

HUMBER ESTUARY CATCHMENT MANAGEMENT PLAN

REPORT SUMMARY - JULY 1994



NRA

National Rivers Authority

ENVIRONMENT AGENCY



099642

National Rivers Authority
Information Centre
Head Office

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INTRODUCTION

Catchment Management Planning aims to create a consistent framework within which all the NRAs functions and responsibilities can be applied in a co-ordinated manner within a particular catchment area.

The current state of the water environment and associated land is systematically analysed and compared with appropriate standards. These standards are also expressed as a vision statement for the catchment. 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 and individuals. Your views on the issues identified are welcomed. You may also wish to comment on other matters affecting the water environment in the catchment area which you think should be examined by the NRA.

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

**Bill Forbes, Area Manager,
Humber Estuary Catchment Management Plan, National Rivers Authority,
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Comments should be received by the 31 October 1994



Humber Bridge

WHAT IS CATCHMENT PLANNING?

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

Catchment management involves the NRA in working with many people and organisations and in 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
- 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.
- Determine, police, enforce and review conditions of water abstraction licences, discharge consents and land drainage consents in order to achieve operational objectives.
- Develop fisheries, promote recreation, navigation and conservation.



Trent Falls

THE CATCHMENT

This Plan covers the area down to the mouth of the Humber Estuary, which is conventionally taken as a line drawn between Spurn Point and Donna Nook, to the upstream points of salt water penetration which are Keadby Bridge on the River Trent and Boothferry Bridge on the River Ouse. For flood defence purposes only, the Plan area has been extended on the River Ouse up to Aires Mouth, as this provides a natural flood defence boundary.

Consideration is given to the impact of a range of activities that either have occurred or may occur within the flood plain ie. the area that potentially would be flooded at high water. This area is particularly important for flood defence, conservation, development, and recreation. An assessment of the importance of the Humber Estuary in terms of the quality of the North Sea is also provided.

Clearly the catchment under consideration is not a normal river catchment and contains somewhat artificial boundaries. The impact of its tributaries, the Ouse and the Trent, and also those rivers discharging from the north and south banks to the Humber itself are considered. Adjacent catchments will be considered in more detail in their own Catchment Management Plans produced by the National Rivers Authority within the next three years.

The Humber Estuary receives run-off from the Trent and Yorkshire Ouse river systems, a fifth of the area of England. This is the largest catchment of any UK



estuary. The Humber itself is a valuable resource for the community, fisheries and wildlife, and is of international importance for a number of species of birds. The location of the Estuary and the size of its input of freshwater makes the Humber of great significance in relation to the environmental management of the North Sea.

CATCHMENT VISION FOR THE HUMBER ESTUARY

The NRA's vision for the Humber Catchment during the lifetime of this Plan is to work towards the sustainable management of the Humber, balancing the legitimate interests of all who use the Estuary. To achieve this vision the following actions are considered necessary:

- To maintain and enhance the national and international status of the Estuary for its bird population and conservation interest.
- To improve existing flood defences to accommodate rising sea levels and to maintain and/or improve their structural integrity.
- To reduce the discharge of dangerous substances to the North Sea.
- To improve the water quality of the tidal Ouse.
- To restore a run of migratory salmonids, ie. salmon and sea trout, through the Humber Estuary.



Sanderling roost at Cleethorpes



Armoured defences along the Humber Estuary

- To set minimum residual flows for the Trent and Ouse which balance all water related interests.
- To ensure that the recreational potential of the Humber Estuary is fulfilled.
- To work with all relevant parties to implement the principles of sustainable development particularly by establishing stronger links with local communities and their representatives.
- To balance the needs of industrial, urban, and agricultural development with the requirements of the Humber wetlands and sites of archaeological importance.
- To provide a management strategy to ensure a sustainable population of shrimp, shellfish, and lugworm and thereby protect this valuable link in the food chain.
- To improve our knowledge of the relationship between sedimentary processes, rising sea levels, and the natural boundaries of the Estuary.



