

# BEDFORD OUSE (LOWER REACHES) CATCHMENT MANAGEMENT PLAN



## NRA

*National Rivers Authority  
Anglian Region*

National Rivers Authority  
 Information Centre  
 Head Office  
 Class No .....  
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ENVIRONMENT AGENCY



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## INTRODUCTION

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

During this planning process, the current state of the water environment and 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:

**Bedford Ouse (Lower Reaches) Catchment Management Plan,  
Area Manager, National Rivers Authority, Central Area, Bromholme Lane,  
Brampton, Huntingdon PE18 8NE.**

Comments must be received by 12 July 1994.



*Bedford Ouse - Great Barford area.*

## 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 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 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.



*Alconbury Brook.*

## THE CATCHMENT

The Bedford Ouse (Lower Reaches) catchment comprises that part of the River Great Ouse between Earith and Kempston, together with its tributaries.

The landscape is diverse, with the rivers draining a mainly clay covered catchment, with the exception of the Hiz, Flit and Upper Ivel which flow over Chalk and Greensand rocks.





*River Great Ouse, Dolphin Hotel, St. Ives.*

Land heights range from 184 metres above sea level on the Chalk outcrop south west of Hitchin to virtually sea level at Earith.

In spite of low annual rainfall, the clay catchments respond rapidly to rainfall, and high river flows, with overland flooding, occur. The river at Earith is also tidally influenced.

## CATCHMENT FACTS

Area: 1556 km<sup>2</sup>  
 Population: 422,000 (1993)      477,000 (predicted 2006)

### WATER QUALITY

#### Chemical

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

Class	km
1A (very good)	0
1B (good)	165
2 (fair)	77
3 (poor)	6
4 (bad)	0

#### Biological

Length of river in Biological  
 classes for 1992

Class	km
A	147
B	75
C	82
D	87

(Note: minor tributaries not included)

## WATER RESOURCES

Availability for resource development:	Chalk	- none
	Lower Greensand	- none
	River Gravels	- limited availability
	Surface Water	- limited availability in winter

## FLOOD PROTECTION

Length of statutory main river	221 km (maintained by NRA)
Length of embanked main river	32 km
Area protected by embanked river	34 km <sup>2</sup>
Area of natural floodplain	60 km <sup>2</sup>

## NAVIGATION

Length of navigable river	66 km
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## FISHERIES

Length of game fisheries	0 km
Length of coarse fisheries	190 km

## CONSERVATION

Sites of Special Scientific Interest (SSSI)	53
County Wildlife Sites	31 (including 4 SSSI's)
Scheduled Ancient Monuments	136



*Great Ouse - Alconbury.*

## LAND USE

The catchment is predominantly rural with over 50% of the population living in the 8 main towns of Bedford, Letchworth, Hitchin, St Neots, Huntingdon, St Ives, Biggleswade and Flitwick.

Arable farming is the primary land use, 39% being Grade 2 and 45% Grade 3.

Flood meadows are an important feature of the Great Ouse Valley, as also are sand and gravel extraction works.

## INFRASTRUCTURE

The area is well served by major road and rail networks which carry large volumes of through and commuter traffic. The A1 trunk road is proposed to be widened and upgraded to motorway standard, and bypasses are to be constructed for Bedford, Baldock and a number of other communities.

## DEVELOPMENT

The population is expected to grow at a rate in excess of 1% per annum, with both residential and commercial development mainly occurring at the existing centres of population. Village growth is generally limited to infill only.

Pressure to develop in the flood plain still exists, which not only puts the new properties at risk to flooding but also increases the risk elsewhere.

The minerals industry is also active in the flood plains, which require careful planning and control to minimise flooding, drainage and water resources impacts.

The ever increasing urbanisation of the catchment together with new roads, changes the pattern of run-off into the river systems with resulting quicker and higher peaks of flow.

## FLOOD DEFENCE

With its predominantly clay catchment, rainfall events will produce flows greater than the capacity of the river channel, and use is then made of the natural floodplains to convey or store floodwaters. This happens several times each year.

With towns such as Bedford, St Neots, Huntingdon and St Ives located in the historic 1947 flood plain, it is essential that floodplains are preserved.

Downstream of Huntingdon, flood embankments protect the communities of the Hemingfords and Houghton, and the low lying fen areas at Over.

Local land drainage problems, especially on non-main river watercourses are a particular feature, where small groups of properties are flooded at times of heavy rainfall. This is often caused by lack of maintenance by the riparian owners.

Essential maintenance of designated main rivers and flood embankments is





undertaken by the NRA, involving dredging, weed cutting, clearance of obstructions, grass cutting and operation of sluices and lock structures.

Internal Drainage Boards have similar responsibilities in parts of the catchment.

## WATER RESOURCES

The river flow in the catchment reflects rainfall, topography and surface geology.

The majority of the summer flow in the Bedford Ouse is derived from sewage treatment works and run-off from the urban conurbations to the west of the catchment.

There are limited water resources underground (groundwater) in the southern part of the catchment. The water stored in the Chalk and Lower Greensand contributes all year to the flows of Rivers Hiz, Flit and Upper Ivel.

