NRA-Anglian 190

LOWER WITHAM CATCHMENT MANAGEMENT PLAN

SUMMARY REPORT - JUNE 1995

NRA
National Rivers Authority
Anglian Region

INTRODUCTION

Catchment management planning aims to create a consistent framework within which all the NRA's functions and responsibilities can be applied in a co-ordinated manner within a particular catchment area.

During this planning process, the current state of the water environment and its associated uses are systematically analysed and compared with appropriate standards. Where these standards are not being met or are likely to be affected in the future, the shortfalls, together with options for action to resolve them, are presented as issues in a table at the end of this brochure.

YOUR VIEWS

Formulation of this plan involves consulting and working with many public bodies, private companies and individuals. The purpose of the document is to identify a number of water management issues in the catchment and to seek comments on these issues and the options identified to resolve them. Comments are also sought on any other matters affecting the water environment in the catchment which should be examined by the NRA.

The next stage of the catchment management process is for the NRA to produce an Action Plan, which will take into account comments received during the consultation process. This Plan will form the basis for the NRA's actions in the catchment for the next five years. The NRA will seek the commitment to planned actions by others wherever necessary.

River Slea at Haverholme

EA - Anglian LEAP

Please write with your comments to the following address, from which a full copy of the consultation report may also be obtained:

Catchment Planning Officer, National Rivers Authority, Northern Area, Aqua House, Harvey Street, Lincoln LN1 1TF.

Comments must be received by 26 September 1995.

WHAT IS CATCHMENT PLANNING?

River catchments are subject to increasing use by a wide variety of activities, many of which interact, some giving rise to conflicts. The many competing demands on the water environment and the interests of users and beneficiaries must be balanced.

Catchment management involves the NRA working with many people and organisations and using its authority to ensure rivers, lakes, coastal and underground waters are protected, and where possible improved, for the benefit of present and future users.

The NRA uses its resources to:

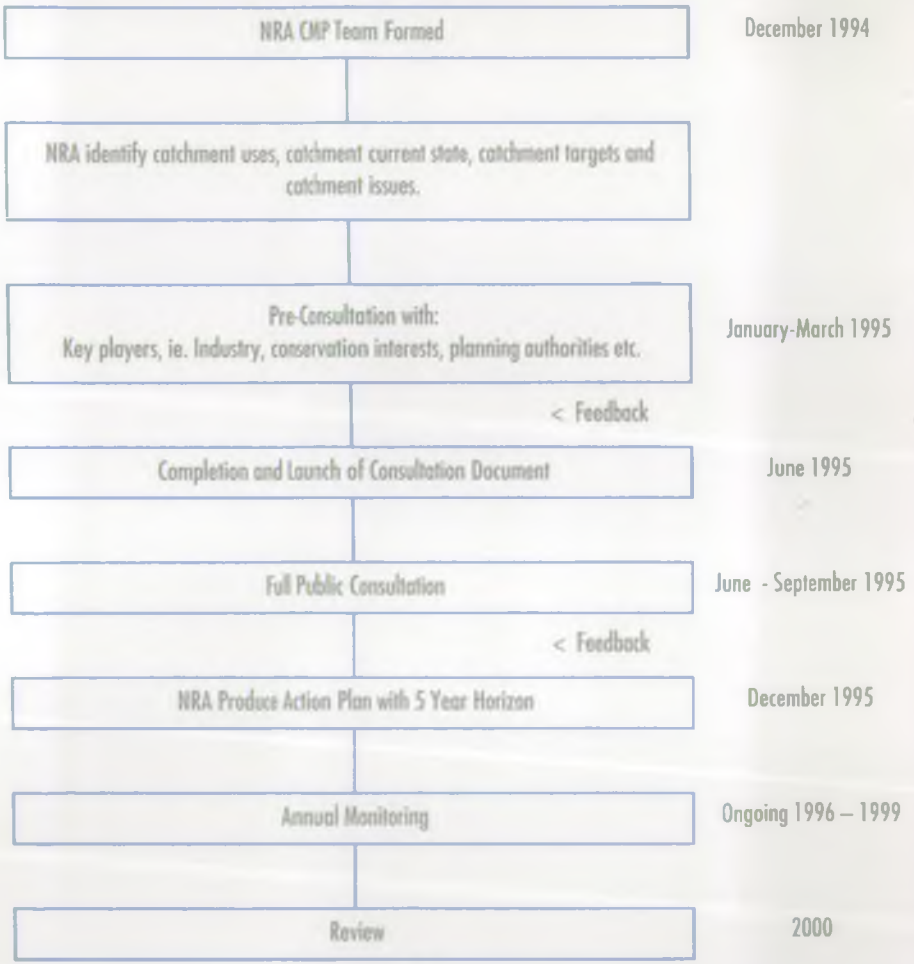
- Respond promptly to all reported pollution incidents and to emergencies due to flooding.

- Control pollution by working with dischargers to achieve improvements and monitor effluent compliance with standards.

River Witham through Boston

- Maintain existing assets and invest in new ones to provide flood protection, manage and develop water resources and provide other NRA services.
- Monitor, survey and investigate the existing quality of controlled waters to determine short and long term changes.

TABLE 1 - THE CATCHMENT PLANNING PROCESS LOWER WITHAM CATCHMENT TIMETABLE



During each of the development stages of this Plan the NRA works in close liaison with its customer consultative committee, the Lincolnshire Catchment Panel.

THE CATCHMENT

The Lower Witham Catchment covers a large part of South Lincolnshire and is characterised by large areas of flat fenland, much of which is close to or below sea level. Without artificial coastal and river defences much of the area would be marshland inundated by the sea.

The only significant higher land in the catchment is to the west of a line between Sleaford and Bourne where the gently undulating landscape formed by the Lincoln Edge provides an important source of groundwater for public water supply. The land also rises to the north east of the catchment towards the Lincolnshire Wolds.

The catchment only contains two towns of any size - Boston, which is also a port, and Sleaford. The area is largely rural with little industrial development of any significance. It is highly developed agriculturally especially on the fens where double harvesting is commonplace. Its ongoing agricultural development is symptomised by land reclamation schemes along the coastline undertaken in recent years.

The River Witham which is an embanked channel dissecting the catchment is the principal river carrying upland waters from the Upper Witham catchment (a Catchment Plan for which will be produced in 1996). The low lying fens on either side of this river are essentially drained by networks of smaller drains maintained by Internal Drainage Boards (IDB's) discharging to both those embanked watercourses maintained by the NRA and directly to tidal waters. The River Slea is the only river in this catchment to discharge to the River Witham above the tidal sluice at Boston, in its upper reaches it is more typical of a "natural" river system.

The agricultural industry within this catchment plays a significant role both in terms of its economic welfare and in terms of its impact upon the physical environment. 200 years ago vast tracks of land would have been permanently under water, reedswamp or seasonally flooded - today in its place is rich, productive farmland which sustains the local economy and is of strategic importance to the nation.

DEVELOPMENT LAND USE AND INFRASTRUCTURE

The vast majority of land within the catchment (around 96%) is used for agricultural purposes, much of this is highly productive and versatile. Crops grown include cereals, potatoes, beet and vegetables; bulbs and flowers grown in the open are also an important feature, 8% of the total agricultural land was set aside in 1993.

