P1** Protection of groundwater resources.
- Issue P2** Surface water run-off from development and development in the flood plain.
- Issue P3** Low level restoration to agriculture/dewatering of mineral workings.
- Issue P4** Sustainable waste management.
- Issue P5** Illegal disposal of waste.
- Issue P6** Land use management and soil erosion.
- Issue P7** Biodiversity and Local Agenda 21.
- Issue P8** Sustainable use of water.
- Issue P9** Recreational use of the water environment.

ISSUE 1a

The measurement of flows along a number of watercourses is inadequate to effectively manage potential flood events.

BACKGROUND

We operate a network of gauging stations which continually monitor levels and flows. Many of these stations are linked to a computerised flood warning system by way of telemetry. This system allows river levels and flows to be monitored and advance warning of flooding to be provided to the public and media.

A recent survey of this telemetry system has identified the need for river flow gauging improvements throughout the Region for flood defence as well as water resource needs. Deficiencies in the river gauging network have been

identified in the Welland Plan area. Gauging of high flows is deficient for the purposes of providing flood warnings. Provision has been made for improvements to existing gauging stations and construction of new gauging stations with telemetry links.

EFFECTS

Inadequate data on river flows and levels during flood events, reduces our ability to respond to such events properly and reduces the advance notice and information we can give to the public of such an event.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To improve the Agency's ability to respond to flood events.	Construct a new river gauging station on the R. Welland in Market Harborough.	Agency		■						85
	Calibrate the existing gauging site on the R. Jordan at Little Bowden to allow a higher range of flows to be measured.	Agency			■					10
	Provide improvements to gauging site on the R. Glen at Kates Bridge.	Agency			■					73

ISSUE 1b

The measurement of river flow on a number of watercourses is inadequate to properly measure low flows and effectively manage river transfers.

BACKGROUND

The Agency measures flow at key sites on a number of watercourses. The information gathered is used to assess the changing nature of flow over time, to improve the management of river transfers and to forecast floods. A river transfer is the movement of river water from one river to another to augment river flows; one such exists in this

area, with waters being taken from the Gwash at Ryhall and pumped into the adjacent Glen via a pipeline.

EFFECTS

Deficiencies in gauging equipment at Belmesthorpe on the River Gwash may result in inefficient operation/management of Gwash/Glen transfer scheme.

Other gauging stations on tributaries of the West Glen need refurbishment work to maintain and improve the quality of data being gathered.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To maintain and improve the quality of flow data being collected.	Improve and upgrade gauging station network (including Belmesthorpe).	Agency				■	■	■		(1)
	Extend telemetry system.	Agency				■	■	■		(1)

(1) Part of the Area Regional Telemetry Scheme amounting to circa £200k over the next 5 years

ISSUE 2

The standard of flood defence at certain locations fall below current target standards.

BACKGROUND

The Region has target standards of protection against flooding of land and properties which vary with the type of use to which the land is put. The target for urban areas, for example, is higher than that for agricultural land. It is accepted that the existing flood defence standards in parts of the Plan area are below standard of service targets. This may have arisen as a consequence of changes in catchment characteristics (increased surface water run-off) due to development in the natural flood plain, and also the structural deterioration of some defences or because of their historical deficiency. In such locations a relatively small number of properties will actually be at risk from flooding.

Over the years, the majority of locations where property flooding has been a problem, have been addressed by improvement works which were carried out to provide the standard of protection considered appropriate at the time. This will not always accord with current standards as in some instances target standards have been revised upwards to reflect the public's raised expectations in terms of flood

protection. The standard of flood protection provided by improvement schemes we promote are to a standard which can be economically justified by benefit/cost analysis.

EFFECTS

Market Harborough: Last flooded as a result of the River Welland overtopping in 1969 following which, a scheme was promoted which gave it a standard of protection against a 1 in 70 year flood event. The River Welland has insufficient channel capacity to carry significant flood flows. This problem is exacerbated by low ground levels in Market Harborough which creates problems with surface water which cannot freely discharge into the river channel. The target standard of flood protection for Market Harborough is notionally for a 1 in 100 year event.

Welland tributaries: A number of villages along the Glen suffer intermittent flooding. These include Castle Bytham, Little Bytham, Greatford, Corby Glen, Essendine, Edenham, Creeton and Carlby. The villages of Little Bowden, Braybrooke and Great Easton all have standards of flood defence below that of Agency targets.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To provide effective flood defence and warning systems to protect people and property from flooding.	Carry out a review to assess the scale of the problem and prioritise action sites for further action.	Agency				■	■	■		(1)
	Extend existing flood warning procedure for the affected areas and provide emergency response.	Agency		■	■	■	■	■		(1)

(1) Internal administrative costs

Siltation of river outfalls and tidal structures impact on flood defence standards and affect the navigational use of waterways in the catchment.

BACKGROUND

The River Welland is tidal over a distance of 22 km from its outfall in the Wash at Tabbs Head to Marsh Road Sluice in Spalding.

The outfall channel is confined within training walls, behind which the salt marsh has been gradually accreting to the point where it is now level with the top of the wall in many places. As a result, tidal movements within the Wash deposit silt into the river channel.

It is also possible that the movement of silt within the Wash is being affected by:

- the effects of erosion of the beach and underlying clays along the Lincolnshire and Yorkshire coasts;
- The Port of Boston depositing dredged material from the port and Witham Haven in the vicinity of Tabbs Head.

Accumulation of silt, especially around bends causes increased erosion leading to a reduction of berm widths required to maintain flood banks and imposes source loads on the channel edge, inducing instability and causing slip failures and dislodging of existing stone protection.

This problem is compounded by the fact that low fluvial flows in recent years have been insufficient to carry both tidally and fluvially derived silt out to sea.

Phase 1 of the Agency's "The Wash Rivers Outfall Study" which analysed the siltation problem and sets out a strategy for its control has recently been completed. A number of options were considered such as the use of training walls, channel re-alignment, dredging, additional land drainage pumping, new sluices and tidal/fluvial flushing. Any actions proposed will be subject to environmental assessment being carried out, to protect the integrity of the cSAC.

EFFECTS

The degree of siltation which has occurred is such that:

- the efficiency of the three tidal structures, located at Marsh Road Sluice, Surfleet Seas End Sluice and Fulney Lock, has been reduced. There is currently in excess of 2 metres depth of silt in front of the tidal sluice at Marsh Road;
- there is now a genuine concern that the tidal channel will be unable to discharge a major fluvial flood flow which might lead to a requirement to utilise the Crowland and Cowbit Washes to store peak flows for the first time since 1947. This would have very serious consequences for the intensive agricultural activities presently sustained within the Washes.
- gravity outfalls from Internal Drainage Board carriers and the River Glen can be restricted as a result, with similar consequences.

ISSUE 3

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
Ensure that the flood discharge capacity of the river channel is restored and maintained.	Implement re-commendations of the Wash River Outfalls Study: ***	Agency		■	■	■	■	■		(1)
	Consider using the Coronation Channel as a flushing reservoir.	Agency		■	■					(2)
	Ensure that siltation effects are considered in determining minimum residual flow to tide.	Agency							■	(2)
	Undertake periodic dredging and scouring of outfall structures to maintain discharge capability.	Agency		■	■	■	■	■	■	40 - 50 pa

*** Recommendations include: periodic removal of sediments and sustaining of training walls, periodic raising of training walls, consider alternative disposal sites for disposal of dredgings, to be mindful of environmental impacts, to review strategy every 5 years.

- (1) Agency dredging c£200k pa
Bank raising c£50k pa
Port Authority dredging c£320k pa

- (2) Internal administrative costs

There is concern that the current management of compensation flow from Rutland Water is not fulfilling the in-river needs of the River Gwash.

BACKGROUND

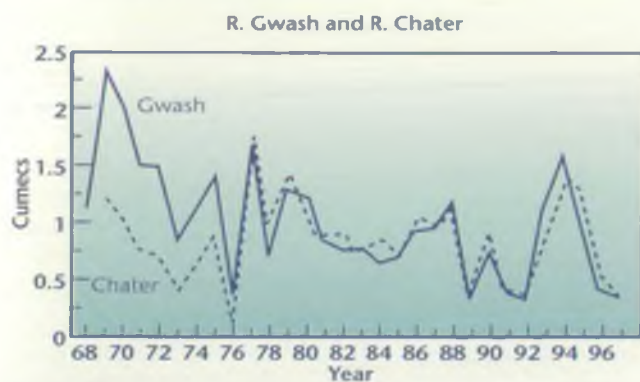
Rutland Water reservoir was constructed in the early 1970's to fulfil the needs of the public water supply network in the East Midlands. It takes its water primarily from the rivers Nene and Welland but also receives flows from the Gwash.

