

YARE CATCHMENT MANAGEMENT PLAN

CONSULTATION REPORT SUMMARY



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.

The current state of the water environment and associated land is 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 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 with your comments to the following address, from which a full copy of the consultation report may also be obtained:

Yare Catchment Management Plan, Area Manager, National Rivers Authority, Eastern Area, Cobham Road, Ipswich, Suffolk IP3 9JE.

Comments must be received by 20 April 1994.



Norfolk Broads

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 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 against 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.



Ant Mouth - Confluence of the Rivers Ant and Bure

- Determine, police, enforce and review conditions of water abstraction licences, discharge consents and flood defence consents in order to achieve operational objectives.
- Develop fisheries; promote recreation, navigation and conservation.
- Influence planning authorities to control development through Town and County Planning legislation.

THE CATCHMENT

The Yare catchment consists of three major freshwater catchments. The River Waveney in the south, the Rivers Yare and Wensum which combine at Norwich and the River Bure to the north. Land use in the area is predominantly



agricultural with slightly heavier soils and more intensive livestock production in the south of the area within the Waveney catchment.

A large proportion of the plan area is environmentally important and the tidal reaches of the rivers form one of Europe's most important lowland wetlands, designated with the same status as a National Park. The catchment also contains the Broads Environmentally Sensitive Area and many Sites of Special Scientific Interest.

In Broadland much of the area is below sea level and potentially at risk from tidal flooding.

There is an extensive tourist industry with visitors being attracted by the opportunities for boating, walking, fishing and general sight-seeing.

CATCHMENT FACTS

Area 3181km²

Population 604,723 (1991)

WATER QUALITY

Length of river in National Water Council (NWC) Class for 1992

| Class: | km | Class: | km |
|----------------|------|----------|------|
| 1A (very good) | 72.5 | 3 (poor) | 24.1 |
| 1B (good) | 27.5 | 4 (bad) | 0 |
| 2 (fair) | 110 | | |

Note: Minor tributaries not included.

WATER QUANTITY

| | |
|----------------------------------|--|
| Availability: Groundwater | Water available in some parts of the catchment |
| Surface water | Some winter water available but none available in the summer |

FLOOD PROTECTION

| | |
|------------------------------------|---------------------------|
| Length of designated main river | 578km (maintained by NRA) |
| Area Protected from Tidal Flooding | 21,300ha |
| Length of tidal embankments | 240km |
| Length of fluvial embankments | 70km |

FISHERIES

| | | | |
|----------------------------|------|--------------------------|-------|
| Length of salmonid fishery | 95km | Length of coarse fishery | 252km |
|----------------------------|------|--------------------------|-------|

CONSERVATION

Sites of Special Scientific Interest (SSSI) 91

LAND USE

The catchment is predominantly rural with nearly 40% of the population living in the City of Norwich and the major towns of Great Yarmouth and Lowestoft.

INFRASTRUCTURE

The major centres of population, Norwich, Great Yarmouth and Lowestoft are linked by passenger rail services.

The major road, the A47 runs east-west across the catchment linking Norwich and Great Yarmouth. The A47 has recently benefitted from major improvements, including the Norwich Southern Bypass, and the proposed Norwich Inner Ring Road, Wroxham Bypass and the dualling of the A47 Acle Straight will further enhance the road network.

There is a statutory navigation on the rivers Yare, Bure and Waveney under the jurisdiction of the Broads Authority.

DEVELOPMENT

The total population within the catchment is approximately 605,000 with 23 5000 being located in the main towns. The structure plans for the area allow for 69,000 new housing units by the year 2006.



Breydon Water - mouth of the Yare

WATER QUALITY

The supply of good quality water for public water supply is of major importance. Large abstractions of water are undertaken by the water companies from the Rivers Wensum, Bure and Waveney, Fritton Lake and Ormesby Broad as well as from several groundwater sources.

The catchment's rivers generally meet quality targets. However two major ports, significant areas of industry and the predominance of agricultural activities within the catchment, make it essential that pollution risks are minimised if acceptable water quality is to be maintained. There is a problem with over-enrichment of some waters with nitrates and phosphates from agricultural runoff and treated sewage, as exemplified by the rivers of the northern Broads where restoration schemes have been planned or are underway.



Of particular note are the presence of rivers which meet Class 1A targets, including the upper reaches of the River Wensum which have recently been designated a Site of Special Scientific Interest.

WATER QUANTITY

Water resources within the catchment are derived from both surface and groundwater. Overall, sufficient groundwater resources exist in the catchment to meet predicted demands, although some localised areas are assessed to be fully committed. Additional surface water is only likely to be available during the winter months unless low flows are ameliorated by river support pumping. Developments will need to be carefully sited to achieve the right balance between the needs of the environment and those of the abstractor.



As well as considering the level of resource availability all abstractions are subject to increasing environmental consideration. The investigations currently underway at Redgrave and Lopham Fen SSSI have highlighted the need for the protection of the catchment areas for wetland sites of conservation interest by minimising the impact of groundwater abstraction.

FLOOD DEFENCE

The fluvial (freshwater) reaches of the Rivers Yare, Wensum, Bure and Waveney together with their major tributaries, combine to form a total length of 358 kms and drain a total of 2,320 kms²

Much of Broadland and Great Yarmouth is susceptible to flooding. The most damaging flooding is associated with high sea levels resulting in saline inundation. The principal tidal rivers are flanked by some 240km of tidal embankments which in turn defend about 21,300 ha of land. Many of the existing defences within Broadland are at risk of being overtopped by floods with return periods of 5 years or less. The deteriorating situation lead to the initiation of a flood alleviation strategy for Broadland in 1991 to consider the options. One option places a barrier across the Yare whilst another requires a barrier across the Bure with the use of Haddiscoe as a washland. Both these options include the widening and strengthening of flood banks. The Local Flood Defence Committee has decided to develop the Yare barrier option, which will necessitate further engineering studies and will be subject to a public enquiry.