Farming interests

Urban development of the area is limited, there has been an historical drift of population away from rural areas towards the urban centres of Boston and Sleaford and the larger villages. Industry and employment within the catchment is closely allied to the farming sector, however the port of Boston is also home to a small fishing fleet.

The catchment is served by an improving network of roads which provide an essential link for the transport of goods beyond the catchment; much of the farm produce is sent to the markets in London. Proposals to improve the road infrastructure by extending the M11 motorway into Lincolnshire are for the moment on hold, there are also wider discussion proposals to improve facilities at Boston Docks by the construction of a Sea Lock.

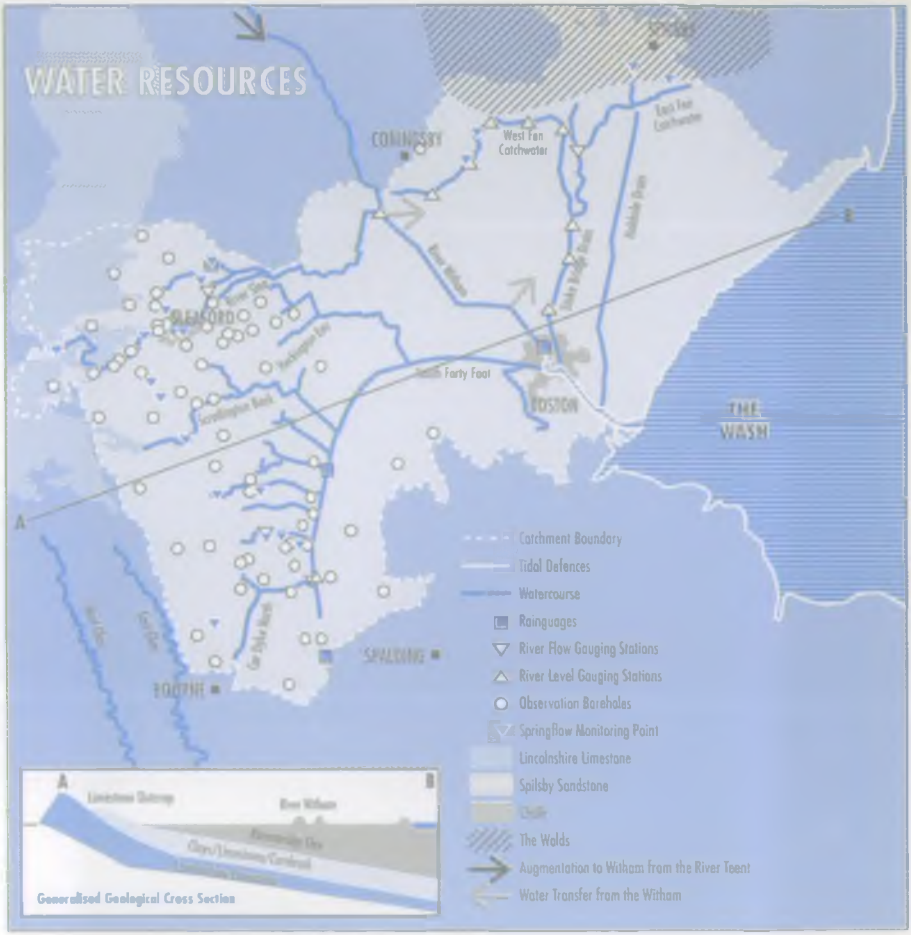
Agricultural and urban development can have significant impacts on water quality and conservation interests in the catchment as well as on surface water run-off characteristics.Because of the influence of Local Planning Authorities in development proposals it is important that links are established between CMP's and Development Plans and that there is liaison between the NRA and Local Authorities.

WATER RESOURCES

Demand for water in the catchment is met from both groundwater and surface water sources. The Lincolnshire Limestone aquifer is the only significant source of groundwater in the catchment. The aquifer is highly developed for public water supply purposes and in smaller volumes for private supplies in the Fens (west of the South Forty Foot Drain) for domestic and agricultural purposes. The resources of the aquifer are fully committed to existing licences and there is little scope for further development.

The River Witham is the most important surface water resource. The natural summer flows in the Witham are limited and are subject to significant demands upstream of this Catchment. In order to meet demands the Authority can augment flows in the river by the transfer of water from the River Trent at Torksey. This allows existing demands within this Catchment to be met.

Extensive lengths of drains east of the Witham are used each summer to store water for irrigation purposes. The lowland system is filled in the spring of each year from the River Witham at Antons Gowt, near Boston, and subsequently augmented with licensed transfers at Dogdyke, near Coningsby. Winter storage of water for irrigation is encouraged by the NRA in preference to summer water abstraction.



WATER QUALITY

Biological and chemical surveys of river quality in the catchment indicate water quality to be mostly fair. Exceptions to this are the old River Slea, which is affected by seasonal low flows and the discharge from sewage treatment works and to a lesser extent the Frampton Town Drain and the Hobhole Drain.

The slow moving and shallow nature of the lowland watercourses, dicharges from sewage treatment works and the nutrient-rich run-off from agricultural land cause many of the watercourses to become eutrophic. Other influences upon water quality in the catchment include localised pollution from inadequate village sewage disposal systems, intermittent pollution to surface water from landfill sites, and isolated pollution incidents. Salinity in the lower reaches of some watercourses poses a problem for fish populations and spray irrigators

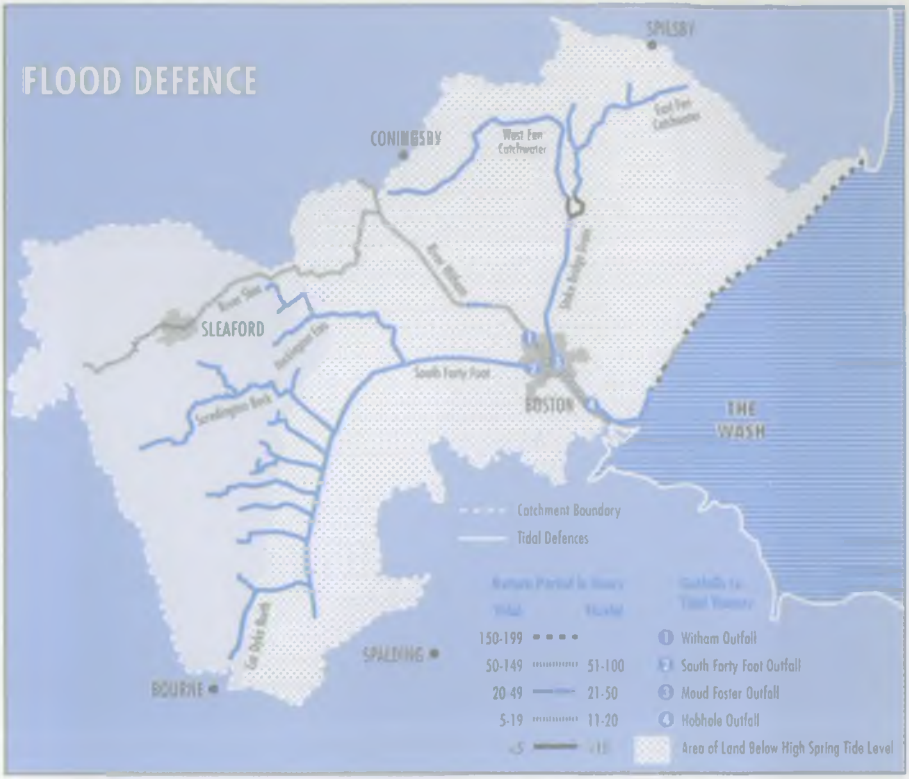
during periods of low flow. Water quality within the tidal length of the River Witham is good.