The graph below shows flows in the adjacent Gwash and Chater catchments. Prior to the filling of Rutland Water (circa 1976) the flows in these watercourses mirror each other, as flows in the Gwash rise and fall, so too do those in Chater with flows in the larger catchment of the Gwash being the higher of the two. Since its construction and

filling, the natural winter flow in the River Gwash downstream of the reservoir, has been reduced (it now has a similar flow rate to that of the Chater) and spate flows no longer occur. The outflow from the reservoir is now strictly regulated and although some variation in flow does occur, (for example, flow is increased when the Gwash/Glen transfer scheme operates), this does not simulate the natural flow regime.

Since the reservoir was commissioned, the character of the Gwash has changed significantly. Out of bank flow is now an extremely rare occurrence and where this does arise it is normally as a result of a local obstruction within the channel. Conversely, because of the regulated discharge from the reservoir, summer flows in the Gwash may be higher than "natural" summer flows.

ANNUAL MEAN WINTER FLOWS - DECEMBER TO MARCH



EFFECTS

It is believed that reduced flow rate and velocity has been directly responsible for an increase in siltation, reduction in channel width and reduced in-stream habitat diversity such as "riffle and pool" sequences. In several locations, silt has blocked land drainage outfalls, resulting in the waterlogging of arable fields. Weed growth has also increased in the silted areas.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To establish the most sustainable method of managing the Gwash and to review current management techniques.	Examine the impact of the flow regime upon land drainage and the ecology of the river and how the fishery has altered since the construction of Rutland Water	Agency Local interest groups	AWS		■	■				5
	Develop a sustainable management strategy for the R. Gwash downstream of Rutland Water.	Agency	Local interest groups. AWS			■	■			(1)

(1) Internal administrative costs.

n.b. We have proposed some habitat improvement works be undertaken by AWS as part of their environmental investment programme.

The area of natural wet fenland habitat in the catchment has been reduced to less than 1% of historic level.

BACKGROUND

Wetland sites are ecologically sensitive habitats dependent on water input from surface and groundwaters. They exist due to this water regime and topographical and geological features. There would have been over 700 kms of fenland habitat in the catchment prior to the draining of the fens. This land, with its high winter water table, contained a wide variety of now very rare plants and animals. Today the remaining wetland habitat is restricted to a few reserves totalling less than 1% of the original area involved, such as at Thurlby and Baston Fens.

Fens are listed as one of the habitats in need of restoration as part of the U.K's Biodiversity Action Plan.

The Agency is one of the leading partners in the 'Wet Fens For The Future Project', along with the Countryside Commission, English Nature, Cambridgeshire and Lincolnshire County Councils and The Royal Society For The Protection of Birds. The aim is to seek opportunities to involve a wide range of partners to maintain, enhance and develop wetlands. The project is exploring not only the environmental benefits but also those of flood defence, water resources, recreation, landscape archaeology, agriculture and economic development and tourism.

EFFECTS

Very few such natural fenland habitats now exist in the catchment and the fragmented nature of this specialised habitat puts even greater pressure on the species which inhabit them.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To increase the area of wet fenland habitat.	Participate in the development and implementation of Local Biodiversity Action Plans.	Agency English Nature LWT	Land – owners FWAG CC	■	■	■	■	■	■	(1)
	Freshwater marsh Support the SHIDB proposed scheme to develop recreation / conservation amenity at Cowbit Wash.	SHIDB	Agency	■	■	■	■	■		(1)
	Habitat creation Create scrapes along the banks of the tidal Welland downstream of Spalding.				■	■				8
	Create off-channel ponds along the R. Glen at Guthram.			■						5

(1) Internal administrative costs

ISSUE 6

Properties upstream of the tidal sluice at Surfleet are at risk of flooding during periods of tide lock.

BACKGROUND

Surfleet Reservoir is situated on the upstream side of the tidal sluice at Surfleet where the River Glen flows into the River Welland. The original purpose of the reservoir was to store water to provide a flushing flow to scour out and remove silt from the tidal channel of the Welland, thereby increasing the efficiency of gravity discharges in the area. However, this did not prove to be a satisfactory operation and the practice was discontinued.

The reservoir is owned by the Welland and Deepings Internal Drainage Board who at some time in the past permitted the construction of a number of chalet type structures within the reservoir area. These were intended for temporary occupation only and the owners were made fully aware of the flood risk. Several of these chalets have

changed hands often with the new owners being unaware of the risks involved. There are approximately 50 chalets within the reservoir many of which are now occupied on a permanent basis.

EFFECTS

When flood flows in the River Glen coincide with higher tide levels in the River Welland, gravity discharge is not possible and the reservoir area begins to fill putting at risk a number of chalets. If levels in the Glen continue to rise through this 'tide locked' period then these chalets will flood. The last occasion on which this occurred was in 1994 when 16 chalets were flooded.

When it is predicted that such a situation will arise it is necessary for the Agency to sand bag the properties and advise evacuation.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To provide more timely and accurate notice of potential flooding.	Improve flood warning to occupiers: build gauging station on the Welland at Kates Bridge.	Agency			■					73
	Provide emergency response as appropriate.	Agency		■	■	■	■	■	■	(1)

(1) Internal administrative costs

The introduction of invasive alien plant and animal species threaten the ecological stability and strength of our natural environment

BACKGROUND

Many introduced plant and animal species have proved to be invasive and consequently threaten native communities.

Plant species found to be invasive include: Giant Hogweed, Swamp Stonecrop, Japanese Knotweed and Himalayan Balsam; the latter has been recognised as a particular problem along the Welland. The spread of some invasive plant species may be at a stage when control is still feasible and opportunities to effect control should be taken where possible. The sale of exotic species through Garden Centres is thought to be responsible for the spread of certain alien species.

A notably threatened animal species present in the River Welland is the Native Crayfish, (*Austropotamobius pallipes*), a species protected by both UK and EC legislation and identified in the UK Steering Group Report on biodiversity as one of the list of 116 species of international importance upon which conservation attention should be focused. The Native Crayfish, which inhabits parts of the Welland, Lower R. Chater & R. Gwash is particularly threatened by the Signal Crayfish an introduced species which can carry 'crayfish plague' and competes for food. Habitat modification and management of rivers are also factors causing loss or decline in populations.

Prior to 1996, the keeping of non native crayfish had to be licensed under the Import of Live Fish Act (1980). Following a review of that legislation, to allow the commercial development of non native crayfish for the food market, the original legislation was relaxed and only certain waters with designated "significant populations" of native crayfish were protected. The differentiation between protected waters and others is administered by the designation of postal areas where licences are not required. The River Welland supports a significant native population yet is not protected by this legislation.

EFFECTS

Competition from non-native species, disease, and damage to habitat, places the Native Crayfish population in this area under serious risk of extinction. Several local populations of Native Crayfish have already been destroyed. The Himalayan Balsam is out competing native species of plant along river banks.

ISSUE 7

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
Attempt to control the spread of invasive plant species.	Identify sites where invasive plant species have become established.	Agency English Nature		■	■	■	■	■	■	2 pa
	Carry out appropriate control measures to destroy invasive plant species at identified sites, where possible.	Agency			■	■				10 pa
	Publicise the risks associated with the spread of invasive alien flora and fauna.	Agency English Nature		■	■	■	■	■	■	3 pa
Protect native crayfish stocks.	Assess the distribution of native and alien crayfish.	Agency English Nature		■	■	■				3 pa
	Formulate a local conservation strategy to protect the vulnerable populations of the Welland.	Agency		■	■	■				(1)
	Implement strategy likely to include trapping and killing of signal crayfish.	Agency English Nature		■	■	■				10 pa
	Promote discussions with MAFF regarding possible removal of PE9 postal district from licence exempt list.	Agency English Nature		■	■	■				2
	Set up reservoirs of native crayfish to maintain their genetic integrity.	Agency English Nature		■	■	■				10

The consent conditions for a number of STW discharges will not protect downstream water quality if significant development occurs within the catchment.

BACKGROUND

Currently, several Sewage Treatment Works (STWs) in the catchment are operating to a significantly better standard than that required by the discharge consent (in terms of volume discharged and/or quality of effluent). This occurs, for example, due to the provision in the consent for growth/development.

As growth occurs in the STW catchment or as STW performance approaches that required by the consent, a deterioration in water quality may result. The risk of deterioration in discharge performance in most cases is low, provided that current operational practices continue and only modest growth occurs within the sewerage catchment areas served by these STWs.

