

ELY OUSE CATCHMENT MANAGEMENT PLAN



CONSULTATION REPORT



NRA

*National Rivers Authority
Anglian Region*

*Final Plan
to be published
Jan. 1994*

NATIONAL RIVERS AUTHORITY

ANGLIAN REGION



ELY OUSE CATCHMENT MANAGEMENT PLAN

FEBRUARY 1993

ENVIRONMENT AGENCY



107643



NRA

*National Rivers Authority
Anglian Region*

Ely Ouse Catchment Management Plan

FOREWORD

February 1993

Established in 1989 the National Rivers Authority has as its role the "Guardians of the Water Environment". As such it is committed to protecting and improving the water environment in its broadest sense. Establishing a sound planning base for the development of river catchments is essential to our future management.

Catchment management plans are a vehicle to achieve improvements in the water environment. By using public consultation they will allow input from others and provide commitment from all parties to achieving action on important issues.

This is the fourth such Plan produced in the Anglian Region. I look forward to receiving comments from those interested to produce a final Plan balancing the conflicting demands placed upon an integral feature of the Nation's Heritage.

Grainger Davies
Regional General Manager

GRAINGER DAVIES, B.Sc.,
C.Eng., F.I.C.E., F.I.W.E.M.
Regional General Manager

Kingfisher House
Goldhay Way
Orton Goldhay
Peterborough
PE2 5ZR
Tel: 0733 371811
Telefax: 0733 231840
DX: 701640

ELY OUSE CATCHMENT MANAGEMENT PLAN

CONTENTS

	<u>Page No</u>
FOREWORD	
1.0 CONCEPT	1
2.0 OVERVIEW	
2.1 Introduction	3
2.2 Landscape	3
2.3 River Flow	4
2.4 Groundwater	5
2.5 Water Quantity	5
2.6 Water Quality	6
2.7 Data Collection	6
2.8 Land Use	7
2.9 Infrastructure	8
Key Details	9
3.0 CATCHMENT USES	
3.1 Development	12
3.2 Potable Water Supply - Groundwater Sources	15
3.3 Potable Water - Surface Water	17
3.4 Agricultural Abstraction	19
3.5 Industrial Abstraction	21
3.6 Raw Water Transfer	23
3.7 Sewage Treatment Works	26
3.8 Industrial and Agricultural Discharges	28
3.9 Waste Disposal	30
3.10 Mineral Extraction	32
3.11 Flood Defence	34
3.12 Flood Water Storage	37
3.13 Water Power	39
3.14 Ecosystem Conservation	40
3.15 Conservation - Landscape and Archaeology	44
3.16 Fisheries	45
3.17 Angling and Commercial Eel Fishing	48
3.18 Recreation and Amenity	50
3.19 Navigation	52
3.20 Boating and Immersion Sports	55

CONTENTS

	<u>Page No</u>
4.0 CATCHMENT TARGETS	
4.1 Water Quality	57
4.2 Water Quantity	59
4.3 Physical Features	63
5.0 CURRENT SHORTFALLS OF CATCHMENT	
5.1 Water Quality	66
5.2 Water Quantity	70
5.3 Physical Features	73
6.0 ISSUES AND OPTIONS	
6.1 General	76
6.2 Issues and Options	76
 APPENDICES	
Appendix 1 :	Protecting and Improving the Water Environment - Model Policies
Appendix 2 :	Cessation Levels/Flows
Appendix 3 :	Anglian Region Interim Levels of Service
Appendix 4 :	Navigation Information

Index of Maps

<u>Title</u>	<u>Facing Page No.</u>
1. The Ely Ouse Catchment	3
2. River Flows and Groundwater	4
3. Water Quantity	5
4. River Quality Survey	6
5. Land Use	7
6. Infrastructure	12
7. Potable Water Supply	15
8. Agricultural Abstraction	19
9. Industrial Abstraction	21
10. Raw Water Transfer	23
11. Sewage Treatment Works	26
12. Industrial Discharges	28
13. Waste Disposal	30
14. Mineral Extraction	32
15. Flood Protection	34
16. Water Power	39
17. Conservation: Ecology	40
18. Landscape and Archaeology	44
19. Fisheries	45
20. Angling	48
21. Navigation	52
22. Current River Quality in terms of Fisheries Ecosystem Classes	57
23. Water Quality Targets	58
24. Future Targets - Physical Features	63
25. Current Shortfalls of Catchment - Water Quality	66
26. Current Shortfalls of Catchment - Water Quantity	70
27. Current Shortfalls of Catchment - Physical Features	73

1.0 CONCEPT

The National Rivers Authority (NRA) is the major environmental protection agency responsible for safeguarding and improving the natural water environment in England and Wales. The nature of its responsibilities are wide reaching and include:-

- Control of pollution and improving the quality of rivers, groundwaters and coastal waters.
- Flood defence, including the protection of people and property.
- Flood warning.
- Effective management of water resources.
- Maintenance and improvement of fisheries.
- Conservation of the natural water environment.
- Promotion of water based recreation including navigation.

To achieve success in all these areas the NRA works with industry, commerce, farming and the general public to promote environmental awareness and to enforce appropriate environmental standards.

Catchment management assists the NRA to use its authority and work with others to ensure that the rivers, lakes, coastal and underground waters are protected and where possible improved for the benefit of future generations.

River catchments are subject to increasing use by a variety of activities. Many of these interact and some conflicts arise. The competing requirements and interests of users and beneficiaries must be balanced.

The NRA will use its resources to:-

- i) Respond promptly to all reported pollution incidents.
- ii) Control pollution by working with dischargers to achieve improvement and monitor effluent compliance with appropriate standards.
- iii) Maintain existing and invest in new assets to provide flood protection, develop water resources and provide other NRA services.
- iv) Determine, police, enforce and review the conditions in water abstraction licences, discharge consents and land drainage consents to achieve operational objectives.

- v) Develop fisheries, promote recreation, navigation and conservation.
- vi) Influence planning authorities to control development so as to avoid conflict with NRA objectives and initiatives through Town and Country planning liaison.
- vii) Assess, manage, plan and conserve water resources.

This draft catchment management plan consolidates the policies, objectives and options for the Ely Ouse catchment for the overall improvement of the water environment. The plan is drawn up as follows:-

1. Uses of the Catchment

For the identified uses of the water environment up to three pages of text is produced supported by a map indicating where in the catchment each use occurs. Objectives for the use are identified and targets set (where applicable) for Water Quality, Water Quantity and Physical Features.

2. Catchment Targets

By taking the targets for individual uses, overall targets for Water Quality, Water Quantity and Physical Features are set for the catchment.

3. Current Shortfalls of the Catchment

Having set targets it is now possible to view the current shortfalls of the catchment and identify issues that need addressing to meet future targets.

4. Issues and Options

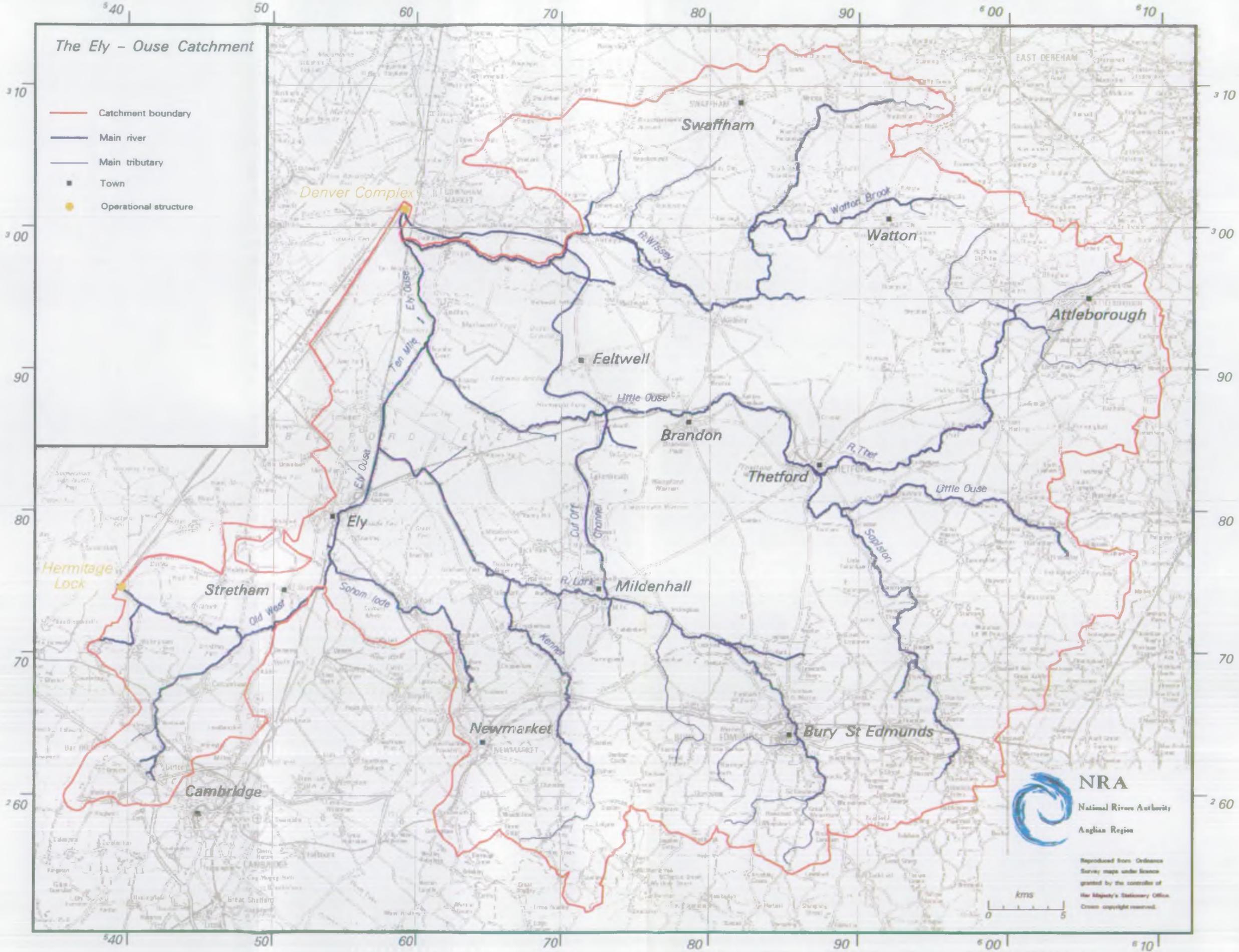
It is now possible to identify individual issues and suggest options to resolve these problems. These options identify responsible bodies and suggest advantages and disadvantages.

The Plan is now released for public consultation in draft form. Comments on the objectives/targets and Issues/Options are invited before the plan is finalised to produce an Action Plan for the Catchment.

The issues and options as presented are the initial thoughts of the Anglian Region of the NRA and do not constitute policy statements. Following the consultation period all comments will be drawn together and considered in drawing up the Action Plan.

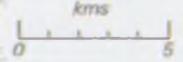
The Ely - Ouse Catchment

- Catchment boundary
- Main river
- Main tributary
- Town
- Operational structure



NRA
National Rivers Authority
Anglian Region

Reproduced from Ordnance Survey maps under license granted by the controller of Her Majesty's Stationery Office. Crown copyright reserved.





2.0 OVERVIEW

2.1 Introduction

The Ely Ouse Catchment is a combination of seventeen sub-catchments, covering 2510 km², which reflect the diversity of topography within the area. It has a population of approximately 272,000, with extensive road and rail networks throughout.

The upland areas (72% of the total catchment) are drained by natural rivers and streams. The lowland drainage systems have been modified by man over centuries to provide flood protection for land up to seven metres below normal high tide level.

To the east, the catchment boundary is the watershed of the upland rivers and streams. To the west it is a combination of the South Level Barrier Bank, alongside the Hundred Foot River, and the hydrological boundary of the Littleport and Downham Internal Drainage Board (IDB). The Denver Sluices provide the northern discharge point whilst balancing the outflow to the tidal river and transferring raw water via the Cut-Off Channel to Essex. To the south, Hermitage Lock controls inflow from the Bedford Ouse system to the Old West River, whilst the River Cam flows into the catchment at Stretham.

Consequently, throughout the lowland area of the catchment, river levels are controlled by the Denver Sluices giving rise to operational and environmental impacts throughout the seasons.

2.2 Landscape

The area covered by this plan would generally be considered as a lowland river catchment. The maximum elevation within the catchment is around 125 m above sea level and is to be found in the chalk outcrop areas south of Newmarket. The Breckland areas are generally between 30 m and 60 m above sea level, while much of the fenland area is at or even below sea level.

Within this flat or gently rolling area, river valleys are an important feature of the landscape. This is particularly true in the fenland areas where the embanked watercourses, often with associated washlands, offer a sharp contrast between the intensive arable agriculture of the fen and the more 'wild' appearance of the grazed areas adjacent to the river.

The fen area is dominated by Ely, and in particular Ely Cathedral, which is visible from a large part of this low lying area.

Much of the fen, on its eastern edge, is bounded by the Brecklands, a designated Environmentally Sensitive Area (ESA). The Brecks characterised by their light, free draining sandy soils and forestry interests, also contain a significant number of important sites for nature conservation. The Brecks are also very rich in sites of archaeological importance.

The other important landscape type found within the catchment is associated with chalk outcrops. These areas support a variety of land uses, principally mixed or arable agriculture, but also including small areas of chalk grassland.

Newmarket racecourse and associated studs are also to be found principally on areas of chalk outcrops.

In summary, the catchment has a diverse range of landscape types within which the river corridor forms an important component.

2.3 River Flow

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

The catchments of the Rivers Wissey, Lark, Little Ouse and their associated tributaries, drain the chalk uplands. Flows from these rivers either flow to the Ely-Ouse or, in times of flood, are diverted by means of sluices into the Cut-Off Channel and then to the Tidal River via the Relief Channel, downstream of Denver.

Ely Ouse flows normally discharge to the Tidal River through Denver Sluice but during floods the flow can be diverted into the Relief Channel.

There is also the opportunity to transfer Ely Ouse flows into the Cut-Off Channel at Denver for public water supply in Essex.

On average the tributaries contribute to the flow in the Ely Ouse as follows; River Wissey 17%, River Little Ouse 36%, River Lark 12% and inflow from outside the catchment from the River Cam 35%. In the low lying land to the west of the Cut-Off Channel, known as the South Level, the rivers are retained and levels controlled by the sluices at the Denver Complex. In winter the river flows are increased due to the land drainage pumping by Internal Drainage Boards and summer river flows may be reduced as water is drawn off into the low level drains for crop irrigation.

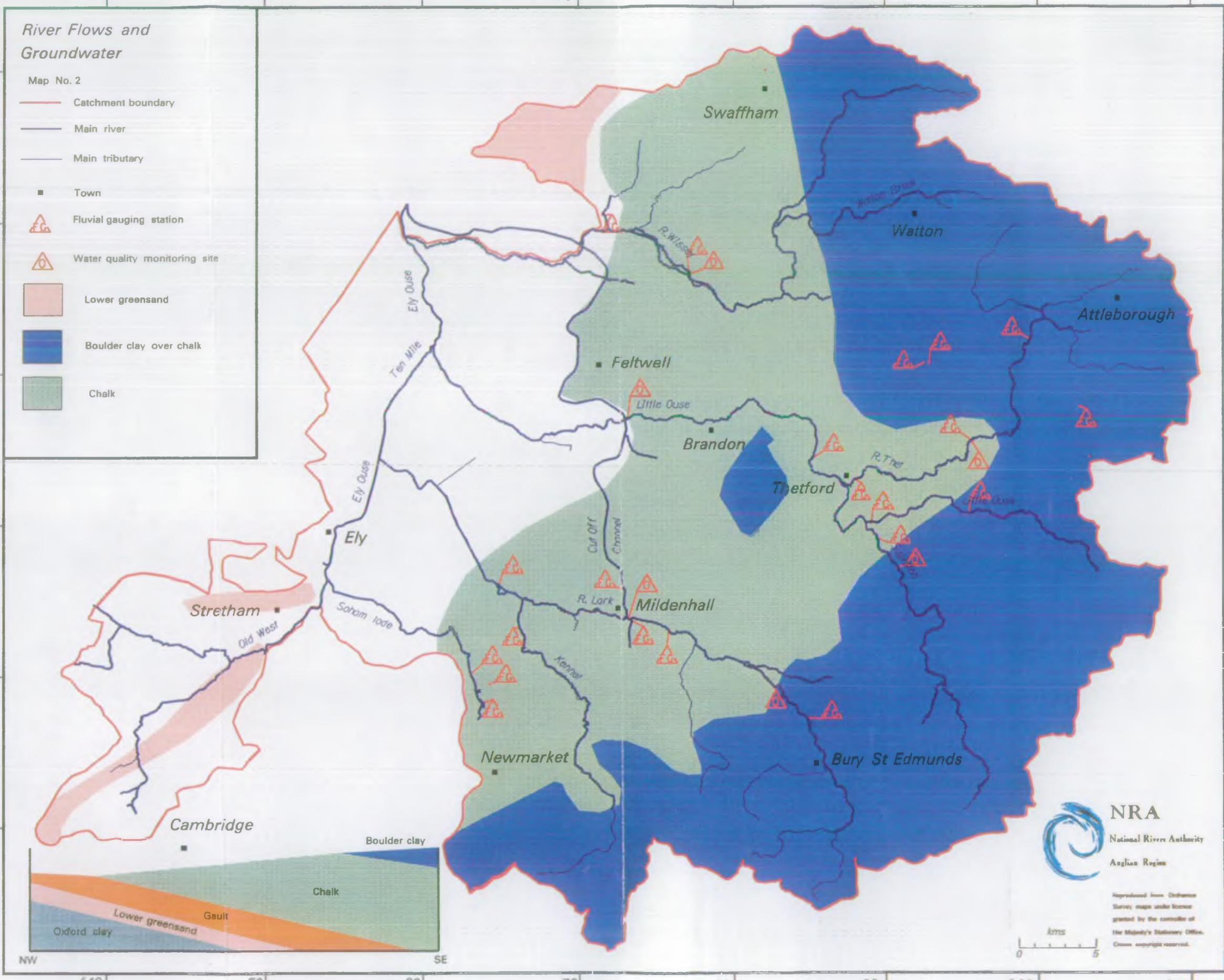
River Flows and Groundwater

Map No. 2

-  Catchment boundary
-  Main river
-  Main tributary
-  Town
-  Fluvial gauging station
-  Water quality monitoring site
-  Lower greensand
-  Boulder clay over chalk
-  Chalk