The protection of groundwater is important in the catchment because of the significant use of groundwater for public water supply. Anglian Water Services have five boreholes in the Sleaford/Bourne area.

The Lincolnshire Limestone in the west of the catchment is given little protection by the soil cover and is vulnerable to diffuse sources of pollution such as those deriving from agricultural activities. The establishing of Nitrate Sensitive Areas and the promotion of good farming practices by MAFF are envisaged as long term solutions to halt and reverse rising nitrate levels in groundwater.

FLOOD DEFENCE

The catchment has 22 kilometres of tidal and 20 kilometres of sea defences which protect approximately 813 square kilometres of predominantly agricultural land and the town of Boston which lie below normal high tide levels.



Maintaining the integrity of these defences is of vital importance for the protection of both land and people, particularly against the background of rising sea levels.

The main arterial watercourses for this catchment - the River Witham, the South Forty Foot Drain and the Maud Foster system (including the Stonebridge Drain and the East and West Fen Catchwaters) are embanked to prevent flooding of low lying land. These watercourses carry highland waters from the whole of the Witham Catchment across the fens to discharge to the Witham Haven through structures designed to prevent tidal waters entering fluvial systems. Some lengths of river embankment, notably along the Witham and Maud Foster are in need of attention.

The system of flood protection/land drainage maintained by the NRA is complemented by an extensive network of drainage channels maintained by the Witham Fourth, Black Sluice and Witham First Internal Drainage Boards. The importance of the agricultural industry to this area makes the effectiveness of both fluvial defences and land drainage a key feature of this plan.

The NRA operates a flood warning service whereby the Police and other organisations are advised of areas likely to be affected by flooding.

FISHERIES

The catchment is characterised by slow moving watercourses and seasonal fluctuations of river levels dictated by flood defence and agricultural requirements. Regular and extensive surveys are carried out on the catchment's watercourses which indicate healthy fish populations which is reflected in the popularity of the catchment with anglers.

The fish species to be found are typical of lowland rivers, ie. roach, bream and pike. Brown Trout are found in the River Slea which is an 'upland' spring fed tributary of the Witham.

During low flow periods the lower reaches of the major watercourses can suffer from saline intrusion causing fish mortalities. The River Slea, in particular, suffers from low flows - during drought periods lengths of the Slea dry up and fish populations suffer accordingly.

Angling along Stonebridge Drain

RECREATION

Recreational use of the water environment is extensive. The Witham, in particular, is popular with anglers, as a navigable waterway, and as a general amenity area with public footpaths. The River Slea particularly through Sleaford is regarded as having a high amenity value.

Other water based activities enjoyed include birdwatching, sailing, canoeing, and along designated lengths of river bank, horse riding.

The coastline and marshland adjacent is an internationally important Nature Reserve and a valuable asset to the catchment.

Numerous enclosed still waters exist which are used for both coarse and trout fishing.

CONSERVATION

The Wash Estuary and parts of the immediately adjacent coastal plain contain a number of conservation areas of National and International importance. For the purposes of the Lower Witham Catchment Management Plan any issues related to this area have been dealt with in the Wash Estuary Management Plan which was published in December 1994.

Elsewhere within the low lying areas of the catchment, modifications to the river and drainage systems for land drainage purposes have resulted in degraded

Restored fenland habitat at Friskney

"in-channel" habitat and aquatic plant diversity and the loss of natural fenland habitat. This situation is accentuated by the maintenance of low winter water levels in many of the watercourses. The naturally eutrophic condition of the watercourses exerts further constraints on bio-diversity.

In upland zones in the west and north of the catchment, areas of mixed farming include some sizeable woodlands, some of which are Sites of Special Scientific Interest (SSSI). As part of a new MAFF initiative and in order to give important water dependant SSSIs due consideration for their future well-being, interested parties, including English Nature and those drainage authorities operating in areas where SSSIs exist, have been tasked to produce Water Level Management Plans for identified sites.

There are 65 Scheduled Monuments in the catchment which are of national importance. Archaeologically rivers and lakes are important because of the types of site preserved in alluvial deposits which, until disturbed, are the best protected in the country.

NAVIGATION

The port of Boston is home to a small fishing fleet and provides dock facilities for vessels up to 3000 tonnes. The River Witham is a navigable waterway and provides a route from Boston and the Wash to Lincoln and beyond - its use is predominantly recreational.

The River Slea/Kyme Eau, which joins the Slea at Chapel Hill, is currently

navigable, subject to river levels, as far as South Kyme. Proposals are being considered by the Slea Navigation Society to extend the Slea Navigation upstream to Sleaford. These proposals which could be of both recreational and commercial benefit to the area could have other impacts upon the water environment.

Limited recreational use is also made of drains maintained by the Witham Fourth Internal Drainage Boards and the Maud Foster system, which are collectively recognised as the "Witham Navigable Drains".

ISSUES AND OPTIONS - GENERAL

This section of the plan considers options to address the issues that have been identified in the full Consultation Document. The options are presented as the initial thoughts of the Anglian Region of the NRA and do not constitute policy statements. Comments on the issues and options are requested together with any new ideas/suggestions.

Where possible, the body responsible for carrying out each option has been identified. In some areas this is identified as someone other than the NRA. However, the options as presented are intended as a plan to facilitate improvements to the water environment for the benefit of all users. Obviously, this will entail many bodies and individuals working together to fulfil the aims and objectives as detailed in this Catchment Management Plan. The issues and options are not shown in priority order and have not been costed or have any timescale determined. After publication of this Consultation Document, the NRA will prepare an Action Plan to provide an overview of the catchment, a policy framework and a series of strategies to deal with the issues. Details of a proposed monitoring programme will also be identified.

Coggesford Mill

GLOSSARY OF TERMS

SALINE INTRUSION - The act of salt water from either the sea or groundwater penetrating into surface waters (rivers and streams).

TIDAL STRUCTURE - A structure such as a lock or 'doors' designed to allow the discharge of river water and to prevent tidal waters entering fluvial systems.

ABSTRACTION - The removal of water from ground or surface water.

RIVER TRANSFER - The transfer of flows from one river to another.

BED WEIR - River structure designed to prevent the movement of saltwater upstream in a river system.

LEACHATE - Liquor formed by the act of water percolating through soil containing soluble substances.

AUGMENTATION - The addition of water to a river under artificial control, usually to top up low flows in the summer.

HYDROGEOLOGICAL - Study of water within the Earth's crust.

ECOLOGY - The study of relationships between an organism and the environment.