EFFECTS

There are a number of "over performing" STWs in this catchment, but it is probable that only one (Market

Harborough STW) could result in a failure of a downstream water quality objective. However, in combination with continued low flows and drought conditions, deterioration may become more marked.

Certain of the receiving waters support valuable macroinvertebrate communities, including species known to be rare in the East Midlands. Such deterioration may seriously threaten such communities, for example:

- River Welland downstream of Deepings sewage treatment works. This stretch supports the locally rare Saucer Bug, *Aphelocheirus aestivalis*, a pollution sensitive species, requiring highly oxygenated water;
- Bourne Eau and Lower R. Glen, downstream of Bourne sewage treatment works. The lower Glen in particular supports a range of unusual macroinvertebrates.

Current Agency consenting policy and planned investment, as agreed by Government during negotiations on water charges (AMP2), do not allow the Agency to take steps to prevent this.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To prevent deterioration of effluent quality as development occurs, and identify priorities for future investments.	Review the rate of development within the STW catchments.	Agency	AWS	■	■				■	(1)
	Review river flow data	Agency	AWS	■	■				■	10
	Calculate consent conditions required to protect water quality.	Agency	AWS	■	■				■	(1)
	Assess priorities for investment for inclusion in AMP 3/4 negotiations.	Agency		■	■	■	■	■	■	(1)

(1) Internal administrative costs

AMP 3/4 - Water company asset management planning process for funding improvements to water quality and resources.

n.b. The costs associated with remedial works identified within AWS asset improvement schemes have not been calculated but are likely to run into millions of pounds.

Inadequate local sewerage systems in some villages result in localised pollution and/or public health problems.

BACKGROUND

Small villages in rural areas have traditionally relied upon each dwelling having individual septic tanks. The overflow from such tanks are designed to drain into the soil via a below-ground soakaway. In poorly drained areas with clay soils, or where the water table is high, common practice was to drain the tanks to the nearest watercourse. The problem manifests itself in terms of localised pollution and public health problems. These effects are worst during periods of dry weather and low dilution flows.

Where such watercourses run through the centre of villages, the pollution and smell nuisance resulted in the watercourses being piped-in and buried. In such cases, the piped watercourse became known as the 'village drain' or 'sewer' and many were maintained by the local council.

EFFECTS

A number of watercourses in the Welland catchment have become polluted to varying degrees in this manner with consequences for the local flora and fauna. Examples include the River Welland at Harringworth and the East Glen at Braceborough; the village of Preston is one which has a 'village sewer' and has a tendency to cause a nuisance in terms of smell during summer months.

In the East Glen, the pollution is extensive and long-standing, with evidence of an impact on the macroinvertebrate community as far downstream as Kate's Bridge on the main River Glen.

Recent changes in legislation enable applications to be made to AWS for the provision of a first time rural sewerage scheme, subject to certain qualifying criteria.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
The provision of an adequate sewerage infrastructure.	Identify areas where a lack of sewerage causes water pollution and/or public health/nuisance problems.	Agency DC's		■						5
	Apply to AWS for provision of first time sewerage under Section 101a of the Water Industry Act.	Parish / District Councils Private Groups		■	■	■	■	■	■	25-500 per scheme
	Requisition of a sewerage scheme under Section 98 of the Water Industry Act.	DC's		■	■	■	■	■	■	25-500 per scheme
	Require action to upgrade unsatisfactory septic tank discharges.	Agency DC's		■	■	■	■	■	■	1-10 per property

Nutrient enrichment of water bodies in the Plan area impacts on water quality and affects flora and fauna and other uses of water eg. navigation, amenity and fishing. River ecosystem quality targets can be compromised.

BACKGROUND

The quality of many watercourses in the Plan area are adversely affected by eutrophication. Eutrophication arises as a consequence of the enrichment of water with nutrients principally from surface water run-off from agricultural land and sewage treatment works discharges. Both the freshwater and tidal sections of the Welland, and also still waters such as Rutland Water are eutrophic.

Eutrophication is a difficult problem to solve - there are no quick or immediate solutions.

The Agency is currently developing a National Eutrophication Strategy to address this issue. At a local level we are working in partnership with English Nature and AWS to develop a Reservoir Action Plan to manage Rutland Water.

EFFECTS

As a consequence of eutrophication, water quality and aquatic communities sensitive to nutrient enrichment become adversely affected and the aquatic ecosystem becomes ecologically disturbed, giving rise to excessive weed growth and changes in the composition of plant and animal communities. Recreational use of the waterway may also at times be compromised by these effects - notably angling.

Under the Urban Waste Water Treatment Directive (UWWTD), surface waters directly/indirectly receiving a qualifying discharge (ie a discharge from a STW serving a population greater than 10,000), and that fulfil certain criteria set out in DoE guidance can be designated as a Sensitive Area Eutrophic SA(E). Designation as a SA(E) requires phosphate removal to Directive standards at implicated STWs, unless it can be demonstrated that such removal would have no effect on the level of eutrophication.

The River Welland receives inputs from large "qualifying" STWs. A national panel of Agency officers has recently recommended that the evidence we have gathered, to support designation of the freshwater Welland as an SA(E) is valid and should be forwarded to the DETR for consideration. Further evidence is required before a decision can be made for the tidal Welland.

Rutland Water is already designated as a SA(E). It has experienced frequent blooms of blue-green algae, some of which may be toxic to vertebrates. These blooms can disrupt uses of Rutland Water. Rutland Water is designated as both a SSSI and a SPA and used extensively for recreational purposes. The integrity of the natural system as a whole is vital in maintaining/supporting the number and diversity of birds using the reservoir.

The Grand Union Canal (Issue 15) also experiences the effects of eutrophication. However there are no "qualifying" discharges to the Canal and thus nutrient removal from sewage effluent under the UWWTD is not available.

RUTLAND RESEVOIR

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To ensure water quality in Rutland Water is suitable for its agreed uses.	Develop Reservoir Action Plan to manage the problems of eutrophication at Rutland Water	AWS, English Nature, Agency			■					(1)
	Implement Reservoir Action Plan.	AWS, English Nature, Agency							■	(TBE)

(1) Internal administrative costs

TBE To be established

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
Reduce nutrient enrichment	Submit evidence to the DETR and recommend designation as Eutrophic Sensitive Areas, under the Urban Waste Water Treatment Directive.	Agency DETR		■	■				■	(1)
	Investigate benefits of non-UWWTD driven phosphorous controls for existing and new discharges.	Agency	AWS English Nature	■	■	■	■	■	■	(1)
	Promote good agricultural practice to reduce diffuse inputs	MAFF ADAS	Agency Agricul- tural comm- unity	■	■	■	■	■	■	(2)
	Encourage the use of phosphate free detergents	Agency Govt.	Soap Deter- gent Industry Assoc.	■	■	■	■	■	■	(2)

(1) Internal administrative costs

(2) Indeterminate

n.b. If DETR designate the Welland as an SA(E) it will be incumbent upon AWS to provide nutrient removal at relevant qualifying STW's.

Leachate from contaminated land near Helpston is affecting groundwater quality in the Lincolnshire Limestone aquifer.

BACKGROUND

Former landfill sites near Helpston, Peterborough are releasing leachate into an aquifer used for water abstraction. Extensive investigations have been carried out over the past seven years to locate the source of contamination and evaluate the impact zone and environmental significance. Leachate migration mechanisms and pathways from the landfill sites are difficult to evaluate. The hydrogeological and hydrological setting of the area is complex. Leachate migration is influenced by rainfall, a geological fault in the aquifer and abstraction. Each of these factors have positive and negative effects dependent on hydraulic conditions.

The Agency continues to closely monitor the quality of surface water and groundwater within the area. Extensive toxicity and chemical testing programmes are being conducted to monitor against threshold protection standards for surface waters. The release of contaminated groundwater which threatens to cause exceedance of these standards can be controlled and a mathematical model is being used to assist development of a long term remedial action programme.

EFFECTS

An area of the Lincolnshire Limestone aquifer, between the landfill sites and Etton has become contaminated, particularly by the pesticide Mecoprop and ammonia. After treatment, water abstracted from the aquifer in this area for public water supply, continues to meet regulation standards.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To minimise the impact of pollution.	Continue to implement the interim management strategy.	Agency	AWS Land-owners	■	■	■	■			150 pa
To secure the water resource for future uses.	Develop a long term strategy for management of the problem.	Agency	AWS Land-owners		■	■	■	■	■	3-10m

Fish movement between river stretches is hampered by river control structures.