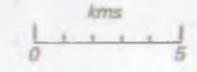
3 10
3 00
90
80
70
2 60

3 10
3 00
90
80
70
2 60



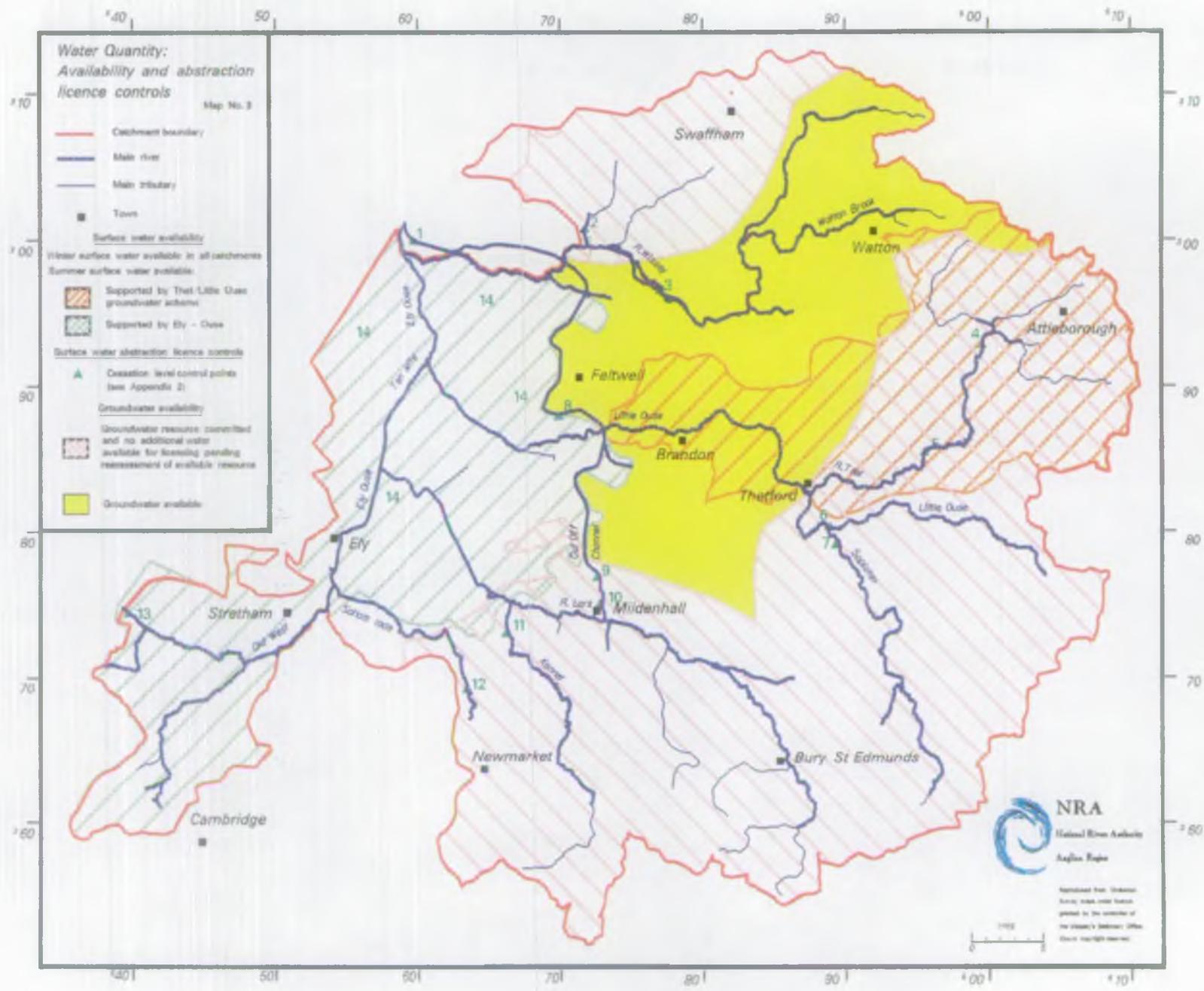
NRA
National Rivers Authority
Anglian Region

Reproduced from Ordnance Survey maps under license granted by the controller of Her Majesty's Stationery Office. Crown copyright reserved.



5 40 | 50 | 60 | 70 | 80 | 90 | 00 | 10





*Surface water
 for water resources*



2.4 Groundwater

Groundwater occurs in saturated rocks known as aquifers.

The principal aquifer is Chalk which occurs in the east of the catchment. On the higher ground much of the Chalk is covered by Boulder Clay and Sands. Additional Sand and Gravel deposits occur within the upland river valleys and may form small, isolated aquifers.

Recharge of the chalk occurs over the whole of its area and the groundwater flows are generally towards the west. Water flows out of the aquifers either at discrete springs or gradually along the length of the Rivers Wissey, Little Ouse, Lark and Soham Lode, and this flow contributes up to 70% of the total annual river flow.

Underlying the Chalk there is the Lower Greensand aquifer. Recharge of water to this aquifer is extremely limited because it is covered by the Gault Clay.

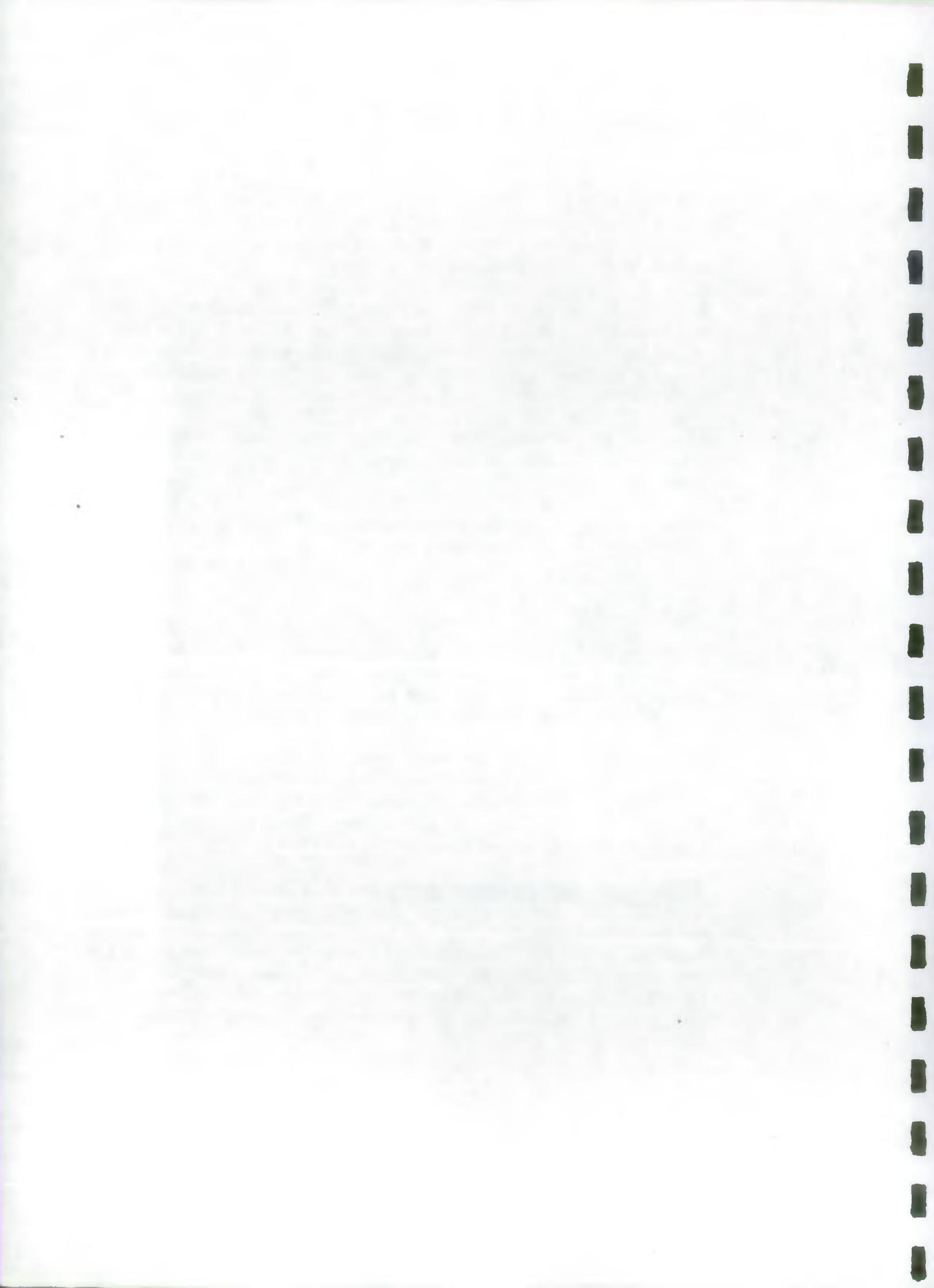
In the low level catchments there is some groundwater available from isolated river and glacial sands and gravels.

2.5 Water Quantity

Within the NRA's planning role is the requirement to balance the varied and competing needs for water resources. These include human needs, such as potable water supply, industry and agriculture, as well as those of the water environment such as rivers, springs and wetlands.

Most uses of water require an abstraction licence issued by the NRA and to date the total quantity licensed within the catchment is 100 million cubic metres per year. Some abstraction licences contain clauses which restrict abstraction at times of low river flow and level. These are defined at key gauging stations in the catchment.

An abstraction licence is only issued if there is sufficient water available, the need for the water is justified, all rights of existing users are protected and the water environment, e.g. rivers, springs and wetland sites, is not unacceptably affected. The availability of water is calculated using long term records of rainfall, evaporation, river flows, water abstractions and discharges, plus an allocation to the river environment. The current policy with respect to the availability of water for licensed abstraction is given below:





Groundwater

Groundwater is only available for abstraction in the following areas:

- chalk aquifer adjacent to the River Little Ouse below Thetford.
- chalk aquifer adjacent to the River Wissey.

Surface Water

- Some winter water is available in all catchments during periods of high flow and abstractors are encouraged to store this water in reservoirs for summer use.
- Summer water is only available in limited quantities from rivers or drains augmented by raw water transfer schemes. This applies to the rivers Thet, Little Ouse and Ely Ouse.

The drought conditions prevailing between 1989-92 put the water environment under stress and caused difficulty to many abstractors. Hence the NRA introduced a moratorium on all additional abstractions of groundwater in the areas of chalk aquifer where resources are limited.

2.6 Water Quality

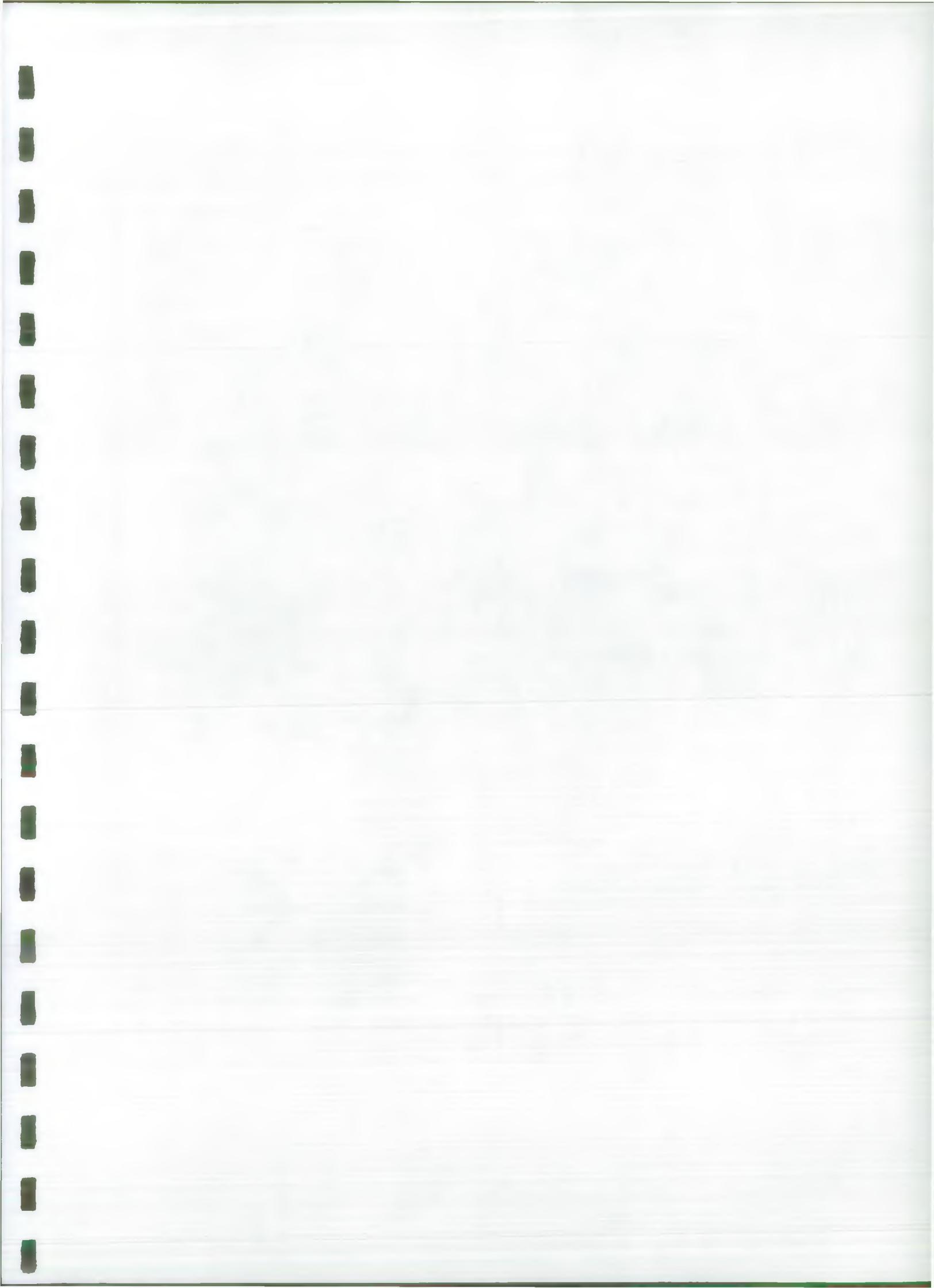
Most of the rivers in this catchment are of very good or good quality. Only recently have there been any significant lengths of poor quality watercourse; this has been due to the effects of the drought.

One of the objectives of this plan is to maintain, and where necessary, improve water quality within the catchment. The most important use to be protected is for drinking water which is abstracted from the River Wissey, and extensively from the chalk in the east of the catchment. The majority of the rivers support good fish populations.

Agriculture is the dominant industry and poses a threat to water quality, both from short term pollutants, for example slurry, and also long term, low level ones, for example nitrate and pesticides. Hence pollution prevention is of great importance. Proposals to protect surface and ground water may have an impact on how agriculture is carried out in the future. Sewage Treatment Works (STW) effluents are the other major contributor of polluting loads to the rivers.

2.7 Data Collection

The NRA requires information and data about the water environment to carry out its regulatory and planning functions. Rainfall, river levels and flows, groundwater levels, water chemistry and biology, and fish



populations are all measured within the catchment.

This is undertaken either by a regular round of visits or by telemetry links. The Authority's telemetry system takes daily readings which are used for both operational purposes and long-term data collection.

2.8 Land Use

The predominant land use is agriculture, the area of urbanisation being comparatively small. Woodland accounts for some 7% of the catchment area. Within the catchment, there are major military installations, eg Mildenhall, Lakenheath, Feltwell, Marham and Honiton and the army battle training areas north-west of Thetford and south of Swaffham.

i) Agriculture

The catchment contains farmland, in the grades I, II, III and IV as classified by the Ministry of Agriculture, Fisheries and Food. Arable farming is the general rule with the fen deposits forming the highly productive Grade I land in the lowland part of the catchment.

The land classification grades as a percentage of the whole catchment are:-

Grade I	11%
Grade II	11%
Grade III	46%
Grade IV	24%
Woodland	7%
Urban	1%

ii) Urbanisation

The catchments population is approximately 272,000 with the following distribution, Norfolk 76,250, Suffolk 129,500 and Cambridgeshire 66,250.

In Norfolk, fifty percent of the population is centred in the towns of Thetford, Attleborough, Swaffham and Watton; and likewise in Suffolk, fifty percent of the population is centred in the towns of Bury St Edmunds, Newmarket and Mildenhall.

The population in Cambridgeshire is more evenly distributed, the main settlement being Ely with a population of 12,060.

Industry type is very varied throughout the catchment and is generally located at the major settlements in designated industrial areas. Notable in Cambridgeshire are the business parks at Witchford, Sutton and Ely.

Apart from the proposed Red Lodge settlement in Suffolk and the potential new village at Kennett in Cambridgeshire, the growth identified in the structure plans of all three counties will be concentrated in the existing major population centres.

2.9 Infrastructure

Rail transport provided by British Rail Network Southeast links all the major population centres, this being predominantly passenger based.

The road network serves the local communities and conveys a large volume of through freight traffic. The two major roads are the A11(T) and A45(T).

Road improvements and new road construction can present many problems to the water environment.

The current trend of increased road traffic means that there will be pressure for road improvements for the foreseeable future.

KEY DETAILS

CATCHMENT DETAILS

Area	2510 km ²	
	<u>Existing</u>	<u>Predicted 2006</u>
Population	272000	309450

Topography

Ground Levels	Min Level	- 2.0 m AOD
	Max Level	125.0 m AOD

Geology

East	- Boulder Clay on chalk
Central	- Chalk outcrop
West	- Clays with fen deposits and some Greensand outcrops

ADMINISTRATIVE DETAILS

<u>County Councils</u>	Cambridgeshire	17% of catchment area
	Norfolk	43%
	Suffolk	40%

<u>District & Borough Councils</u>	Babergh
	Breckland
	East Cambs
	Forest Heath
	Kings Lynn and West Norfolk
	Mid Suffolk
	St Edmundsbury
	South Cambs
	South Norfolk

NRA	Anglian Region - Central Area
	Ely District
	Kings Lynn District

Water Companies	Anglian Water Services Limited	94% of catchment area
	Cambridge Water Company	6%
	Suffolk Water Company	Minimal

Sewage Treatment Works 140

Internal Drainage Boards
 Burnt Fen, Cawdle Fen, East Harling, Haddenham Level, Hilgay Great West Fen, Lakenheath Fen, Littleport and Downham, Mildenhall, Middle Fen and Mere, Northwold, Old West, Padnal and Waterden, Southery and District, Stoke Ferry, Stringsides.

Main Towns and Populations

Bury St Edmunds	32310	Ely	12060
Thetford	19485	Brandon	7480
Newmarket	16920	Swaffham	5690
Mildenhall	13120	Watton	5570

WATER QUALITY

Length of river in National Water Council (NWC) Class for 1991.

<u>Class</u>	<u>km</u>
1A (very good)	40.6
1B (good)	218.6
2 (fair)	94.1
3 (poor)	72.2
4 (bad)	0.

Note: Minor tributaries not included.