AQUIFER - A water bearing strata of rock below ground level. The water within an aquifer is known as groundwater.

RIPARIAN OWNER - Owner of riverbank and/or land adjacent to the river.

CULVERT - Channel or conduit carrying water underground, eg. beneath a road.

ENMAIN WATERCOURSE - Procedure in which the NRA assumes powers to maintain a watercourse.

RETURN PERIOD - Refers to a return period of a flood. Flood events are usually described in terms of the frequency at which, on average, a certain severity of flood is equalled or exceeded. This is expressed as a return period in years, eg. 1 in 50 years.

SEWERAGE SYSTEM - System of sewers used to transport sewage to a Sewage Treatment Works.

REQUISITION - To formally demand.

REVETMENT - Strengthening added to river banks to prevent erosion, eg. by the placing of stone.

PACKAGE TREATMENT PLANT - Small sewage treatment works designed for a single or small number of properties.

AESTHETIC QUALITY - Visual quality.

BUND - Structure/wall built around say an oil tank to prevent any accidental discharge of pollutants escaping into the environment.

ISSUE 1

THE QUALITY OF THE LOWER REACHES OF CERTAIN WATERCOURSES IS ADVERSELY AFFECTED BY SALINE INTRUSION DURING PERIODS OF LOW FLOW.

PRINCIPAL RIVERS AFFECTED ARE THE WITHAM, HOBHOLE, MAUD FOSTER, AND SOUTH FORTY FOOT.

BACKGROUND

During extended periods of low flows, salinity levels in a number of watercourses rise. Freshwater fish have a limited ability to adapt to this and if the change is too rapid it can cause fish mortalities. The flora of the watercourse are similarly affected. Excessive salinity is a particular concern for the agricultural industry as the poor water quality may become unsuitable for spray irrigation purposes. The primary source of this salinity is from leakage around and through tidal structures and through sea banks, although salinity may also arise from areas of land once used as "salt-pans".

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Reduce leakage through tidal structures.	NRA/Internal Drainage Boards/ British Waterways	Reduced levels of saline intrusion. Improved reliability for abstractors.	Costs. Partial solution.
Install pumps to pump saline water back to the Haven. (River Witham only).	NRA	Reduced levels of saline intrusion. Improved reliability for abstractors.	Costs. Partial solution.
Increase residual flows by river transfer schemes.	NRA	Reduced levels of saline intrusion. Improved reliability for abstractors.	Costs. Only marginal benefits will occur, limited to River Witham.
Install bubble curtains.	NRA	Reduced levels of saline intrusion. Improved reliability for abstractors. Tried and tested.	High maintenance and running costs.
Construct bed weirs to limit the extent of the intrusion.	NRA/Internal Drainage Boards	Reduced levels of saline intrusion. Improved reliability for abstractors. Tried and tested.	May affect the channel's drainage ability. May affect navigation.
Do nothing.	NRA/Internal Drainage Boards		Increased problem with salinity

ISSUE 2

FISH POPULATIONS IN THE SOUTH FORTY FOOT RIVER AND RIVER WITHAM SUFFER DURING PERIODS OF HIGH FLOW.

BACKGROUND

The lower reaches of the South Forty Foot and River Witham are trapezoidal channels offering few features behind which fish can shelter during periods of high flow. Under such conditions, many fish are swept out to sea where they perish.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Construct tyre reefs to provide shelter.	NRA	Immediate effect. Tried and tested. Known to work. Relatively cheap.	Artificial feature. Difficult to assess their impact.
Construct fish shelters into river banks.	NRA	May also provide over-wintering shelter. Can be easily sampled to assess its impact.	Untried. Cost.
Construct wet berms to diversify habitat as during routine drainage improvements.	NRA	Natural solution. Provides habitat diversity and spawning sites.	Expensive.
Review Flood Control procedures.	NRA	May reduce the incidence of fish losses.	None

ISSUE 3

THE CATCHMENT HAS LOST NEARLY ALL OF ITS NATURAL FENLAND HABITAT.

BACKGROUND

Intensive agricultural practises have resulted in fenland being drained over the last two centuries to increase its productivity and economic value. The consequence of this has been the loss of an environmentally important habitat along with its associated flora and fauna.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
The NRA should encourage any practical schemes which seek to restore natural fenland habitat.	NRA/ Landowners/ Fisheries & Wildlife Advisory Group/ Countryside Commission	Increased diversity of flora and fauna and habitat. Possible flood defence benefit. Reduction in flood peak timing.	Cost.
The NRA should consider the feasibility of enhancing habitat during both routine maintenance works and capital works.	NRA	Increased diversity of flora and fauna and habitat. Associated Flood Defence benefits of Washlands.	Cost of flood defence works may increase.

ISSUE 4

AREAS OF RIVER CHANNEL AND RIVER CORRIDOR HAVE BEEN IDENTIFIED AS HAVING LOW PLANT SPECIES DIVERSITY.

BACKGROUND

Intensively managed rivers are subject to works aimed primarily at supporting the land drainage function. The resultant river channel lacks features that influence the plant community it could support. The ecological value of the wetted margin of these rivers is degraded and of little significance.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Restore and enhance during routine Flood Defence maintenance or Capital Works without loss of Channel capacity.	NRA	Increased plant and habitat diversity. Environmental gain to other higher organisms ie. fish. Ecological stability.	Cost of Flood Defence works is increased.
Encourage landowners to restore wetland and riparian habitats (Countryside Stewardship, Set Aside Schemes, etc).	NRA/Landowners/ Countryside Commission/ Ministry of Agriculture, Fisheries & Food Farming & Wildlife Advisory Group	Increased plant and habitat diversity. Shared Costs. Grants/funding may be available from other bodies. Recreation and amenity value enhanced.	Cost.
Encourage farmers to graze embanked watercourses with stock on selected sites.	NRA	Increased plant species diversity. Reduced maintenance costs for NRA.	Conflict of interests between tenant and other river users.

ISSUE 5

THE PROPOSALS BY THE SLEAFORD NAVIGATION SOCIETY TO RESTORE THE SLEA NAVIGATION ARE CONSTRAINED BY WATER RESOURCES, WATER QUALITY, FLOOD DEFENCE AND ENVIRONMENTAL CONCERNS.

BACKGROUND

The restoration of the Slea as far as Sleaford is a keenly sought aim by boating groups and commercial interests. The NRA is keen to support initiatives which increase the water based recreational value of this Catchment. It does, however, have to balance that interest against those others - flood defence, water quality, conservation and fisheries, which could all suffer as a consequence of such a scheme. Not least of the NRA's concerns is the apparent non-availability of water to facilitate such a navigation.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
NRA to liaise with the Slea Navigation Society to ensure that NRA interests are protected, and concerns understood.	NRA/ Slea Navigation Society	The needs of the water environment will be appropriately balanced.	None.
Carry out an environmental assessment to establish the impact of these proposals upon the water environment.	Slea Navigation Society	The implications of the problems will be understood more fully. This will ensure all the needs of the water environment will be identified.	None.

ISSUE 6

LOW FLOWS IN THE RIVER SLEA BETWEEN ANCASTER AND SLEAFORD HAVE A DETRIMENTAL EFFECT ON THE TROUT FISHERY.