BACKGROUND

Throughout the Welland system there are many barriers which hinder fish migration such as syphons, weirs and sluiceways. These prevent the movement of fish such as the inland migration of elvers from the sea during the spring, and the gravel seeking migrations of dace during spawning time. Various designs of fish pass are available and can be fitted to most weirs without detriment to other uses.

An example of this is the 1996 survey of Medbourne Brook either side of a flow gauging weir. Downstream of the structure fish biomass (the average weight of fish in a given area of water) was recorded as 52 grams per square metre, upstream the biomass was zero!

EFFECTS

Barriers have led to the extinction of sea trout and elvers in the Welland and Glen and have contributed to the disappearance of dace from the upper reaches of watercourses such as the Medbourne Brooke.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To develop and promote a more appropriate distribution of fish in our river systems.	Install fish passes within planned schemes to upgrade flow gauging weirs:	Agency			■	■	■	■	■	10 pa
	Kates Bridge				■					
	Market Harborough				■					
	Seek other opportunities to install fish passes and riffles at appropriate river structures.	Agency			■	■	■	■	■	1-5

There is growing concern regarding the apparent decline in eel populations in rivers

BACKGROUND

Fishery surveys indicate the population of eels has declined over recent years. This is reflected by decreased commercial eel catches in the Welland; decreased elver recruitment and a decrease in the numbers of eel caught in our own fishery surveys. This is believed to be due to a combination of factors such as the construction of river structures which inhibit their migratory routes, low flow conditions and marine environmental factors. Other factors may also be affecting eel populations.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To better understand the reasons for the apparent decline in eel populations.	Initiate detailed survey of eel populations.	Agency			■	■	■			5 pa
To enable migrating elvers to access the upper reaches of rivers.	Promote the construction of eel passes at all structures along the Welland Valley.	Agency			■	■	■			50
	Monitor the impact of works on eel populations.	Agency			■	■	■	■	■	5 pa
Support a sustainable eel fishery.	Review licensing policy.	Agency			■	■				(1)

(1) Internal administrative costs

The recreational and navigation potential of the catchment is not being fulfilled.

BACKGROUND

The recreational and navigation use of the Welland and Glen is restricted due to deficiencies in existing facilities, such as slipways and moorings and a lack of publicity over what does exist.

Requests are frequently received from the public concerning the lack of public slipways on the non-tidal Welland and Glen. There is one private slipway on the Welland which is owned by the Spalding Yacht club, but no public slipway facility. On the Glen there is a slipway, but access is very difficult and the actual ownership is uncertain.

EFFECTS

Under utilisation of the waterways by navigation users and potential users.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
Improve the recreational / amenity value of the Welland and it's tributaries.	Construct new slipway on the Welland opposite the Spalding yacht club.	Agency			■	■	■			10-20
	Construct new slipway at Crowland bridge.	Agency				■	■	■		10-20
	Construct access points for disabled anglers.	Agency			■	■	■	■	■	1 pa
	Ensure the Agency's policy towards access on Agency owned land is implemented.	Agency			■	■				(1)
	Promote a study to assess the recreational demand and needs on the Welland.	Agency				■	■			10

(1) Internal administrative costs

The stability of the Welland outfall channel and flood defences are threatened by navigational activity.

BACKGROUND

The Welland's only port is at Fosdyke Bridge some 6 kms inland from it's outfall into the Wash. Up until 25 years ago it was home to a small shellfishing fleet and today it's main cargo is imported fertiliser. Ships larger than 58m in length have to be towed up the channel. The river channel is also used for recreational purpose by small craft and water skiers.

The Wash outfalls are mainly engineered channels with berms and flood banks on either side. The berms protect the flood banks as well as providing a working platform for maintenance and emergency works.

Damage to the banks of the Welland in the immediate vicinity of the quay at Fosdyke is occasionally caused by vessels whilst manoeuvring. This can lead to local irregularities in the bank which in turn give rise to eddies in the flow, promoting further scouring effects and accelerated bank instability. Efforts to retrieve the costs of emergency bank repairs from those responsible, have proved fruitless. Further damage to the river channel is caused by 'wash' from smaller craft which also causes disturbance to wildlife in an important section of the Wash SSSI.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To prevent damage to flood defences by vessels manoeuvring.	Undertake liaison with the Port Authorities to find a solution to this problem.	Agency Port of Fosdyke			■	■	■			(1)
To reduce the damage and disruption caused by speeding craft in the tidal Welland.	Enforce the existing 6 mph speed limit along the Welland by: a) Public awareness campaign, b) Increased policing activity.	Agency			■					10
					■	■	■			(1)

(1) Internal administrative costs

Routine biological and chemical monitoring has revealed a problem with water quality at a number of sites/stretches in the Plan area.

BACKGROUND

The River Ecosystem (RE) scheme provides, on a National basis, a set of water quality targets which the Agency uses as a basis for setting consents to discharge and in undertaking other water quality planning activities. A number of river stretches in this catchment fail to achieve their existing River Ecosystem target classes.

The majority of the marginal and significant failures against these targets relate to reduced oxygen concentrations or elevated biochemical oxygen demand which cannot be related to effluent discharges or to diffuse pollution sources. Continued low flows and drought conditions are possible contributing factors.

In some cases the chemical water quality targets set may be inappropriate (see Appendix 3 in the Consultation Document). In addition, some sample point locations may reflect local conditions rather than the overall quality of the river stretch. A detailed review of the current situation is being undertaken to ensure that appropriate targets are set.

In general, biological quality is good, however routine biological monitoring has identified certain problem sites eg. downstream of some of the smaller utility STWs (see also issue 9 relating to the impact of problems with inadequate rural sewerage), and stretches affected by urban run-off.

FAILING STRETCHES

a. Grand Union Canal

(Husbands Bosworth to Foxton, Foxton to Market Harborough and Foxton to Saddington.)

A review of chemical data from the last 15 years

demonstrates that these stretches have always failed their Biochemical Oxygen Demand (BOD) and Dissolved Oxygen (DO) targets, either marginally or more recently significantly. These failures are characterised by peaks in BOD in summer and super-saturated dissolved oxygen levels. This indicates the presence of algal blooms due to raised nutrient levels rather than an actual pollution problem.

Despite the failure against chemical targets, water quality remains suitable for its use and biological quality very good, consequently we do not propose to take any particular action to resolve this issue. It is hoped that the actions identified at Issue10 will ameliorate this problem in the longer term.

b. River Welland. (Headwaters to Ashley Dyke.)

The upper reaches of this stretch have suffered from low flows for several years (drought) resulting in raised BOD concentrations and lowered DO concentrations, and invertebrate communities are already adversely affected. Sibbertoft sewage treatment works also discharges into the headwaters such that during low flow periods the effluent becomes a significant proportion of the total flow. The discharge from this STW meets the relevant River Needs Consent and does not contribute to this problem.

Further downstream the affects of urban run-off, particularly rainwater washing off from roads and industrial areas in Market Harborough, exacerbate the problem. AWS have identified one surface water outlet in particular, known as the "CO-OP" surface water sewer, as requiring improvement and have included it in their capital improvement programme.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To reduce pollution from diffuse sources.	Undertake pollution prevention inspections to identify problem sites requiring action.	Agency		■	■					5
To reduce local impacts of surface water run-off.	Improve Co-op surface water sewer.	AWS							■	45

c. River Chater. (Headwaters to Morcott Brook.)

Whilst biological water quality is generally good, there were consistent failures for BOD, DO and ammonia in this stretch from 1989 to 1993 and a significant DO failure in early 1996. Up to September 1996, BOD, DO and ammonia have failed marginally. The drought has significantly reduced flows in this river and hence its capacity to dilute the effluent from small village sewage

treatment works. It should be noted that the RE1 target is designed to protect very high quality rivers.

Although this water quality shortfall is identified as a marginal failure, due to the high water quality expected on this stretch, the Agency intends to take early action to investigate this failure.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To maintain water quality standards in the Chater: To better understand any shortfall in water quality.	Additional biological monitoring to be undertaken to identify any unusual quality changes.	Agency		■	■					1

d. North Gwash, downstream of Oakham

There have been intermittent marginal failures for BOD, DO/Ammonia (once only) in this stretch in recent years (1990 to 1996). Poor quality macroinvertebrate fauna has also been recorded. These affects are thought to be due to surface run-off from Oakham town.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To better understand the reason for failures and to improve water quality.	Review data and continue monitoring.	Agency		■	■	■	■	■	■	(1)
	Carry out pollution prevention inspections in Oakham (N Gwash).	Agency	AWS	■	■					5

(1) Internal administrative costs

e. North Brook. (Exton Arm to River Gwash.)
Prior to 1993 this stretch complied with its RE1 target. Since then, BOD has failed significantly and DO marginally. The stretch currently complies with RE4.
BOD concentrations recorded since 1993 clearly show the summer peaks, consistent with algal activity. Fort Henry Lakes, through which the North Brook flows, is known to have suffered major algal blooms for 30 years. Effluent from RAF Cottesmore STW, discharging to the headwaters of this stretch, has become a more significant source of "dilution flow" since the beginning of the drought. Apart from this effluent, the stretch is fed by springs which have reduced considerably during the drought. Consequently, when the water reaches Fort Henry Lakes, nutrient levels are such that algal blooms are encouraged - more recently the duration of these 'blooms' has become prolonged.