There is some groundwater available from river terrace and glacial sands and gravels along the main river corridor.

The major demands in the catchment are as follows:

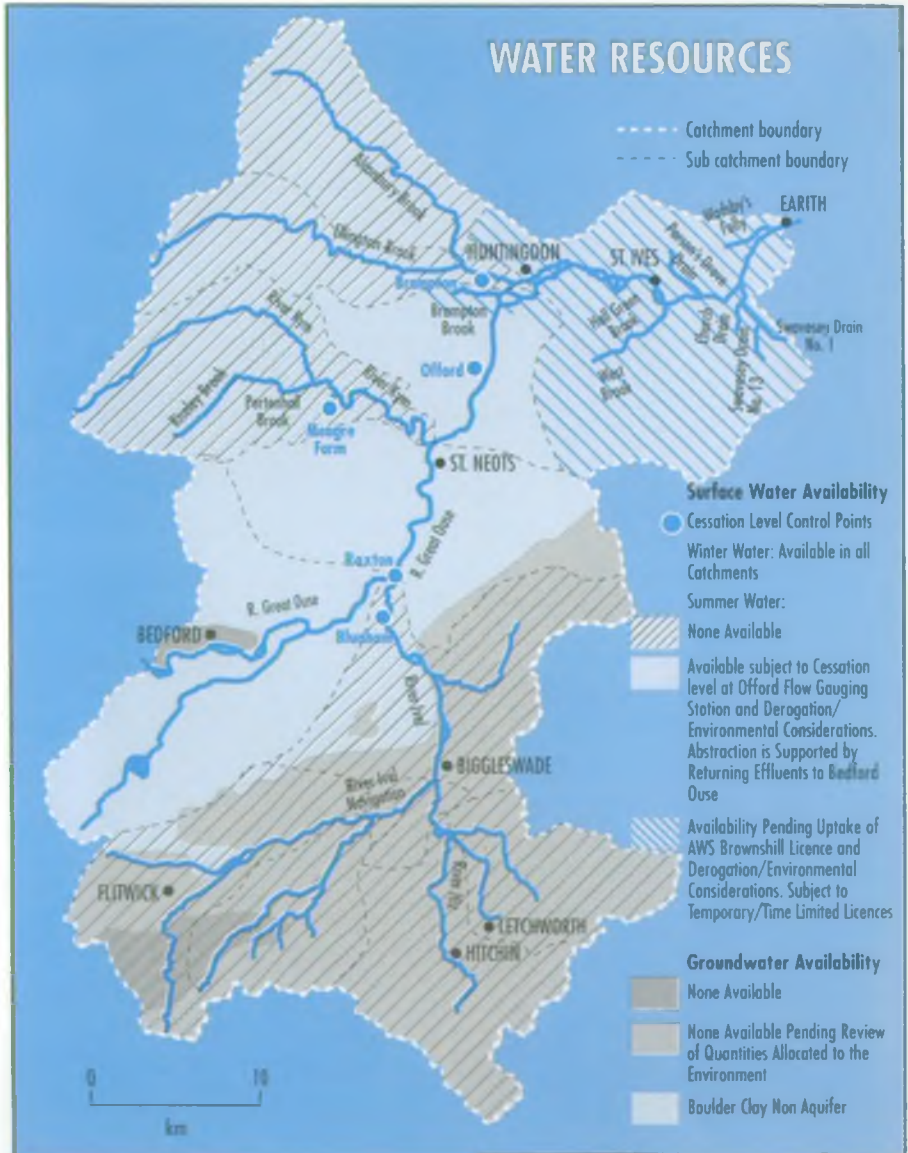
(a) Surface water intake works operated by Anglian Water Services at Offord



*Spray irrigation.*

abstracts water and pumps it via a pipeline to fill Grafham Water.

- (b) Summer demands from the Bedford Ouse include spray irrigation, and agricultural use. There is also a need to maintain the navigation levels within the system.
- (c) There is limited all year abstraction for industrial and agricultural purposes.



## WATER QUALITY

Generally, water quality is good along the River Great Ouse from Bedford to Earith. Locally, problems with poor quality are associated with sewage effluent discharges and urban run-off, particularly where limited dilution is available. These problem areas are most notably found in the upper reaches of the River Ivel.



On the River Great Ouse at Offord there is a major abstraction which supplies Grafham Water reservoir. This is strategically important for the Anglian Water Services drinking water supply network. The reservoir has secondary amenity value, and eutrophication and blue-green algae are important issues.

Numerous sewage works discharges, often in the headwaters of tributaries, combined with impact of water resource schemes makes water quality planning a complex issue.



Long term water quality problems are mainly associated with sewage or urban run-off. As is typical of many other areas, oil is responsible for the majority of individual pollution incidents and are mainly associated with individual sources, notably in the Letchworth and Huntingdon areas.

## FISHERIES

The Lower Bedford Ouse supports an important coarse fishery. The main Great Ouse River fish population is dominated by roach, common bream and pike. The river supports a good fish population throughout most of the Lower Bedford Ouse, with Bedford, St Neots and Huntingdon generally the better areas. Below St Ives the fish population is moderate.