WATER RESOURCES

Availability
 Chalk aquifer - limited availability.
 Lower Greensand - none
 Surface water - winter only except from supported watercourses

FLOOD PROTECTION

Length of statutory main river (maintained by NRA) 407.3 km

Embanked main river 161 km

Area protected by embanked channel 495 km²

Area of natural flood plain 71 km²

NAVIGATION

Length of navigable river 103.3 km

FISHERIES

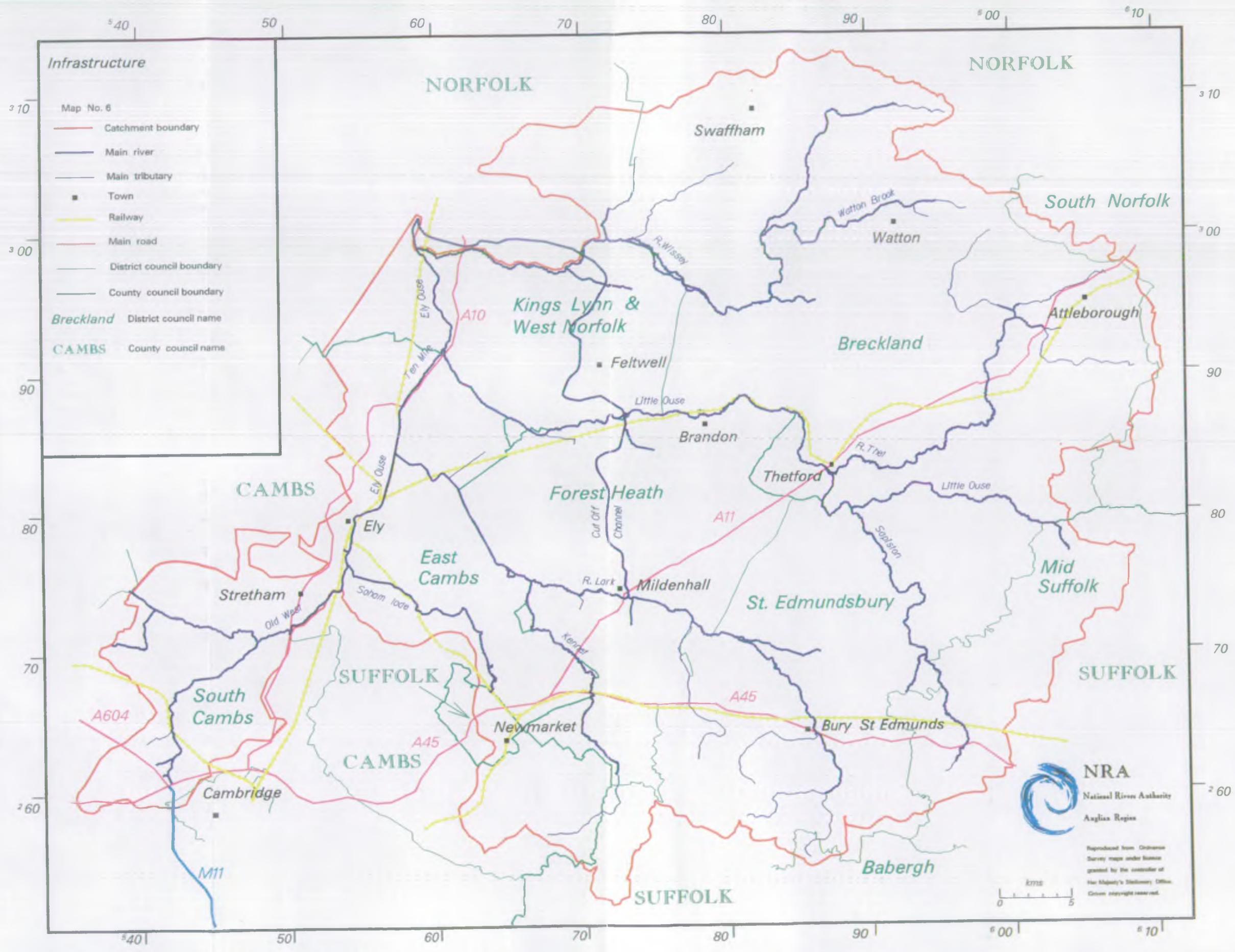
Length of game (trout) fishery 106 km

Length of cyprinid (Coarse) fishery 227 km

CONSERVATION

Sites of Special Scientific Interest (SSSIs): 78

Water dependent SSSIs: 39



Infrastructure

Map No. 6

- Catchment boundary
- Main river
- Main tributary
- Town
- Railway
- Main road
- District council boundary
- County council boundary

Breckland District council name

CAMBS County council name

NRA
National River Authority
Anglian Region

Reproduced from Ordnance Survey maps under license granted by the controller of Her Majesty's Stationery Office. Crown copyright reserved.

0 5 km



3.0 CATCHMENT USES

3.1 DEVELOPMENT - Housing, Industry and Commerce

3.1.1 General

The consideration of development is essential in effective river catchment planning, this includes existing development and the predicted residential, commercial and industrial development as identified in draft and adopted county structure and district local plans. These plans identify policies against which the Planning Authorities consider planning applications.

The NRA is a statutory consultee under planning legislation and advises county and local authorities on development proposals which may have an impact on matters relevant to the NRA.

The NRA seeks to pursue its aims and policies in relation to development through the planning consultation process, and although the final decision on planning matters rests with the planning authority, government guidelines advise on the need to consider the NRA's concern in determining proposals.

3.1.2 Local Perspective

Planning legislation within the catchment involves three County and nine District Councils. Within Norfolk are the District Councils of Breckland, King's Lynn and West Norfolk, and South Norfolk. Within Suffolk are the District Councils of Forest Heath, Mid Suffolk, Babergh and the Borough of St Edmundsbury. Within Cambridgeshire are the District Councils of East Cambridgeshire and South Cambridgeshire.

In general all three County Structure Plans (in their various stages of updating) recognise the need for development to meet the requirements of a rising population, both in housing and employment.

In Norfolk, the anticipated population increase to the year 2006 is just over 1% per annum with Thetford the major growth centre for residential and commercial development.

Suffolk has an anticipated population increase of 1% per annum to the year 2006, with the major development concentrated in Bury St Edmunds, Mildenhall and the Red Lodge New Settlement with its proposed 1500 new dwellings plus employment.

Cambridgeshire also has an anticipated population increase of 1% per annum to the year 2006. Ely is proposed to be the major growth centre with attendant commercial development. Industrial development will be centred at Witchford and Sutton. Limited development will take place at Soham, Littleport, Willingham, Cottenham and Girton.

In Cambridgeshire is a potential village of 1650 dwellings off the A45 at Kennett and a sub-regional shopping centre adjacent to the A604 road near Bar Hill.

The major road improvement scheme within the catchment is the dualling of the A11 from the A45 south of Red Lodge on route to Norwich.

The Authority's aims and policies are reflected to varying degrees by the County Structure plans.

3.1.3 Development - Objectives

Flood Defence:

- To ensure new development is not at risk from flooding and does not put other areas at risk of flooding which could endanger life and damage property.
- To ensure any work which is needed to reduce the risk of flooding created by a new development is paid for by the developer and not the public.

Conservation and Enhancement of the Water Environment:

- To protect the water environment from any detriment due to development.
- To enhance the water environment in conjunction with development.

Water Quality:

- To protect surface and groundwaters from pollution arising from development.

Water Quantity:

- To ensure that development does not cause unacceptable effects on surface water and groundwater resources and to protect the rights of those who abstract water.

3.1.4 Development - Policy Summary (See Appendix 1 for Anglian Region Model Policies)

Introduction:

The NRA through its available legislation and by consultation, addresses:-

- i) The disposal of surface water run-off.
- ii) Pollution prevention measures to both surface and groundwater.
- iii) The crossing of watercourses and their attendant flood plains.
- iv) The effect on water resources and the protection of existing sources.
- v) The impact of the works on the conservation aspects of the watercourse.

Flood Defence:

- There will be a presumption against development, including the raising of land where, in the opinion of the NRA, such development would be likely to impede the flow of flood water, or increase the risk of flooding elsewhere or increase the number of people or properties at risk.

Conservation and Enhancement of the Water Environment:

- The conservation and enhancement of wildlife, landscape and archaeological features associated with rivers, ponds, lakes, wetland etc will be encouraged.

Water Quality:

- There will be a presumption against development including changes in land use which, in the opinion of the NRA will pose an unacceptable risk to the quality of ground and surface water.

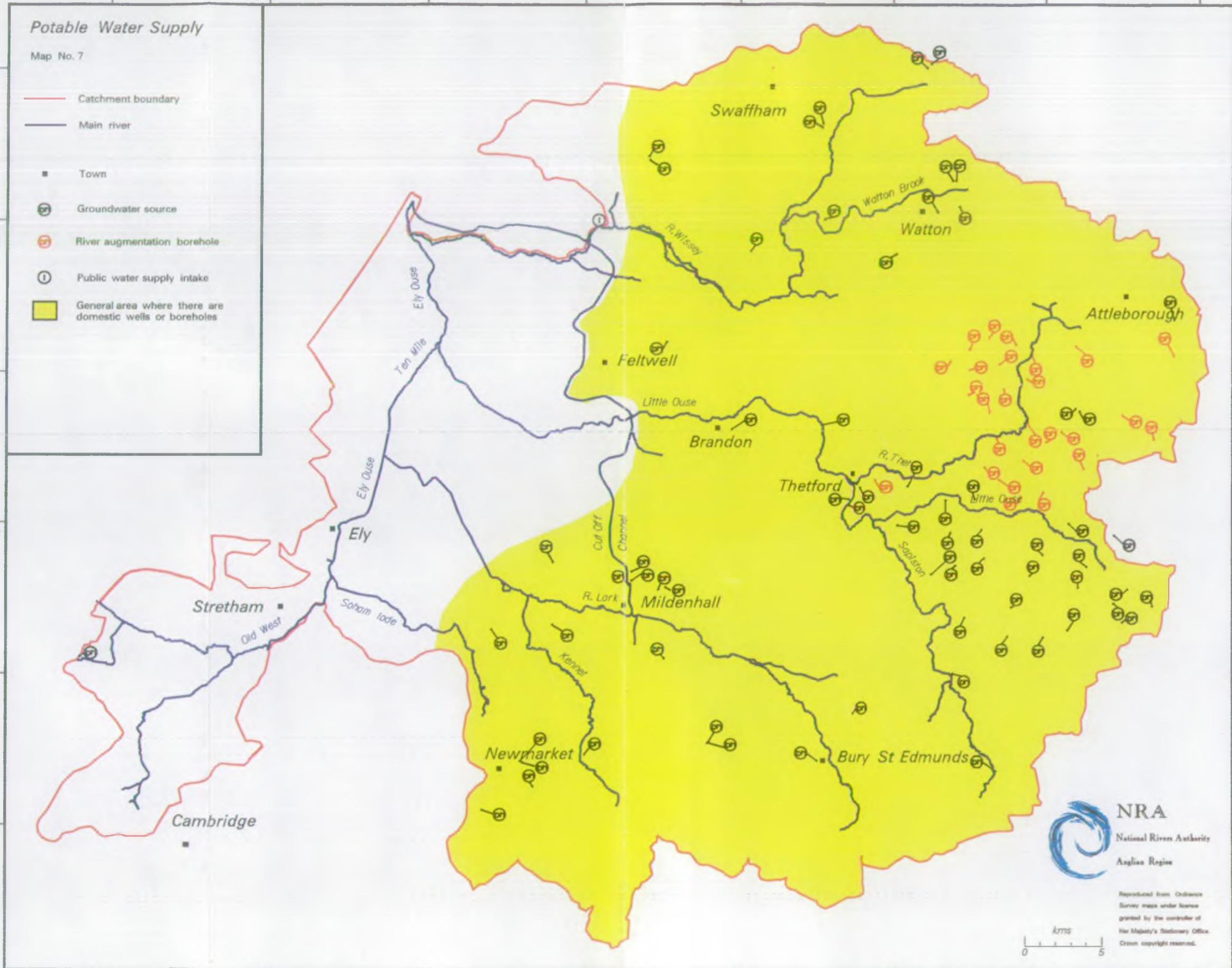
Water Quantity:

- There will be a presumption against development including changes in land use which, in the opinion of the NRA, will have an unacceptable impact on water resources.

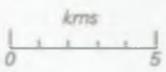
Potable Water Supply

Map No. 7

- Catchment boundary
- Main river
- Town
- ⊗ Groundwater source
- ⊗ River augmentation borehole
- ⊙ Public water supply intake
- General area where there are domestic wells or boreholes



Reproduced from Ordnance Survey maps under license granted by the controller of Her Majesty's Stationary Office. Crown copyright reserved.





3.2 POTABLE WATER SUPPLY - GROUNDWATER SOURCES

3.2.1 General

This relates to the use of groundwater for domestic purposes, such as drinking, cooking and washing. The water is abstracted from wells and boreholes constructed within the underground rocks (called aquifers). The major source of groundwater in this catchment is the Chalk aquifer.

Abstractions are made by the water supply companies, in particular Anglian Water Services (AWS) Limited, Cambridge Water Company and Suffolk Water. In addition, individual householders abstract from wells or boreholes for their own domestic use.

The abstractions made by the water supply companies are controlled by abstraction licences issued by the NRA under the Water Resources Act 1991 (previously the Water Resources Act 1963). An abstraction licence is only issued by the NRA if there is sufficient water available, the need for the water is justified, all rights of existing users are protected and the water environment, eg rivers, springs and wetland sites, is not unacceptably affected.

Abstraction made by private individuals for their own individual domestic use is not required to have an abstraction licence under the Water Resources Act 1991 unless the quantity used exceeds 20 cubic metres per day.

3.2.2 Local Perspective

There are forty-two borehole sites operated in the catchment for public water supply. AWS Limited operate thirty eight sites, Cambridge Water Company operate three and Suffolk Water operates one. All these abstractions are from chalk boreholes.

AWS Limited supply water to most of the population within the catchment. The company operates a comprehensive water supply mains network and hence the water can be distributed from the borehole source to the point of demand. In general, the needs of the local community are supplied first then the water is distributed to towns and major demand centres at distance. All the towns and villages within the area are supplied with chalk groundwater.

AWS Limited are also responsible for supplies outside the area of this catchment and water is transferred across the borders to meet needs in Narborough, areas near Diss, areas near Stowmarket as well as south to areas north of Sudbury.

The total quantity of water licensed to AWS Limited in this catchment is 49 million cubic metres per year.

Cambridge Water Company intend to operate the three chalk borehole sites near Thetford to help meet the demands of people living in Cambridge. The pipeline is currently under construction. The total quantity of water licensed to Cambridge Water Company in this catchment is 8.5 million cubic metres per year.

Suffolk Water operate one source at Rickinghall for local needs. The total licensed quantity is 0.5 million cubic metres per year for this source.

The total quantity of groundwater licensed for public water supply is 58 million cubic metres per year. This is 58% of the total water licensed for abstraction in the catchment.

The catchment is characterised by a large number of groundwater sources used for private domestic supply. These abstractions are principally from the Chalk aquifer but there are some shallow wells into local Sands and Gravel deposits. The majority of this use is exempt from licensing under the Acts. The small amount that is licensed, accounts for 1% of the total water licensed for abstraction in the catchment.

3.2.3 Environmental Objectives

Water Quantity:

- To protect aquifers from overcommitment and ensure groundwater abstraction does not have an unacceptable effect on environmental waters.
- To ensure the proper use of groundwater resources.
- To conserve water resources, for example, by encouraging efficient water use and leakage control.
- To augment and/or redistribute water resources, where appropriate, to meet water demands to appropriate standards of reliability.

Water Quality:

- To protect existing licensed potable water abstractions from pollution using protection zones which are currently being prepared.
- To protect all groundwater as a potential future resource in accordance with the NRA Groundwater Protection Policy.

3.3 POTABLE WATER SUPPLY - SURFACE WATER

3.3.1 General

This describes the abstraction of surface water, ie rivers and springs for domestic potable use. Abstractions by water companies require an abstraction licence under the Water Resources Act 1991. An abstraction licence is only issued by the NRA if there is sufficient water available, the need for the water is justified, all rights of existing users are protected and the water environment, eg rivers, springs and wetland sites, is not unacceptably affected.

Abstraction by a private individual for one household's domestic supply would only require a licence if the abstraction is greater than 20 cubic metres per day.

3.3.2 Local Perspective

There is one surface water supply works operated for public water supply in the catchment. This is at Stoke Ferry where water is abstracted by AWS Limited from the River Wissey and the Cut Off Channel. The majority of water abstracted is used to supply the needs of the population of Kings Lynn. The total quantity licensed is 6.5 million cubic metres per year. The licence contains clauses to protect the downstream flow of the River Wissey. This licence represents 6% of the total quantity of water licensed for abstraction in the catchment.

There are a small number of spring sources within the catchment which are used for private domestic supplies.

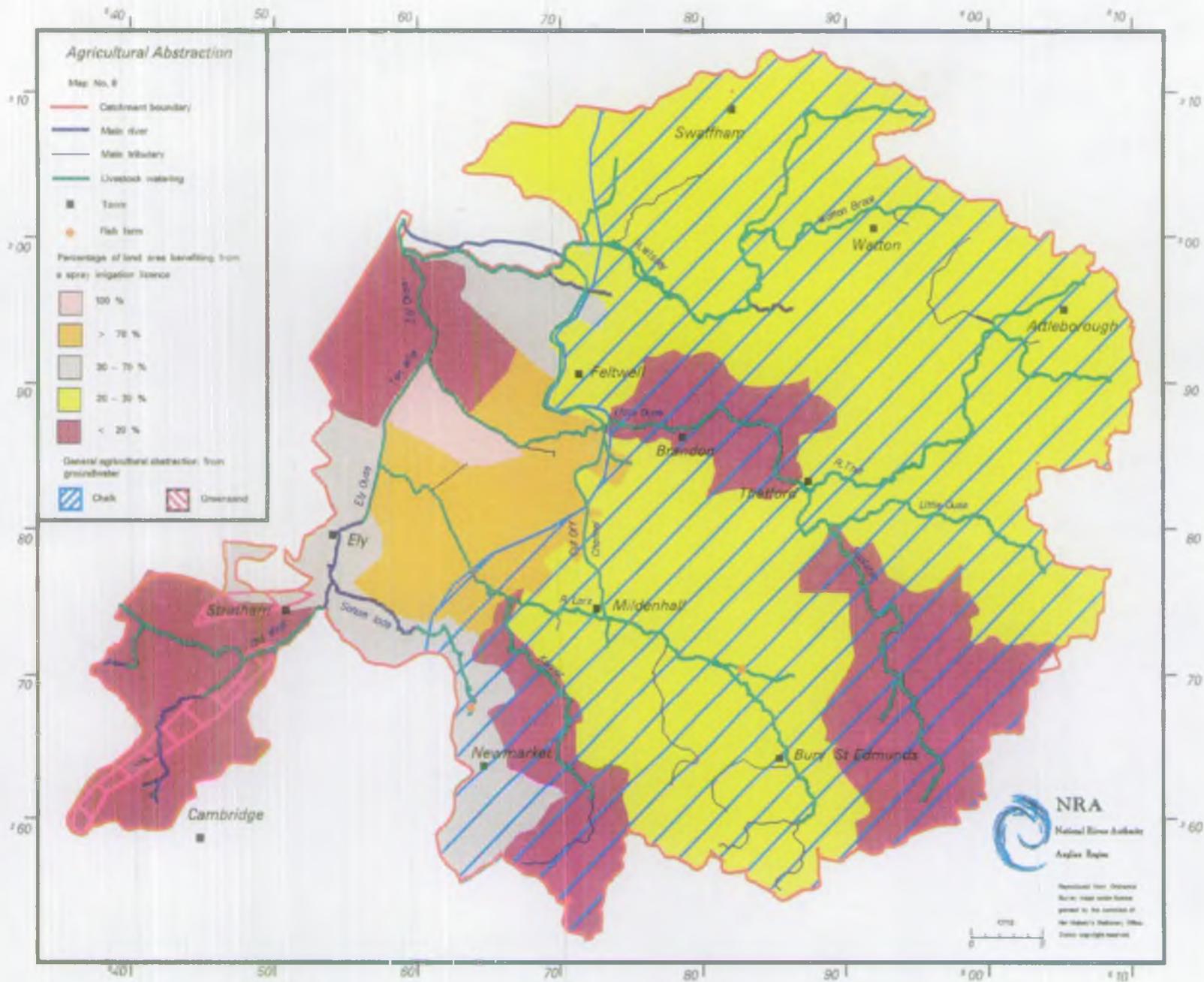
3.3.3 Environmental Objectives

Water Quantity:

- To protect surface waters from overcommitment and ensure groundwater abstraction does not have an unacceptable effect on environmental waters.
- To ensure the proper use of surface water resources.
- To conserve water resources, for example, by encouraging efficient water use and leakage control.
- To augment and/or redistribute water resources, where appropriate, to meet water demands to appropriate standards of reliability.