Sea Vigil

The health of the North Sea has increasingly been called into question in recent years. On occasion it has been alleged that the Humber has contributed to a decline in that health. Sometimes it has been difficult to refute the allegations; either due to their non-specific nature; or due to the limited availability of counter-balancing



Jetty and industrial area

evidence. The NRA's vision for the future for the waters of the Humber and adjacent North Sea is one where these allegations can no longer be made because:

- The record shows reducing domestic and trade effluent loads being discharged to these waters.
- The results of chemical monitoring show the restoration of water quality achieved over the past decades are being maintained and that further improvements are occurring.
- The results of biological monitoring show a healthy and diverse life throughout the waters and their sediments.
- The widespread publication of the results of monitoring and of effluent reduction programmes creates a general awareness of the well being of the Humber and the surrounding parts of the North Sea.

The Sea impinges on NRA responsibilities in other ways:

- It can breach sea defences causing flooding of the large areas of Humberside that are at or below sea level.
- It creates productive fisheries both within the Humber and in adjacent coastal waters.

The NRA will exercise its responsibilities so as to prevent or mitigate the first and to ensure the continuation of the second.

LAND USE AND DEVELOPMENT

The area covered by the Plan lies predominantly within the administrative boundary of Humberside County Council with a small area within the Lincolnshire boundary.

The Estuary itself is the third largest shipping complex in Britain. The availability of large flat areas adjacent to the deep water navigation and the proximity of water for abstraction and effluent disposal gives the Humber Bank significant potential for further expansion. The area is served by a road infrastructure providing motorways along both banks and the electrified east coast rail line.

Both banks of the Estuary are extensively developed. A 15km length of the South Bank, between the ports of Grimsby and Immingham and the jetties at North and South Killingholme, is now one of the major concentrations of industrial activity within the region. Along the North Bank, docks occupy a 4.5km length

through Hull behind which lies an array of industry typical of a large sea port - fishing, petrochemicals etc. Other notable industrial activity along the Estuary includes that of British Aerospace at Brough, the docks at Goole and the Kimberly Clark works at Barton on Humber; and along the Trent the gas fired power station under construction at Keadby and the chemical storage and blending plants at Grove and Guinness Wharves.

Agriculture throughout the catchment is mainly arable with the occasional intensive farming practice such as piggeries, poultry and horticulture. The land is low lying and relies upon artificial drainage provided by Internal Drainage Boards.



Industry and the Estuary

WATER RESOURCES

Freshwater flows to the Humber Estuary are principally from the catchments of the Yorkshire Ouse and River Trent. Both the southern industrial tributaries of the Yorkshire Ouse, and the River Trent contain significant “artificial” components. These are caused by the discharge of effluents within these catchments of water which had been imported from other catchments.

The salty nature of the water in much of the catchment limits its use for direct abstraction. There are four large industrial cooling water abstractions (two of which are power stations) direct from the Humber Estuary.



WATER QUALITY

The overall quality of the Humber Estuary is largely determined by the quality of the rivers draining via the Ouse and Trent river systems. The quality of the Yorkshire Ouse gives cause for concern. Dissolved oxygen levels have been low in the tidal Ouse for many years, largely due to the poor quality of effluent discharged from sewage treatment works on its tributaries, particularly the Aire and the Don, plus some strong organic discharges in the Selby area. The Plan identifies options for remedying this situation.

An assessment is made of the discharge of dangerous substances to the Estuary and ultimately to the North Sea. A comparison with other estuaries and options for reducing the loads of dangerous substances in effluents are provided.

In determining monitoring and management strategies for the Humber catchment, it is recognised that in the Estuary, it is the biological life that is the most valuable resource, whereas in the tributaries protection of the freshwater itself becomes more important.

Consequently monitoring of the biology of the Estuary is considered vital. The Humber Estuary is found to be very productive biologically with at least 180 species of invertebrates being recorded. The high silt content of the water results in layers of mud on the estuary bed and it is in this layer of mud that very high

densities of individuals are to be found, up to 300,000 individuals per square metres. The abundance is reflected in the number of predators which are found in the Estuary, notably birds and fish.