Many of the tributaries and back channels associated with the Lower Bedford Ouse support good to excellent fish populations. Chub and dace are of greater importance in most tributaries, and the River Ivel supports a notable coarse fishery.

Commercial fishing is restricted primarily to eel fishing in the tidal reach below Brownhill Staunch.

## NAVIGATION

The Lower Bedford Ouse is the busiest NRA controlled navigation within the Anglian Region. The head of navigation is at Kempston Mill, just upstream of Bedford, and there are fifteen locks between Bedford and Earith (the downstream point covered by this plan). The river below Brownhill Staunch is



*Eaton Socon Weir.*

openly connected to the tidal Great Ouse and the sea, via King's Lynn. Navigation is also possible into the Ely Ouse system, via Hermitage Lock at Earith. Boat users are well catered for on the Lower Bedford Ouse by the large number of marinas and chandlery shops on the river. A number of 48 hour moorings are also provided for the visiting boats or crafts in transit. Navigation is restricted primarily to the main River Great Ouse, with none of the tributaries recognised as a statutory navigation.



## RECREATION

There are many opportunities for water based recreation within the catchment. The Ouse Valley Way is a long distance footpath which follows the Lower Bedford Ouse through Huntingdonshire District, from St Neots to Earith. This footpath passes through many of the most attractive areas of river landscape found within the catchment.



More formal water based recreation is catered for by the many enclosed waters within the catchment. These are frequently old mineral workings, but also include Grafham Water, the 600Ha public water supply reservoir near Huntingdon. These waters variously provide opportunities for sailing, windsurfing, water skiing, jet skiing and sub-aqua.

Canoeing also takes place beyond the areas of statutory navigation, most notably on the River Ivel.





## CONSERVATION

The lower reaches of the Bedford Ouse, being navigable, are characterised by 'ponded' reaches within which water levels are controlled by sluices and weirs. The back channels are therefore an important feature of this section. A variety of physical features ranging from ponded areas to gravel riffles, glide and pool areas, in association with the paucity or absence of boat traffic, account for a distinct diversity of plant, invertebrate and fish communities.

The flood plain grasslands contribute significantly to the habitat and landscape value of the river corridor, particularly Portholme Meadow SSSI and Godmanchester Meadow SSSI.

The largest tributary is the River Ivel which has been designated as a linear country park by Bedfordshire County Council. Other significant tributaries are the River Kym and Alconbury Brook which drain arable land in a clay catchment. These have been widened in the past to accommodate high flows. Their habitat and ecological diversity is generally lower than that of the main river.

There are 53 SSSI's in the catchment, 31 of which are wetland dependent. Grafham Water reservoir is the largest SSSI and is noted for its over-wintering birds. There are also a total of 31 county wildlife sites and local Nature Reserves.

## ISSUES AND OPTIONS - GENERAL

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

Wherever possible, the body responsible for carrying out each option has been identified. In some areas this is identified as someone other than the NRA. However, the options as presented are intended as a plan to facilitate improvements to the water environment for the benefit of all users. Obviously, this will entail many bodies and individuals working together to fulfil the aims and objectives as detailed in this Catchment Management Plan.

The issues and options (numbered in sequence with the full consultation report) are not shown in priority order, not costed or to any timescale. After publication of this Consultation Document, the NRA will prepare a Final Plan to provide an overview of the catchment, a policy framework and series of strategies to deal with the issues. Details of a proposed monitoring programme will also be identified.

## SUMMARY OF CATCHMENT ISSUES AND OPTIONS

ISSUE	OPTIONS
<p><b>6.1 Water Quality - Surface Water</b>  <b>6.1.1 RIVER QUALITY OBJECTIVE FAILURES</b>                      a) Impact of Unsewered Villages - River Kym, Alconbury Brook and Ellington Brook Catchments</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><b>ABBREVIATIONS</b>                          For key to abbreviations please see page 28.</p> </div>	<ol style="list-style-type: none"> <li>1. Investigate impact of "village drains" on water quality</li> <li>2. Installation of private package sewage treatment plants</li> <li>3. Installation of first time sewerage schemes</li> </ol>
<p>b) Alconbury Brook: Headwaters to Ellington Brook - Failure to meet FEC 4 Target for BOD and DO</p>	<ol style="list-style-type: none"> <li>1. Investigate fully cause of low DO and high BOD</li> <li>2. Adopt lower target FEC</li> </ol>
<p>c) River Til/River Kym: Headwaters to Bedford Ouse - Failure to meet RQO's for BOD, NH3 and DO and FEC 4 target for DO</p>	<ol style="list-style-type: none"> <li>1. Investigate fully failure to meet objectives</li> <li>2. Set lower FEC targets</li> </ol>
<p>d) Impact on Kimbolton STW on river Kym - Failure to meet FEC 3 target</p>	<ol style="list-style-type: none"> <li>1. Investigate impact of Kimbolton STW</li> <li>2. Collate/update river flow data</li> <li>3. Review consent condition if necessary</li> </ol>
<p>e) Brampton Brook: Buckden Waste Disposal Site to Bedford Ouse - Failure to meet RQO's for BOD, NH3 and DO</p>	<ol style="list-style-type: none"> <li>1. Improve leachate control at Buckden Waste Disposal Site</li> <li>2. Install leachate treatment system</li> <li>3. Continue to review impact of Brampton STW</li> </ol>
<p>f) Impact of Marston Moretaine STW on Marston Brook - Failure to meet FEC 4 target</p>	<ol style="list-style-type: none"> <li>1. Determine more representative sample point downstream of discharge</li> <li>2. Improve STW to meet standard needed to achieve FEC 4</li> <li>3. Change target to FEC 5</li> </ol>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
NRA  Householders  AWS/Councils/Householders	Provide information to local councils for decision making  Improved water quality  Improved water quality and reduction in number of public complaints	Uncertainty of positive outcome  Only appropriate to a small number, cost, increased monitoring by NRA  Cost to householders and councils
NRA  NRA	Provide data for decision making  Immediate compliance and no cost	Water quality could deteriorate
NRA  NRA	Provide data for decision making  Targets may be achievable	Failure to protect water environment
NRA  NRA  NRA	Provide data for correct decision making  As above  Improved water quality	Cost to discharger
Waste disposal site operator  As above  NRA	Improve water quality  As above  Provide data for decision making	Cost  Cost
NRA  AWS  NRA	Improved information on true quality of watercourse  Improved water quality  Immediate compliance	Uncertain outcome  Cost  Water quality remains moderate