Water Quality:

- Compliance with EC Directive 75/440/EC on the quality required of surface water abstracted for drinking water.
- Implement catchment control measures in order to enhance pollution prevention.





3.4 AGRICULTURAL ABSTRACTION

3.4.1 General

This use includes water abstracted for general agricultural use (eg stock watering, crop spraying), fish farms and spray irrigation. All abstraction, except for general agricultural use less than 20 cubic metres per day taken from surface waters, requires a licence under the Water Resources Act 1991.

An abstraction licence is only issued by the NRA if there is sufficient water available, the need for the water is justified, all rights of existing users are protected and the water environment, eg rivers, springs and wetland sites, is not unacceptably affected. Abstraction from surface water sources is subject to low level or flow restrictions in order to protect the river and downstream users.

3.4.2 Local Perspective

Water abstracted for agricultural use represents the second largest abstraction demand in the catchment (the first is Public Water Supply) and the greatest number of licences issued. This reflects the rural character of the area.

General Agriculture

There are 420 licences for general agricultural use of water in the catchment. Abstraction is mainly from groundwater sources although some surface water abstractions do occur. The total quantity licensed for this use is nearly 3 million cubic metres per year, which is 3% of the total water licensed for all uses in the catchment.

Spray Irrigation

Water abstracted from surface water and groundwater is used for spray irrigation across the whole catchment. The total of 548 licences for this purpose comprise a total 23 million cubic metres per year and 23% of the total water licensed in the catchment.

The majority of the spray irrigation in the fen areas uses water from the drains controlled by Internal Drainage Boards. Water is transferred to these drains via 'slackers' (pipes and valves) from the main surface watercourses. This transfer of water supports both the use of spray irrigation and the water levels in the sub soil. The latter represents up to ten times the quantity that is licensed for spray irrigation and is lost by evapotranspiration.

The NRA has no water resource control of the slacker transfer as currently the abstraction does not require a licence. This is an important issue because in dry summers, up to 50% of the river flow from the upland catchment into the South Level, is transferred into the IDB System. However, part of the abstraction is indirectly controlled by the NRA, in the abstraction licences for Spray Irrigation, and from January 1992 all new or renewed licences are subject to a cessation limit based on the flow at Denver.

Fish Farms

There are two fish farms in the catchment, in the River Lark and the Soham Lode sub-catchments. Water is abstracted to maintain a level and flow in the farms but is returned to the main watercourses in total.

Livestock Watering

Most watercourses in the catchment are used or have the potential to be used for livestock watering.

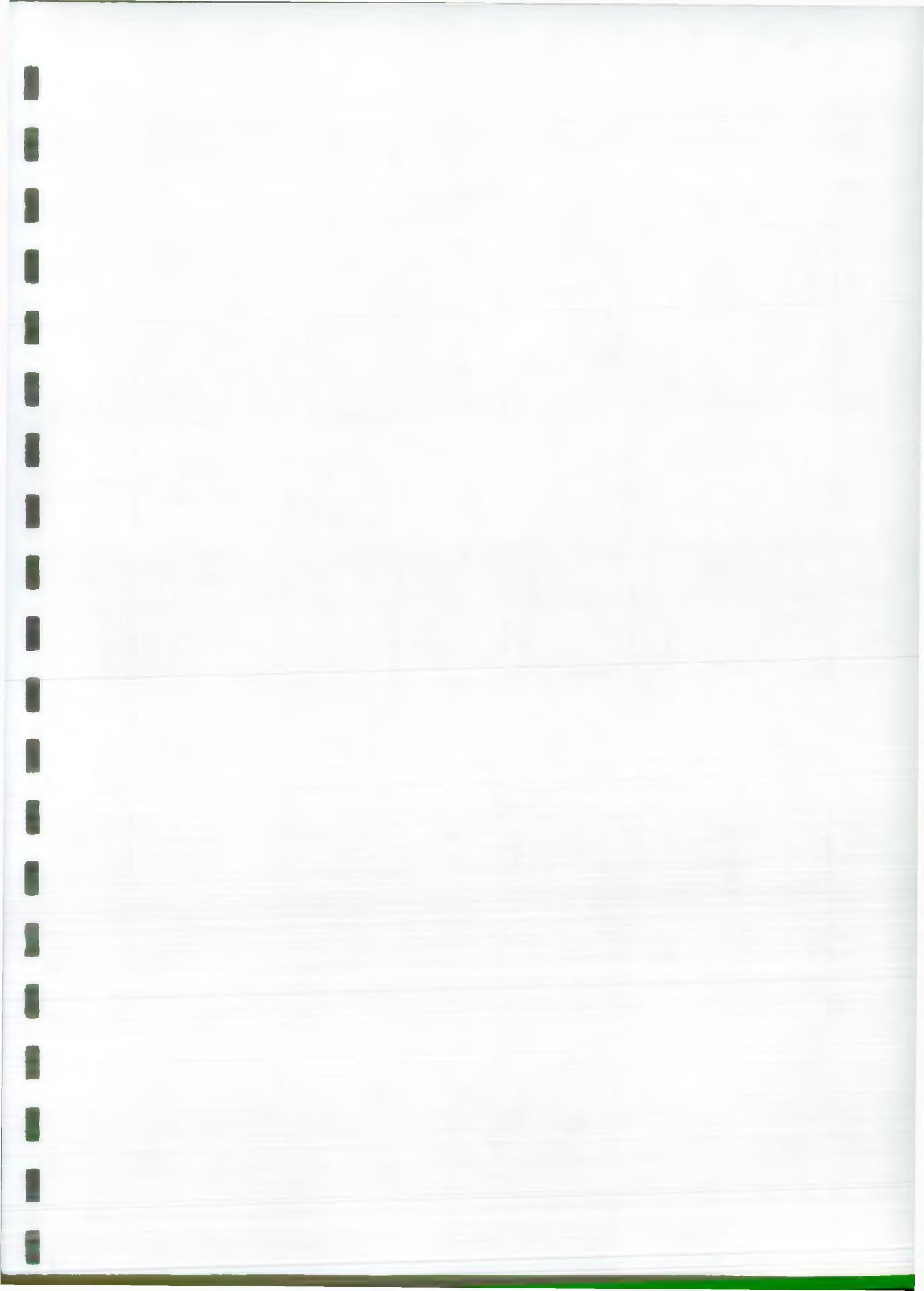
3.4.3 Environmental Objectives

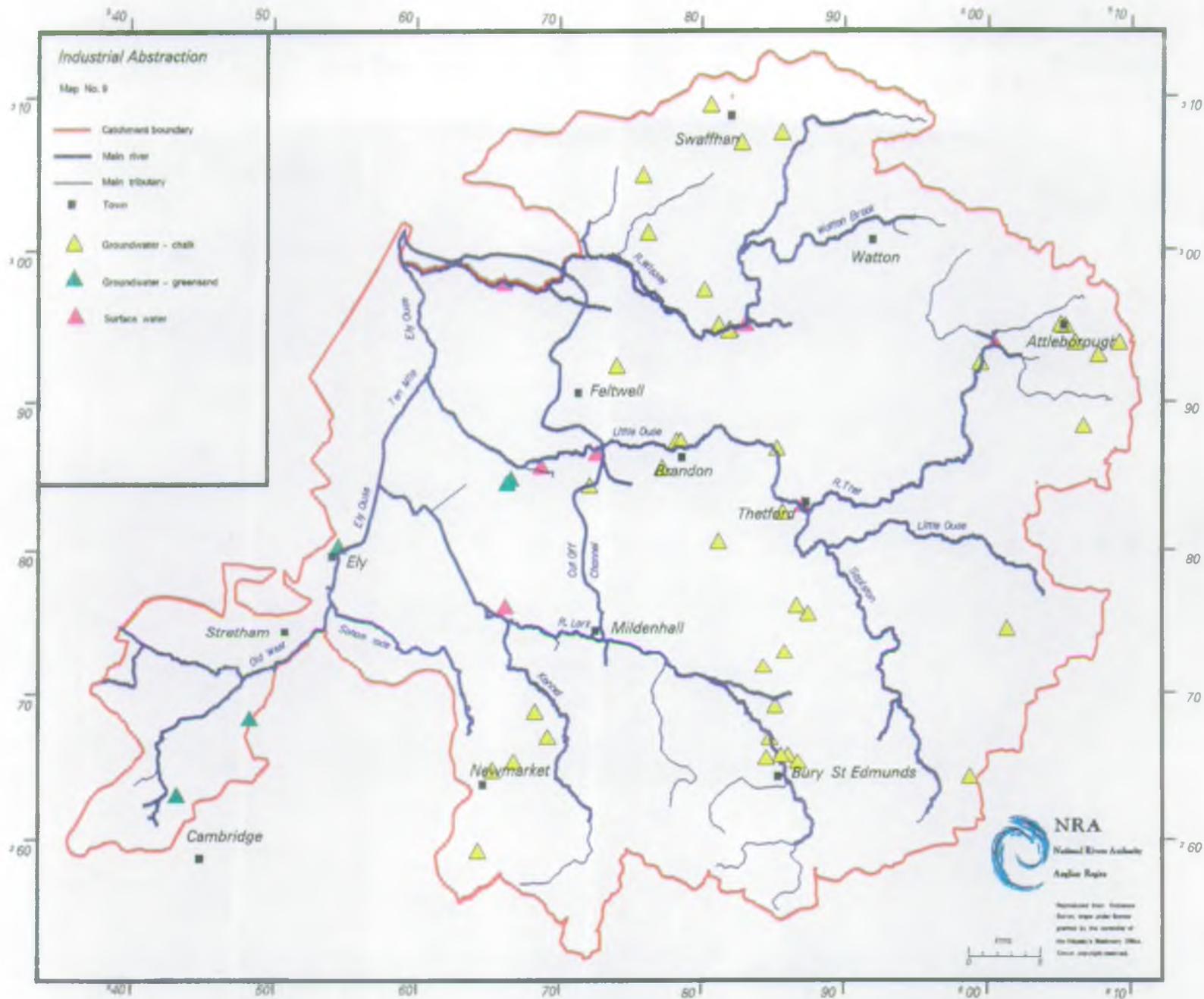
Water Quantity:

- To protect aquifers and surface waters from overcommitment and ensure groundwater abstraction does not have an unacceptable effect on environmental waters.
- To ensure the proper use of water resources.
- To conserve water resources, for example, by encouraging good irrigation practice.
- To augment and/or redistribute water resources, where appropriate, to meet water demands to appropriate standards of reliability.
- To manage and control the transfer of water from the main river system into the Internal Drainage Board drains.

Water Quality:

- To meet the water quality criteria set for spray irrigation and livestock watering.
- To prevent abstraction having an adverse impact on water quality.





3.5 INDUSTRIAL ABSTRACTION

3.5.1 General

This use describes the abstraction of water from ground and surface waters for industrial purposes. Industrial abstractions include water used for industrial processing, cooling and sand and gravel washing. These abstractions require an abstraction licence under the Water Resources Act 1991. An abstraction licence is only issued by the NRA if there is sufficient water available, the need for the water is justified, all rights of existing users are protected and the water environment, eg rivers, springs and wetland sites, is not unacceptably affected.

3.5.2 Local Perspective

The catchment is essentially rural in character and there is relatively little industry. Some industry uses water supplied by the water companies and do not have separate sources.

There are 50 licensed industrial abstractors in the catchment with the greatest concentration around Bury St Edmunds.

The total licensed quantity is almost 9 million cubic metres per year (which is 9% of the total licensed abstraction in the catchment). The largest single use is for sand and gravel washing plants which are licensed to abstract just over 2 million cubic metres per year.

Other industrial uses in this catchment include brewing, sugar refinement, cooling, laundry, concrete manufacture, vehicle washing and food processing.

3.5.3 Environmental Objectives

Water Quantity:

- To protect aquifers and surface water from overcommitment and ensure groundwater abstraction does not have an unacceptable effect on environmental waters.
- To ensure the proper use of water resources.
- To conserve water resources, for example, by encouraging efficient water use.

- To augment and/or redistribute water resources, where appropriate, to meet water demands to appropriate standards of reliability.

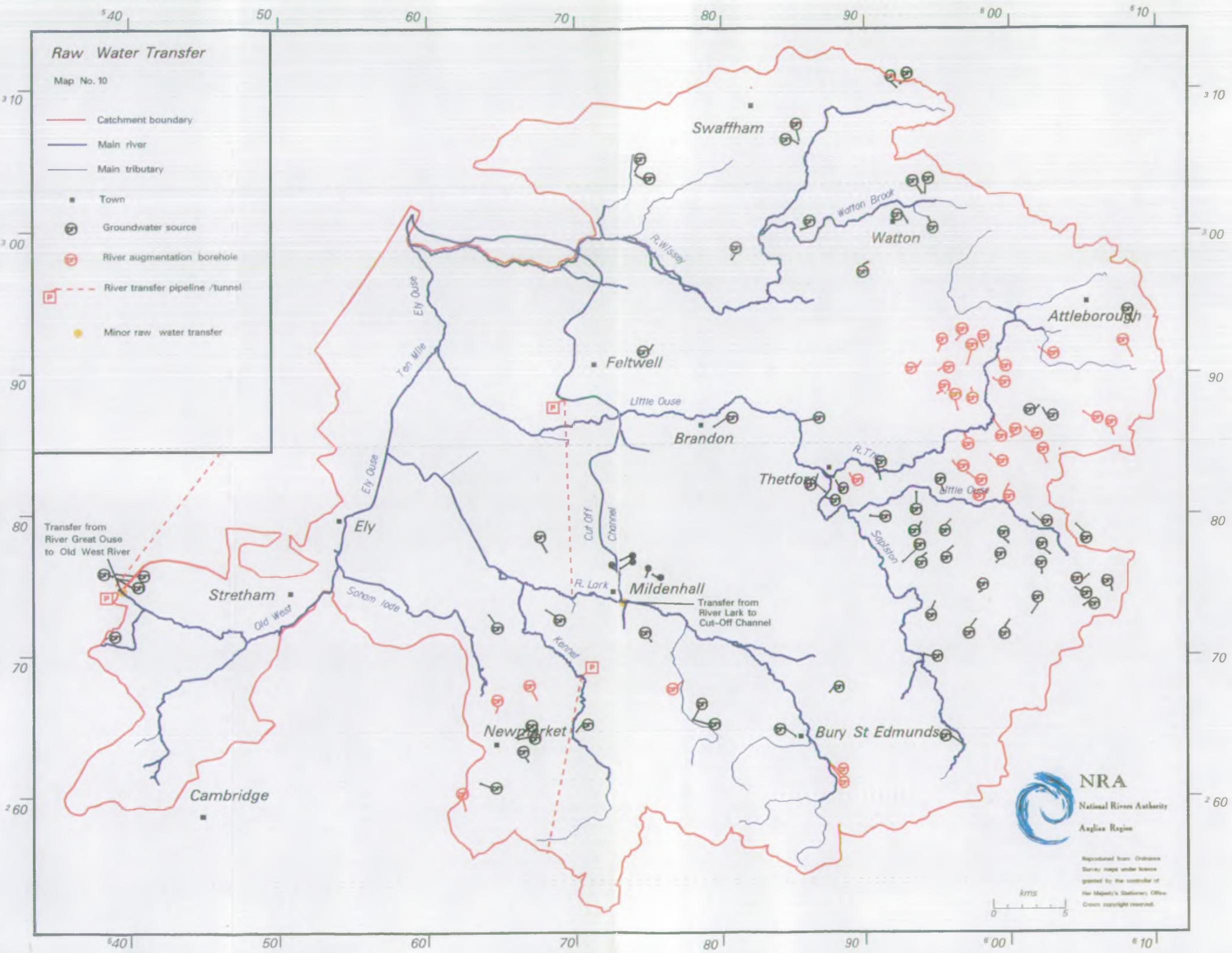
Water Quality:

- To meet the water quality criteria set for industrial abstraction.
- To prevent abstraction having an adverse impact on water quality.

Raw Water Transfer

Map No. 10

- Catchment boundary
- Main river
- Main tributary
- Town
- Groundwater source
- River augmentation borehole
- River transfer pipeline /tunnel
- Minor raw water transfer



Transfer from River Great Ouse to Old West River

Transfer from River Lark to Cut-Off Channel

NRA
National Rivers Authority
Anglia Region

Reproduced from Ordnance Survey maps under license granted by the controller of Her Majesty's Stationery Office. Crown copyright reserved.

0 5 kms



3.6 RAW WATER TRANSFER

3.6.1 General

The NRA has a responsibility to conserve, redistribute, augment and protect water resources and it therefore undertakes raw water transfers to redistribute water from areas where there are local surpluses to ones where there are local deficits. There are raw water transfers between catchments and also within the same catchments. Where possible the schemes use existing watercourses to redistribute the water.