In 1996 a major bloom of diatoms (as distinct from 'blue-greens') in the lakes caused the death of 7,000 fish in the Horn-Mill trout farm. This affect was due to irritation of the fish gills and shows the extent to which algal presence can influence water-quality (the trout farm is located 1 km downstream of the lakes).

Biology quality at the bottom end of the stretch (Empingham) remains very good. This supports the view that the local water quality problem is a result of algal activity rather than a pollution source.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To better understand the reason for failures and decide on possible remedies.	Review data and continue monitoring.	Agency		■						(1)
	Install new sampling & flow gauging points in N Brook and Fort Henry lakes.	Agency		■	■					2-5
	Investigate the possibility of using reed beds as a further treatment to effluent from Cottesmore STW.	Agency AWS			■					(2)
	Consider use of barley straw bales in Fort Henry lakes.	Agency			■					(1)

(1) Internal administrative costs

(2) The Agency have proposed works be undertaken by AWS as part of their environmental investment programme.

Losses of water from certain stretches of the River Glen are inadequately understood; this impacts upon the effectiveness and operation of the River Gwash to River Glen river transfer scheme.

BACKGROUND

The Southern Limestone aquifer within this and the adjacent Lower Witham Plan Area is extensively used for public water supply. Under a long standing agreement, abstraction has increased from the aquifer over the last 6 years subject to there being an augmentation scheme available to support flows in the River Glen. This Gwash-Glen Transfer scheme was commissioned in 1991 to transfer water from Rutland Water via the R. Gwash to the

R. Glen downstream of Essendine. Losses occur from the river channel downstream of the transfer discharge point so that the full flow benefit downstream in the R. Glen is not as great as had been hoped.

EFFECTS

Of the water transferred and discharged to the River Glen, a proportion is lost through the bed of the river. The scale and reason for these losses are inadequately understood. This diminishes the potential environmental benefits to the Lower Glen which the transfer scheme might realise.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To secure the most environmental benefit from the water allocation available for river transfer and support.	Investigate and evaluate the role of the local geology on losses from the River Glen.	Agency	AWS	■	■	■				35
	Carry out a thorough hydrological review of the 5/6 years of transfer scheme operation and make recommendations for its future operation.	Agency		■	■	■				10-15

Baseflows in some watercourses south of Bourne have been reduced by the sealing of 'wild' boreholes which are believed to have impacted on environmental and other uses.

BACKGROUND

The Southern Limestone aquifer within this and the adjacent Lower Witham Plan Area is extensively utilised for public water supply. Numerous abandoned agricultural and industrial boreholes exist in the area which discharge, uncontrolled, into the surface water drainage system. In the early 90's, work was carried out by our predecessor, the NRA, to control/seal some of these "wild" boreholes to reduce water losses from the aquifer. This resulted in less water being available in the surface water system for dilution, abstraction and ecological benefit purposes. One such area where this work was carried out was Bourne South Fen.

EFFECTS

Since the bores were sealed, the volume of surface water draining through parts of the catchment has been reduced substantially. However, the extent of the environmental impacts that these cappings have had have only become apparent in recent dry winters. Peat soils in this area naturally leach ammonia and iron-ochre during wet weather. This has led to elevated ammonia concentrations and orange discolouration in local watercourses (notably the Thurlby Main Drain) which is impacting onto both conservation and fisheries locally, and to a lesser degree the Glen. Although the ammonia and iron-ochre problem is a naturally occurring feature, it's impact has been exacerbated by the capping of boreholes with a subsequent reduction in available dilution.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To determine the impact of sealing wild bores and its impact on surface water systems and the aquifer.	Investigate the impact of reduced flows on the catchment's watercourses.	Agency		■	■	■				(1)
Optimise the use of available water resources from the aquifer.	Determine whether a reallocation of water between ground and surface water is required.	Agency							■	(1)

(1) Internal administrative costs

Land drainage and agricultural practices have significantly reduced habitat diversity within rivers and their flood plains

BACKGROUND

For most of this century river management across the Region was driven by agricultural policy to improve drainage within the floodplain and hence maximise the production of crops, notably cereals. These activities have resulted in the loss of many in-channel and floodplain habitats and a consequent reduction in floral and faunal diversity. In the Welland catchment for example, the River Welland between Market Harborough and Stamford was dredged and shortened in the late 1960's and early 70's. The bed level of the river and tributaries was lowered by over a metre and important habitat features such as riffles and cliffs disappeared along with large numbers of meanders. At the same time a large number of trees were removed. The Northampton Wildlife Trust have developed

some broad scale restoration proposals in the River Welland - a Vision for the Flood Plain which we would like to see pursued by the development of specific site restoration management plans.

EFFECTS

The relationship between water level and the surrounding flood plain has been broken leaving the river to flow in a deep gorge with very few riparian habitats upon which flora and fauna depended for their survival. Plant diversity is now very limited with only a fraction of the number of species present that we might expect.

An example of the way in which the environment can be impacted by changes in land drainage was raised during the consultation process: Seaton Meadows - a SSSI noted for it's flora - is suffering from less frequent flooding and possibly lowered water tables; our proposals for this site are identified below.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
Improve habitat diversity in the Welland Valley in line with the recommendations of "the River Welland - a Vision for the Floodplain."	Seaton SSSI: Investigate the feasibility of installing a stone weir in the Seaton Brook to raise adjacent groundwater levels.	Agency	Land-owner	■	■					2
	Collaborate with landowners to restore wetland habitats and create buffer zones where appropriate.	Agency	English Nature, LWT, CC	■	■	■	■	■	■	3-4 pa
	Install gravel bars and riffles at suitable sites as opportunities arise.	Agency		■	■	■	■	■	■	5 pa
	Improve operational management of Main rivers. Encourage good grazing practice	Agency		■	■					(1)

(1) Indeterminate

The demand for water from the lower Welland exceeds available river flows in summers.

BACKGROUND

The demand for water from the Welland includes that of the public for domestic use, that of the farming fraternity for irrigation purposes, that of industries such as food processing and that of the environment. These competing demands can exceed the quantity available especially during periods of low flow when very often the demand in the Lower Welland for water increases.

During such periods of excess demand, our ability to maintain river levels and flows becomes difficult. The lack of flow impacts on flora and fauna, upon water quality in general and the lack of flow to tide has implications for siltation in the tidal Welland.

Major water abstractions occur in parts of the catchment, whereby water is transferred from higher level rivers to meet

abstraction needs in lower level watercourses. These transfers, effected by sluices known as "slackers", are not licensed and are outside the regulatory control of the Agency.

Inconsistencies arise between abstractors with more recent licences, which are linked to flow conditions in the main river, and those with historic licences which exert little control.

The DETR have recently proposed a review of the abstraction licensing system. This will in part address the issue by considering the control of "slacker" abstraction within its wider remit.

EFFECTS

During periods of low flow, a lack of abstraction policy for "slackers" leads to inconsistency, whereby some abstractors are prevented from abstracting whilst others continue.

See also issue 8

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To ensure flows/ levels in the lower Welland are protected in low rainfall periods by consistent and even-handed control of abstractions which affect that flow.	Short to Medium Term: Clarify owner- ship, mainten- ance and operation of slackers;	Agency	IDB		■	■				(1)
	Draw up operational guidelines for slackers;	Agency	IDB		■	■				(1)
	Encourage use of Winter Storage Reservoirs.	Agency			■	■	■	■	■	(1)
	Seek to control summer licences with stricter control levels or revoke licences.	Agency			■	■	■	■	■	(1)
	Give consideration to possible water losses at Fulney lock	Agency			■					(1)
To manage water resources in a sustainable way which balances human needs with those of the environment	Long term: DETR review of licensing system.	Govt		■	■	■	■			
	Agency to implement any licensing system changes appropriate locally.	Agency							■	(1)
	Determine minimum flow / level requirements in the lower Welland system.	Agency		■	■	■				(1)

(1) Internal administrative costs Actions relating to "demand management" are discussed at Issue P8

The use of the Maxey Cut as a fishery and as a source of water for summer irrigation are not sustainable.