The NRA is keen to improve



Fisheries interests extend from the uppermost reaches downstream to the salinity limits for freshwater fish. Different habitats within all rivers are used for spawning and as juvenile areas whilst adult fish of different species are found throughout the rivers Yare, Wensum, Waveney and Bure. The Broads are an important recreational Fishery and support populations which include common bream, roach and pike. Commercial eel fishing also takes place in the Broads. Species such as barbel, chub and grayling have established populations from introduced stock.



Upper River Bure

ISSUES AND OPTIONS

This section of the plan considers options to address the issues that have been raised in the preceding sections. The options as presented are the initial thoughts of the Anglian Region of the NRA and do not constitute policy statements. It must be re-emphasised that at this stage, it is not the objective to present a detailed programme of action or to prioritise the issues and options identified. It is recognised that considerable consultation and negotiation will be necessary before an acceptable and practicable action plan can be drawn up. This will be the next stage. Comments on the issues and options are therefore requested together with any new ideas/ suggestions.

Wherever possible the body responsible for carrying out each option has been identified. In some cases 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.

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|---|---|
| <p>Issue No. 1: R Wensum - Taverham to Mile Cross Bridge (Norwich) R Tud - Honingham to R Wensum Failure to meet nitrate levels laid down in EC Surface Water Directive</p> | <p>Derive a nitrogen "budget" for these rivers</p> <p>Application of nutrient removal requirements, under E.C. Urban Waste Water Directive, to appropriate sewage treatment works</p> <p>Use of EC Nitrate Directive for limiting nitrogen application by farmers in designated areas</p> |
| <p>Issue No. 2: Wendling Beck Failure to achieve target class and predicted biological score</p> | <p>Survey in upper catchment to identify polluting sources</p> <p>Improvements to Dereham STW to meet River Needs consent limits</p> |
| <p>Issue No.3: R Tud - Headwaters to Mattishall Failure to meet target class, fishery classification and predicted biological score</p> | <p>Monitor effluent from Mattishall STW to assess improvements resulting from recent extensions to the works</p> <p>Pollution survey upstream of Mattishall STW</p> |
| <p>Issue No. 4: R Tiffey - Wymondham to River Yare Failure to meet target class and predicted biological score</p> <div data-bbox="230 1358 664 1465" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>ABBREVIATIONS For key to abbreviations please see page 50.</p> </div> | <p>Assess improvements to water quality in 1996 after completion of planned improvements to Wymondham STW</p> <p>Ensure best compliance with river needs consent limits, set on Wymondham STW, until completion of planned improvements</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|----------------|--|--|
| NRA | Identifies significant nitrogen sources for targeting action | <ul style="list-style-type: none"> i) Cost to NRA. ii) Potential cost to AWS Ltd and agriculture |
| NRA/AWS | Reduction in nitrogen loading on rivers | <ul style="list-style-type: none"> i) Cost to AWS ii) No guarantee of improvement |
| NRA | Reduction in river nitrogen levels | <ul style="list-style-type: none"> i) Cost to farmers ii) Possible difficulty in enforcement iii) No guarantee of improvement |
| NRA AWS | Action can be targeted Compliance with class objectives | <ul style="list-style-type: none"> i) Cost ii) Potential cost to dischargers Cost |
| NRA | Identifies source of problem | Cost |
| NRA | Identifies possible problem sources and targets action | <ul style="list-style-type: none"> i) Cost ii) Potential cost to dischargers |
| NRA | Identifies whether present problem has been resolved | Cost |
| AWS | No further deterioration in water quality | Cost |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|--|--|
| <p>Issue No. 5: Intwood Stream Failure to meet target class</p> | <p>Improvements to Swardeston STW to meet target class River Needs consent limits</p> |
| <p>Issue No. 6: R Tas Headwaters to Fornsett St Mary Failure to meet target class and fishery classification</p> | <p>Survey to identify polluting sources</p> |
| <p>Issue No. 7: River Chet - Loddon By Pass. Failure to meet predicted biological score.</p> | <p>Pollution survey</p> |
| <p>Issue No 8: River Tat, Tatterford Common - Failure to meet predicted biological score</p> | <p>Pollution survey</p> |
| <p>Issue No 9: River Wensum - A1065 Road Bridge. Kings Beck - Kings Bridge Failure to meet predicted biological score</p> | <p>Liaise with IDBs over possible adverse affects of their works programme</p> |
| <p>Issue No. 10: Concern that bacteriological requirements for water contact sports are not met in tidal R Yare</p> | <p>Derivation and application of statutory quality objective, related to water contact sports, in River Yare from Brundall to Rockland Broad</p> |
| <p>Issue No. 11: Concern over risk to R Wensum by Attlebridge waste disposal site</p> | <p>Monitoring to assess changes in groundwater quality away from site</p> <p>Implementation of contingency plan if required</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|--|---|---|
| AWS | Compliance with target levels | Cost |
| NRA | Targets action | i) Cost ii) Potential cost to discharge |
| NRA | Identifies source of problem | Cost and staff resource |
| NRA | Identifies source of problem | Cost and staff resource |
| NRA/IDB | Improved habitat | Resource costs |
| DoE/NRA AWS | Target level identified Achievement of target levels | Possible additional costs of sewage treatment in area |
| NRA/WRA/Site Operator Site Operator | Identifies need for action Safeguards River Wensum | Cost Cost |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|--|---|