3.6.2 Local Perspective

There is a major raw water transfer from the Ely Ouse Catchment to Essex promoted in the 1960's and authorised by the Ely Ouse to Essex Water Act 1968. The works were completed in 1971. Water is diverted at Denver from the Ely Ouse River into the Cut-Off Channel and is subsequently pumped from the Cut-Off Channel at Blackdyke through tunnels and pipelines and the Essex watercourses, to supply Public Water Supply Company reservoirs in South East Essex and small local supplies. The abstraction at Blackdyke is limited by licence to 455 thousand cubic metres per day (tcmd) and 79.5 million cubic metres over an 18 month period. The transfer from the Ely Ouse at Denver is limited by a minimum flow requirement to the Tidal River Ouse which is 113.6 tcmd from March to August and 318.2 tcmd from October to February.

The transfer and abstraction are subject to flow and level cessation conditions to preserve a minimum flow to the estuary when there is water available in the catchment. The water is stored in Essex reservoirs and used for public water supply. The actual quantity of raw water transferred in this way is variable as it depends on both the availability of water in this catchment and the shortfall of resources in Essex. The historical abstraction in most years has only been approximately 3% of the daily licensed quantity. In the recent drought years the usage rose to nearly 30%.

The scheme utilises the man-made Cut-Off Channel which was constructed as part of the Great Ouse Flood Protection Scheme.

At times of natural low river flow the water availability in the Ely Ouse is insufficient to meet demands in Essex and a supplementary scheme was designed. This is the Groundwater Development Scheme (GWDS) in the Thet and Little Ouse Sub-Catchments and the Hockwold transfer. The NRA and its predecessor bodies drilled 27 abstraction boreholes in the Thet and Little Ouse Sub-

Catchments. These are operated under the Great Ouse Groundwater Scheme Order 1977 in periods of low river flow to supplement the water resources of the Little Ouse River. At Hockwold up to 68 tcmd can be transferred directly into the Cut-off Channel thereby making available water for abstraction at Blackdyke. The abstraction from a groundwater scheme borehole is limited by daily, annual and 600 day quantities given on the abstraction licence. The NRA also has powers to drill additional boreholes in the Little Ouse and Sapiston sub-catchments if required. The NRA will drill the boreholes in the Sapiston sub-catchment to meet local environmental needs. However, the remainder of the scheme is under review.

There is a small transfer of water into the Catchment from the Bedford Ouse at Earith into the Old West River through the penstocks of Hermitage Lock. The Old West River, which is the former course of the River Great Ouse, has a very limited natural catchment and therefore during periods of dry weather the flow and level can become low. The transfer is undertaken to supplement the Old West River to retain navigation levels and prevent deterioration in water quality.

Water is transferred within the Catchment from the River Lark into the head of the Cut-Off Channel at Barton Mills. For almost its entire length the Cut-Off Channel has no natural catchment and intersects the Chalk underground aquifer, resulting in natural losses and gains of water. During periods of normal or low groundwater level the Cut-Off Channel between the Lark and the Little Ouse loses its level along many of the reaches between the retaining weirs and therefore the transfer is undertaken to provide a small flow and prevent deterioration in water level and quality. The quantity transferred is controlled by a penstock in the Lark Head Sluice and is measured at Tollgate Weir. The quantity normally transferred is 4.3 tcmd.

3.6.3 Environmental Objectives

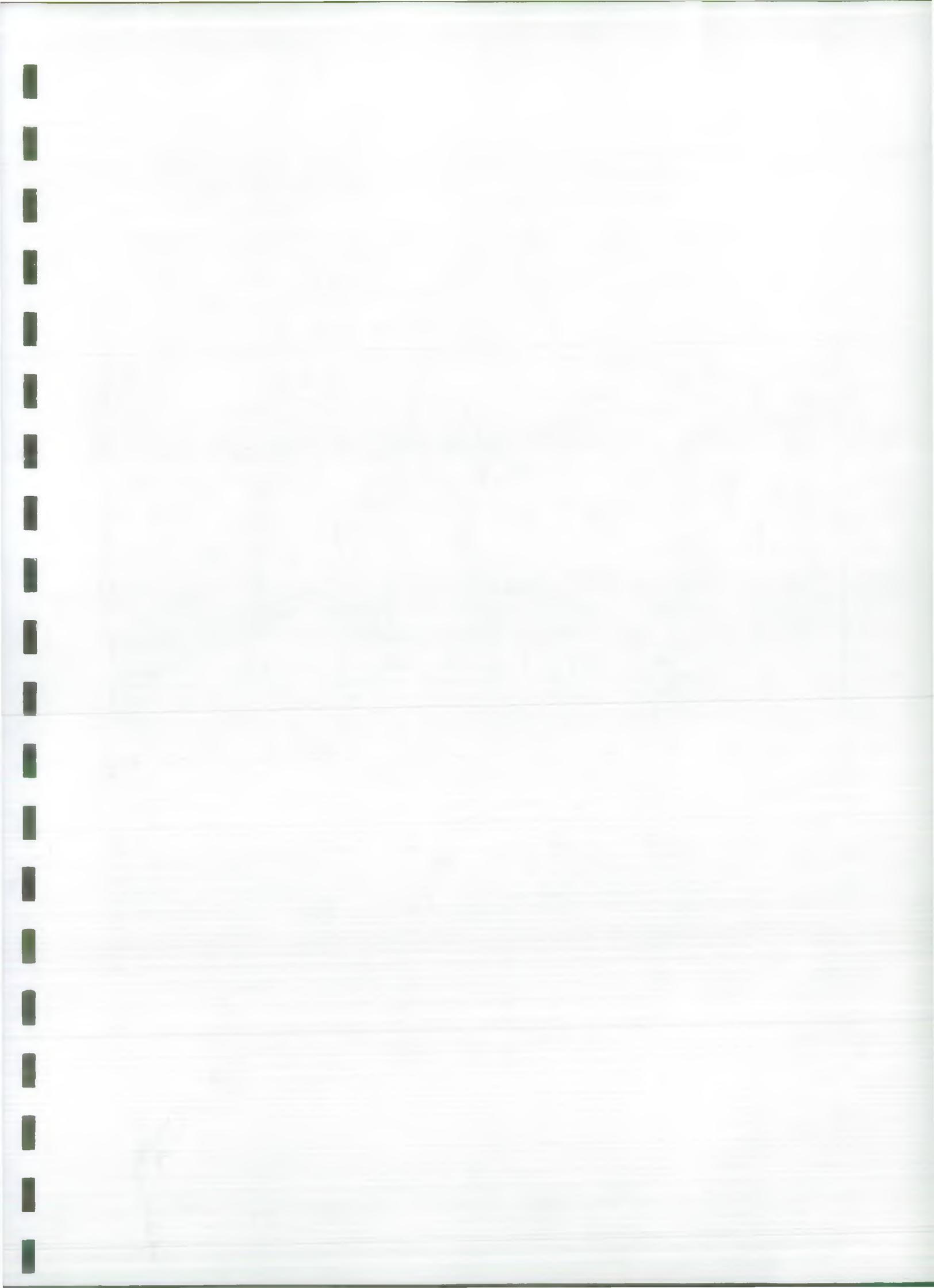
Water Quantity:

- To protect aquifers and surface waters from overcommitment and ensure groundwater abstraction does not have an unacceptable effect on environmental waters.
- To ensure the proper use of water resources.
- To conserve water resources, for example, by encouraging efficient water use.

- To augment and/or redistribute water resources, where appropriate, to meet water demands to appropriate standards of reliability.

Water Quality:

- To ensure that pollutants are not transferred from one catchment which could effect the water quality objectives of the receiving system.



3.7 SEWAGE TREATMENT WORKS

3.7.1 General

The quality of any effluent discharged to rivers must comply with criteria set out in a consent issued by the NRA under the Water Resources Act 1991. New consents are set so that the receiving water remains acceptable for its many uses and is compliant with prescribed water quality standards: these are termed "River Needs Consents". Historically, some discharges have consents which are laxer than that required by modern standards, but are under review for future improvements.

Crown discharges are exempt under the legislation from the consenting requirements which apply to all other discharges, but the NRA does set discharge standards in "pseudo-consents" which the Crown has given a commitment to comply with.

3.7.2 Local Perspective

There are 105 main Sewage Treatment Works (STWs) operated by Anglian Water Services (AWS) within the catchment. Of these 69 meet their River Needs Consents (RNC), while the remainder are on laxer standards. All are monitored by the NRA, the larger being sampled more frequently.

There are 36 AWS STWs which have standards which are laxer than the River Needs Consents. The priority for dealing with these is under discussion with AWS, and is being considered in a region-wide scheme so that the discharges which have the greatest environmental impact can be improved first.

The largest STW in the catchment, is at Bury St Edmunds, and discharges to the River Lark, complies with its current legal consent. Other major STWs include Thetford which discharges to the River Little Ouse in accordance with its RNC; Newmarket which now produces a very high standard effluent and major improvements in the quality of the Soham Lode have already been seen; and Mildenhall which has also had major improvements and now meets its RNC.

There are also many private STWs in the catchment, but most are small and their discharges are not significant in water quality terms. Of the larger ones, totalling 34, the most important are those associated with military installations, particularly at Mildenhall, Lakenheath, Honington and Feltwell.

In order to prevent the proliferation of small treatment plants, each of which presents an additional pollution hazard, the NRA will seek to ensure that new development connects to main foul sewer if one is available.

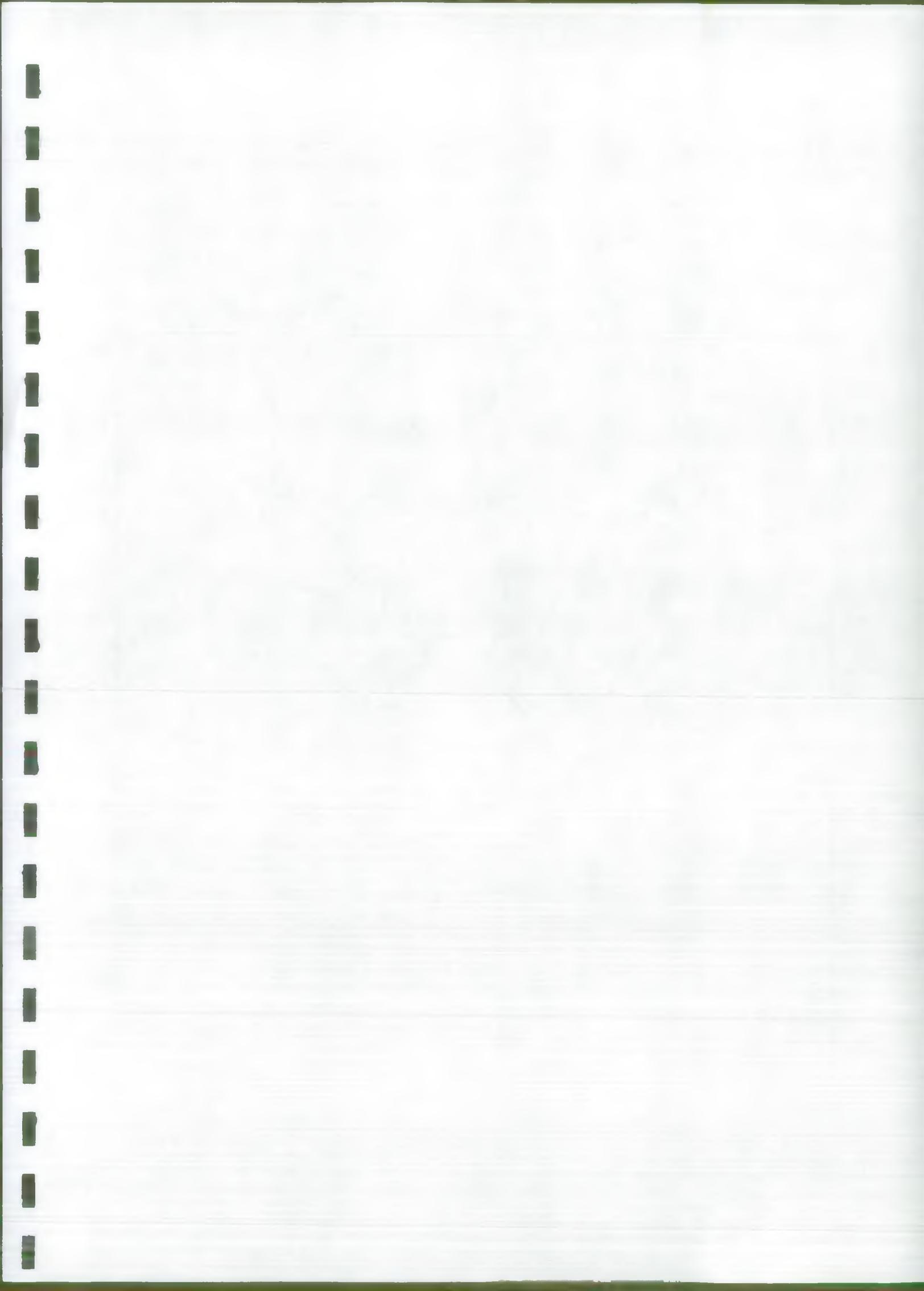
3.7.3 Environmental Objectives

Water Quality:

- To quantify and pursue required improvements in effluent quality from existing discharges so that river quality targets are complied with.
- To ensure that new consent conditions safeguard water quality and prevent exceedence of EC Directives and Water Quality Objectives.
- To monitor environmental waters and discharges to establish compliance with standards and to take steps to ensure compliance.

Water Quantity:

- To ensure adequate monitoring of effluent returns made to surface waters to enable better assessment of water resource usage.



3.8 INDUSTRIAL AND AGRICULTURAL DISCHARGES

3.8.1 General

The quality of any effluent discharged to rivers must comply with criteria set out in a consent issued by the NRA. New consents are set so that the receiving water remains acceptable for its many uses and is compliant with prescribed water quality standards: these are termed "River Needs Consents".

3.8.2 Local Perspective

In terms of the potential impact on the receiving water the most notable of the industrial discharges in the catchment are sugar refinement, food processing, poultry and a public water supply nitrate removal plant.

Most effluents from industrial processes and developments are discharged to main sewer for treatment at Anglian Water Services' STWs.

Surface water run-off from industrial development can have a significant impact on water quality; developers must be aware of this and provide adequate pollution prevention measures, especially with regard to oil interception. Some existing surface water discharges do cause water quality problems, for example with oil in Bury St Edmunds and Thetford.

There are two fish farms in the catchment which discharge to watercourses. If not carefully managed, there is great potential for pollution, especially in terms of oxygen demand.

Discharges to watercourses of effluent from agriculture are discouraged because of the problems of treating such waste and complying consistently with consent standards.

3.8.3 Environmental Objectives

Water Quality:

- To quantify and pursue required improvements in effluent quality from existing discharges so that river quality targets are complied with.
- To ensure that new consent conditions safeguard water quality.

- To monitor environmental waters and discharges to establish compliance with standards and to take steps to ensure compliance.
- To ensure that developers and industrialists take measures to minimise the risk of pollution from their sites so as not to compromise water quality.

Water Quantity:

- To ensure adequate monitoring of effluent returns made to surface waters to enable better assessment of water resource usage.



3.9 WASTE DISPOSAL

3.9.1 General

The NRA is a statutory consultee on all activities that require a waste disposal licence issued by the Waste Disposal Authority (County Council) under Part 1 of the Control of Pollution Act 1974 (Powers contained in the Environment Protection Act 1990 are to be implemented at some future date).

There is NRA involvement at three levels:

- i) On the Waste Disposal Plan which each County Council is required to produce;
- ii) On the Planning Application for individual sites: this allows consideration of the principle of a waste disposal activity at a particular location and includes aftercare considerations;
- iii) On the Site Licence: this covers the operation of the site.

A wide range of operations require a licence, for example, transfer stations, waste storage facilities and scrap yards, all of which have potential to pollute water. In general, the greatest threat is from waste landfill sites.

In recent years there has been a major change in the philosophy of landfilling waste. Previously a policy of "dilute and disperse" was applied: this assumed that any leachate generated could be accepted in an aquifer provided that no local use was threatened taking into account attenuation mechanisms. Nowadays all new sites taking any potentially polluting waste must be designed on a containment basis in order to protect all groundwaters, as required by the EC Directive on the protection of groundwater quality.

3.9.2 Local Perspective

Following the transfer of disposal responsibilities for domestic waste to the County Councils in 1974, waste disposal was concentrated in fewer larger sites, and it is these that may pose a longer term risk to water quality rather than the large number of small sites. Currently, the main sites for domestic waste are at Barton Mills, Lackford, Knettishall and Wereham; however they do take commercial wastes and in the past some may have taken industrial wastes.

In addition, there are closed sites at Aldreth, Ingham, Kentford, Red Lodge and Stretham. Also, the site at The Folly, Ingham, took a wide range of liquid industrial wastes in the late 60's and early 70's.

In practice, any disposal site in use prior to 1972 could have taken virtually any type of waste as there was no control of dangerous wastes, and the records for many sites are poor or non-existent.

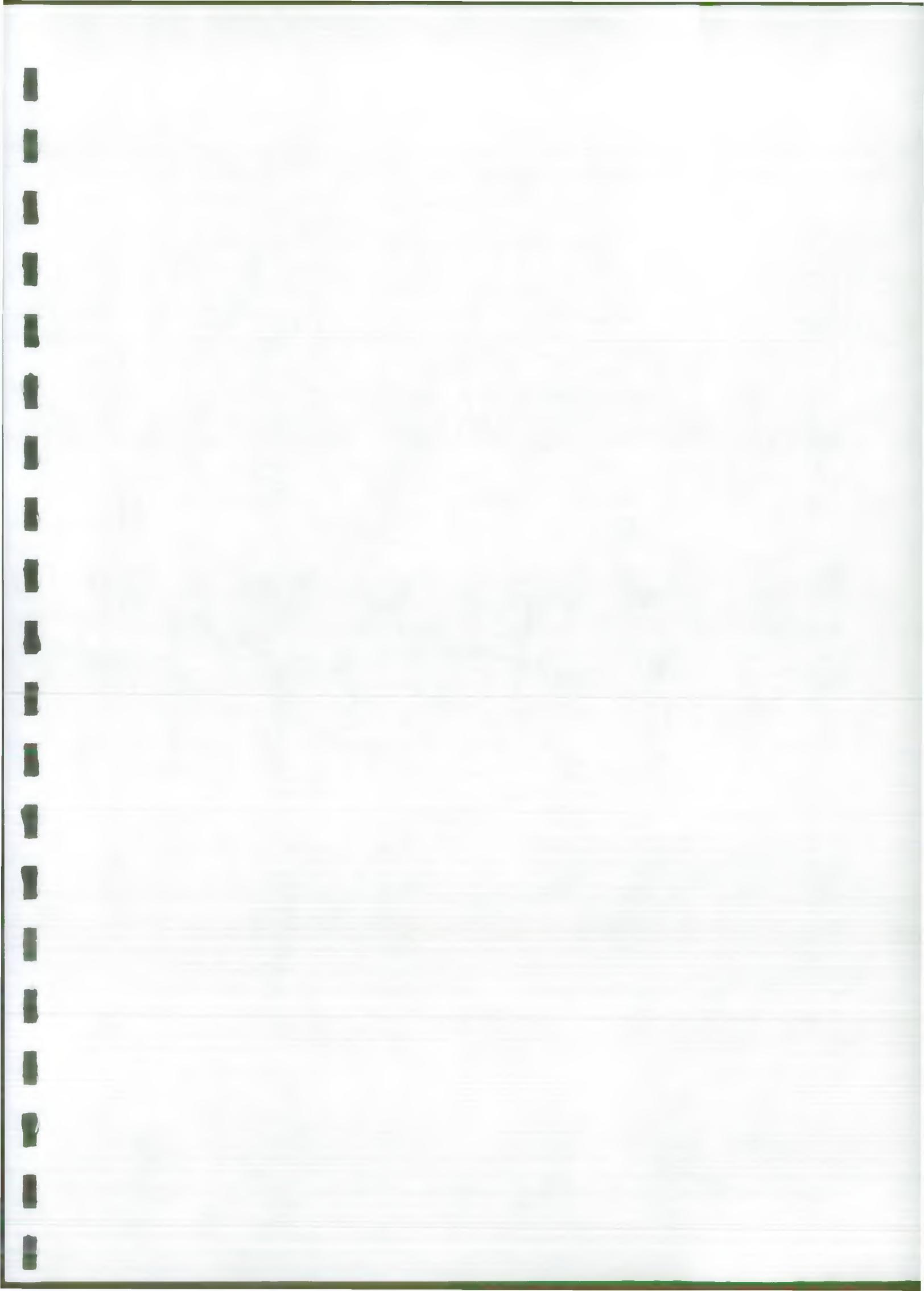
3.9.3 Environmental Objectives

Water Quality:

- To ensure that waste disposal activities do not compromise water quality, particularly groundwater: regard will be given to the NRA's Groundwater Protection Policy.
- To ensure compliance with EC Directives, especially the "groundwater" directive;
- To ensure adequate monitoring of existing and closed waste disposal sites;
- To take steps to alleviate any pollution coming from landfill activities.