## SUMMARY OF CATCHMENT ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>g) Marston Brook/Elstow Brook: Stewartby Lake outfall to Wootton Brook - Failure to meet FEC 3 target for Ammonia</p>	<p>1. Investigate occurrence of high ammonia</p>
<p>h) Millbridge/Common Brook: Gamlingay to River Ivel - Failure to meet FEC 3 target for DO, total and un-ionised NH<sub>3</sub></p>	<p>1. Improve monitoring/investigate failures 2. Set lower target FEC</p>
<p>i) Steppingley Brook: Station Road, Amphill to River Flit - Failure to meet FEC 4 for Ammonia</p>	<p>1. Detailed investigation of impact of Flitwick STW on River Flit 2. Improve monitoring to investigate upstream quality 3. Review consent if necessary 4. Reset realistic sampling points and FEC targets 5. Improve upstream quality</p>
<p>j) Hen Brook - Failure to meet RQO's and poor Biological Quality</p>	<p>1. Investigate impact of surface water sewers 2. Undertake pollution prevention visits at industrial areas in St Neot 3. Carry out pollution prevention measures - bunding/installation of oil interceptors</p>
<p>k) Impact of Barton-Le-Clay STW on Barton Brook - Failure to meet FEC 3 target</p>	<p>1. Monitor improvements to check compliance of river with objectives</p>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
NRA	Pin points source	Cost
NRA NRA	Better data for decision making Immediate compliance with targets	Water Quality could deteriorate
NRA  NRA  NRA  NRA  NRA	Provide data for decision making  As above  Improved water quality  Immediate compliance with targets  Improved water quality	Cost  Potential cost to discharger  No improvement to water quality  Uncertain of positive outcome
NRA  NRA  Industry/AWS	Provides information for targeting sites in need of inspection  Increases awareness of water quality issues  Improved water quality, reduced risk of pollution	Cost  Uncertain if targets will be met. Cost
NRA	Provide data for correct decision making	

## SUMMARY OF CATCHMENT ISSUES AND OPTIONS

ISSUE	OPTIONS
<p><b>l) Pix Brook: Headwaters to River Ivel -</b>                      Failure to meet FEC 4 for BOD upstream and total NH3 downstream of Letchworth STW and poor Biological Quality</p>	<ol style="list-style-type: none"> <li>1. Fully investigate impact of industrial surface water runoff</li> <li>2. Undertake pollution prevention visits at industrial areas</li> <li>3. Investigate impact of surface water sewers</li> <li>4. Investigate illegal connections to SWS's</li> </ol>
<p><b>m) Impact of Storm Sewage overflows and Surface Water Discharges</b></p>	<ol style="list-style-type: none"> <li>1. Improve monitoring to identify problem storm sewage overflows and surface water discharges</li> <li>2. Upgrade sewerage systems to eliminate unsatisfactory overflows</li> <li>3. Improve safeguards/treatment on problem surface water discharges</li> <li>4. Ensure new surface water drainage systems for domestic and industrial developments have adequate safeguards and treatment</li> </ol>
<p><b>6.1.2 MINISTRY OF DEFENCE BASES</b>                      Lack of statutory powers to control polluting discharges</p>	<ol style="list-style-type: none"> <li>1. Improve STW's to ensure compliance with standards required in "pseudo consents"</li> <li>2. Continue to establish a close liaison with MOD sites and survey current pollution risks</li> <li>3. Improve pollution control practices</li> </ol>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
<p>NRA</p> <p>NRA</p> <p>NRA</p> <p>AWS</p>	<p>Provides information for decision making</p> <p>Increases awareness of water quality issues</p> <p>Provides information for targeting sites in need of inspection</p> <p>As above</p>	<p>Cost</p>
<p>NRA</p> <p>AWS</p> <p>AWS/Industry</p> <p>NRA/AWS/Planning Authorities</p>	<p>Improved basis for decision making</p> <p>Improved water quality</p> <p>Reduced number of pollution incidents</p> <p>Protection of water quality</p>	<p>Costs</p> <p>Costs and maintenance problems</p> <p>Costs and maintenance problems</p>
<p>MOD</p> <p>NRA/MOD</p> <p>MOD</p>	<p>Improved water quality</p> <p>Increases awareness of issues in MOD and improves information for decision making</p> <p>Reduction of pollution risks and improved water quality</p>	<p>Cost</p> <p>Cost</p>