BACKGROUND

The Maxey Cut was constructed as a flood relief channel to take flood flows, from the River Welland around Market Deeping. Since its construction, and despite its lack of natural flow, it has been populated by fish to the extent that it has developed into a spawning and breeding area for coarse fish and brown trout. It is also used by farmers for summer irrigation purposes.

During the last few years the Maxey Cut, along with other watercourses in the area, has been increasingly affected by low flows. Due to the Cut's permeable gravel bed, levels within the watercourse respond rapidly to changes in the ground water level and it dries up during drought conditions. This leaves numerous small ponded stretches

from which fish have to be rescued. The angling club which leased the water has relinquished its lease because of low fish stocks and heavy weed growth which make it difficult to fish. The three abstractors licensed to take water for summer spray irrigation from the Maxey Cut are affected by low flows.

This issue is made more complex because the Maxey Cut receives water (at times) from a discharge from an adjacent sand and gravel quarry. This discharge will eventually cease, and hence cannot be considered as part of the long term available resource within the Maxey Cut.

EFFECTS

There is an impact upon flora and fauna within the system and upon fish in particular. Water resources for spray irrigation purposes become unreliable.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
Develop a sustainable strategy for the Maxey Cut.	Set up a project team to report on this issue.	Agency			■	■				(1)

(1) Internal administrative costs

Concern has been raised over local derogation/over commitment of resources within the Southern Limestone aquifer.

BACKGROUND

The Southern Lincolnshire Limestone aquifer within this area and extending into the adjacent Lower Witham Plan Area is extensively utilised for public water abstraction. Temporary variations in licences were issued to Anglian Water Services Limited in 1990 and these are time limited to the end of 1997. The water company have applied to maintain the current level of abstraction with some redistribution in terms of where the water is taken from within the aquifer.

Advertisements relating to these licence applications has resulted in several local interested parties raising concerns over the proposals.

To accompany their licence applications, as required by the Agency, AWS commissioned a study to assess the potential impacts of abstraction on river flows and associated ecology, groundwater levels and groundwater quality (saline intrusion). The results of this study are currently being assessed by the Agency.

EFFECTS

Although AWS requirements are for no overall increase in current licensed abstraction quantities, the past effects of this level of abstraction need to be reviewed and the proposed changes in abstraction pattern considered. This will determine whether there are any implications for other abstractors or environmental flows.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To ensure an appropriate balance is achieved between the needs of abstractors and those of the environment.	Review licence applications, accompanying environmental assessments and objections. Determine applications and issue appropriate licences.	Agency	AWS	■						(1)
	Carry out appropriate monitoring / investigations over the next licence period to gain further understanding of the aquifer system.	Agency			■	■	■	■	■	(1)

(1) Internal administrative costs

ISSUE 22

The burning of wastes at cement and lime plants is of national and local concern.

BACKGROUND

The burning of wastes at cement and lime plants is of national and local interest. The situation at Castle Cements, Ketton, is part of this general concern.

Public concern on this issue has led to the Government taking a close interest in the Substitute Liquid Fuel trials and a House of Commons Select Committee on the Environment has conducted an enquiry into the Environmental Impact of Cement Manufacture. The Committee's findings confirmed that the use of such fuel was of positive benefit to the environment as a whole. It went on to recommend improvements to the way in which we carry out some of our duties which included increased sampling of vegetation and soils.

The cement works at Ketton is currently burning substitute liquid fuels and tyres on a trial basis. The types of waste, their composition and maximum burning quantities burned are all controlled within their authorisation to operate.

The company are fully committed to public liaison regarding their operations including any use of alternative fuels and are presently looking to comply with the revised protocols (resulting from the Select Committee report). The company are also fully committed to continuous improvement within their operation. Regulation through IPC provides a flexible method for prioritising and channelling this improvement.

The new protocols provide for significantly increased public consultation, in terms of quantity, quality, frequency and accessibility of information.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
To allay public concerns regarding the use of SLF and to reduce the level of their emissions.	Continue to regulate process as part of IPC.	Agency		■	■	■	■	■	■	(1)
	To maintain existing public liaison through existing forum.	Agency		■	■	■	■	■	■	(1)
	Comply with new govt. protocols which includes increased sampling of vegetation and soils.	Agency		■	■	■	■	■	■	(1)

(1) Internal administrative costs

5.0 PROTECTION THROUGH PARTNERSHIP

5.1 INTRODUCTION

The Environment Agency influences many activities affecting the environment through our own activities and enforcing the Environmental Protection Act 1990, the Water Resources Act 1991, the Environment Act 1995 and associated legislation. However, for land use changes, development and activities outside this legislation, there is a need to create and maintain close partnerships with other organisations, particularly local authorities, individuals, landowners, businesses and community groups in order to ensure that the actions are implemented and that the long term vision can be realised.

This 'Protection through Partnership' section provides the opportunity to address longer term management issues in partnership with others. It looks at how we can work with others for the benefit of the local environment. The timescales for action will depend upon our ability to work effectively with other groups, and requires a commitment from all to improve the environment.

5.2 LAND USE PLANNING AND LEAPS

Land use is the single most important influence on the environment. Development and changes in land use can bring with them the risk of: increased flooding through changes in surface water run-off; pollution through increased discharges to air, ground and surface water and a threat to flora and fauna. Government Planning Guidance highlights the importance of communication between Local Planning Authorities (LPAs) and ourselves and the relationship between land use and environmental matters.

Control of land use change is primarily the responsibility of LPAs, through implementation of the Town and Country planning acts. Through local development plans, which provide a framework for land use change, and the implementation of development control, local councils decide on the location of new development, the redevelopment of existing areas and changes of use of land or buildings. These decisions can have a profound affect on the environment and it is important that we are able to influence this process.

Whilst the planning system has a significant role in seeking sustainability, it cannot always ensure that an appropriate balance of habitats and features are maintained in the countryside. Many activities which destroy wildlife habitats, such as ploughing meadows and grubbing out woodlands are outside the scope of the planning process.

5.3 PLANNING ISSUES

There are a number of important planning issues of concern within the Plan area which will be addressed and resolved through the adoption of a productive partnership approach between the Agency and local planning authorities. These are identified as follows.

P1 Protection of groundwater resources

P2 Surface water run-off from development

P3 Low level restoration to agriculture / de-watering of mineral workings

ISSUE P1 PROTECTION OF GROUNDWATER RESOURCES

Groundwater resources are very important and are a major source of high quality public water supply. Both the quantity and quality of groundwater resources must be protected to ensure that future generations continue to benefit from this essential resource. Groundwater resources require special protection from pollution, since once contaminated it is extremely difficult and expensive to remediate.

The vulnerability of aquifers to pollution depends upon many factors, such as the overlying geology and soils. Around boreholes, which abstract groundwater from the aquifer special protection is given. We have mapped the vulnerability of aquifers and identified areas where special protection is required. These maps, which show areas where groundwaters are at varying degrees of risk from potentially polluting activities and developments, have been circulated to all planning authorities in the Plan area for guidance in the formulation of planning policy.

Development should not be permitted, which in the opinion of the local planning authority, after consultation with the Agency, poses an unacceptable risk of pollution of groundwater resources.

We will seek to ensure that:

- (i) LPAs do not permit development which poses an unacceptable risk of pollution to the water resource;
- (ii) appropriate pollution control measures are included where development is permitted in areas where groundwater is vulnerable; and
- (iii) appropriate policies relating to groundwater protection are included within LPA development plans.

Recent pollution incidents and feedback received during the consultation process have reminded us that ground water quality monitoring must reflect the land use of borehole catchments.

At a National level we will:

- (iv) consider the case for groundwater quality monitoring to reflect the land use of borehole catchments.

5.0 PROTECTION THROUGH PARTNERSHIP

ISSUE P2 SURFACE WATER RUN-OFF FROM DEVELOPMENT AND DEVELOPMENT IN THE FLOOD PLAIN

Piecemeal development can lead to severe land drainage problems where the discharge of surface water is dealt with on an ad hoc basis rather than managed in an integrated and strategic way. This is a potential issue throughout the Plan area, but is currently of particular concern in the Barleythorpe Brook and Bourne catchment areas where future residential and industrial developments are proposed. The responsibility for surface water drainage remains a mix of: riparian owners, IDBs, local councils, the water company and ourselves.