Water Quantity:

- To ensure that the development of a landfill site does not cause unacceptable effects on surface water and groundwater resources and to protect the rights of those who abstract water.



3.10 MINERAL EXTRACTION

3.10.1 General

Mineral extraction can affect both groundwater quantity and quality. It can restrict recharge to an aquifer and divert flow. Derogation of existing rights to abstract can occur. In addition, purification which occurs as water percolates through the unsaturated zone cannot occur if the gravel strata have been removed. Subsequent use of mineral extraction sites for landfill also poses a significant threat to groundwater quality.

Under the Water Resources Act 1991, dewatering of mineral workings is exempt from the need to obtain an abstraction licence. However, under Section 30 of the Act, the NRA can issue a 'Conservation Notice' to the Mineral Extraction Company in order to conserve water in the dewatering process, but these powers are limited, and cannot be used to prevent mineral extraction.

3.10.2 Local Perspective

The majority of sites are found along the main river corridors where valley sands and gravel deposits are extracted. Limited chalk extraction occurs to the south of Bury St Edmunds. Peat is also extracted in some limited areas.

All County Councils within the catchment have produced Mineral Plans as required under the Town and Country Planning Act 1990, in accordance with Planning Policy Guidance Note 12. The NRA as a statutory consultee, makes representation to any Mineral Plans.

Demand for aggregates means that until well into the next century, extraction of sand and gravel will continue at least at the existing rate.

The NRA has not issued any 'Conservation Notices' for dewatering works in this catchment.

3.10.3 Environmental Objectives

Whenever possible, groundwater reserves must be conserved and protected. Mineral workings must be operated within the guidance given in the NRA's Groundwater Protection Policy.

Water Quality:

- No deterioration of groundwater or surface water quality.

Water Quantity:

- To ensure that dewatering a mineral extraction site does not cause unacceptable effects on surface waters and groundwater resources and to protect the rights of those who abstract water.

Physical Features:

- No obstruction to flood flows for those extractions within flood plains both during and after working and following final reinstatement.
- No detriment to areas of ecological or archaeological value.
- Potential for development to enhance conservation and water based recreation should be maximised.

3.11 FLOOD DEFENCE

3.11.1 General

This use deals with the provision of effective defence for people and property against flooding from rivers and the sea. Normally flooding is a result of extreme climatic conditions, such as high winds or very heavy rainfall. Flood events are described in terms of the frequency at which, on average, a certain severity of flood is exceeded. This frequency is usually expressed as a return period in years e.g. 1 in 50 years.

The effectiveness of flood defences can be measured in terms of the return period up to which they prevent flooding. It is clear that different types of land use, for example, urban areas and pasture land, require different levels of effectiveness for the defences. The different land uses and the proposed targets for their protection are shown in Appendix 3. The fenland area associated with this catchment has a 1 in 100 year standard of protection because of the large area of low lying land and hence the very serious consequences of any flooding.

Not only does the Citizens Charter require standards of service to be published, but they are a key factor to determining priorities of capital and maintenance works programmes and in measures which demonstrate the efficiency and effectiveness with which the Region undertakes its flood defence service. It is intended to carry out a Regional standards of service survey such that for every flood defence length, a statement can be made which relates the actual standard of service with an associated land use of the area of risk.

The NRA, under Section 105 of the Water Resources Act 1991, has powers to exercise a general supervision over flood defence and land drainage matters. The NRA uses its Land Drainage Byelaws and powers to determine applications for land drainage consents to endeavour to prevent obstructions to river flow and storage within the flood plain and river channel and retain access for maintenance.

For management purposes, the principal rivers in the catchment have been formally designated as "statutory main river" and these are maintained by the NRA. The key watercourses in the low lying areas of the Fens are maintained by the local Internal Drainage Boards (IDB's). A number of other watercourses within the catchment are maintained by the East Cambridgeshire District Council. Riparian owners are responsible for the maintenance of other watercourses in the catchment.

The nature of works carried out for flood defence requires specific consideration for other river needs. Environmental Statements are necessary under EC Directive 85/337 and implemented by Statutory Instruments 1188 and 1217. Consultations are carried out with conservation bodies under the Water Resources Act 1991, and, wherever feasible, works allow for the flood protection target as well as providing habitat enhancements.

The NRA provides river information and advice to the County Police Forces and other Emergency Services, for the purpose of giving advance warnings of areas likely to be affected by flooding, both tidal and main river. Forecasts of flooding are compiled using tidal, rainfall and riverflow/level data collected from outstations by the regional telemetry scheme.

3.11.2 Local Perspective

The catchment consists of a low-lying fenland basin known as the South Level in the west, with higher ground in the east.

The 'highland' water is conducted across the fenland areas in embanked channels and then discharged by gravity, under normal flow conditions, into the tidal River Ouse at Denver Sluice when the tide permits.

Denver Sluice Complex which is situated in the northwest corner of the catchment controls all the flows from the catchment as well as controlling the retention level in the South Level ponded section. Denver Sluice also provides protection to the South Level from the tidal river.

The low-lying fenland areas situated between the embanked channels, which are all maintained by the NRA, require pumped drainage. These pumped systems are in the main under the control of the IDB's, however, a few very small pumped areas are under the control of a local landowner.

The majority of the fenland areas consist of peat which has been drained over the centuries to provide valuable, mainly grade 1 agricultural land. Progressive wasting and shrinkage of the peat means that the flood embankments are up to five metres above the surrounding land.

Following the 1947 floods, a major flood protection scheme was undertaken in the 1950's and early 1960's. The main part of the scheme was to build the Flood Relief Channel from Denver to Kings Lynn as well as the Cut-Off Channel from Barton Mills, on the River Lark, round the fenland area to Denver. Work was also

undertaken on dredging and raising the embankments along the Ely Ouse, Wissey, Lark and Little Ouse.

During the 1960's some of the main rivers in the high area to the west of the catchment were extended to provide better agricultural drainage to these areas.

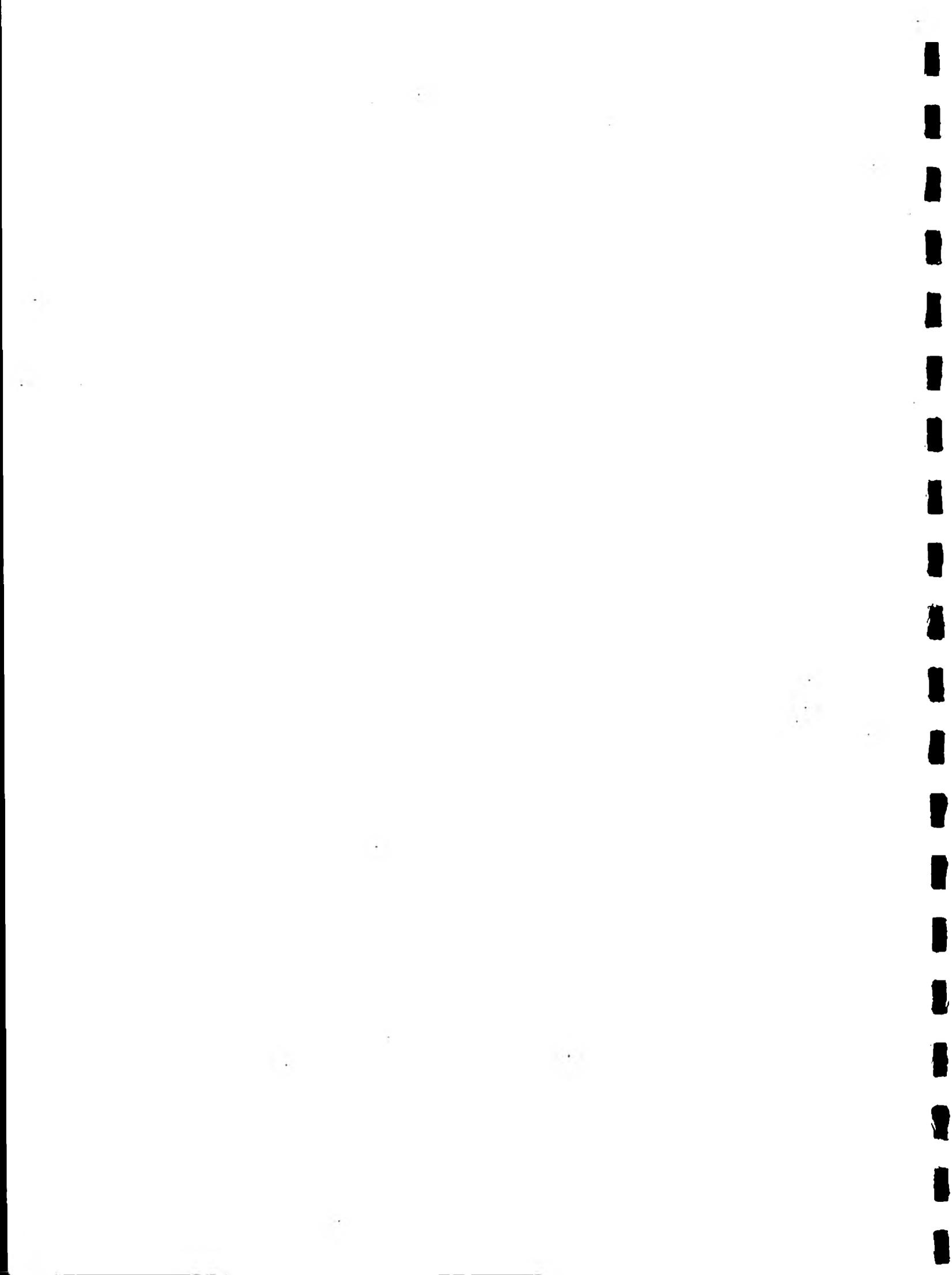
The maintenance of the embankments and channels is essential and this is done in ways sensitive to the environment, whilst at the same time preserving the integrity of embankments and the flood capacity of the channels.

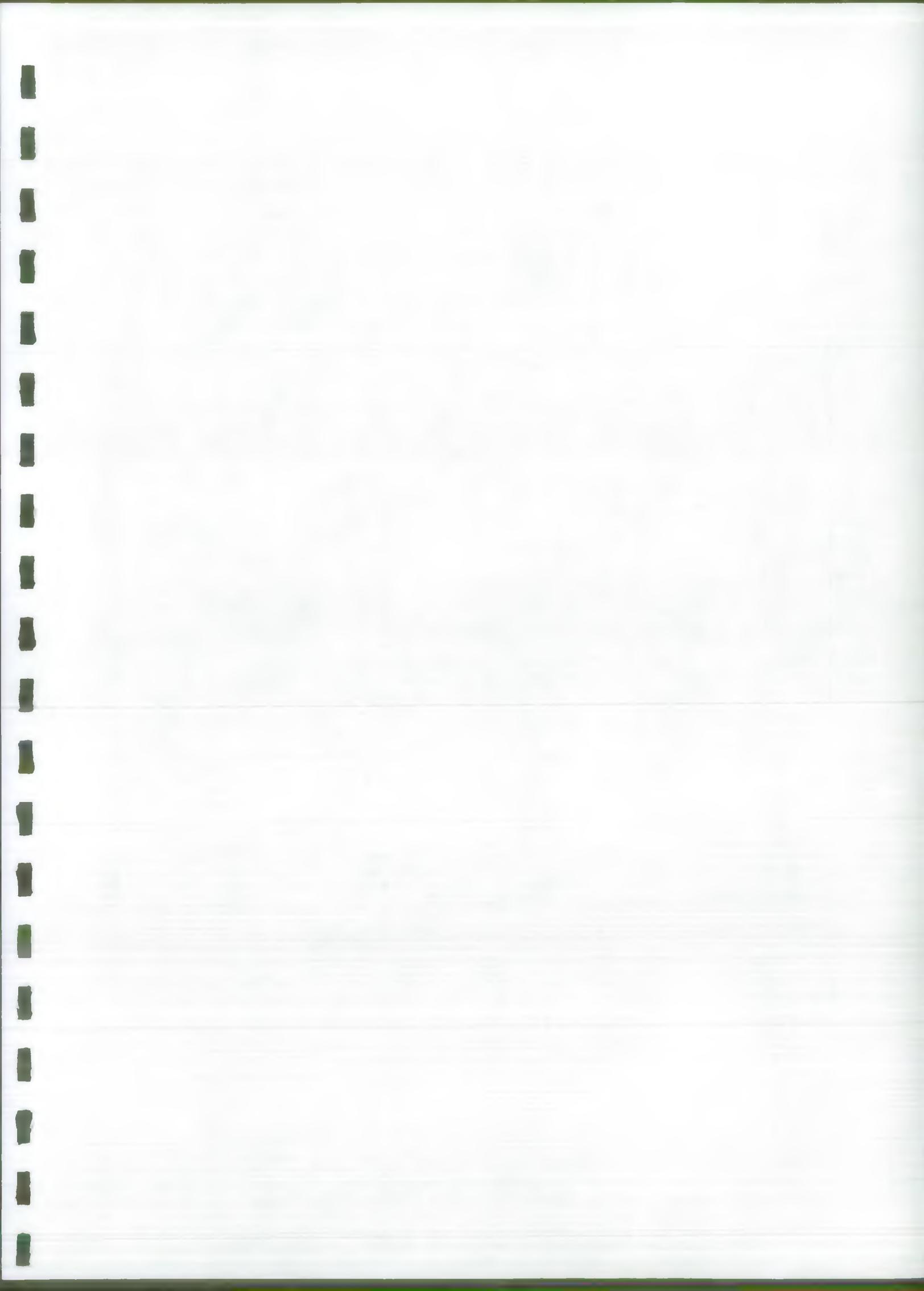
Flooding of non-main rivers from development, with increased surface water discharges due to inadequate or lack of drainage infrastructure, does occur.

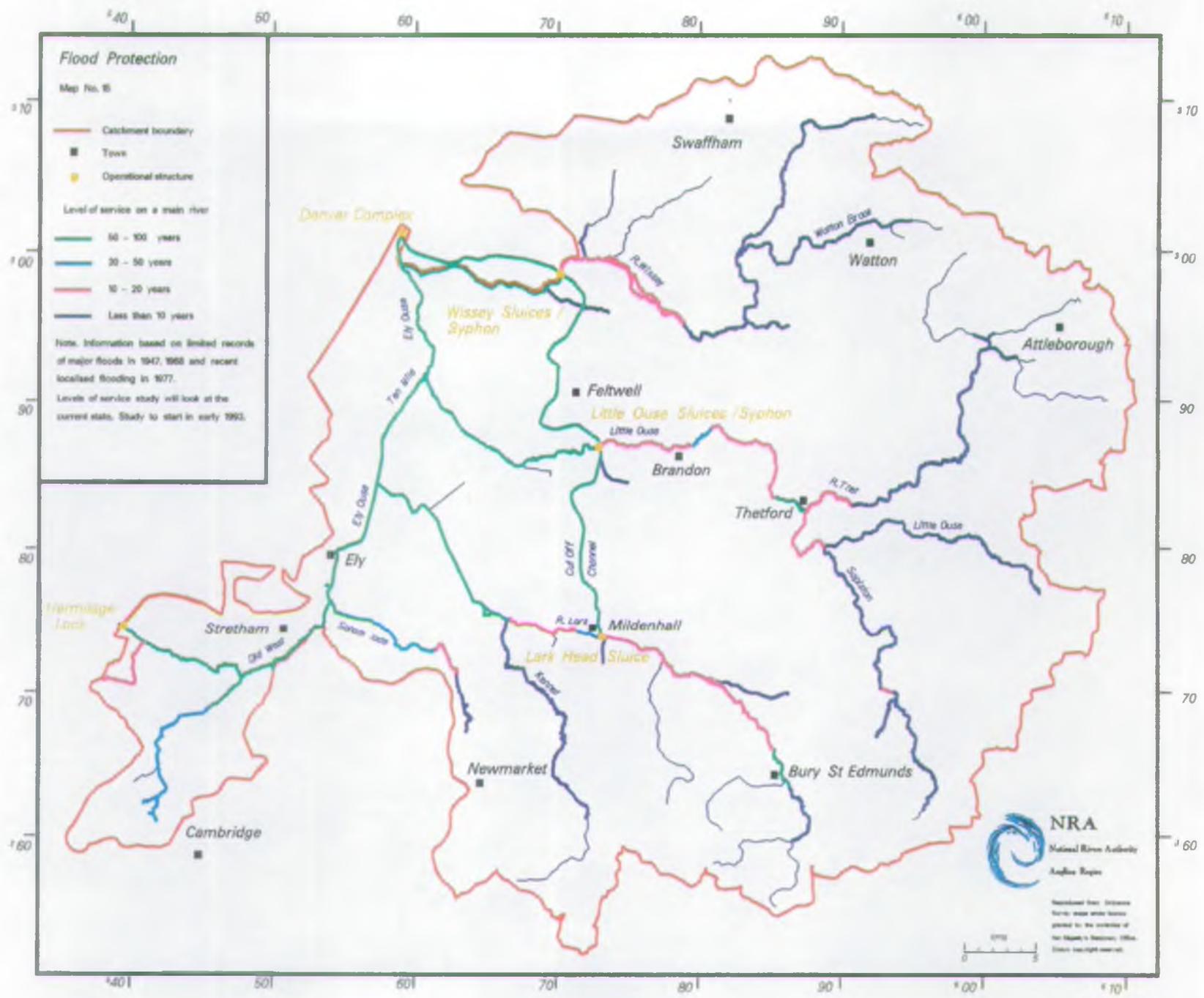
River flooding in this catchment, is affected by the coincidence or otherwise of the peak flow and high tidal river levels. The objective is to provide reports on the developing situation and issue warnings via the national flood warning system at the earliest opportunity.