## SUMMARY OF CATCHMENT ISSUES AND OPTIONS

ISSUE	OPTIONS
<p><b>6.1.3 LANDFILL SITES</b></p> <p>a) Marston Vale - avoidance of pollution of the water environment</p> <p>b) Flitwick - avoidance of pollution of groundwater</p>	<p>1. Ensure high regulation of future developments and waste disposal operations</p> <p>1. Construct boreholes and contain leachate by pumping from eastern and southern boundary</p>
<p><b>6.1.4 EUTROPHICATION</b> Impact of excessive nutrients</p>	<p>1. Continue to review nutrient data</p> <p>2. Undertake investigation of algae and aquatic plant communities</p> <p>3. Consider designation as vulnerable zone or sensitive area under EC Nitrate or UWW Directive</p> <p>4. Develop programme for nutrient reduction, possibly at STW</p> <p>5. Treat water entering Grafham Reservoir</p>
<p><b>6.1.5 BLUE GREEN ALGAE</b> Impact of toxic blooms</p>	<p>1. Continue reactive sampling</p> <p>2. Produce "Action Plans"</p> <p>3. Research programme</p> <p>4. Artificial mixing of reservoirs and lakes</p> <p>5. Nutrient removal/reduction at reservoir/lake</p> <p>6. Nutrient removal/reduction of source</p>



RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
<p>NRA/Waste Regulation Authorities</p> <p>SKF</p>	<p>Protection of local environment</p> <p>Containment of leachate. Remediation of groundwater</p>	<p>Cost and maintenance problems</p> <p>Cost to SKF and DoE</p>
<p>NRA</p> <p>NRA</p> <p>NRA/DOE</p> <p>NRA/AWS/ MAFF</p> <p>AWS</p>	<p>Provide basis for decision making</p> <p>As above</p> <p>Provide framework for control of inputs</p> <p>Reduction in nutrient inputs</p> <p>As above</p>	<p>Cost</p> <p>Cost (AWS + agriculture)</p> <p>Cost</p> <p>Cost</p>
<p>NRA</p> <p>NRA</p> <p>NRA/AWS</p> <p>AWS/Lake Owners</p> <p>AWS/Lake Owners/NRA</p> <p>AWS/Lake Owners/NRA</p>	<p>Provide basis for decision making</p> <p>Provide basis for decision making</p> <p>Provide basis for decision making</p> <p>Minimise surface blooms and scums</p> <p>Minimise blue-green algae and other algae</p> <p>Reduction in nutrient inputs</p>	<p>Cost</p> <p>Cost</p> <p>Cost</p> <p>Cost. Does not control algal production</p> <p>Cost and potential damage to reservoir/lake ecology</p> <p>Cost uncertainty of outcome</p>

## SUMMARY OF CATCHMENT ISSUES AND OPTIONS

ISSUE	OPTIONS
<p><b>6.2 Water Quality - Groundwater</b>  <b>6.2.1 NITRATE SENSITIVE AREAS</b>                      Meeting EC Drinking Water Directive</p>	<ol style="list-style-type: none"> <li>1. Designation of NSA's + implementation of restricted farming practices to reduce</li> <li>2. Encourage liaison between farmers and NRA</li> </ol>
<p><b>6.2.2 GROUNDWATER CONTAMINATION AT BALDOCK ROAD, LETCHWORTH AND BIGGLESWADE</b></p>	<ol style="list-style-type: none"> <li>1. Maintain liaison and data exchange between NRA and Water Companies</li> <li>2. Investigate sources of solvent contamination</li> <li>3. Review other potential sources of contamination</li> <li>4. Improve waste disposal practices</li> <li>5. Provide treatment where necessary</li> <li>6. Develop alternative sources</li> </ol>
<p><b>6.3 Water Resources</b>  <b>6.3.1 a) Future Demand for Abstraction cannot be met from Surface Water (Issue 1)</b></p>	<p>Increase use of winter stored water</p> <p>Transfer water from British Waterways Canal system</p> <p>Increase the return of effluent</p>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
<p>MAFF/NRA/Farmers nitrate input to land</p> <p>NRA/Farmers</p>	<p>Reduction of nitrate in groundwater</p> <p>Increases awareness and reduces pollution risks</p>	<p>Cost - requires incentive compensation schemes</p>
<p>NRA/AWS</p> <p>NRA</p> <p>NRA</p> <p>NRA/Solvent users</p> <p>TVWCO/Greene King</p> <p>NRA/TVWCO/Greene King</p>	<p>Exchange of information for decision making</p> <p>Improved data for decision making</p> <p>Improved data for decision making</p> <p>Reduces risks, improves groundwater quality</p> <p>Compliance with EC standards</p> <p>As above</p>	<p>Uncertainty of positive outcome</p> <p>Cost</p> <p>Cost</p> <p>Cost</p>
<p>Licence holder</p> <p>NRA/BWB</p> <p>PWS/industry</p>	<p>Reduce pressure on summer resources. Potential to create conservation habitat. Potential for development to commercial fishery</p> <p>No need to construct large-scale reservoirs. Recreational use of connections to BWB system</p> <p>Under utilised source. Provide local solution to local problem</p>	<p>Cost to licence holder. Loss of agricultural land</p> <p>Quality problems in carrier rivers. Unknown costs. Unlikely to yield in periods of peak demand</p> <p>Public perception. Piping and treatment costs</p>