BACKGROUND

In recent years springs forming the source of the River Slea have periodically failed causing river flow in certain sections to cease and water quality in some sections to fail. The impact of these low flows is on its flora and fauna - particularly the brown trout which have traditionally spawned but which periodically have to be rescued and restocked. Low natural flows may be accentuated by levels of water abstraction in the area.

An augmentation scheme for the Slea has recently been commissioned however, this was primarily designed to maintain river levels through Sleaford and not to sustain a viable trout fishery. Environmental benefit may also derive from this work.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Augment the River Slea from the borehole in accordance with existing operational practices and monitor its impact.	NRA	Fish populations downstream of the augmentation may be sustained through periods of low flow.	Cost. There may be insufficient water during periods of drought.
Consider reducing abstraction levels/switching abstraction sources.	Anglian Water Services	Fish populations may benefit from increased flows which would follow reduced abstraction to the west of Sleaford. There may be benefits to the abstractors.	Impact of switching abstraction sources is unknown. Costs to Anglian Water Services may exceed benefits.
Accept existing situation.		None.	Sustainability of the trout population is at risk.

ISSUE 7

THE FISH POPULATION OF INTERNAL DRAINAGE BOARD DRAINS AND THE SOUTH FORTY FOOT RIVER ARE ADVERSELY AFFECTED BY LOW RIVER LEVELS DURING THE WINTER MONTHS.

BACKGROUND

The management of some of the large fenland drains in this Catchment involves the practice of holding levels low. This practice impacts on the ecology of these drains and can cause fish population to congregate in very high densities in any available deep areas eg. where pumped water is discharged into the South Forty Foot.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Increase depth of water by dredging operations.	NRA/Internal Drainage Boards	Provides suitable conditions for fish survival during winter months. Impacts of dredging.	Cost. Increased risk of bank slippage. Negative environmental.
Review water level control levels and the impact on flood defence of increasing winter retention levels.	NRA/Internal Drainage Boards	Provides suitable conditions for fish survival during winter months. Environmental benefit - protection of marginal plant growth. Habitat would provide protection for fish from predators.	Increased flood risk. High cost to drainage authorities of increased pumping.

ISSUE 8

THE PROPOSED DEVELOPMENT OF BOSTON LOCK WILL HAVE SIGNIFICANT IMPLICATIONS FOR THE WATER ENVIRONMENT.

BACKGROUND

Proposals are under way to consider the feasibility or otherwise of constructing a sea lock for Boston. This will obviously have implications for the NRA in terms of flood defence, land drainage, water quality and conservation interests. A number of other issues in this plan are impacted upon by these proposals.

It is important that the NRA involves itself with the planning of this project to take maximum benefit from opportunities this project might bring.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
NRA to ensure its interests are adequately represented by maintaining close liaison with the relevant organisations.	NRA/Relevant Organisations	Protection of NRA interests.	None

ISSUE 9

THE LEVEL OF PROTECTION PROVIDED BY EXISTING TIDAL DEFENCES ON THE WITHAM HAVEN AGAINST FLOODING IS BEING REDUCED BY RISING SEA LEVELS.

BACKGROUND

Along the Lincolnshire coastline sea levels relative to land levels are rising at an estimated 6mm per annum. The cumulative effect of this to the year 2030 is a 210mm rise in levels.

Existing sea defences have taken this rise in sea level into account, however, by early next century the defence levels will have been eroded and the prospect of raising the defence still higher will have to be considered.

The proposals to construct a sea lock for Boston could affect this requirement if, for example, it were to be designed with the dual purpose of providing a first line defence against high tide levels.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Accept the lower standard of protection.	NRA/Ministry of Agriculture, Fisheries & Food	None.	Increased risk of flooding.
Improve standard of defence to the justifiable design standard.	NRA/Ministry of Agriculture, Fisheries & Food	Acceptable standard of flood protection provided.	Cost.
Construct barrier in Haven (in association with Boston Lock). See Issue 8	NRA/Ministry of Agriculture, Fisheries & Food/ Lincolnshire County Council/ Boston Borough Council/ Port of Boston	Acceptable standard of protection provided against tidal flooding. Possible improvement to fluvial flood protection. Possible environmental improvement to Boston Town.	Cost. Possible adverse impact on land drainage. Possible adverse environmental impact to Haven channel.

ISSUE 10

NITRATE CONCENTRATIONS IN GROUNDWATERS EXCEED, OR ARE EXPECTED TO EXCEED 50 MILLIGRAMMES PER LITRE.

BACKGROUND

In the west of the Catchment where the limestone aquifer outcrops, it is given little protection by the thin soils and is highly vulnerable to diffuse sources of pollution. Agricultural practices within this part of the Catchment ie. the use of fertilisers has led to the presence of high concentrations of nitrates in the groundwaters.

The EC Drinking Water Directive for Nitrates requires compulsory controls where levels exceed or are at risk of exceeding the 50mg-1 standard set. Zones identified in the consultation document have been designated as Nitrate Vulnerable Zones and Nitrate Sensitive Areas by the Ministry of Agriculture Fisheries and Food. Through this designation the Ministry aim to change farming practices and water quality improvements are expected to follow.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Designate/implement Nitrate Protection Zones and Nitrate Sensitive Areas.	Ministry of Agriculture, Fisheries & Food	Reduces nitrate concentrations in groundwaters. Reduces the need to remove nitrates from drinking water sources.	Cost. Impact on agricultural activity.

ISSUE 11

A) THE LEVEL OF PROTECTION AGAINST TIDAL FLOODING ALONG THE COAST IS BEING REDUCED BY RISING SEA LEVELS.

B) LAND RECLAMATION HAS TAKEN PLACE AND PRIVATE SEA DEFENCES CONSTRUCTED, RESULTING IN DIVERSE RESPONSIBILITIES FOR SEA DEFENCES.

BACKGROUND

Existing standards of defence against tidal flooding along some lengths of the coastline between Boston and Wainfleet are below the NRA Standards of Service target. Rising sea levels will further impact upon their effectiveness.

This issue is complicated further as a consequence of successive land reclamation schemes by farmers which have resulted in one and sometimes two private sea defence structures being constructed, in front of those maintained by the NRA affording different standards of flood protection.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
The NRA needs to develop a strategy to define a sustainable line of defence. This will consider options such as: Accepting lower standards of defence against flooding. Improving standards to a justifiable design standard based on Ministry of Agriculture, Fisheries & Food indicative standards. Managed retreat.	NRA/Ministry of Agriculture, Fisheries & Food/ Private defence owners	This will provide a co-ordinated and consistent approach towards flood defences.	None.

ISSUE 12

THE STANDARD OF FLOOD DEFENCE ALONG THE LOWER RIVER WITHAM IS BELIEVED TO BE INADEQUATE.

BACKGROUND

The flood defence standards for lengths of the Lower Witham between Lincoln and Boston and its major tributaries are below the NRA Standards of Service targets. This has arisen in part as a consequence of the high flows the Witham has experienced in recent times due to changes in the catchment's characteristics. A study to assess the situation and to put forward options to resolve the situation has been initiated and its outcome is awaited.