3.11.3 Environmental Objectives

- To provide effective defence for people and property against flooding from rivers and the sea. The standard of protection to be appropriate to the land use, where this is economically viable. It will always be impracticable to prevent all flooding in extreme climatic conditions.
- To provide adequate arrangements for flood forecasting and warning.
- Carry out weedcutting in the channels before the winter flood season where necessary to protect people and property to the appropriate standard.
- Ensure correct operation of relevant sluice gates and other river control structures.
- Carry out flood defence works with reference to environmental needs and requirements.







Flood Protection
 Map No. 15

— Catchment boundary
 ■ Towns
 ● Operational structure

Level of service on a main river

- 50 - 100 years
- 30 - 50 years
- 10 - 20 years
- Less than 10 years

Note: Information based on limited records of major floods in 1947, 1968 and recent localised flooding in 1977.
 Levels of service study will look at the current state. Study to start in early 1993.



Reproduced from: *Anglia Region: water and flood protection in the catchment of the Great Ouse*, 1988. Crown copyright reserved.



3.12 FLOOD WATER STORAGE

3.12.1 General

This use relates to the storage of flood waters both in the short and longer terms.

3.12.2 Local Perspective

Short Term Storage:

All of the embanked channels crossing the low-lying fenland are in effect linear flood water storage areas during periods when discharge at Denver is interrupted by high water levels in the Tidal River Ouse. In total up to 105 kms of channel in the catchment are subject to this use.

At Denver (95 ha) and Littleport (16 ha) there are off-channel reservoirs which provide additional flood storage for major events if required. They are embanked to the same standard as the other channels and can be flooded if necessary by means of breaching sections in the case of Denver or by opening sluice gates at Littleport.

Flood storage other than the above, relates to out of channel flow in the flood plains of the upland rivers and in cases where, as part of a development in areas susceptible to flooding, on site attenuation of flows has been provided to meet a planning condition of the development.

Long Term Storage:

The paucity of summer flows during the recent series of very dry years has encouraged many agricultural landowners to construct retention ponds or reservoirs for the storage of winter flows for summer use. This use is expanding and is likely to accelerate further but it is unlikely to moderate peak flows significantly.

3.12.3 Environmental Objectives

Short Term Storage:

Water Quality and Quantity:

In relation to this use the quality and quantity of flood water are not a problem but become a factor when the quantity exceeds available storage and, in "out of channel flow" situations in urban areas, lack of quality may have an impact

on public health.

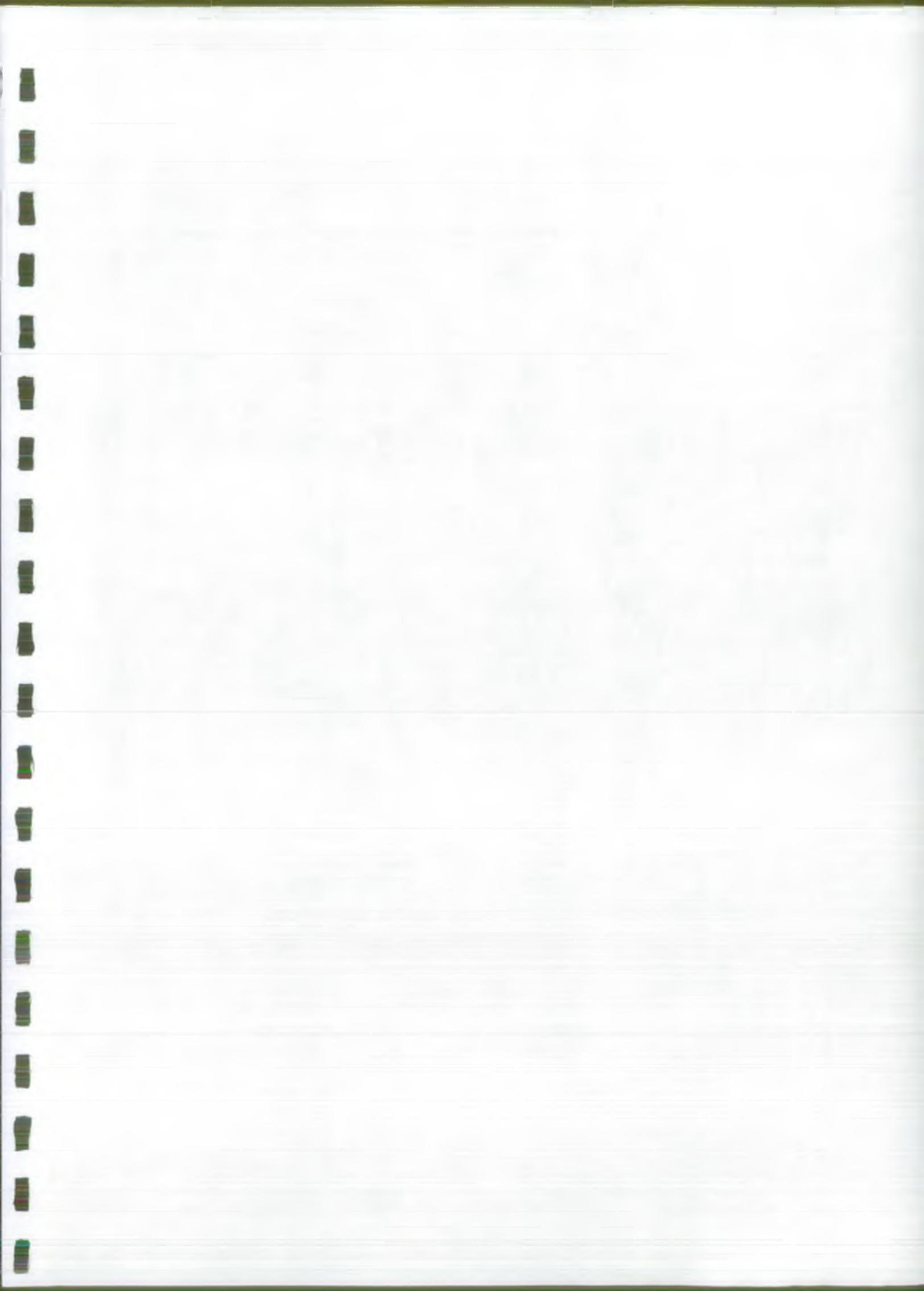
Physical Features:

- To maintain the capacity and integrity of embanked channels to prevent flooding.
- To maintain the effectiveness of structures at the fluvial/tidal interface (Denver) to prevent tidal flooding and to facilitate maximum fluvial discharge.
- To maintain all other watercourses free of obstruction by weed or debris to minimise out of channel flow.
- To provide adequate flood defences in urban areas to the highest economic standard.

Long Term Storage:

Water Quality and Quantity:

- To store the required quantity of the highest available quality water for later agricultural uses.



3.13 WATER POWER

3.13.1 General

This use deals with water power as the motive force in energy generation and also with its appeal as a tourist attraction or its amenity value.

3.13.2 Local Perspective

At present water power is or could be used at the following sites in the catchment:-

River Lark: Parkers Mill
Chimney Mill

River Little Ouse: Coffee Mill
Hall Weir-Euston
Bardwell Mill
Ixworth Mill
Pakenham Mill
East Harling Mill

River Wissey: Hilborough Mill
Little Cressingham Mill

Soham Lode: Clark and Butchers Mill

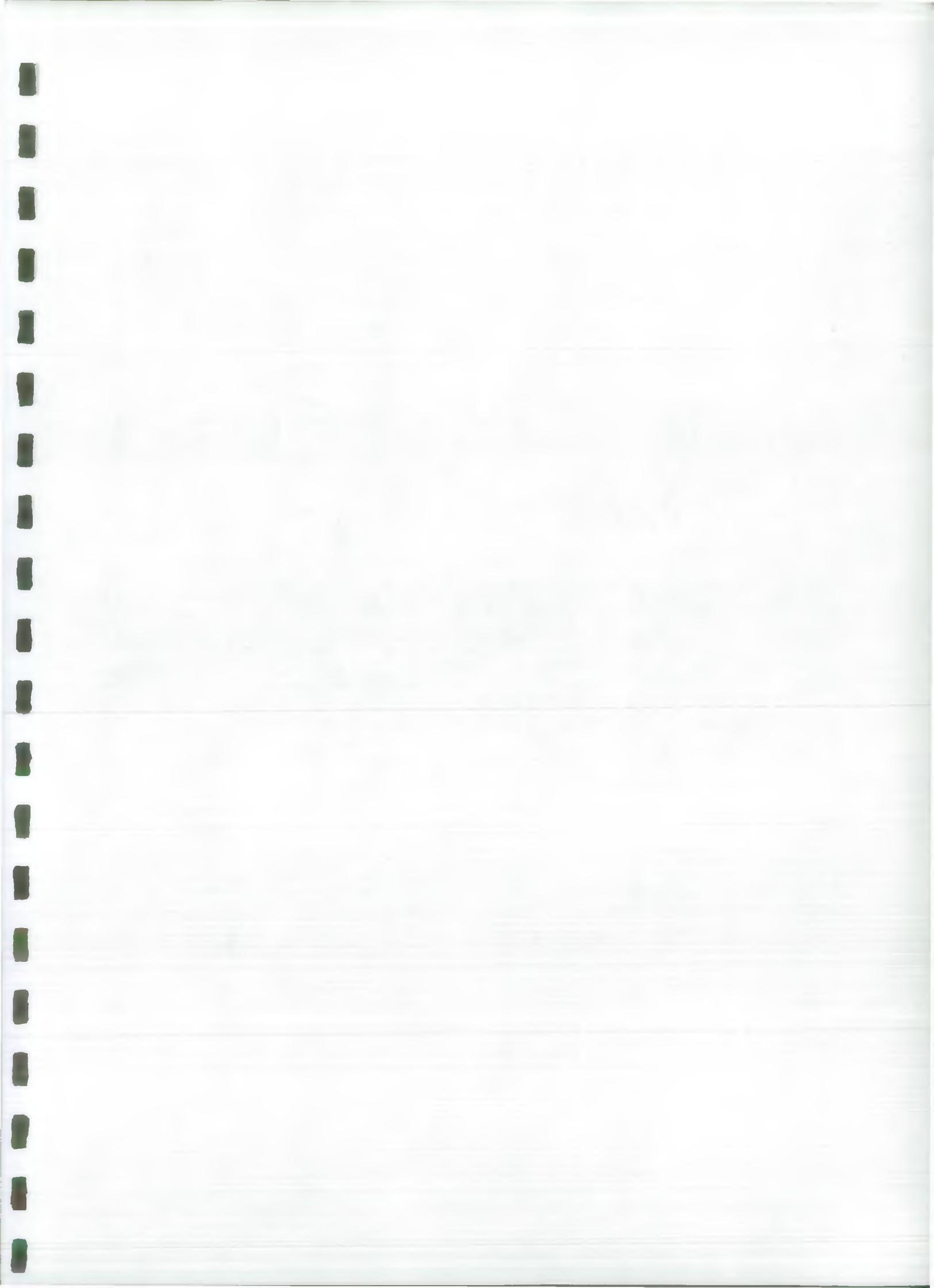
3.13.3 Environmental Objectives

Water Quantity:

- To have due regard of the requirements of the prescribed use and take these into account when allocating water resources for abstraction.

Physical Features:

- To maintain millstreams free of silt, obstructions and weedgrowth sufficient to enable continued use.



3.14 ECOSYSTEM CONSERVATION

3.14.1 General

This use relates to the protection of flora and fauna both within the river corridor and in sites of conservation value which are wetland dependent. These areas will support a range of plant and animals ranging from those species wholly dependent on open water to species which simply exploit river corridors and wetlands as relatively natural 'wild' places.

The maintenance and enhancement of species diversity in these areas will depend on the future management regimes. The NRA has a statutory duty to further the conservation of flora and fauna when carrying out its duties, and will assess the likely impact of these activities before work is carried out.

In addition to general conservation duties the NRA is specifically required to consult outside organisations where NRA work or consent is likely to impact on sites of high conservation value such as National Nature Reserves and Sites of Special Scientific Interest.

The environmental demand for water consists of two elements; the level and flow needed to maintain wetland sites of conservation interest and the "in river needs".

The wetland sites exist where the geomorphology, geology and land use allow a concentration of surface and groundwater flows and levels. The proportion of these contributing factors will vary for each site and hence this adds to the complexity of the study of wetlands. The area of groundwater contributing to the wetland site can be defined as the wetland catchment area. Therefore the NRA will seek to protect wetland sites of conservation interest by controlling future abstraction from boreholes within the wetland catchment area.

The "In river needs" can be defined as the flow, level and quality of water necessary to satisfy:-

- a) the aquatic and riparian communities;
- b) the requirement for effluent dilution;
- c) the needs of surface water abstractors;
- d) navigation;
- e) flushing of silt.

Extensive ecological and hydrological studies are required to define the existing ecology of the river system and to establish the minimum water level, flow and quality required to maintain the

system.

3.14.2 Local Perspective

All rivers which flow from east to west in this catchment flow as chalk streams for at least part of their length, and with the exception of Soham Lode, flow through the Brecklands before reaching the Fen and becoming part of the South Level "pond".

The Brecklands is an area made up largely of free draining sandy soils overlying chalk and is recognised as being an area of national importance to nature conservation. Although the Brecklands is not given any statutory conservation designation as a whole, the area does contain a number of SSSI's and is designated as an Environmentally Sensitive Area (ESA).

The Brecklands is the subject of a recent study completed by the Brecklands Study Group, comprised of representatives from NRA, various Councils, conservation bodies, the Countryside Commission, MAFF and the Forestry Commission.

The 'Brecks Study Report' examines planning policy and emphasises the need for co-ordinated action by the various organisations and individuals to promote the conservation value and recreation use of the Breckland area. In relation to the aquatic environment, the report emphasises the importance of river valleys and other wetland sites to the area and discusses the sensitive issue of water resource management and the sometimes conflicting demands of conservation ecology and other legitimate uses of water.

It is the diversity in geomorphology which underlies the ecological diversity and conservation value of the area. There are some 78 SSSI sites within the catchment, 39 of which are wetland dependent. In addition to SSSI sites there are a large number of County Trust sites of nature conservation importance.

The largest SSSI is the Ministry of Defence owned Stanford Training Area covering an area of 4597 hectares. Located by the River Wissey, this site is the last remaining extensive area of Breckland grassland and heath, which also includes areas of wetlands, springs, streams and standing water within the SSSI.

The upstream catchment of the River Little Ouse supports a number of valuable wetland SSSI sites, the Blo Norton, Thelnetham, Hinderclay Weston and Hopton fens represent some of the remaining fragments of once extensive fen areas. The internationally important Redgrave and Lopham Fens lie at the

source of the Little Ouse and will be included in the River Waveney CMP.

Other important wetland areas, particularly within the Breckland, are Ice Age landscape features (known as pingo systems).

There already exists an abstraction policy in order to protect the Breckland meres including Fowlmere, Homemere, Langmere and Ringmere. A cessation level of 27.5 m AOD has been determined at Ringmere and if the water level falls to this level, abstractions are reduced or ceased.

Within all main river corridors the NRA has undertaken an environmental survey, this has been compiled and is known as the Rivers Environmental Database (RED). Although not yet fully analysed, the RED contains a species list for plants and birds within each 500m section of river.

In terms of instream habitat features the headwaters and Breckland sections of rivers are generally more diverse with many riffle - pool sequences present in these sections. Within the lower fenland sections, the river, ponded by control structures forms an important 'green corridor' through mainly arable farmland. These lower sections of river are embanked, often with substantial areas of washland, and contain areas of semi-improved grassland.

3.14.3 Environmental Requirements

To protect and further conservation in river corridors and other sites of wetland conservation value.

3.14.4 Environmental Objectives

Water Quality:

- All rivers to comply with the relevant use related standard.
- Water quality should be maintained or improved to ensure that sensitive ecosystems do not deteriorate particularly where notable aquatic invertebrate communities are known to occur.
- Groundwater quality should not deteriorate to a level where the conservation value of wetland SSSI sites is adversely affected.
- To ensure that water quality does not adversely affect the general conservation value of watercourses, and to prevent

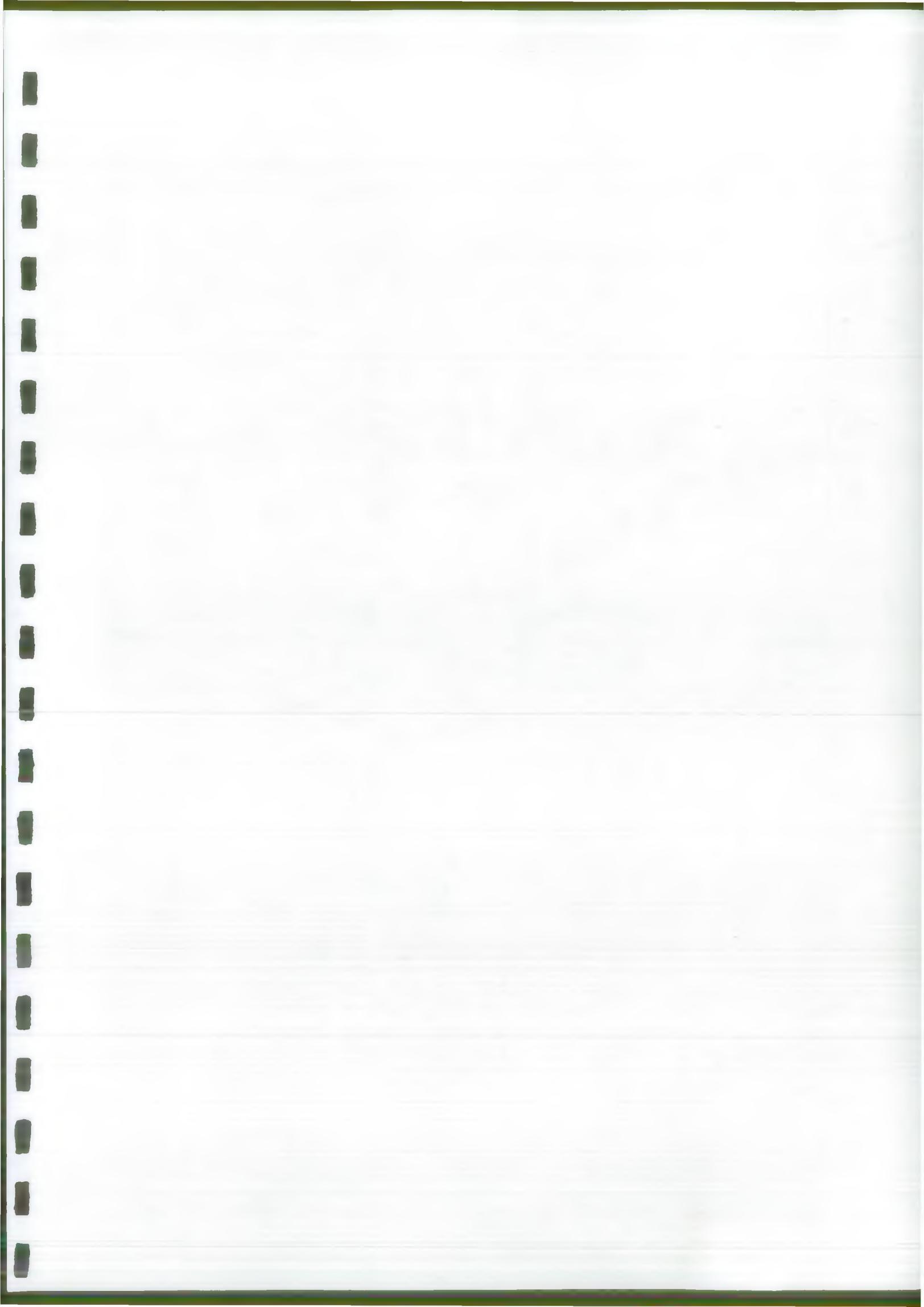
any deterioration in water quality which could in any way affect special conservation areas.