## SUMMARY OF CATCHMENT ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>a) Continued</p> <div data-bbox="232 255 666 859" style="border: 1px solid black; padding: 5px;"> <p><b>ABBREVIATIONS USED</b></p> <p><b>AWS</b> Anglian Water Services</p> <p><b>BOD</b> Biochemical Oxygen Demand</p> <p><b>BWB</b> British Waterways Board</p> <p><b>DO</b> Dissolved Oxygen</p> <p><b>DOE</b> Department of the Environment</p> <p><b>FEC</b> Fisheries Ecosystem Class</p> <p><b>MAFF</b> Ministry of Agriculture, Fisheries and Food</p> <p><b>MOD</b> Ministry of Defence</p> <p><b>MRF</b> Minimum Required Flow</p> <p><b>NSA</b> Nitrate Sensitive Area</p> <p><b>PWS</b> Public Water Supply</p> <p><b>STW</b> Sewage Treatment Works</p> <p><b>TVWCO</b> Three Valleys Water Company</p> </div>	<p>Direct transfer from River Trent</p> <p>Construction of Brownhill Tunnel</p> <p>Reduction of Offord MRF</p> <p>Earith Transfer</p> <p>Improve reliability by lowering cessation level.</p>
<p>b) Future demand for Abstraction cannot be met from existing groundwater sources (Issue 1)</p>	<p>Re-evaluation of groundwater resource allocation to the environment</p> <p>Abstraction from existing and old mineral workings</p> <p>Increase abstraction from gravels and other minor aquifers</p>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
<p>NRA</p> <p>AWS</p> <p>NRA/AWS</p> <p>NRA</p>	<p>Trent already of suitable quality for potable water supplies. Available resources in Upper Trent</p> <p>Increase Grafham yield by 100 tcmd. Some permissions already exist.</p> <p>Requires minimal additional cost. Would increase reliable yield of Grafham works.</p> <p>Minimal cost Greater reliability for irrigation abstraction in Middle Level, less pressure on River Nene resources.</p>	<p>May be quality changes in carrier rivers. Cost of new works. May not form reliable supply in a drought</p> <p>Cost of sourceworks. Possible environmental effect on lower Bedford Ouse. Possible effect on navigability of Lower Bedford Ouse</p> <p>Possible environmental effect on Lower Bedford Ouse. Possible effect on navigability of Bedford Ouse. Possible environmental effects on channels of the river.</p> <p>Perceived conflict with navigation in lowered level. Some small reduction in flow.</p>
<p>NRA</p> <p>Landowners/NRA</p> <p>NRA</p>	<p>May yield additional water in some aquifers.</p> <p>Enable more accurate resource planning</p> <p>Extensive workings in valley bottoms. Local source. Replenishes in winter floods. Sites for winter stored water</p> <p>Marginally increase available resources in some areas</p>	<p>In some areas the allocation may increase long-term availability.</p> <p>May show allocation to environment not sufficient. Technical complexity of study</p> <p>Water quality (sulphates). Engineering stability. Many of the sites are quite small. May be hydraulically linked to rivers. Many pits are already allocated for other use</p> <p>Yields may be low. May be hydraulically linked to rivers. Subject to drought</p>