The proposals to develop a Sea Lock for the Port of Boston will have significant implications for flood defences.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
NRA to clarify the scale of the problem and to develop and implement an appropriate strategy. This will have to consider options such as:			
Raising bank levels to improve the standard of defence.	NRA/Ministry of Agriculture, Fisheries & Food/ Railtrack/ British Rail	Reduced risk of flooding. Provide a consistent standard of defence. Possible environmental benefits.	Cost.
Construct Flood Storage Reservoirs/Washlands to attenuate high flows.	NRA/Ministry of Agriculture, Fisheries & Food	Reduced risk of flooding. Provide a consistent standard of defence. Possible environmental benefits.	None.
Accept existing standard of defence.	NRA/Ministry of Agriculture, Fisheries & Food		Increased risk of flooding.

ISSUE 13

LOCALLY INADEQUATE RIPARIAN DRAINAGE SYSTEMS EXIST OUTSIDE INTERNAL DRAINAGE BOARD AREAS. UNAUTHORISED CULVERTING, A LACK OF MAINTENANCE AND CONTINUING DEVELOPMENT GIVE RISE TO LAND DRAINAGE PROBLEMS.

BACKGROUND

Localised flooding results as a consequence of insufficient maintenance of riparian watercourses, inappropriate culverting and the insufficient capacity of watercourses to accommodate the increased surface water run-off which follows 'uncontrolled' development.

Ultimately, the responsibility to deal with these problems lie with the riparian owner. Local Authorities who have supervisory powers to resolve this problem are increasingly reluctant to do so because of its resource implications and/or the lack of expertise.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Enmain watercourses.	NRA/Ministry of Agriculture, Fisheries & Food	Management rests with responsible body.	Lengthy process. Not appropriate to The NRA's role.
Extend Internal Drainage Board area.	NRA/Ministry of Agriculture, Fisheries & Food/ Internal Drainage Boards	Management rests with responsible body.	Cost. Lengthy process. Not appropriate in all cases.
District Councils to use their powers to resolve problems.	Local Planning Authorities	Management rests with responsible body.	Cost. Lack of appropriate resource or expertise.
Riparian owners to undertake their maintenance responsibilities.	Private owners		Disjointed approach. Not always practicable.
NRA to ensure new development incorporates appropriate provisions for land drainage.	NRA/Developers	Future drainage problems are minimised. Costs built into development costs.	Does not address the ongoing maintenance needs.
NRA to liaise with Local Authorities and Internal Drainage Boards to develop on agreed approach towards this problem.	NRA/Local Planning Authorities/ Internal Drainage Boards	Future drainage problems are minimised.	None.

ISSUE 14

THE STANDARD OF FLOOD PROTECTION ALONG THE MAUD FOSTER SYSTEM IS INADEQUATE.

BACKGROUND

The standard of flood protection along the Maud Foster system approximates to a 1:10 year return period. The river is heavily silted up, not having been dredged for 50 years. A program of de-silting the watercourse started in 1994.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Improve the drainage capability of the system by:			
Dredge drainage channels.	NRA	Maintains optimum drainage efficiency.	Cost Environmental opportunities.
Undertake bank improvements.	NRA	Maintains the standard of flood protection.	May increase the risk of flooding elsewhere.
Installing a pumping station at its outfall.	NRA	Improved control of river levels.	
Provide flood washlands/ widen channels and develop berms.	NRA	Improved standard of flood protection. Environmental benefits.	
Accept existing standard of defence.	NRA	None.	Increased risk of flooding.

ISSUE 15

INADEQUATE LOCAL SEWERAGE SYSTEMS RESULT IN LOCALISED POLLUTION AND HAVE PUBLIC HEALTH IMPLICATIONS.

BACKGROUND

A number of small watercourses and ditches suffer from localised pollution because of inadequate village sewage disposal systems - a typical example of such is Swaton, where discharges to the watercourse are made from septic tank overflows. The problem manifests itself in terms of smell and appearance.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
District Councils to requisition sewerage schemes for villages affected.	District Councils/ Individual Property owners/NRA	Improvement in water quality. Co-ordinated approach.	Costs.
Individual householders to provide adequate sewage disposal facilities.	Property owners/ Developers/NRA	Improvement in water quality.	Piecemeal, unco-ordinated approach to the problem. Numerous small sewage plants provide less satisfactory effluent treatment than one large plant.
Cooperative investment in Package Treatment Plant.	Property owners/ Developers/NRA	Improvement in water quality. Co-ordinated approach.	Legal problems. Such initiatives can suffer difficulties arising from joint ownership regarding future maintenance.

ISSUE 16

THE AESTHETIC QUALITY OF THE WITHAM HAVEN IN BOSTON IS AFFECTED BY THE DISCHARGE OF RAW SEWAGE FROM PRIVATE PROPERTIES.

BACKGROUND

A number of properties in High Street, Boston have historically discharged their foul water directly to the Witham Haven, there being no suitable foul sewer to connect to. This discharge of crude sewage creates an aesthetic problem in the Witham Haven.

Anglian Water Services and Boston Borough Council are currently in negotiation to resolve this problem. If not resolved, this will have greater water quality implications if or when the 'Boston Sea Lock' is developed.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Properties to be connected to new foul sewer.	Anglian Water Services/Boston Borough Council	Improved aesthetic quality. Co-ordinated approach. Permanent solution could be achieved in a short timescale. Facilitates further development.	Cost.
Individual properties to provide their own effluent treatment.	Discharger/NRA	Improved aesthetic quality.	Piecemeal approach. Unlikely to achieve a comprehensive solution.

ISSUE 17

INADEQUATE OIL STORAGE FACILITIES WITHIN THE CATCHMENT LEAD TO SERIOUS OIL POLLUTIONS AFFECTING WATER QUALITY.

BACKGROUND

Water quality within the Catchment is intermittently affected by localised pollution incidents. Many of these incidents are oil related.

Numerous industrial and agricultural sites within the Catchment have oil storage facilities which are not adequately bunded. Accidental spillage or leakage from such tanks and occasional acts of vandalism causes pollution and subsequently environmental damage.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Carry out pro-active pollution prevention campaigns to identify potential sources of pollutants, and seek the co-operation of site operators.	NRA/Dischargers/ Developers	Reduced frequency of pollution incidents. Improved water quality. Cost savings on pollution incident investigations.	Cost of implementing pollution protection measures.
Persuade local authorities to include oil prevention measures when granting planning permission (Cross ref Issue 20).	NRA/Local Authority	Reduced frequency of pollution incidents. Improved water quality. Cost savings on pollution incident investigations.	Cost of implementing pollution protection measures. Increased enforcement required.
Increase enforcement of pollution control legislation when dealing with individual incidents.	NRA	Possible reduction in incident frequency. Some improvement in water quality. Follows 'polluter pays' principle.	Reactive and Piecemeal approach. Enforcement is not always appropriate.
Seek additional regulatory powers to require pollution prevention works, on those industrial sites not covered by pollution control legislation.	NRA/Department of the Environment	Reduced frequency of pollution incidents. Improved water quality. Cost savings on pollution incident remedial works.	Increased enforcement required.