| <p>Issue No. 12: Possible risk to participants in water sports, including swimming in rivers particularly in Norwich area in the catchment</p> | <p>Ban all water contact sports in Norwich including swimming</p> <p>Achieve a bacteriological quality in the river which presents no risk to swimmers etc.</p> <p>Management policy to be derived to cover water contact sports within Norwich</p> <p>Mount public awareness campaign of the physical and health dangers</p> |
| <p>Issue No. 13: Mercury in tidal River Yare from past discharges to foul sewer in Norwich</p> | <p>Do nothing apart from navigational dredging</p> <p>Removal of contaminated sediments</p> <p>Planned programme of management with Broads Authority to include navigational dredging</p> |
| <p>Issue No. 14 and 18: Water Quality in the Broads area is required to be of an appropriate quality to allow Broads restoration objectives to be met</p> | <p>Setting of appropriate non-statutory quality targets for specific areas in Broadland</p> <p>Setting of statutory quality objectives when available in Broadland</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|--|---|---|
| <p>NRA/Norwich City Council</p> <p>NRA/City Council/AWS</p> <p>NRA/City Council</p> <p>NRA/Local Authorities</p> | <p>No risk to health</p> <p>No risk to health</p> <p>Clear objectives</p> <p>Clear statement of risks</p> | <p>1) Difficult to enforce 2) Some participants are willing to accept a slight risk</p> <p>Impossible to achieve due to urban nature of area.</p> <p>Cost</p> <p>Cost</p> |
| <p>NRA</p> <p>NRA</p> | <p>No cost</p> <p>Reduced level of mercury in river</p> | <p>Increased capacity for methyl mercury production</p> <p>i) Unlikely to be successful ii) Disturbance likely to temporarily increase methyl mercury production</p> |
| <p>NRA/Broods Authority</p> | <p>Reduced capacity for methyl mercury production</p> | <p>Additional costs to routine dredging programme</p> |
| <p>NRA/Broods Authority</p> <p>NRA/Broods Authority</p> | <p>Enables long term ecological targets to be met</p> <p>i) Enables meaningful long term ecological targets to be met ii) legally enforceable</p> | <p>Not legally enforceable</p> <p>Could result in long term non compliance or the need to set short term interim limits</p> |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|---|---|
| <p>Issue No 15: R Bure - Horning to Ant Mouth R Ant - Barton to Ant Mouth Failure to meet predicted biological score and fishery classification due to eutrophication</p> | <p>Continuation of R&D programme, in conjunction with Broads Authority, to lead to eventual restoration of water quality</p> |
| <p>Issue No. 16: R Thurne Failure to meet fishery classification due to enrichment and elevated ammonia levels</p> | <p>Continue to participate in R&D programme with Broads Authority and continue active participation in Thurne Broads Management Group</p> |
| <p>Issue No. 17: Increased salinity in River Bure above Thurne mouth</p> | <p>Investigate fresh water flow requirement and set appropriate MAFs</p> <p>Allow further upstream movement of saline water to new agreed limits</p> |
| <p>Issue No. 19: Production of intermittent algal toxins in Hickling Broad which result in extensive fish mortalities</p> | <p>Enhancement of existing fish refuge</p> <p>Long term improvements within the catchment to decrease the salinity which encourages toxin release</p> |
| <p>Issue No 20: Maintenance of acceptable levels of salinity in Halvergate Marshes system</p> | <p>Do nothing</p> <p>Appropriate management strategy to be adopted by farmers in the area</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|--|--|---|
| NRA and Broads Authority | Achievement of Broads restoration objectives | Cost |
| NRA and Broads Authority | Achievement of Thurne Broads restoration objectives. | Cost |
| NRA NRA/Broads Authority | Ability to plan for increased fresh water flow No direct costs | Cost and potential cost for increasing fresh water flow 1) Possible inability to restore South Walsham Broad 2) Possible adverse effects on Suffolk Water Company intake Horning 3) Adverse effects on fisheries |
| NRA NRA/Broads Authority | Reduction in number of fish killed Reduction in number of fish killed | 1) Inadequate water resource 2) Only of local benefit Potential cost to farmer/IDB? |
| MAFF/NRA/IDB/Broads Authority MAFF/NRA/IDB/Broads Authority | No cost Agreed chloride levels achieved | Continues present unacceptable situation Conflicting interests by farmers in the area |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|--|--|
| <p>Issue No. 21: R Waveney - Roydon to Billingford. Failure to meet target class, fishery classification predicted biological score</p> | <p>MAF to be assessed to take account of effluent dilution and environmental requirements</p> <p>River flow to be maintained above assessed MAF.</p> |
| <p>Issue No. 22: Failure to meet fisheries classification</p> | <p>MAF to be derived to take account of effluent dilution and river flow to be maintained above derived MAF</p> <p>Improved effluent quality from sewage treatment works & industry</p> |
| <p>Issue No. 23: R Waveney - Bungay to Beccles Exceedance of nitrate level required under E.C. Surface Water Directive</p> | <p>Nitrogen "budget" required for Waveney</p> <p>Application of nutrient removal requirements, under EC Urban Waste Water Directive, to appropriate STWs</p> <p>Use of EC Nitrate Directive for limiting nitrogen application by farmers in designated areas</p> |
| <p>Issue No 24: River Dove, Thorndon Watercourse - Cat Bridge Low river dilution of sewage and industrial effluents causes failure to meet predicted biological score</p> | <p>MAF to be derived to take account of effluent dilution and river flow to be maintained above derived MAF</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|--|--|--|
| <p>NRA</p> <p>NRA/Abstractors</p> | <p>Derived river flow figure can be used to plan action</p> <p>Compliance with target levels</p> | <p>Cost</p> <p>i) Possible flow augmentation costs for NRA</p> <p>ii) Possible costs for NRA in compensation for licence revocations.</p> |
| <p>NRA/Abstractors</p> <p>AWS/Industry</p> | <p>i) Compliance with target levels</p> <p>ii) Derived river flow figure can be used to plan action</p> <p>River quality meets RQO's</p> | <p>i) Possible flow augmentation costs for NRA</p> <p>ii) Possible compensation costs abstraction for NRA in revoking licences.</p> <p>High cost in order to meet stringent effluent standards</p> |