## SUMMARY OF CATCHMENT ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>6.3.2 "IN-RIVER NEEDS" ARE NOT QUANTIFIED AND MINIMUM ACCEPTABLE FLOWS NEED TO BE DEFINED</p>	<p>Carry out extensive ecological studies throughout the catchment</p>
<p>6.3.3 CATCHMENT AREAS FOR WETLAND AND WASHLAND SITES OF CONSERVATION VALUE NEED TO BE DEFINED (Issue 3)</p>	<p>Carry out hydrological, hydrogeological and ecological studies</p>
<p>6.3.4 RE-EVALUATION OF THE GROUNDWATER RESOURCES ALLOCATED TO THE ENVIRONMENT (Issue 4)</p>	<p>Carry out extensive ecological hydrological and hydrogeological studies throughout the catchment</p>
<p>6.3.5 RIVER SUPPORT AND ALLEVIATION OF LOW FLOWS IN THE RIVER HIZ (Issue 5)</p>	<p>Carry out surveys to assess the extent of low flow problems and to establish the required "flow" regime</p> <p>Revoke unused abstraction licences and control use of new abstraction</p> <p>Install a river support scheme using boreholes</p>
<p><b>6.4 Environmental Features</b>  <b>6.4.1 FISHERIES</b>            Issue 1 Habitat Improvements to Tributaries and Backchannels of Bedford Ouse</p>	<p>1. Carry out fishery habitat improvements to tributaries such as the River Ivel, River Kym and Alconbury Brook and backchannels such as the Lees Brook and the Houghton Trout Stream</p>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
NRA	Protects in-river ecology. Improved resource management. Verification of water resource availability. Satisfies local requirements	Cost and timescale. Possible restriction on existing abstractors
NRA	Provide effective protection of existing sites. Improves water resource management	Cost. Technical complexity of study
NRA	Improved resource management. Verification of water resource availability. Satisfies legal requirements	Cost and timescale. May increase allocation in some areas
NRA  NRA  NRA	Improved resource management. Provides baseline data and a target to aim at  May lead to a short-term gain in notionally available resource but unlikely to solve problem in long term  Will provide additional flow in river. Enable NRA to manage resources	Does not 'solve' problem  Unlikely to yield significant additional flow. May protect any additional flow gained  Cost/timescale may lower water table in some locations
NRA	Increase habitat diversity and further the value of the rivers for fisheries and conservation in the area	Cost

## SUMMARY OF CATCHMENT ISSUES AND OPTIONS

ISSUE	OPTIONS
Issue 2 Restoration of Bedford Ouse Dace Populations	1. Rehabilitation of the dace population in the Bedford Ouse Rivers which surveys highlighted had declined as a result of reduced recruitment in drought years
Issue 3 Enhancement of the Barbel Population	To increase the distribution of barbel within this catchment by re-stocking into areas of suitable habitat
Issue 4 Creation of Off-River Refuge areas between St Ives and Earith	1. Poor biomass and densities of fish recorded between St Ives and Earith is linked to poor marginal cover and a lack of backwaters. Creation of off-river refuge areas should help enhance cyprinid production and provide shelter in flood conditions
Issue 5 Provision of Fish Passes	1. Consideration should be given to the provision of fish passes to any structures undergoing major refurbishment
<p><b>6.4.2 RECREATION</b></p> <p>Issue 1 Improved Canoe Portage Facilities around Navigation Structure</p>	1. To carry out works that will ease the handling of canoes around navigation structures improving the service provided by the NRA where they are the statutory navigation authority
Issue 2 Creation of an area for Fishing by Anglers with Disabilities	1. To create an area in which organised angling such as a small fishing match could be undertaken by disabled anglers. This could possibly be created in the Bedford Town area



RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
NRA	Maintenance of species diversity and increased angling potential	Cost
NRA	Enhance species diversity and re-establish populations of this popular angling species	Cost
NRA	Enhanced cyprinid production and hence greater angling potential in this area	Cost
NRA	Enhance the successful run of migratory species such as sea trout and eels	Cost, but this would be modest during any major refurbishment
NRA	Improving facilities for licence paying canoeists	Cost
NRA	Improved facilities for licence paying disabled anglers who currently have little provision for safe accessible angling	Cost

## SUMMARY OF CATCHMENT ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>Issue 3 Demand for Wider Access to the Countryside</p>	<p>1. To work in conjunction with others on collaborative projects to improve public access to water based recreational activities such as footpaths, bridleways and cycle tracks. The work of the Ivel Valley Countryside Project is of particular relevance in this respect</p>
<p>Issue 4 Development of Interpretation Boards and Centres around Water-Based Recreational Areas</p>	<p>1. Construction of interpretation boards to provide general public with useful information to enlighten them as to the wildlife historical areas of interest and the NRA's involvement in these. These could be placed on existing Reserves or footpaths or any proposed extensions of footpaths or bridleways</p>
<p>Issue 5 Creation of Safe Stable Fishing Platforms in Liaison with Angling Clubs</p>	<p>1. To construct fishing platforms which do not present a flood defence risk and will discourage anglers from creating swims in sensitive floodbanks. Particularly needed in Blunham Area of the River Ivel</p>
<p><b>6.4.3 CONSERVATION</b>            Issue 1 Possible Impact of earlier River Engineering Schemes and Dredging, Resulting in Degradation of the River Environment in some Locations</p>	<p>1. To develop and implement effective standard methods to describe, classify and monitor the conservation resource</p> <p>2. Identify areas with potential for restoration and enhancement and determine costs</p> <p>3. Undertake restoration and enhancement schemes (if identified and cost effective)</p>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
NRA Ivel Valley Countryside Project. Local Authorities	Improved public access to riverside recreational activities in line with NRA Recreation Strategy	Cost
NRA in collaboration with local conservation groups and Trusts	Better public information on NRA's activities and good publicity where collaborative projects have been undertaken	Initial cost
NRA in collaboration with Angling Clubs	Reduced flood defence risk and provision of permanent accessible fishing areas. Reduced disturbance to other areas of bank and bankside vegetation.	Initial cost
<p>NRA</p> <p>NRA</p> <p>NRA/Mineral Companies</p>	<p>Provide basis for decision making</p> <p>Provide basis for decision making</p> <p>Improve habitats and landscape</p>	<p></p> <p></p> <p>Costs</p>