ISSUE 18

LITTER ACCUMULATION OCCURS IN WATERCOURSES CLOSE TO URBAN AREAS.

BACKGROUND

In urban areas such as Boston and Sleaford, the general accumulation and dumping of litter along watercourses is visually and environmentally unacceptable. There is an added risk of flooding where such debris causes blockages of culverts and weed screens.

Responsibility for addressing this problem is not clear and may involve a number of bodies working together towards a solution.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Awareness campaigns (signs).	NRA/Local Councils	Low cost. Some improvements.	Limited effectiveness.
Litter removal.	NRA/Local Councils/Local Groups/Angling Clubs/Landowners	Aesthetic improvement.	Cost.
Joint ventures between NRA and district/parish councils to provide rubbish bins etc.	NRA/District/ Parish Councils	Shares the responsibility and costs of the problem. Pro-active.	None.

ISSUE 19

LAND CONTAMINATED AS A RESULT OF PAST INDUSTRIAL PRACTICES CAUSES THE WATER QUALITY IN THE TOWNS DRAIN IN BOSTON TO FAIL THE EC DANGEROUS SUBSTANCES. DIRECTIVE.

BACKGROUND

Water quality in the Towns Drain in Boston currently fails statutory Environmental Quality Standards for 'dieldrin' and 'gamma HCH' of the EC Dangerous Substance Directives (Dangerous Substance Directive 76/464/EEC). This has arisen due to the pollution of surface water from land contaminated with wood preservation chemicals. Extensive work has been carried out on the site to remedy the situation.

The first full year for compliance assessment since the improvements were completed at the site will be 1995.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Contain any further spillages. Provide continuing treatment to contaminated surface water.	Discharger	Improved water quality. Follows the 'polluter pays' principle.	Cost to the company.
Continue to monitor the situation: - surface water discharges from site - water quality in surrounding watercourses - sediment in Town's Drain/ London Road Drain	NRA	Ensures sufficient information is obtained to satisfy statutory reporting requirements. Improvements can be monitored and the need for further remediation measures can be ascertained. Monitoring costs are recovered via the NRA Charges for Discharges Scheme - follows the 'polluter pays' principle.	Cost to the company.

ISSUE 20

A) THE NRA'S VIEWS ARE NOT ALWAYS ADEQUATELY REFLECTED IN PLANNING MATTERS.

BACKGROUND

During the Planning Process the NRA, as a statutory consultee, comments upon development proposals and asks for its comments to be reflected in their planning decision. A lack of understanding by the Planning Authorities of NRA powers and by the NRA of Planning Authorities' planning criteria - occasionally leads to development proposals without appropriate constraints, placing the water environment at unnecessary risk.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
NRA increase its influence in the planning process:		Ensures sustainable development. Minimises risks to the water environment from development	None.
a) influence the formulation of National and Regional Planning Policy	NRA at a National Level/Department of the Environment	Provides a co-ordinated national approach. Provides consistency.	None.
b) seek the inclusion of NRA Guidance Notes and give regard to Catchment Management Plan issues in development plans	NRA/Planning Authorities/ Department of the Environment	Provides clear guidance to developers on the acceptable uses of land.	None.
c) agree the inclusion of NRA comments into planning decisions.	As above	Reduces the chance of inappropriate land use.	None.
NRA to become more pro-active in its planning liaison activity.	NRA	Long-term benefits. Environmental gain.	None. Short-term costs.

B) THE CUMULATIVE EFFECT OF PIECEMEAL DEVELOPMENT HAS AN ADVERSE EFFECT ON FLOOD DEFENCE, WATER QUALITY, AND CONSERVATION INTERESTS.

BACKGROUND

Piecemeal development - which involves a change in land use, occurs daily throughout the Catchment. When such development takes place it may involve the installation of septic tanks, discharge of surface water to ditches and/or their culverting. All of these are likely to change the characteristic of the Catchment. They will bring marginal increases in surface water run off, decreases in water quality and impacts on the water environment. Over time the cumulative effect of such development can lead to serious problems because the appropriate infrastructures have not been developed accordingly, water quality and land drainage problems then become apparent.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
NRA to encourage local planning authorities to adopt a strategic approach and fund infrastructure costs.	NRA/Local Planning Authority	Strategic approach. Reduced risk to water environment. Lower overall infrastructure costs.	Cost to Local Planning Authority. Not always practical.
NRA to encourage local planning authorities to adopt strategic approach and require developers to fund infrastructure costs.	NRA/Local Planning Authority/ Developers	Strategic approach. Reduced risk to water environment. Lower overall infrastructure costs.	Cost to developers. Difficult to control the funding and timing. Not always practical.
Allow piecemeal development to continue.	Local Planning Authority		Deterioration of the water environment.
NRA to undertake works and recover costs from developers.	NRA	Strategic approach. Reduced risk to water environment. Lower overall infrastructure costs.	NRA would have to raise the capital. It might be difficult to recover the costs. Lack of powers.

ISSUE 21

A) THE INCREASED USE OF THE MAUD FOSTER FOR NAVIGATION PURPOSES COULD GIVE RISE TO FLOOD DEFENCE AND WATER RESOURCE DIFFICULTIES.

B) THE BODY RESPONSIBLE FOR NAVIGATION FOR THE MAUD FOSTER AND WEST FEN CATCHWATER DRAINS IS UNCLEAR.

BACKGROUND

The NRA perceives an increased use of the Maud Foster for navigational purposes. In principle, the NRA supports the increased recreational use of waterways provided that use is controlled. Legislation defining which body is responsible for this "navigation" is unclear. Control needs to be exerted upon the navigation users to ensure boat movements from the River Witham during periods of low flow do not have an adverse effect upon water resources and to ensure boats are securely attended to or removed from the system during winter months when they could pose a problem during flood events.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Undertake survey to establish the scale of boat use and its implications for the NRA.	NRA/Internal Drainage Boards/ Others	Better understanding of the problem.	Cost.
The operating authority should manage the use of the navigation using its existing powers.	Internal Drainage Boards/Others	Effective operation of the navigation.	Legislative powers may not be sufficient. Operating authority may not be willing to accept its responsibilities.
Establish who is responsible for the navigation in the Maud Foster and East & West Fen Catchwater Drains.	Internal Drainage Boards/Others	Operational responsibility will become clear.	

ISSUE 22

BANK EROSION ON THE MAUD FOSTER AND SOUTH FORTY FOOT IS REDUCING THEIR STANDARD OF DEFENCE.

BACKGROUND

Bank protection in the form of revetment systems installed on these drains are reaching the end of their effective lives. Progressive failure of the revetment is leading to bank slips and local erosion causing excessive siltation within the channel area. Where raised flood banks are subjected to erosion the risk of a complete bank failure and flooding is increased.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Carry out bank repairs.	NRA	Maintain standards of defence. Environmental improvement opportunity. Allow continued use of channel for navigation.	Economic justification.
Allow deterioration of defence.	NRA		Reduction in standards of service.

ISSUE 23

THE RIVER WITHAM HAVEN CHANNEL IS SUFFERING FROM BANK EROSION.

BACKGROUND

Tidal defences along the Witham Haven are formed of earth banks raised to protect the adjacent low lying land.