| <p>NRA</p> <p>NRA/AWS</p> | <p>Identifies significant nitrogen sources for targeting action</p> <p>Reduction in river nitrate levels</p> | <p>Cost to NRA</p> <p>Cost to AWS</p> |
| <p>NRA</p> | <p>Reduction in river nitrogen levels</p> | <p>1) Cost to farmers</p> <p>2) Possible difficulty in enforcement</p> |
| <p>NRA/Abstractors</p> | <p>Improved biological quality</p> | <p>1) Possible flow augmentation cost for NRA</p> <p>2) Possible compensation costs</p> |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|---|---|
| <p>Issue No 24 continued</p> | <p>Enhanced quality limits on discharge consents</p> |
| <p>Issue No 25 Marsh dyke downstream of Beccles STW - Failure to meet predicted biological score</p> | <p>Enhanced quality of effluent from Beccles STW</p> |
| <p>Issue No. 26: Starston Beck - Harleston to Waveney. Local quality objectives for ammonia not achieved</p> | <p>Improvements to Harleston STW to meet River Needs consent limits</p> |
| <p>Issue No. 27: Non compliance with E C Directive on the Quality of Bathing Waters at South Beach, Great Yarmouth</p> | <p>Monitor affects of diversion of existing phased programme of sewage outfalls to new Caister sea outfall by 1997</p> |
| <p>Issue No. 28: Concern over pollution by surface water discharges from industrial estates in Great Yarmouth</p> | <p>Prosecution when sources are proven</p> <p>Controlling discharges by means of consents when justifiable</p> <p>Diversion of "risk areas" to foul sewer when available</p> <p>Planned strategy for future industrial areas to ensure that effective drainage systems are in place at the beginning of the development</p> |
| <p>Issue No. 29: Groundwater contamination - Trowse, Norwich</p> | <p>Do nothing</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|------------------|--|---|
| NRA/Dischargers | Improved biological quality | 1) Cost to dischargers 2) Doubt whether objective would be achieved as present limits are stringent. |
| AWS Limited | Improved quality of marsh dyke | Cost |
| AWS | Compliance with objective levels | Cost |
| NRA | Confirms compliance with EC limits or identifies need for further action | i) Cost ii) Potential cost to AWS |
| NRA | May effect an improvement | Action is taken after pollution has occurred. |
| NRA | May effect an improvement | Possible cost to dischargers for improvements |
| NRA/G.Y.B.C./AWS | Reduction in pollution | Cost to dischargers |
| NRA/G.Y.B.C./AWS | Reduction in pollution | Costs to dischargers |
| NRA | No Cost | Risk to present and future abstractors |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|--|---|
| <p>Issue No. 29 continued</p> | <p>Investigation to determine source of pollution and remedial action to clean up groundwater</p> |
| <p>Issue No. 30: Groundwater contamination by solvents - Thorpe, Norwich</p> | <p>Do nothing</p> <p>Continue to monitor extent of contamination and warn groundwater users if required</p> <p>Remedial action to recover solvents and clean up the groundwater</p> |
| <p>Issue No. 31: Groundwater pollution and potential pollution of River Yare from old waste disposal site at Harford, Norwich</p> | <p>Investigation and monitoring to assess extent of groundwater contamination</p> <p>Remedial measures on site.</p> |
| <p>Issue No. 32: Concern regarding blue/green algae in a number of recreational and amenity lakes or adversely affecting public drinking water supply sources</p> | <p>Develop an "Action Plan" for each lake, in a priority order, which will identify practical remedial measures</p> |
| <p>Issue No. 33: General concern over dilution for effluents in tributaries of Catchment</p> | <p>Derive MAFs</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|--|---|--|
| NRA/Polluters | Returns groundwater to suitable quality for future users | 1) Cost to NRA 2) Potential cost to owner of polluting source 3) Original owner of polluting source untraceable |
| NRA NRA NRA/Polluter | No Cost Enables appropriate action to be taken Groundwater suitable for use as required | Risk to present and future abstractors Cost No improvement to groundwater 1) Historical pollution and sources are unidentified 2) Difficult, costly and unlikely to be wholly successful |
| NRA/Norwich City Council Norwich City Council | Enable appropriate action to be taken Reduced risk of pollution to groundwater and river | Cost Cost |
| NRA | Identifies options leading to reduction in problem | Cost of "Plan" and potential cost to owners of the lakes |
| NRA | Derived MAF to be used to plan action | Cost |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|---|---|
| Issue No. 33 continued | River flows to be maintained above MAF Enhanced treatment of effluents from sewage treatment works and industry |
| Issue No. 34: Broads Area - Oil Pollution | Joint initiative with Broads Authority to assess best means of managing problem Education campaign Prosecution of offenders Production of bye-laws enforcing oil handling and storage procedures |
| Issue No. 35: Minimum acceptable flows are not defined. | Do nothing Carry out extensive ecological and in-river needs studies |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|---|--|---|
| <p>NRA/Abstractors</p> <p>AWS/Industry</p> | <p>Improved water quality to meet environmental requirements</p> <p>River quality meets RQO's</p> | <p>1. Possible flow augmentation costs for NRA.</p> <p>2. Possible compensation costs for NRA in revoking abstraction licences</p> <p>High cost to meet stringent effluent standards</p> |
| <p>NRA/Broads Authority</p> <p>NRA/BroadsAuthority</p> <p>NRA/BroadsAuthority</p> <p>Broads Authority</p> | <p>Defines extent of problem and means of resolution</p> <p>Heightens public awareness</p> <p>Publicity leading to reduced pollution</p> <p>Reduces risk of pollution</p> | <p>Potential cost to boating activities</p> <p>Potential cost to boating activities</p> <p>Often difficult to prove</p> <p>i) Cost to boating industry ii) Need for enforcement</p> |