## SUMMARY OF CATCHMENT ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>Issue 2 Degradation of the Traditional Lowland Landscape</p>	<ol style="list-style-type: none"> <li>1. To develop and implement effective standard methods to describe, classify and monitor the conservation resource</li> <li>2. Identify areas with potential for landscape restoration and enhancement through replacement of, for example, riverside trees, increasing the areas of permanent flood meadow grassland and reed beds</li> <li>3. Undertake restoration and enhancement schemes (if identified and cost effective)</li> <li>4. NRA continue to develop a programme of riverside tree replacement within its maintenance operations</li> </ol>
<p>Issue 3 Examination of the Weedcutting Regime</p>	<ol style="list-style-type: none"> <li>1. Review code of practice on weedcutting</li> <li>2. Consider reduction of weedcutting programme</li> <li>3. Improve disposal arrangements for cut weeds</li> </ol>
<p>6.4.4 NAVIGATION Issue 1 Boat Traffic Congestion at Locks during the Summer period</p>	<ol style="list-style-type: none"> <li>1. Lock automation</li> <li>2. Lock pen enlargement</li> <li>3. Set level of service for lock waiting times</li> </ol>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
<p>NRA</p> <p>NRA, EN, MAFF, Wildlife Trusts, Riparian Owner</p> <p>NRA/EN, MAFF, Wildlife Trusts, Riparian Owner, CC, District Council, County Council, LA</p> <p>NRA, Riparian Owner</p>	<p>Provide basis for decision making</p> <p>Provide basis for decision making</p> <p>Improve habitats and landscape</p> <p>Improve habitats and landscape</p>	<p>Costs</p> <p>Costs. Possible conflict with Flood Defence. Standards of Service</p>
<p>NRA</p> <p>NRA</p> <p>NRA/Riparian Owner</p>	<p>Monitor impact and performance of weedcutting practice</p> <p>Raise water levels for lowland flood meadows, improve habitats for birds, improve habitats for coarse fish</p> <p>Increase bankside plant diversity</p>	<p>Possible Interference with navigation and fishing</p> <p>Possible reduction of Flood Defence standards</p> <p>Costs</p>
<p>NRA</p> <p>NRA</p> <p>NRA/District Council/ Boat users</p>	<p>Reduces lockage times, part of ongoing programme</p> <p>As above</p> <p>Assist in strategic planning for the development of navigation facilities</p>	<p>Initial cost, only a short term solution if boat numbers continues to rise in pressure areas</p> <p>As above</p> <p>Subjective - what is a reasonable waiting time. Determination of 'saturation point'</p>

## SUMMARY OF CATCHMENT ISSUES AND OPTIONS

ISSUE	OPTIONS
<p>Issue 2 River Level Navigation Reopening</p>	<ol style="list-style-type: none"> <li>1. Feasibility study</li> <li>2. Construction of locks and channel works to re-open navigation</li> </ol>
<p><b>6.5 Flood Defence</b> To optimise and improve standards of service</p>	<p>Assessment and execution of main river works</p> <p>To assess the area at risk from flooding, the effective standard of service and the target standard of service</p> <p>Investigate non-main river flooding and implement alleviation works</p>
<p><b>6.6 Development</b> <b>6.6.1 DEVELOPMENT CONTROL - ISSUE 1</b> To incorporate protection of the water environment into the town and country planning system</p>	<ol style="list-style-type: none"> <li>1. Include relevant policies in structure and local plans</li> <li>2. Amend planning application forms to include water supply source i.e mains/borehole</li> </ol>
<p><b>6.6.2 NEW ROADS AND BYPASSES - ISSUE 2</b> Minimise impact on the water environment</p>	<ol style="list-style-type: none"> <li>1. Incorporate flood protection measures into all road proposals</li> <li>2. Incorporate pollution prevention measures into all road proposals</li> <li>3. Ensure nature conservation interests are protected and enhanced with all road proposals</li> </ol>

RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
NRA/Boat users/ Local authorities	Establish cost benefit	Initial cost with little prospect of the project progressing
NRA/Boat users/ Local authorities	Increase navigation potential and increase boat registration income	High cost, unlikely to commence within foreseeable future
NRA	Improved levels of urban flood protection	Costs
NRA	Improvements in identification of priorities. Utilises resources to best effect	Loss of Flexibility in maintenance activities. Does not cover non main river
Riparian Owners Local Authorities	Improved levels of urban flood protection	Costs. "Permissive" nature of available powers
NRA/Planning Authorities	Protection and enhancement of the water environment	
Local Authorities	Will enable NRA to better assess planning proposals in terms of water resources and to advise accordingly	Initial cost of change of administration to councils
NRA/Highway Authorities/DOT	Avoid increased flood risk	
NRA/Highway Authorities/DOT	Avoid pollution	
NRA/highway Authorities/DOT	Protection and enhancement of water environment	Costs

# 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 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.