FLOOD DEFENCE

Within the Humber Estuary Catchment Management Plan boundary an area of some 805 square kilometres lies below high spring tide level and is therefore potentially at risk from tidal inundation. This area includes parts of Grimsby, Cleethorpes, Hull and Goole and the highly industrialised section along the South Bank between East Halton and Grimsby plus much high grade agricultural land.

The existing defences in the Estuary vary widely in both their type and size. The smallest defences are relatively low earth banks. The most complex is the Hull Barrier which is lowered at times of high risk. Much of the existing defences are fronted by mud flats and saltmarsh some of which are designated as Sites of Special Scientific Interest (SSSIs) and soon to be designated Special Protection Areas (SPAs) and RAMSAR sites. Any works to the defences must include due consideration of the effect upon these conservation areas.

Historically structures have been replaced following a major failure. The 1953 East Coast flooding resulted in significant upgrading of the Humber defences. Many of these defences are reaching the end of their design life and will require increasing repair and eventual replacement. In addition to the deterioration of the



Hull Barrage

existing defences are the effects of rising sea levels and loss of foreshore which is steadily and continuously eroding the standard of protection given.

The NRA is pursuing a holistic strategy for improving the Humber tidal defences based on an understanding of the physical processes operating within the Estuary. This will take into account the many uses of the Estuary, particularly its importance to nature conservation and wildlife.



Small fishing boat

FISHERIES

Marine species of fish dominate the composition of the fish stocks particularly in the outer Estuary, with estuarine and freshwater fish also present. The outer Estuary is of particular importance as a nursery area for North Sea plaice. Plaice, dab and sand goby are the three most abundant species. Sole and cod are also target fish for sea anglers.

Migratory fish such as eels, salmon and flounder also frequent the Estuary. The former in particular are fished for but mainly on a part-time basis. A prolific salmon fishery existed up until the end of the nineteenth century but following a significant decline no commercial fishery exists. Strategies are being proposed to restore the fishery.

The shrimp fishery is now exploited commercially although at a low level but the shell fish fishery is now much reduced following a decline in stocks.



Dunlin-Wader roost at high tide

CONSERVATION

The Humber Estuary is renowned for the bird populations which it supports both during migratory passage and as their winter residence. As such it is of national and international importance. Based on the number of birds it supports it is one of the top five estuaries in the United Kingdom.

The extensive intertidal mudflats, fringing marsh, reed bed and open water habitats provide year round sources of food, safe roosts and breeding sites for waterfowl and passerine species. The protection of these habitats is essential to the maintenance of the status of the Humber Estuary and the international importance of the bird populations. In addition, opportunities exist to enhance these habitats not only as part of the Flood Defence strategy but in collaboration with other organisations and individuals.

The importance of nature conservation in the Humber Estuary has been recognised by a number of international and national designations eg. the entire Estuary qualifies as a Special Protection Area and parts have been proposed as RAMSAR sites under the Ramsar Convention on Wetlands of International Importance. National designations include 7 Sites of Special Scientific Interest. There are also 9 Wildlife Trust reserves, a designated Heritage Coast, RSPB reserves, and part of the Upper Humber is a wildfowl refuge.

There are a large number of archaeological interests in and around the Estuary. These are potentially under threat from a range of activities and it is necessary to identify undiscovered sites prior to development work being carried out.

NAVIGATION, RECREATION AND EDUCATION

A number of specific locations attract significant visitors drawn either by the spectacular scenery or the importance of the Estuary for waders and wildfowl. In addition, the Humber Bridge is an important visitor attraction in its own right. Use of the Humber for sport and recreation remains comparatively undeveloped because the waters are difficult for navigation as a result of shifting sand banks, high levels of commercial shipping and strong tidal currents.

Recreational sea angling occurs mainly in areas of easy access and coarse fishing takes place on the drains and streams entering the Estuary and on the many lakes and pits bordering the banks.

Sailing and cruising does take place in the Estuary and the latter also in the navigable lower sections of rivers entering it. A number of marinas and moorings occur within the Estuary. In addition, the Estuary has an EEC recognised bathing water beach at Cleethorpes.