| <p>NRA</p> <p>NRA</p> | <p>Saving of staff resource</p> <p>Improved resource management Enables better protection and understanding of river ecology. Verification of water resources availability</p> | <p>Inability to adequately assess water resources availability particularly critical in the Bure catchment. Need to rely on existing MRF which may be inappropriate</p> <p>Cost and timescale. Reduction in current MRF may impact on water quality. Increase would impact on water resource availability</p> |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|---|---|
| <p>Issue No. 35 continued</p> | <p>Await outcome of National R&D Study on defining MAF's</p> <p>Set MAF's based on review of existing MAF's and experience</p> |
| <p>Issue No. 36: Groundwater resources in the Bure catchment are inadequate to meet future demands compared against current resource assessments</p> | <p>Review environmental/river needs and reassess ground water availability</p> <p>Demand Management</p> <p>Groundwater support to augment low flows in rivers</p> <p>Revocation of underused licences</p> <p>Re-use of sewage effluents</p> <p>Encourage aquifer recharge levels. Better utilisation of water resources</p> |
| <p>Issue No. 37: Groundwater Catchment Areas for wetland sites of conservation value need to be identified</p> | <p>Environmental studies at sites of particular concern</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|---|---|---|
| <p>NRA</p> <p>NRA</p> | <p>Better understanding of in-river needs. National standardised approach identified for setting MAF's</p> <p>Quicker implementation</p> | <p>Timescale - study not due for completion until 1996. Local issues could be "masked" by National approach</p> <p>Possible lack of National consistent approach. Subjective</p> |
| <p>NRA</p> <p>NRA (Raw Water allocation). WCo's (PWS)</p> <p>NRA/WCo's/Abstractors</p> <p>NRA</p> <p>NRA/WCo's</p> <p>NRA</p> | <p>Potential for further development of groundwater resources linked to issue no 35</p> <p>Reduces demand and delays major expenditure</p> <p>Satisfies environmental requirement. Would enable greater groundwater exploitation</p> <p>Make more water resources available for reallocation to other potential users</p> <p>Better utilisation of water resources</p> <p>Re-establishment of groundwater</p> | <p>Potential impact on river system. Relies on Issue 35 being addressed.</p> <p>Possibly expensive to Water Companies. Impact on local users</p> <p>Cost Resource limitations</p> <p>Cost Public Relations</p> <p>Emotive. Water quality implications for Broadland. eg eutrophication if discharged to river first</p> <p>Cost. Unproven techniques. Limited yield. Pollution risk Requires suitable geological conditions</p> |
| <p>NRA/WCo's/conservation bodies</p> | <p>Better hydrological understanding of wetland behaviour. Provide effective protection to wetlands. Improved management</p> | <p>Timescale and cost. Possible lack of National consistency in approach</p> |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|---|--|
| <p>Issue No. 37 continued</p> | <p>Await outcome of R&D Study on wetlands</p> <p>Use empirical assessments</p> |
| <p>Issue No. 38: There is a requirement to develop plans for optimum water resource management and development within catchments</p> | <p>Do nothing</p> <p>Detailed investigation and modelling of system</p> |
| <p>Issue No. 39: Opportunity exists to consider more flexible methods of allocating long term resources</p> | <p>Temporary allocation of committed, unused, licensed amounts to other applicants in the short term</p> <p>Issue stepped incremental licence quantities to new longer term issues</p> |
| <p>Issue No. 40: Inability to guarantee maintenance of agreed water level at Costessey Mill</p> | <p>Do nothing</p> <p>Vary AWS's surface water abstraction licence to reflect level requirement as well as flow</p> <p>Modify gauging structure at Costessey Mill</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|----------------------------------|---|---|
| <p>NRA</p> <p>NRA</p> | <p>Consistent approach. Cheaper than site specific studies.</p> <p>Quick</p> | <p>May not be appropriate for local issues - site specific investigations may still be necessary</p> <p>Potential to be inaccurate. Subjective.</p> |
| <p>NRA</p> <p>NRA</p> | <p>Cost and saving in staff resources</p> <p>Better understanding of how the catchment aquifers respond to water resource development</p> | <p>Water resources would be inadequately managed</p> <p>Cost and timescale</p> |
| <p>NRA</p> <p>NRA</p> | <p>More efficient utilisation of water resource allocation</p> <p>More efficient utilisation of water resource allocation</p> | <p>Suitable for short term requirements only. High risk of non renewal. Requires cooperation of existing licence holders. Difficult to administer and police. Removes flexibility of operation for existing longer term licence holders</p> <p>As above - except does not require cooperation of longer term licence holder</p> |
| <p>NRA</p> <p>NRA</p> <p>NRA</p> | <p>Cost</p> <p>Agreed level could be maintained.</p> <p>Ensure consistency between level and flow control with regard to abstraction</p> | <p>NRA open to legal action</p> <p>Depends on cooperation of Water Company</p> <p>Cost. Still requires variation of AWS licence to regularise</p> |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|---|---|
| <p>Issue No. 40 continued</p> | <p>Operating agreement with Water Company</p> <p>Renegotiate agreed level</p> |
| <p>Issue No. 41: Gauging at Ellingham Mill is inadequate to provide accurate data</p> | <p>Do nothing</p> <p>Abandon flow gauging at Ellingham</p> <p>Build new gauging station</p> |
| <p>Issue No. 42: Hydrometric Network review required to ensure timely and accurate hydrometric data is available</p> | <p>Do nothing</p> <p>Await Regional Review</p> <p>Review for this catchment</p> |
| <p>Issue No. 43: Broadland Flood Alleviation Strategy - many of the embankments in Broadland have settled and the existing standard of protection is not up to NRA target standard</p> | <p>Do nothing</p> <p>Sustain present standard of defences by widening and strengthening the 240km of tidal embankments</p> <p><i>N.B. bank strengthening is a common requirement of the Bure and the Yare barrier options</i></p> |

| | RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|--|----------------------------------|--|--|
| | <p>NRA/AWS</p> <p>NRA</p> | <p>Easier to implement</p> <p>Agreed level could be maintained</p> | <p>Not legally binding</p> <p>Possible cost implication of environmental effects</p> |
| | <p>NRA</p> <p>NRA</p> <p>NRA</p> | <p>Short term cost savings to NRA</p> <p>No capital cost. Processing time saved</p> <p>Accurate data. Some processing time saved</p> | <p>Continuing inefficient processing and inaccurate data.</p> <p>No flow data available for this important site</p> <p>Capital Cost</p> |
| | <p>NRA</p> <p>NRA</p> | <p>No Capital Cost</p> <p>Regional consistency. Network tailored to present day requirements. Economy of scale.</p> <p>Possible time saving. Network tailored to present day requirements.</p> | <p>Network may not meet requirements</p> <p>Cost Time</p> <p>Cost No economy of scale No Regional consistency</p> |
| | <p>NRA</p> <p>NRA</p> | <p>Short term cost savings to NRA</p> <p>Secures existing standard of protection</p> | <p>Increased tidal flooding with up to 90% of the currently defended land permanently flooded</p> <p>(i) Existing standard of protection is not up to NRA target standard</p> <p>(ii) Annual flooding will occur in certain areas.</p> <p>(iii) A major flood event would cause wide spread damage</p> |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|---|--|
| <p>Issue No. 43 continued</p> | <p>Raise existing flood embankments</p> <p>Construct a barrier across the Yare upstream of the Haven Bridge Gt. Yarmouth</p> <p>Construct a barrier across the Bure with washland storage at Haddiscoe</p> |
| <p>Issue No. 44 Requirement for Integrated Sea Defence Management</p> | <p>Do nothing</p> <p>Maintain policy of sea defence management</p> |
| <p>Issue No 45: Sea Level Rise and managed retreat (of flood defences)</p> | <p>Do nothing</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|--------------------------------|---|---|
| NRA | Provides a consistent standard of protection throughout Broadland | <ul style="list-style-type: none"> (i) Could be serious technical difficulties due to poor ground conditions. (ii) Flooding of currently un-protected areas will increase (iii) Visually intrusive |
| NRA | <ul style="list-style-type: none"> (i) Provides a 1 in 200 year standard of protection throughout Broadland (ii) Technically sound. | <ul style="list-style-type: none"> (i) Not the cheapest option to provide NRA target standards (ii) May impact on the port detrimentally (iii) Environmental concerns |
| NRA | <ul style="list-style-type: none"> (i) Meets the NRA targets standards of protection. (ii) economically viable (iii) Technically sound (iv) Environmentally acceptable | <ul style="list-style-type: none"> (i) Split level of protection (1 in 200 yrs to Bure and 1 in 20 to Yare/Waveney) |
| NRA/Maritime Local Authorities | Short term cost savings | <ul style="list-style-type: none"> (i) Fragmented approach to coastal management (ii) General decline in standard of protection (iii) No accumulated coastal data |
| NRA/Maritime Local Authorities | <ul style="list-style-type: none"> (i) Integrated approach to coastal management (ii) Availability of coastal management information (iii) Enables prioritising of standards of protection | Cost |
| NRA | Short term cost savings | <ul style="list-style-type: none"> (i) Increased frequency of flooding (ii) Increased risk to life and property |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|--|---|
| Issue No 45 continued | <p>Sustain existing defences</p> <p>Managed Retreat</p> <p>Take account of sea level rise</p> |
| Issue No. 46: Standards of Service and 10 Year Needs | <p>Do nothing</p> <p>Produce target standards of service</p> <p>Provide 10 year needs programme</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|---|---|---|
| <p>NRA</p> <p>NRA</p> <p>NRA</p> <p>NRA</p> | <p>Short term cost savings</p> <p>(i) Medium to long term cost savings (ii) Development of salt marsh as soft defence/protection. (iii) Environmental enhancement opportunities</p> <p>Short term cost savings</p> <p>Maintains target standards of protection</p> | <p>(i) Standard of protection will decrease (ii) Increased maintenance requirement. (i) Loss of land to the sea. (ii) Loss of coastal frontage protection to Broadland.</p> <p>(i) Standard of protection will decrease (ii) Increased maintenance requirement.</p> <p>Cost</p> |
| <p>NRA</p> <p>NRA</p> <p>NRA</p> | <p>Short term cost saving</p> <p>(i) Integrated approach to defence needs of catchment. (ii) Aids feasibility studies. (iii) Will provide data for performance measures. (iv) Improved planning efficiency.</p> <p>(i) Integrated approach to defence needs of catchment. (ii) Known priorities and costs (iii) Aids capital investment (iv) Utilises resource economically</p> | <p>(i) Fragmented approach to flood defence needs. (ii) Lack of priority</p> <p>Needs continually updating hence cost implications.</p> <p>None.</p> |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|---|---|
| <p>Issue No. 47 Development Control in Flood Risk Areas Development often increases risks to the water environment but NRA has only limited powers to impose conditions on development.</p> | <p>Do nothing</p> <p>To continue to gain a direct influence in the planning process using existing legislation and adoption of NRA Anglian Region model policies/guidance notes</p> |
| <p>Issue No. 48: Undefended Properties</p> | <p>Do nothing</p> <p>Provide protection</p> <p><i>NB: NRA have permissive powers to carry out flood protection works where economic viability can be demonstrated.</i></p> |
| <p>Issue No. 49: The condition and operation of river control structures and the ownership of mill rights need to be reviewed to allow integrated river management</p> | <p>Do nothing</p> <p>Rebuild structures to NRA requirements</p> <p>Investigation into overall management policy of river system related to structures</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|--|---|--|
| <p>NRA</p> <p>Local Authorities/NRA/Developers/ Landowners</p> | <p>None other than staff saving</p> <p>Ensure matters the NRA are responsible for are fully taken into account in all development proposals</p> | <p>Uncontrolled development in flood risk areas</p> <p>Implications on LA control. Possible cost implications to landowners/developers.</p> |
| <p>Planning Authority</p> <p>Landowner</p> | <p>Cost</p> <p>Reduction in frequency of flooding</p> | <p>Existing property and life at risk to flooding</p> <p>(i) Likely to be uneconomic (ii) May encourage further development</p> |
| <p>Private owner/NRA</p> <p>Private owner/ NRA</p> <p>NRA</p> | <p>Cost</p> <p>i) Co-ordinated approach. ii) Retains structures and associated benefits to river users. iii) Allows the introduction of more automation into river level control - and improved flood flow management.</p> <p>i) Identifies real needs and environmental impact. ii) Includes co-ordinated approach</p> | <p>i) Loss of water levels. ii) Loss of amenity. iii) Possible flood defence problem. iv) Environmental concerns</p> <p>i) Cost ii) Possible conflict between requirements and apportionment of costs.</p> <p>Cost</p> |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|---|--|
| <p>Issue No. 50: Requirement for fish passes access through mills and control structures</p> | <p>Do nothing</p> <p>Provide fish passes through mills, sluices etc., where appropriate eg New Mills at Norwich</p> <p>Provide underwater tunnels for migration, through or around existing structures</p> |
| <p>Issue No. 51: River Rehabilitation Schemes are required to restore habitat diversity and ecological value whilst addressing the requirement for flood defence</p> | <p>Do nothing</p> <p>Minimise interruption of the progression towards natural channel characteristics when undertaking channel and vegetation management. Particularly in the upper reaches</p> <p>Assist progression towards meander development within existing embankments, when undertaking channel and vegetation management</p> <p>Modify bank gradient to create shallower profile and wider aquatic margin</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|--|---|---|
| <p>NRA</p> <p>NRA/Fishery owners</p> <p>NRA/Fishery owners</p> | <p>No cost</p> <p>Ensure the natural migration of fish species, particularly trout and eels</p> <p>As above Possible lower cost than conventional fish pass Appraisal of alternative design solution</p> | <p>Impacts upon salmonid, coarse fish and eel populations. Cost of remedial work to fish populations.</p> <p>Negotiating consent of landowners. Cost of installation</p> <p>Requires R + D assessment</p> |