Development in the flood plain may increase the risk of flooding elsewhere in a river catchment and can also impact on dependent wildlife within the river corridor. The Agency's flood defence policies in relation to development within floodplains is set out in our document "Policy and Practice for the Protection of Floodplains". These policies are aimed particularly at LPAs, but also developers, environmental interests and members of the public. To assist local authorities in floodplain land use planning, the

Agency is in the process of producing up to date and consistent maps of floodplains as part of our survey duties under S105 of the Water Resources Act 1991.

We will seek to ensure that:

- (i) LPAs do not permit development which would result in an adverse impact on the environment due to additional surface water run-off and that where development is permitted, appropriate alleviation measures are incorporated;
- (ii) LPAs pursue the strategic approach by either funding infrastructure costs themselves or requiring developers to fund such costs (to include the costs of long term monitoring and management);
- (iii) appropriate policies relating to surface water run-off and development within floodplains are included within LPA development plans.

Objective	Action	Responsibility		97/98	98/99	99/00	00/01	01/02	Future	Cost £K
		Lead	Other							
Improve our understanding of surface water drainage characteristics of the river catchment.	Undertake hydrological surveys of river catchments:									
	Bourne Eau	Agency		■	■					20-25
	Barleythorpe Brooke.	Agency							Impending	

ISSUE P3 LOW LEVEL RESTORATION TO AGRICULTURE / DEWATERING OF MINERAL WORKINGS.

There has been some concern reflected in the consultation process regarding the dewatering of mineral workings and those sites, formerly used for mineral extraction now restored to low level agriculture. By low level agriculture we mean that land is returned to agricultural use at a level below its original height (effectively in a depression in the ground). Such restoration normally only occurs where the water table is sufficiently low to not be affected, or exceptionally where the water table is higher if the site can be sealed to prevent the movement of water into the site.

The concern registered is that dewatering is being undertaken in the vicinity of Maxey and impacting upon water levels in adjacent land used for agriculture. Hydrological studies for sites within sand/gravel deposits indicate that the impact on the surrounding water table is generally very localised. Long term impacts from such

sites should be negligible where adequately engineered seals are installed to prevent inflow of water to the restored low level area.

Further consultation with relevant planning authorities indicate that the engineering specifications set in the planning permissions will protect local water resource requirements and meet the criteria of sustainability.

The Agency's preferred option in terms of aftercare is for restoration to open water, or fill with clean inert waste which we regard as the most sustainable solutions; we recognise however that these options are not always the most practicable or cost effective solutions.

5.0 PROTECTION THROUGH PARTNERSHIP

We will:

- (i) continue to liaise closely with planning authorities on such matters;
- (ii) encourage local planning authorities to look favourably at options for restoration to open water, or fill with clean inert waste, in preference to restoration to low level agriculture;
- (iii) continue to monitor groundwater levels where appropriate;
- (iv) encourage restoration works that result in environmental enhancement such as the "Wet Fens for the Future" Project.

5.4 OTHER ISSUES FOR PARTNERSHIP

There are a number of other important issues which will be addressed and resolved through a partnership approach between ourselves, local authorities and other interested organisations and individuals. These are identified below.

ISSUE P4: SUSTAINABLE WASTE MANAGEMENT

Sustainable waste practices are an important part of an overall sustainable development strategy for the country. While waste production cannot be totally eliminated much could be done to make waste production and management practices more sustainable, by considering and applying options in the waste management hierarchy of: reduction-re-use-recovery-disposal. The objectives are to reduce the quantity of society's waste, make the best use of it and to minimise its risks to the environment and human health now and in the future.

The Agency will, in partnership with others:

- (i) promote and implement waste reduction and minimisation processes;
- (ii) encourage waste recovery techniques such as recycling, composting and energy production;
- (iii) improve awareness of recycling/minimisation opportunities by publicity and education.

ISSUE P5: ILLEGAL DISPOSAL OF WASTE

The disposal of waste on unlicensed sites or in contravention with waste management licence conditions may cause pollution to the environment, harm to human health and serious detriment to local amenities. This includes the irresponsible disposal of litter and household waste, waste operators not complying with their licence conditions and commercial operators who deliberately dispose of waste. Part of the problem stems from a lack of awareness by those involved of the nature and extent of current waste management legislation.

We will continue enforcement activities and, in partnership with others such as local schools:

- (i) improve awareness by publicity and education;
- (ii) encourage people to report incidents of illegal waste disposal through the promotion of our environmental emergency hotline on 0800 80 70 60.

ISSUE P6: LAND USE MANAGEMENT AND SOIL EROSION

Modern agricultural land use practices such as the removal of hedgerows can result in an increase in soil erosion. These, in turn, can result in an increase in sediment load to watercourses. Changes in the natural input of sediment into watercourses can have significant effects on stream habitats and may result in drainage problems and harm to wildlife. Sediments can also carry chemical pollutants such as pesticides or nutrients and sources of sediment can either be from the land or river banks. High inputs of sediment occur following severe soil erosion either caused by uniform sheet erosion or where flow collects in rills and gullies. The risk of erosion is greatest on vulnerable soils such as sandy and chalky soils.

Changes in land management are important for tackling this issue and one technique for reducing diffuse pollution from agriculture lies in the use of vegetated strips of land alongside watercourses, known as buffer strips. Guidance on buffer strips and their implementation is given in the Agency's publication "Understanding Buffer Strips - An Information Booklet".

We will:

- (i) encourage the use of buffer strips to reduce land run-off and soil erosion.

ISSUE P7: BIODIVERSITY AND LOCAL AGENDA 21

In 1994, the UK government produced "Biodiversity: the UK Action Plan" and guidance was given on the production of Local Biodiversity Action Plans (BAPs). The purpose of BAPs is to focus resources to conserve and enhance biodiversity by means of local partnerships, taking account of national and local priorities. BAPs can identify where action needs to be taken to implement targets for habitats and species and it specifies appropriate mechanisms.

In keeping with Local Agenda 21, the formulation of BAPs should not be undertaken by a single organisation. Delivering the biodiversity targets will require inputs from Central and Local Government, conservation organisations, land managers, members of the public and ourselves. We are in a key position to influence many of the targets since Action Plans will be concerned with coastal habitats, wetland and aquatic species (eg. otters, crayfish, reedbeds etc.)

5.0 PROTECTION THROUGH PARTNERSHIP

The conservation of biodiversity will be a key indicator of the successful implementation of sustainable development in the Plan area. To date, Local Biodiversity Strategies have been prepared, principally by the Wildlife Trusts for Lincolnshire, Northamptonshire and Leicestershire.

Local Agenda 21 has been adopted to ensure sustainable development is achieved on a local scale. The Environment Agency has been working with Lincolnshire County Council on the preparation of its State of the Environment Report and now plays an active part on Environment Forums for both Lincolnshire and Northamptonshire.

We will:

- (i) continue to assist our partners in the production of Local Biodiversity Action Plans and in Local Agenda 21 and other local sustainability initiatives.

ISSUE P8: SUSTAINABLE USE OF WATER

As a generalisation, during summer months, the demand for water by farmers for spray irrigation occurs when there is least water available naturally. This is true both of those who are dependent upon the groundwaters of the Lincolnshire Limestone and of those wishing to make use of surface waters.

Our licensing policy for the limestone aquifer states that no abstraction licences should be issued for additional groundwater abstraction. Within the Welland catchment, additional surface water may be available by abstraction of winter water for storage and subsequent summer use, subject to conditions.

To address this shortfall, the Agency encourages farmers to consider the construction of winter storage reservoirs and offers a financial incentive to farmers to take winter water by charging it at a rate of 10% of the summer water abstraction rate.

We will, in partnership with others:

- (i) raise public awareness in the wise use of water in the home and garden;
- (ii) encourage the water companies to reduce and achieve further reduction in water supply leakage;
- (iii) encourage farmers to undertake "good irrigation practice" and the construction of winter storage reservoirs.

ISSUE P9: RECREATIONAL USE OF THE WATER ENVIRONMENT

The amount of recreation within the Welland catchment is relatively low especially when compared with the use of the nearby Nene. Exceptions to this are Rutland Water and the river corridor through Stamford which are heavily used, particularly during the summer months. Although informal recreation takes place throughout the rest of the

catchment, it is at a much lower level and is regulated by access restrictions and a lack of facilities. We recognise that the potential recreational value of the water environment is not fulfilled in this area, for example navigational activity, and are keen to support initiatives such as the development of a Welland Way, the development of disabled fishing platforms, the establishment of canoe launch sites, bird watching hides, gates for disabled access and other similar initiatives.

We do, however, have to balance these interest against others and have a duty to take into account the interests of flood defence, water quality and conservation when assessing proposed recreational initiatives.