The Humber is one of the UK's foremost commercial waterways with approximately 18% of all cargo entering and leaving the UK passing through the ports and wharves of the Humber. Associated British Ports (ABP) are the navigation authority who carry out an extensive programme of depth monitoring and dredging to provide sufficient depths for safe passage of vessels.



Spurn Head

The need to recognise the existing uses and potential changes in the future has focused attention on the requirement for the many organisations and interests of the Estuary to work together and it is anticipated that this Plan will help in this process.

ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>ISSUE 1: A methodology is required to set Minimum Residual Flows to the Estuary to take account of all water uses.</p> <div data-bbox="201 556 672 932" style="border: 1px solid black; padding: 5px; margin-top: 20px;"> <p>ABBREVIATIONS USED</p> <p>ABP Associated British Ports</p> <p>EQS Environmental Quality Standards</p> <p>FRCN Fisheries, Recreation, Conservation and Navigation</p> <p>HMIP Her Majesty's Inspectorate of Pollution</p> <p>IDB Internal Drainage Board</p> <p>MAFF Ministry of Agriculture, Fisheries and Food</p> <p>MRF Minimum Residual Flow</p> <p>PML Plymouth Marine Laboratory</p> </div>	<p>R&D to define methodology and NRA to develop a River Minimum Flow Objective policy.</p> <p>Regions to develop and use existing/new methods.</p> <p>Central R & D just to develop broad framework/concept. Regions implement within that framework.</p> <p>Do Nothing.</p>
<p>ISSUE 2: To set Minimum Residual Flows for the Trent and Ouse which balance all water uses.</p>	<p>Set MRFs.</p> <p>Do nothing.</p>

ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>ISSUE 3: The level of accuracy of gauging of freshwater flows to the Estuary needs to be improved</p>	<p>Ouse: Calibration and continuous upgrading of quality of flow measurements at the tidal limits</p> <p>Trent: Improve NMuskhams from open channel rated sections to ultrasonic flow gauge</p> <p>Do nothing</p>
<p>ISSUE 4: Water quality of the Tidal Ouse requires improvement</p>	<p>Reduce effluent loads</p> <p>Increase river flows</p>
<p>ISSUE 5: Cleethorpes bathing beach fails the European Bathing Water Directive <i>Note:</i> Completion 1995</p>	<p>Improve sewerage and sewage treatment at Cleethorpes</p>
<p>ISSUE 6: Reduce the discharge of dangerous substances ultimately to the North Sea</p>	<p>Reduce discharges of dangerous substances in effluents by application of:</p> <ul style="list-style-type: none"> a) Best available techniques b) Waste minimisation programmes c) Integrated Pollution Control <p>Do nothing</p>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
NRA	Small improvement in accuracy of measurement	Cost to NRA
NRA	Improved accuracy of measurement Improved control of abstractions under licences with flow restrictions	Cost to NRA Insufficiently accurate measurement of flows to the Estuary
NRA/Yorkshire Water Industry NRA	Achieve objectives Increased dilution	Cost to dischargers Restriction of abstractions Cost of augmentation
NRA/Anglian Water Services	Bathing water complies with targets	Cost
NRA/HMIP/Dischargers	Reduce concentration in food chain Reduce input to North Sea Achieve EQS Reduce costs to industry	Cost Cost to industry increases as concentration decreases Viability decreases as concentration decreases UK fails to meet its commitment to the Ministerial declaration on the North Sea

ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>ISSUE 7: Nutrient data are inadequate to determine the eutrophic status of the Humber Estuary and its adjacent coastal waters for Urban Waste Water Directive and North Sea Declaration purposes</p>	<p>Use existing NRA nutrient data to establish status</p> <p>Use all data readily available from NRA, MAFF (JoNuS project)¹ and PML (LOIS project)²</p> <p>Continue existing monitoring for three more years</p> <p>Increase monitoring</p> <p>Do nothing</p>
<p>ISSUE 8: Different standards of flood protection are ascribed to adjacent lengths of flood defences because the responsibility for flood defences rests with a number of organisations</p>	<p>Form a unitary authority to be responsible for all sea/tidal defences</p> <p>Liaise with other bodies and try to mutually agree approach and standards</p> <p>Do nothing</p>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
NRA	Quick Cheap	Uses only some of the existing data High risk of wrong result
NRA	Makes best judgement of status currently possible	Risk of wrong result due to short time frame of data
NRA/PML	Create a five year data set on which to judge status Reduces risk of bias due to 1992 or 1993 being abnormal years	No final decision for three years No reduction in monitoring costs
NRA/PML	Shortens time frame within which a decision could be made Increases robustness of decision No new expenditure on monitoring Existing expenditure is reduced	Increased cost Very high risk of wrong result and inappropriate expenditure on effluent improvement
NRA/Government	Consistency of purpose and standards One stop shop for customers	Resource and set up costs Legislative change required
NRA/Riparian owners/ Local Authorities	Consistency of purpose and standards One stop shop for customers No resource implications	Limitations of existing legislation Obtaining third party commitment to increased investment An uncoordinated and inconsistent approach toward determining standards and levels of defence will remain

ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>ISSUE 9:</p> <p>a) Existing defences will need to be substantially improved if the NRA is to maintain standards to accommodate rising sea levels</p> <p>b) The structural integrity of the defences needs improving to lessen the risk of flooding due to their failure through reaching the end of their useful life</p>	<p>Improve existing defences to the justifiable design standard</p> <p>Accept the reduced standard of protection and maintain at the reduced standard</p> <p>Consider managed retreat</p> <p>Patch and repair defences / do little</p>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
<p>NRA /ABP/Industry/ Crown Estates</p> <p>NRA/ABP/Industry/ Crown Estates</p> <p>NRA/ABP/Industry/ Crown Estates</p>	<p>This will optimise the level of protection</p> <p>Lower cost than above option in the short term Effectiveness of flood warning will decrease</p> <p>Possible environmental gain</p>	<p>Cost May have adverse effect on other coastal processes</p> <p>Increased risk of overtopping Increased likelihood of sudden failure with consequent risk to life and property</p> <p>Possible environmental loss Detrimental to landowners and the community Limited option, not always appropriate Legal framework unclear Effect on coastal processes is unknown</p>
<p>NRA/Others</p>	<p>Maintains the status quo</p>	<p>Possible environmental loss Detrimental to landowners and community Limited option, not always appropriate Effect on coastal processes is unknown Increased risk of flooding</p>

ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>ISSUE 10: Defences need to be protected from increased wave attack brought about by the erosion of the foreshore</p>	<p>Improve existing defence</p> <p>Undertake works to the foreshore</p> <p>Consider managed retreat</p> <p>Do nothing</p>
<p>ISSUE 11: Insufficient information exists on the relationship between sedimentary processes, freshwater flow, rising sea levels and Estuary boundaries</p>	<p>Initiate a study to predict the impact on flood defences, navigable channels and estuarine habitats</p> <p>Wait and see</p>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
NRA/Others	Maintains existing level of protection	Cost May have an adverse effect on other coastal processes
NRA/Others	Maintains existing level of protection Maintains environmental benefit of foreshore	Environmentally contentious
NRA/Government/Others	Possible environmental gain	Possible environmental loss Detrimental to landowners and the community Limited option, not always appropriate Legal framework unclear Effect on coastal processes is unknown
NRA/Government	Possible environmental gains	As above Reduced standard of protection
NRA/English Nature/ABP/ Local Authorities/MAFF	Improved knowledge of impact will aid the decision making of all parties Could produce a coordinated approach by interested parties There may be greater benefit to all parties by waiting for improved understanding of the processes involved Provides time for a management framework for the Estuary to be established	The long term cost/benefit of any study is indeterminate Lack of any suitable modelling techniques May be long term cost disadvantages Reduced level of protection Reactive works may prove more expensive Environmental loss Increased possibility of breaches with consequent risk to life and property Continued high cost of dredging

ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>ISSUE 12: Coastal erosion along the Holderness Coast is linked to the overall sediment balance in the Humber Estuary Demands to provide coastal protection along that coastline may conflict with the flood defence and environmental needs of the Estuary</p>	<p>Initiate a study to evaluate the extent of the problem</p> <p>Wait and see</p>
<p>ISSUE 13: Development and upgrading of land behind defences may be inconsistent with the current level of protection afforded</p>	<p>Liaise with Planning Authorities to ensure there is consistency between Structure Plans and Catchment Management Plans</p> <p>Encourage appropriate development in low risk areas</p> <p>Improve the standards of the defence</p> <p>a) Through Developer contributions</p> <p>b) Through Local Council funding</p> <p>c) Through NRA funding</p>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
NRA/Others	<p>Improved knowledge will aid the decision-making of all parties</p> <p>There may be greater benefit to all parties by waiting for improved understanding of the processes involved</p> <p>Provides time for a management framework for the Estuary to be established</p>	<p>The long term cost-benefit of any study is indeterminate</p> <p>Lack of suitable modelling techniques</p> <p>May be long term disadvantages</p> <p>Reduced level of protection</p> <p>Reactive works may prove more expensive</p> <p>Environmental Loss</p> <p>Increased possibility of breaches with consequent risk to life and property</p>
NRA/Planning Authorities	Consistent approach	
Local Planning Authorities/NRA	<p>Environmental benefits</p> <p>Reduced risk to new development</p>	
NRA/Others	<p>Developer pays</p> <p>Coordinated approach can be most realistic and appropriate way of obtaining development funds</p>	<p>Cost to individual companies may be too high</p> <p>Competing Local Authority priorities</p> <p>Unrealistic</p>

ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>ISSUE 14: Opportunities exist to improve the conservation value of the Estuary</p> <p>Sub-issue 1: Embankment of the Estuary has lead to the loss of complex wetland habitats such as saltmarshes</p> <p>Sub-issue 2: Opportunities exist to improve the habitat diversity of coastal corridors</p>	<p>Managed retreat to natural profile or new line of defence</p> <p>Managed creation of new habitats on landward side of bank on the back of capital and maintenance schemes e.g. borrow pits, tidal storage/flushing reservoirs</p> <p>Maximisation of existing wetland habitats through joint projects e.g. Barton Claypits</p> <p>Encourage landowners to restore/create wetlands and grazing marshes on either side of embankments</p> <p>New embankments or repair to existing structures to be to a varying profile with less steep slopes</p> <p>Review the design and management of NRA banks</p> <p>Restore and enhance during maintenance or Capital works</p>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Landowner/NRA/MAFF/ Countryside Commission/Govt	Restoration of wetland habitats Full integration of salt to freshwater flora and fauna	Cost Limited number of viable sites Full impact unknown Effects on rural economy
NRA/Landowner/MAFF/ Countryside Commission	Restoration of freshwater habitats Increased integration of bird fauna e.g. high tide feeding roosting sites	Cost Partial solution
NRA/English Nature/ Landowners/County Trust/ Local Authorities/ Countryside Commission	Maintenance / enhancement of target species e.g. bittern, bearded tit etc. Development of management expertise	Cost Partial solution
Landowners/NRA/MAFF/ Countryside Commission etc.	Restoration of wetland habitats Increase integration of bird fauna	Cost Partial solution
NRA/Riparian owners/District Councils /Crown Estates/MAFF	Suitable for hay cropping Increased environmental asset	Cost
NRA/MAFF	Identify conservation improvements	Cost
NRA	Increased environmental asset	Cost

ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>ISSUE 15: Silt build up in havens restricts access to recreational craft and inhibits land drainage</p>	<p>Creation of tidal storage/flushing lagoons to prevent silt build-up</p> <p>Dredging tidal channels</p> <p>Re-align tidal channels with training walls</p> <p>Pumped freshwater outfall to tide</p>
<p>ISSUE 16: Industrial, urban and agricultural development may have an adverse effect on the local environment, for example loss of Humber wetlands and sites of archaeological importance</p>	<p>Work with other interested parties to create coordinated land-use strategies</p> <p>Develop zonal restrictions</p>