| <p>NRA/Landowner</p> <p>NRA/Landowner</p> <p>NRA/Landowner</p> | <p>No cost</p> <p>Improves habitat and holding capacity for river corridor fauna and flora</p> <p>Improvement in fishery classification Alleviation of low flow problems. Reduction in major disturbance. High benefit: cost ratio</p> <p>As above May be integral with E.S.A. or Countryside Stewardship schemes</p> <p>As above</p> | <p>Continued impoverished status of fauna and flora of many reaches</p> <p>Requires pre-operational channel design Cost</p> <p>Will require landowners agreements</p> <p>As above</p> <p>As above</p> |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|---|--|
| Issue No. 51 continued | Design and implement restored channel configuration at suitable locations. eg River Waveney |
| Issue No. 52: Lack of spawning sites | Do nothing Allow greater encroachment of marginal vegetation to constrict and accelerate flow, thus cleaning channel Reinstate gravel runs and riffles where appropriate |
| Issue No. 53: Lack of Shallow Margins | Do nothing Create shallows in appropriate marginal areas of rivers and adjacent dykes Allow existing margins to encroach outwards into the existing channel |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|--------------------|--|---|
| NRA/Landowner | <p>As above</p> <p>Maximises enhancement of ecological features whilst incorporating existing flood defence requirements</p> | As above |
| NRA/Fishery Owners | <p>Retains status quo</p> <p>Gravel exposure where 'natural' flow regime dictates</p> <p>Reduced frequency and cost of dredging</p> <p>Increase in marginal habitat and its interface with the channel.</p> <p>No requirement for machinery movement</p> | <p>Possible impact upon fisheries biomass and holding capacity for invertebrates</p> <p>Requires forward planned projections of channel response and necessary vegetation management</p> <p>Possible flood defence implications</p> |
| NRA/Fishery owners | <p>Creates immediate spawning sites for fish and habitat for invertebrates</p> <p>Can be integrated with current flood defence schemes</p> | <p>Cost of implementation.</p> <p>Possible flood defence implications</p> |
| NRA | No cost | Has a negative impact upon the survival and recruitment of juvenile fish |
| NRA/Fishery owners | <p>Creates survival and feeding zone for juvenile fish</p> <p>Ensures good recruitment of fish.</p> <p>Creates access to water for stock</p> | <p>May involve disposing of spoil onto existing banks, and cutting into or moving existing banks</p> <p>Need land owners permission</p> |
| NRA/Fishery owners | As above | Possible flood defence implication |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|---|---|
| <p>Issue No. 54: River maintenance frequencies</p> | <p>Do nothing (no maintenance)</p> <p>Continue with current practice</p> <p>Meet recommended frequencies</p> |
| <p>Issue No. 55: Management policy for bankside trees and bushes</p> | <p>Adjust current management techniques, and introduce planting schemes</p> <p>Maintain current level of management and safeguard existing trees. Provide training in conservation aspects of riverside management e.g. coppicing, pollarding etc.</p> <p>Maintain current management</p> |
| <p>Issue No. 56: Concern over increasing sediment and nutrient levels from land runoff</p> | <p>The formation of buffer zones adjacent to rivers</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|--|---|--|
| <p>NRA</p> <p>NRA</p> <p>NRA</p> | <p>Short term cost savings</p> <p>No increase in current costs Minimum environmental disturbance</p> <p>Target standards of maintenance reached Maximise flood defence standards Some routine maintenance costs reduced Potential for environmental enhancement works</p> | <p>Increased flooding risk</p> <p>Deteriorating channel capacity, structure and flood banks Standards of flood defence protection will deteriorate</p> <p>Increase over current costs Environmental disturbance and conflict with fisheries and conservation interests</p> |
| <p>Landowner Countryside Management Projects/NRA</p> <p>Landowners/Countryside Management Project/NRA</p> <p>Landowners/Countryside Management Project/NRA</p> | <p>Improvement in the holding capacity for fish by providing cover (particularly encourages trout) Loss of important riverside habitat Improved husbandry will reduce future management requirements</p> <p>Maintains the current level of cover on many stretches No extra training or subsequent maintenance considerations</p> <p>No additional cost</p> | <p>Requires corridor planning via REDS to integrate planting schemes Requires landowner participation to protect trees from stock Reduction in future management requirements</p> <p>No improvement in fishery and river corridor habitat. Future costs of remedial works to improve fishery by less appropriate means i.e. stocking</p> <p>Continued lack of adequate tree management</p> |
| <p>NRA/MAFF</p> | <p>Provides more effective protection to surface waters. Could be developed in conjunction with ESA's</p> | <p>i) Cost. Timescale. Conflict of interest ie. production of land or set aside ii) May not address the problem</p> |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|--|---|
| <p>Issue No. 57: Erosion of marginal vegetation and embankments affects habitats and can affect the integrity of the flood bank</p> | <p>Do nothing</p> <p>Traditional steel/timber piling</p> <p>'Soft' protection</p> <p>Reduction of navigation speed limit</p> <p>Improved boat hull design</p> |
| <p>Issue No. 58: Bio-manipulation in Broadland - Impact on Angling</p> | <p>Improve understanding and liaison with angling representatives and promote awareness of future enhanced angling opportunities. Limited area/time</p> <p>Fish removal for limited time, and/or limited area</p> |
| <p>Issue No. 59: Provision of bankside facilities for anglers in Broadland</p> | <p>Do nothing</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|--|--|--|
| NRA | Cost | (i) Integrity of flood embankment in jeopardy (ii) Loss of sands/marginal vegetation |
| NRA | (i) Maintain integrity of flood embankments (ii) Reduces erosion (iii) Only option in deeper water | (i) can be unsightly (ii) Relatively expensive (iii) Little environmental benefit |
| NRA | (i) less expensive than piling (ii) Environmentally more acceptable (iii) Visually more pleasing | (i) Provides lower level of protection (ii) Shorter life expectancy (iii) Only suitable in shallow water |
| Broads Authority | Reduced boat wash Environmentally more acceptable | Needs enforcing |
| Boat construction industry boat owners | Reduced wash Environmentally more acceptable | (i) Cost (ii) Long terms solution |
| NRA/Broads Authority | Create understanding and co-operation | Staff time. |
| NRA/Broads Authority | Minimal disruption to angling | May be insufficient time to effect improvements |
| NRA/Broads/Landowners | No cost | Continued piecemeal pressure upon sensitive locations. Loss of public relations initiative |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|--|---|
| <p>Issue No. 59 continued</p> | <p>Carry out feasibility study to assess extent of requirement and suitability of locations Provides framework for consultation and implementation</p> <p>Feasibility study and implementation of recommendations</p> |
| <p>Issue No. 60: Limited access to riverbanks</p> | <p>Do nothing</p> <p>Negotiate access to riverside in order to provide riverside walks and appropriate recreation</p> <p>Negotiate access to riverside and assist with access creation and maintenance</p> |
| <p>Issue No. 61: Lack of Habitat Diversity for Fish</p> | <p>Do nothing</p> <p>Provide artificial habitat structures in areas where natural habitat restoration cannot be achieved.</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|---|--|--|
| <p>NRA/BroadsAuthority/Landowners</p> <p>NRA/BroadsAuthority/Landowners</p> | <p>Low cost.</p> <p>As above. May result in enhanced facilities for angling Control user impact and activity within the catchment May minimise negative impact upon sensitive locations</p> | <p>Cost</p> <p>Cost. Planning permission required</p> |
| <p>NRA/Landowners/Local Authorities/Countryside Management Projects</p> <p>NRA/Landowners/Local Authorities/Countryside Management Projects</p> <p>NRA/Landowners/Local Authorities/Countryside Management Projects</p> | <p>No cost</p> <p>Provides basis with which to plan access, and amenity walks. Enhancement of NRA recreational profile Low cost: benefit ratio</p> <p>As above. Provision of advice upon the planning, design and implementation of access. Enhances working relationship with the River Valley Projects</p> | <p>Loss of public relations initiative</p> <p>Cost Requirement for additional staff</p> <p>As above</p> |
| <p>NRA/Fishery owners</p> | <p>No cost</p> <p>Improve and holding capacity for fish; improve fishery</p> | <p>Continuing inadequacy of fish habitat</p> <p>Cost of installation and maintenance</p> |