We will:

- (i) liaise with all parties involved with this issue and reach agreements which will enable us to plan and implement recreational initiatives.
- (ii) Work with others to explore opportunities to link the Welland navigation to the South Forty Foot River.

6.0 FUTURE REVIEW AND MONITORING

The Environment Agency will be jointly responsible, with other identified organisations and individuals, for implementing this Action Plan. Progress will be monitored and normally reported annually. These Annual Reviews will examine the need to update the Plan in the light of local change. The period between major revisions will normally be five years.

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

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APPENDIX I

INDIVIDUALS AND ORGANISATIONS WHO COMMENTED ON THE WELLAND LEAP CONSULTATION

Anglian Water Services Ltd
Inland Waterways Association
National Farmers Union
Royal Society for the Protection of Birds
Lincolnshire Trust for Nature Conservation
English Nature
Peterborough City Council
Preston Parish Council
Stamford Town Council

Leicestershire County Council
Mr K Allsop
Cambridge County Council
British Steel
Mr & Mrs R & K Heath
Plantlife
Welland and Deepings IDB
Northamptonshire County Council
Milton Estates

APPENDIX II

GLOSSARY AND ABBREVIATIONS

Abstraction	The removal of water from any source, either permanently or temporarily.	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).
Abstraction Licence	A statutory document issued by the Agency to permit removal of water from a source of supply. It can limit the quantity of water taken daily etc.	Biota	Biological life.
Algae	Microscopic (sometimes larger) plants, which may be floating or attached. Algae occur in still and flowing water.	Buffer Zone	Strip of land 10-100m wide, alongside rivers which is removed from intensive agricultural use and managed to provide appropriate habitat types.
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.	Coarse Fish	Freshwater fish other than salmon and trout.
AMP2	An acronym for the second Asset Management Plan produced by the Water Companies for the Office of Water Services (OFWAT). It sets out the water industry investment programme for the period 1995 to 2005.	Consent (Discharge)	A statutory document issued by the 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.
Aquifer	A water-bearing stratum situated below ground level. The water contained in aquifers is known as groundwater.	Controlled Waste	Industrial, household and commercial wastes - excludes mine and quarry waste, agricultural waste, sewage sludge, radio-active wastes and explosives.
Anaerobic	Oxygen free	Controlled Waters	All rivers, canals, lakes, groundwaters, estuaries and coastal waters to three nautical miles from the shore, including the bed and channel which may for the time being be dry.
Anglian Water Services (AWS)		Department of Environment and Transport Regions (DETR)	
Augmentation	The addition of water by artificial input. (Usually to "top up" low flows in summer by either groundwater pumping or via reservoir release.	Dissolved Oxygen (DO)	
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.	Ecology	The study of relationships between an organism and its environment.
		Ecosystem	A functioning, interacting system composed of one or more living organisms and their effective environment, in biological, chemical and physical sense.

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Effluent	Liquid waste from industry, agriculture or sewage treatment plants.	Leachate	Liquor formed by the act of leaching.
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.	Macroinvertebrate	Animals without backbones eg. leeches, snails, worms, insects.
Eutrophic	A description of water which is rich in nutrients. At worst, such waters are sometimes beset with unsightly growths of algae.	Main River	The watercourse shown on the statutory 'Main River maps' held by the Agency and MAFF. The Agency has permissive powers to carry out works of maintenance and improvement on these rivers.
Fauna	Animal life.	Mitigation	Refers to the environmental impact of scheme development or operation and the actions which may be taken to reduce or ameliorate such impacts.
Fish Biomass	A measure of the quality of a fishery as found in terms of surveys, weight by area ie. g/m	Nitrate Vulnerable Zone (NVZ)	An area where nitrate concentrations in sources of public drinking water exceed, or are at risk of exceeding, the limit of 50 mg/l laid down in the 1991 EC Nitrate Directive; and where compulsory, un-compensated agricultural measures will be introduced from 1996 as a means of reducing those levels.
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.	Nutrient	Substance providing nourishment for plants and animals eg. nitrogen, phosphorus.
Flora	Plant life.	Organic	Generally any substance containing carbon as part of its chemical make-up.
Fluvial	Relating to the freshwater river.	Over commitment	Where the volume licensed for abstraction from an aquifer or river system, exceeds the availability of the water resource. In balancing supply and demand the Agency has to consider not only licensed abstraction eg. spray irrigation, Public Water Supply and industrial use but also the environmental needs and riparian uses such as livestock watering.
Geomorphology	Scientific study of land forms and of the processes that formed them.	Package Treatment Plant	Small sewage treatment plant built to treat effluents from small numbers of dwellings.
Gravity outfall	Discharge through a pipe or sluice with no pumping.	Permeability	The ease at which liquids (or gases) can pass through rocks or a layer of soil.
Groundwater	Water which saturates a porous soil or rock substratum (or aquifer). Water held in storage below ground level.	Permissive powers	Powers which confer on the Agency the right to do things but not the duty to do them.
Hydrogeology	Branch of geology concerned with water within the Earth's crust.	pH	Quantitative expression of acidity or alkalinity of a solution.
Hydrology	The study of water on and below the earth's surface.	Public Water Supply	The supply of water by companies appointed as Water Undertakers by the Secretary of State for the Environment under the Water Industry Act 1991.
Hydrometric	The measurement of water.	RAMSAR	Wetland site of International Importance that is designated under the Ramsar* convention (*a town in Iran where the international convention originally agreed in 1975 to stem the progressive encroachment on, and loss of, wetland).
Impounded	The holding back of water behind a dam. Strictly a structure which raises water levels above their "normal" height. May need a licence and/or Land Drainage Consent from the Agency.		
Integrated Pollution Control (IPC)	An approach to pollution control in the UK which recognises the need to look at the environment as a whole, so that solutions to particular pollution problems take account of potential effects upon all environmental media.		
Internal Drainage Boards (IDB)	Authorities responsible for dealing with land drainage within a district. They are primarily concerned with agricultural land drainage but also may be involved with water supply to their district for agricultural purposes.		
IPC Authorisation	An authorisation issued by the Agency prescribed by the Environmental Protection Act 1990 covering certain operation of processes.		
Landfill	Site used for waste disposal into/onto land.		

APPENDIX II

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, eg. 1 in 50 years.	Surface Water	Water collecting on and running off the surface of the ground.
Riffle	A shallow area in a river where the substrate is composed of gravel and the flow is faster.	Sustainable Development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Riparian Owner	Owner of riverbank and/or land adjacent to a river. Normally owns river bed and rights to the midline of channel.	Telemetry	A means of directly collecting data from remote sites.
River Corridor	The continuous area of river, river banks and immediately adjacent land alongside a river and its tributaries.	Washlands	Extensive semi-natural area of flood plain adjacent to a river, where water is stored in time of flood. Structures can be added to control the amount of water stored in the washland and time its release to alleviate peak flood flows in areas downstream.
Saline Ingress	Salt water may enter rivers through or around tidal structures. Once salt water has entered a watercourse it is difficult to remove other than by flushing with high flows during floods. It can have profound effects on the ecology of a river.	Waste Transfer Stations	Site where waste is stored prior to its disposal/recycling.
Saline Waters Sewage	Water containing salts. Liquid waste from cities, towns and villages which is normally collected and conveyed in sewers for treatment and/or discharge to the environment.	Weir	A dam built across a river to raise upstream levels.
Sewage Treatment Works (STW)	System of sewers usually used to transport sewage to a sewage treatment works.	Wetland	An area of low lying land where the water table is at or near the surface for most of the time, leading to characteristic habitats.
Sewerage	The accumulation of solids from treatment processes. Sludge can be incinerated or spread on farm land.	Winter Storage Reservoir	Reservoirs built by farmers to store water during the winter months when it is "plentiful" for re-use during the summer.
Sludge	Statutory protected habitats for wild birds under EC regulations.		
Special Protection Area (SPA)	The watering of crops by spraying. Can have a high impact on water resources.		
Spray Irrigation	A site given a statutory designation by English Nature or the Countryside Council for Wales because it is particularly important, on account of its nature conservation value.		
Site of Special Scientific Interest (SSSI)	Overflow built into combined surface and foul sewerage systems to accommodate higher volumes generated during intense rainfall events thereby protecting the integrity of the sewer and preventing properties from flooding. These discharge diluted but untreated effluent direct to watercourses.		
Storm Sewer Overflow			

MANAGEMENT AND CONTACTS:

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

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

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ENVIRONMENT AGENCY GENERAL ENQUIRY LINE

0645 333 111

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

ENVIRONMENT AGENCY EMERGENCY HOTLINE

0800 80 70 60



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AGENCY**



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