ISSUES AND OPTIONS

ISSUE	OPTIONS
ISSUE 16 continued	Encourage landowners to create sanctuary areas
<p>ISSUE 17: Managed exploitation of shrimp, shellfish and lugworm would allow sustainable development and protect natural predators e.g. birds and fish</p>	<p>Research/monitor</p> <p>Investigate methods of Regulation</p> <p>Zone areas for exploitation</p> <p>Develop Marine Nature Reserves</p>
<p>ISSUE 18: The suitability of fish and shellfish for human consumption has been reduced by bacteria and other contaminants</p>	<p>Research/Monitor</p> <p>Improve quality of effluent</p> <p>Do nothing</p>
<p>ISSUE 19: Flounder populations have declined on watercourses where free access from the Estuary has been restricted</p>	<p>Construct 'fish passes' as appropriate'</p> <p>Do nothing</p>
<p>ISSUE 20: Insufficient information exists on fish species in tidal rivers and the Humber Estuary</p>	<p>Research/study fish populations</p> <p>Do nothing</p>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Land owners/NRA/English Nature/Countryside Commission/Local Authorities	Reduced disturbance Benefits to other flora and fauna	Cost Limitation on development
Sea Fisheries Committee/ MAFF/NRA Sea Fisheries Committee/ MAFF/NRA Sea Fisheries Committee/ MAFF/NRA MAFF/NRA	This will lead to a better understanding of the Estuary's fisheries Lead to sustainable exploitation Target suitable and effective regulation Protect sanctuary areas Strategic approach to exploitation Protect sanctuary areas Strategic approach to exploitation	Time to react to known over exploitation Restriction to Commercial Fisheries Restriction to Commercial Fisheries
Environmental Health/ MAFF/NRA/Research establishments NRA/Dischargers	Assess suitable consumption levels Reduced contamination No expenditure	Cost Potential restriction on Commercial Fisheries Cost to dischargers Potential health risk
NRA/MAFF	Develop free passage for fish species No expenditure	Cost No re-establishment of flounder population
Sea Fisheries Committees	Improved understanding No expenditure	Cost Less understanding No data for management

ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>ISSUE 21: The run of migratory salmon through the Humber Estuary has declined since the 19th century</p>	<p>Improve water quality around Trent Falls and Lower River Ouse to facilitate free passage</p> <p>Provide free passage at obstructions at all stages of the tide</p> <p>Control exploitation via Net Limitation order or by laws</p> <p>Develop a Humber Salmonid recovery group</p>
<p>ISSUE 22: The recreational potential of the Estuary is not fully developed</p> <p>Sub-issue 1: A coordinated strategy for the development of recreational uses of the Estuary is required</p> <p>Sub-issue 2: Footpath access is restricted on some embankments particularly to disabled persons</p> <p>Sub-issue 3: Potential conflicts exist between recreational activities and other users</p>	<p>Study present and potential uses</p> <p>Provide better footpaths using small stone material</p> <p>Provide better gate access</p> <p>Provide car parks</p> <p>Work with other interested parties to develop management strategies</p>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
<p>NRA/Effluent dischargers</p> <p>NRA</p> <p>NRA/North Eastern Sea Fisheries Committee</p> <p>NRA</p>	<p>General environmental benefit</p> <p>Passage for migratory fish to spawning grounds</p> <p>Limit exploitation until recovery is strong enough to support sustainable fishery</p> <p>Co-ordinate the recovery of migratory fish</p>	<p>Cost to dischargers</p> <p>Cost</p>
<p>NRA/Local Authorities/ Sports Council</p> <p>NRA/Local Authorities/ Sports Council</p> <p>NRA/Local Authorities/ Sports Council</p> <p>NRA/Local Authorities</p> <p>County Councils/Local Councils/ NRA/Recreational organisations</p>	<p>Better understanding of present and future requirements</p> <p>Provide better access to all users</p> <p>Provide better access to all users</p> <p>Provide better access to all users</p> <p>Strategic approach Reduce conflicts Protect sensitive areas</p>	<p>Cost</p> <p>Cost May provide access for inappropriate users</p> <p>Cost</p> <p>Cost</p>

ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>ISSUE 23: The educational value of the Estuary has significant potential for future development</p>	<p>Assess the Educational Potential</p> <p>Increased involvement in existing facilities</p>
<p>ISSUE 24: Enforcement of the commercial eel fishery is not consistent</p>	<p>Develop a coordinated and consistent approach to enforcement</p>
<p>ISSUE 25: The potential to reclaim land along the Estuary poses a threat to its flora and fauna</p>	<p>Control land reclamation through liaison with local planning authorities</p> <p>Allow development without stringent controls</p> <p>Discourage land reclamation</p>
<p>ISSUE 26: Development on areas of contaminated land has the potential to pollute, but provides opportunity to clean up existing problems</p>	<p>Persuade Local Authorities not to allow building on contaminated land</p> <p>Ensure the pollutants within the site are effectively contained</p> <p>Ensure the pollutants within the site are effectively removed</p> <p>Seek legislative change</p>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
<p>NRA/Local Councils</p> <p>NRA/Others</p>	<p>Maximise educational potential</p> <p>Greater understanding</p>	<p>Cost</p>
<p>NRA</p>	<p>Improve understanding of exploitation</p> <p>Develop consistent arrangements for eel fishermen</p>	<p>Potential increase of restrictions on eel fishermen</p>
<p>NRA/Local Planning Authorities</p> <p>Local Planning Authorities/NRA/Developer</p> <p>Local Planning Authorities/NRA</p>	<p>Controlled economic development Protection for flora and fauna</p> <p>Unrestricted economic development</p> <p>No threat to flora and fauna No change to siltation and erosion patterns</p>	<p>Changes to Estuary flow patterns may lead to siltation at havens Potential loss of habitat</p> <p>Loss of habitat, flora and fauna Siltation and erosion patterns may be changed</p> <p>Economic development hindered</p>
<p>NRA/Local Planning Authorities/Government</p> <p>NRA/Local Planning Authorities/Developer</p> <p>NRA/Local Planning Authorities/Developer</p> <p>NRA/Government</p>	<p>Risk of pollution not increased</p> <p>Reduced risk of pollution</p> <p>Reduced risk of pollution Cleans up existing problems</p> <p>Reduced risk of pollution</p>	<p>Does not permit land reclamation</p> <p>Cost Residual risk of pollution</p> <p>Cost</p> <p>Timescale of change for legislation</p>

ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>ISSUE 27: Development involving the controlled storage and transportation of hazardous materials within the catchment may create a pollution and health and safety risk</p>	<p>Ensure appropriate pollution prevention measures are in place</p> <p>Ensure high risk sites are situated in areas with appropriate flood protection</p> <p>Ensure adequate emergency procedures are in place and publicised</p>
<p>ISSUE 28: There is a need to improve liaison with local planning authorities in order that NRA recommendations are adequately considered in the planning process</p>	<p>To increase NRA influences in the planning process</p> <p>a) by contributing to the formulation of National Planning Policy</p> <p>b) by seeking the inclusion of NRA policies into development plans</p> <p>c) by agreeing the inclusion of NRA comments in planning application decisions</p> <p>Encourage environmental enhancements as part of development/redevelopment</p>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
<p>NRA/Local Planning Authorities/ Developer/Operator</p> <p>NRA/Local Planning Authorities/ Developer</p> <p>NRA/Emergency Services/ Local Authorities/Developer/ Site Owner</p>	<p>Reduced risk of pollution</p> <p>Reduced risk of pollution</p> <p>Effective response to emergency incidents</p>	<p>Cost</p> <p>Restriction of development</p> <p>Cost</p>
<p>Dept of Environment/NRA</p> <p>Dept of Environment/NRA</p> <p>NRA/Local Planning Authorities/</p> <p>NRA/Local Planning Authorities</p> <p>NRA/Developers</p>	<p>Reduced planning and operational costs</p> <p>Clear guidance for landowners and developers on acceptable uses of land</p> <p>New development/redevelopment would have regard to constraints aimed at conserving the water environment</p> <p>Reduces chance of inappropriate use of land</p> <p>New development/redevelopment would have regard to constraints aimed at conserving the water environment</p>	

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 8 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

NRA EMERGENCY HOTLINE

0800 80 70 60

24 hour emergency telephone line