ISSUES AND OPTIONS

| ISSUE | OPTIONS |
|---|--|
| <p>Issue No. 62: Insufficient Knowledge of Factors Limiting Fish Populations in Broadland</p> <div data-bbox="236 363 640 1086" style="border: 1px solid black; padding: 10px;"><p>ABBREVIATIONS USED</p><p>AWS Anglian Water Services</p><p>STW Sewage Treatment Works</p><p>IDB Internal Drainage Board</p><p>RQO River Quality Objectives</p><p>MAF Minimum Acceptable Flow</p><p>MRF Minimum Required Flow</p><p>GYBC Great Yarmouth Borough Council</p><p>WCo's Water Companies</p><p>PWS Public Water Supply</p><p>R + D Research and Development</p><p>ESA Environmentally Sensitive Area</p></div> | <p>Do nothing</p> <p>Review all existing fisheries work in Broadland and produce a strategy for future work</p> <p>Extend existing routine fisheries work in Broadland</p> |

| RESPONSIBILITY | ADVANTAGES | DISADVANTAGES |
|----------------|---|--|
| NRA | <p>No cost</p> <p>Better understanding of existing data and factors limiting Broadland fisheries</p> <p>Strategic approach to future fisheries requirements to address existing Broads Authority work</p> | <p>Fragmented approach to fisheries work in Broadland</p> <p>Cost</p> <p>Staff resources</p> |
| NRA | <p>More general data on existing status of fisheries</p> | <p>No analysis of long term trends; no strategic approach; costs; staff resources</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 1989, the NRA is the central policy body coordinating the activities of 8 regional groups each one mirroring an area(s) served by a former regional water authority.

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.

ENVIRONMENT AGENCY



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