The Haven channel, which is subjected to tides, wave action and boat wash is suffering from erosion which, if allowed to continue, would undermine the stability of the defences.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Undertake remedial works.	NRA/Ministry of Agriculture, Fisheries & Food	Maintain standards of flood defence. Maintain navigation channel.	Cost.
Allow deterioration of defence.	NRA/Ministry of Agriculture, Fisheries & Food		Reduction in standard of flood defence and increase in flood risk.

ISSUE 24

THE LACK OF FLOW INFORMATION ON THE RIVER WITHAM HAMPERS THE NRA'S ABILITY TO MANAGE RESIDUAL FLOWS TO TIDE AND SALINE INTRUSION IN BOTH THE WITHAM ITSELF AND WATERCOURSES IN THE EAST AND WEST FEN DRAINAGE SYSTEM.

BACKGROUND

At times of low summer flows saline intrusion into the lower reaches of the Witham can occur. The cause of the salinity is largely leakage through the tidal doors in Boston. The NRA can augment (increase) the flow of the Witham by transfers of water from the River Trent at Torksey via the Fossdyke canal. When operating the NRA's river transfer scheme at Torksey to augment the Witham for subsequent abstraction, the NRA manages the river in such a way as to maintain a positive flow to tide to exclude where possible, the threat from saline intrusion. There are currently no river gauging stations on the Lower Witham which could assist greater control of river flows.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Construct a flow gauging station.	NRA	Provides information on low flows to ensure an appropriate residual flow to tide; to manage saline intrusion to a minimum and provide efficient operation of river transfers. Effective management of transfers will be required as the rate of river transfers increases to meet rising demands. Improved information for flood warning purposes.	Cost.
Do nothing.			Ineffective management of resources that will become more critical as demands increase.

ISSUE 25

THE QUALITY OF WATERCOURSES IN THE CATCHMENT ARE ADVERSELY AFFECTED BY EUTROPHICATION.

BACKGROUND

Eutrophication arises as a consequence of the enrichment of water with nutrients from the surface water run-off from agricultural land and sewage treatment discharges, and the slow moving nature of watercourses in this Catchment.

Under the Urban Waste Water Treatment Directive watercourses can be designated as sensitive. This would then place an obligation on the water undertaker to undertake nutrient stripping at sewage treatment works. However, only waters receiving discharges from sewage treatment works for populations greater than 10,000 can be considered for such. In this Catchment, using this criteria only the River Witham and River Slea/Kyme Eau can be considered. Eutrophication is a difficult problem to solve - there are no quick or immediate solutions.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Gather more data from rivers which receive nutrient inputs from large sewage treatment works and press for their designation as "sensitive" under the Urban Waste Water Treatment Directive.	NRA/Department of the Environment	Data collected will demonstrate the effects of eutrophication. Designate as sensitive would necessitate further treatment of sewage by Anglian Water Services culminating in reduced levels of nutrient. Possible reduction in eutrophication.	Cost.
Promote good agricultural practises to reduce nutrient input into the watercourse.	NRA/Ministry of Agriculture, Fisheries & Food/ National Farmers' Union/Fisheries & Wildlife Advisory Group	Possible reduction in eutrophication.	None

ISSUE 26

AGRICULTURAL ABSTRACTION AND THE LOCAL WATERCOURSE ENVIRONMENT MAY BE IMPACTED UPON BY THE REDUCED FLOWS FROM WILD BOREHOLES DURING THE SUMMER MONTHS IN MINOR WATERCOURSES DRAINING TO THE SOUTH FORTY FOOT RIVER.

BACKGROUND

During the 1988-1992 drought, (taking advantage of the unusually low groundwater levels) the NRA carried out works to seal or control 30 wild boreholes across the Fen area of the South Forty Foot catchment. These boreholes had historically overflowed under artesian pressure from the limestone aquifer in an uncontrolled way (hence the term 'wild') into local watercourses and ditches. Action was taken to seal/control the borehole flow in order to conserve the high quality groundwater resources of the limestone aquifer.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Review the current use of wild borehole discharge (in both abstraction and environmental terms) and make provision for additional water release if necessary. Draw up operational rules to manage flows from selected boreholes.	NRA	Safeguarding the local water environment and existing water users rights.	None.
Do Nothing.			Existing water users and the local environment will be adversely affected.

ISSUE 27

THE DILUTE AND DISPERSE PRINCIPLE OF OPERATION AT THE SLIPPERY GOWT LANDFILL CAUSES INTERMITTENT POLLUTION OF LOCAL WATERCOURSES AND MAY HAVE OTHER ENVIRONMENTAL IMPLICATIONS.

BACKGROUND

Slippery Gowt Landfill was developed at a time when it was not considered necessary to contain leachates within landfill sites. It was accepted practice to allow leachates to move away from sites, and become diluted in the environment. There are now doubts as to the suitability of this method of leachate management.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Operators to carry out hydrogeological studies to provide a full explanation of dilute and identify all possible environmental impacts.	Site operator	A better understanding of the movement of leachate and its environmental impact, will be gained.	Cost.
Operators to improve leachate management.	Site operator	Prevent incidents of pollution.	Cost.

ISSUE 28

THE STORM SEWER OVERFLOW AT LONDON ROAD PUMPING STATION IN BOSTON WHICH DISCHARGES TO THE HAVEN OPERATES AT AN UNACCEPTABLE FREQUENCY.

BACKGROUND

Development over a number of years in Boston has increased the load upon the existing infrastructure for foul sewage. The existing system is not of the required capacity and will overflow rapidly following storm conditions.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Improve sewerage system.	Anglian Water Services	Improved water quality in Tidal Haven.	Cost.

COMMENTS

COMMENTS

COMMENTS

The National Rivers Authority

Guardians of the Water Environment

The National Rivers Authority is responsible for a wide range of regulatory and statutory duties connected with the water environment.

Created in 1989 under the Water Act it comprises a national policy body coordinating the activities of eight regional groups.

The main functions of the NRA are:

Water resources	—	The planning of resources to meet the water needs of the country; licensing companies, organisations and individuals to abstract water and monitoring the licences.
Environmental quality and Pollution control	—	maintaining and improving water quality in rivers, estuaries and coastal seas; granting consents for discharges to the water environment; monitoring water quality; pollution control.
Flood defence	—	the general supervision of flood defences; the carrying out of works on main rivers and sea defences.
Fisheries	—	the maintenance, improvement and development of fisheries in inland waters including licensing, re-stocking and enforcement functions.
Conservation	—	furthering the conservation of the water environment and protecting its amenity.
Navigation and Recreation	—	navigation responsibilities in three regions — Anglian, Southern and Thames and the provision and maintenance of recreational facilities on rivers and waters under its control.

NRA EMERGENCY HOTLINE

0800 80 70 60

NRA **24 hour emergency telephone line**

Published by the Public Relations Department of the National Rivers Authority, Anglian Region, Kingfisher House, Orton Goldhay, Peterborough PE2 5ZR. Telephone (01733) 371811.

Printed on 20% virgin, 40% pre-consumer waste, 40% post-consumer waste - totally chlorine free paper.

P110/6/95