Water Quantity:

- To protect aquifers and surface water from overcommitment and to ensure groundwater abstraction does not have an unacceptable effect on spring flows.
- To identify the river flow regime necessary to satisfy the "in river needs" of the catchment.
- To ensure that the "in river needs" are satisfied if necessary by the augmentation and redistribution of water resources.
- To investigate wetlands in order to understand their vulnerability to abstraction and define wetland catchment areas.

River Physical Features:

- The maintenance and enhancement of habitat diversity within the river corridor. Features such as riffles/pools, meanders, river margins, adjacent wetlands and bankside trees all contribute to the diversity and therefore conservation value of the river corridor.
- The channel cross section should be appropriate for the prevailing flow regimes of the river.



— How much water.

* How many houses are unused? \cup

it is unsatisfactory when some need water but others have resources which ~~are~~ ^{is} unused.

Copy # 40/41

3.15 CONSERVATION - LANDSCAPE AND ARCHAEOLOGY

3.15.1 General

The NRA has a statutory duty to conserve and enhance landscape and archaeological features associated with water.

This includes specific duties with respect of areas formally designated as being of value, eg Areas of Outstanding Natural Beauty and Scheduled Ancient Monuments. In addition, the NRA also has a general duty to protect areas which although valuable in landscape or archaeological terms are not formally protected.

3.15.2 Local Perspectives

Within the catchment there are 295 sites designated as Scheduled Ancient Monuments (SAMs). The Breckland area is particularly rich in archaeological sites and contains 177 SAM's. In addition to scheduled sites, there are a number of other sites which are recognised as being of archaeological value.

The archaeological sites most affected by the work of the NRA are those sensitive to changes in groundwater level. This is particularly important where reduced water table results in drying out at foundation level.

River valleys form an important component of the landscape and the aesthetic as well as the ecological value of these areas is considered when assessing the impact of any NRA activity.

3.15.3 Environmental Objectives

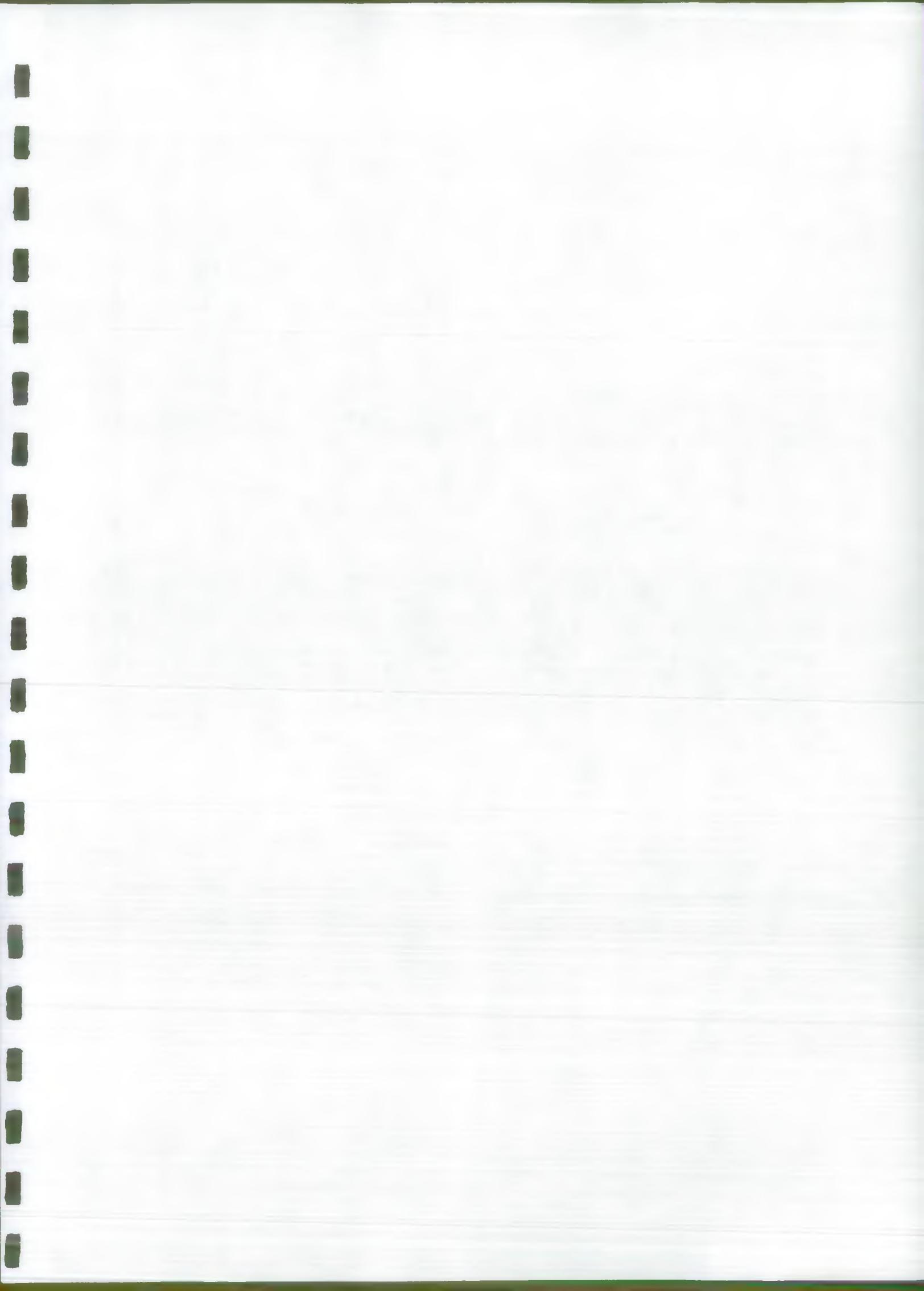
To protect the landscape and archaeological features associated with rivers in the catchment and to safeguard the special interest for which sites have been designated.

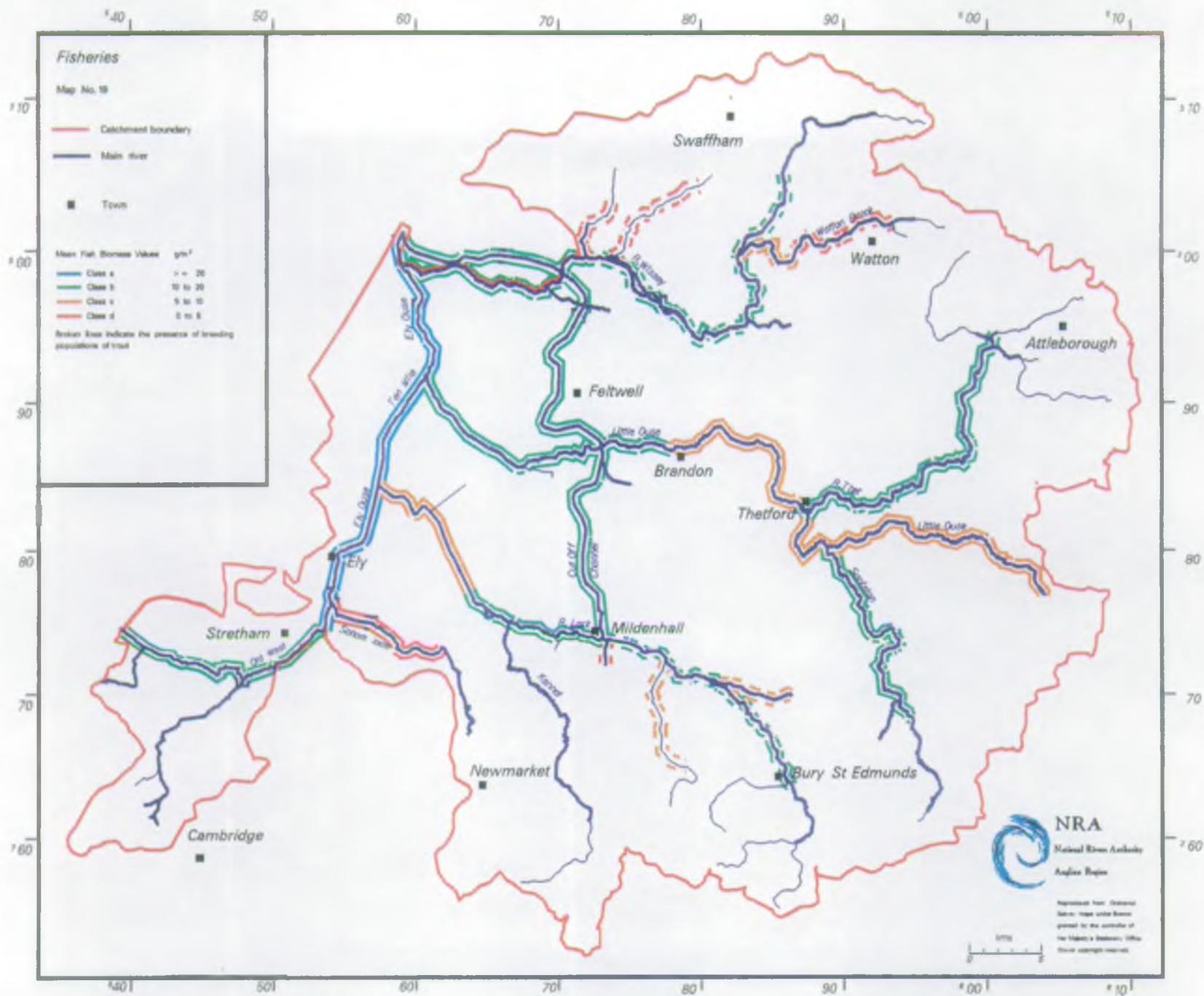
Water Quantity:

- To have due regard of the water requirements of archaeological features.

Water Quality:

- All rivers to comply with the relevant use related standard.
- To ensure that water quality does not adversely affect the landscape and archaeological value of land adjacent to watercourses.





3.16 FISHERIES

3.16.1 General

The NRA has duties to maintain, improve and develop fisheries and to further the conservation of fish species. Fish populations are affected by the quality and quantity of water as well as by the availability of suitable physical habitat features. Fish are therefore important indicators of the overall health of the river.

Specified fisheries are designated under EC Fisheries Directives which set water quality criteria according to fishery type; either Salmonid (salmon and trout) or Cyprinid (coarse fish).

This use covers:-

1. Game fisheries; that is the maintenance of breeding populations of salmonid fish species, namely brown trout and sea trout in this catchment.
2. Coarse fisheries; that is the maintenance of breeding populations of coarse fish species.

3.16.2 Local Perspective

The principal coarse fishery in this catchment lies within the South Level 'pond'. This includes the main Ely Ouse River, the River Wissey below Oxborough, the Little Ouse below Brandon, the River Lark below Isleham, and the Old West River.

There is no barrier to fish movement within this 'pond' and it appears likely that fish do move between rivers in some areas. The fish population is dominated by roach, with common bream and pike also widely distributed. Some 20 species of fish have been recorded in this section of the catchment.

The Ely Ouse River is the major coarse fishery and supports a Class A fish population (greater than 20 grammes per square metre). The Lower River Wissey and Little Ouse both support a Class B fish population (10 - 20 grammes per square metre), while the lower River Lark supports a Class A fish population. The Old West River is the smallest of these coarse fisheries, and supports a Class B fish population dominated by small fish. This is similar to many canal fisheries and is probably related to the canal type habitat of this river.

The upstream sections of the major Ely Ouse tributaries see a gradual change in fish species to those more suited to the erosive riffle/pool habitat found in some sections. The finest example of this is found in the River Wissey, which supports a breeding brown trout, and possibly sea trout population. Brown trout recruitment is known to occur in both the main River Wissey and in most of its upstream tributaries.

A breeding population of brown trout is also present in the River Lark catchment upstream of Barton Mills. Fish biomass estimates are generally lower in the trout sections than those found in the coarse fishing sections.

Biomass estimates are typically Class B or Class C (5 - 10 grammes per square metre). This is partly a habitat limitation and partly the result of control measures used in some areas to limit coarse fish numbers.

The Little Ouse catchment is the only major tributary of the Ely Ouse which does not support a trout population. Fish populations in the upper parts of this catchment are dominated by roach, dace, chub and pike. As historical fish population data is not available, the reasons for the absence of trout in the Little Ouse catchment can only be speculated on, but it seems probable that a breeding population did exist at some time in the past.

There is evidence that both the River Kennett and the River Snail both used to support a breeding trout population. However, a combination of water resource problems and in the case of the River Snail, additional water quality problems have led to the loss of this species from both rivers

The man made Cut Off Channel which flows from Barton Mills to Denver supports a biomass Class A or B coarse fish population throughout its length, although only the lower 9 km is actually leased for angling. The remainder is retained by the NRA as part of its fish production capacity.

In addition to the catchment rivers, there are a large number of Internal Drainage Board (IDB) drains. Although the IDB system does not support a recognised fishery most drains are known to support fish populations.

The following rivers are designated under the EC Fisheries Directive:-

Salmonid:

- River Wissey 13.5 km from Hilborough to Northwold Common

Cyprinid:

- River Lark 20 km from Mildenhall Gas Pool to Ely Ouse
- Ten Mile River 10 km from Little Ouse River to Denver
- Little Ouse River 60 km from Broom Hills Botesdale to Ten Mile River
- River Thet 34 km from Portwood Brook to Little Ouse River
- River Wissey 19.5 km from Northwold Common to Ten Mile River

All these stretches comply with the requirements of the Directive.

3.16.3 Environmental Objectives

The overall objective is to sustain a natural fish population appropriate to the catchment and achieve a biomass Class 'A' fish population. It is however recognised that this level of population will not be achieved in some smaller river channels where habitat is limiting.

Water Quality:

- To ensure that the requirements of the EC Fisheries Directive continue to be achieved.
- To comply with water quality objectives for fisheries in other appropriate stretches.

Water Quantity:

- To maintain a flow regime to meet the "in river needs" identified for fish species native to the catchment.



3.17 ANGLING AND COMMERCIAL EEL FISHING

3.17.1 General

This relates to the recreational and commercial use of the fishery.

3.17.2 Local Perspective

This catchment, and in particular the Ely Ouse River, supports a nationally famous coarse fishery. Used extensively by both match and pleasure anglers, the catchment has hosted the national angling championship and it is proposed to repeat this event on the Ely Ouse in 1995.

There are currently two British rod caught records held by fish captured from within this catchment, the zander and the dace.

In the upper sections of the River Wissey and the River Lark, there are a number of trout fisheries. These fisheries are supported by a combination of natural brown trout production and restocking. A small run of sea trout is also known to occur in the River Wissey and occasionally to other rivers in the catchment.

In addition to river fisheries, angling also takes place in a number of enclosed stillwaters. Of note in this category are the popular coarse fisheries at West Stow Country Park, close to the River Lark, and the Nunnery Lake complex near Thetford.

Commercial eel fishing is confined principally to the lowland 'fen' sections of the river. A significant component of eel fishing activity in the catchment is carried out in sections of the Ely Ouse which are owned and leased by the NRA. Commercial eel fishing is a seasonal activity and is carried out principally between April and October, usually by using Dutch fyke nets.

3.17.3 Environmental Requirements

To protect and enhance fish stocks and to maximise access to NRA owned fisheries where this does not conflict with other users.

3.17.4 Environmental Objectives

Water Quality:

- To comply with the appropriate use related water quality objective. This should be salmonid fishery quality where breeding trout populations occur and cyprinid fishery in other areas.

- To ensure that the requirement of the EC Fisheries Directive continue to be achieved.

Water Quantity:

- Sufficient to ensure the long term viability of all fish species native to the catchment.
- Sympathetic control of river flow and level at operational structures.

Physical Features:

- Maintain and enhance habitat diversity to maximise fish production.
- Balance the need for instream weed control between flood defence, navigation and angling, and the ecological benefits of instream plants.
- Where possible adopt river flow and level control in a manner sympathetic to general environmental needs and to angling.

3.18 RECREATION AND AMENITY

3.18.1 General

This use deals with recreational and amenity facilities such as walking, horse riding, caravanning and camping, tourism and sites of interest within the water environment on land owned by the NRA.

3.18.2 Local Perspective

All of the local authorities within the catchment promote tourism, much of which is indirectly linked to the water environment. There are many sites throughout the catchment attracting visitors which have historical and archaeological links with the river system.

There are local authority/Forestry Commission maintained facilities as follows:

Lark Valley Countryside Park
Brandon Country Park
Thetford Country Park,

as well as many other sites managed by English Heritage and the National Trust.

Some river banks have availability of access to the general public for walking pursuits with interest in the flora and fauna of the surrounding countryside. Horse riding is also available on some embankments by means of bridleway access. Long distance footpaths are routed through the catchment as part of the national network.

Caravanning and camping interests are catered for at numerous sites with easy access to the tourist attractions.

Many visitors are attracted to the Denver Complex where talks and literature are made available by the NRA. The Jenyns Arms Public House at Denver, owned by the NRA, provides an ideal location for visitors to take refreshment whilst visiting the associated waterways.

3.18.3 Environmental Requirement

To develop the amenity and recreational potential of NRA land either directly or in conjunction with local authorities, developers and other national organisations.

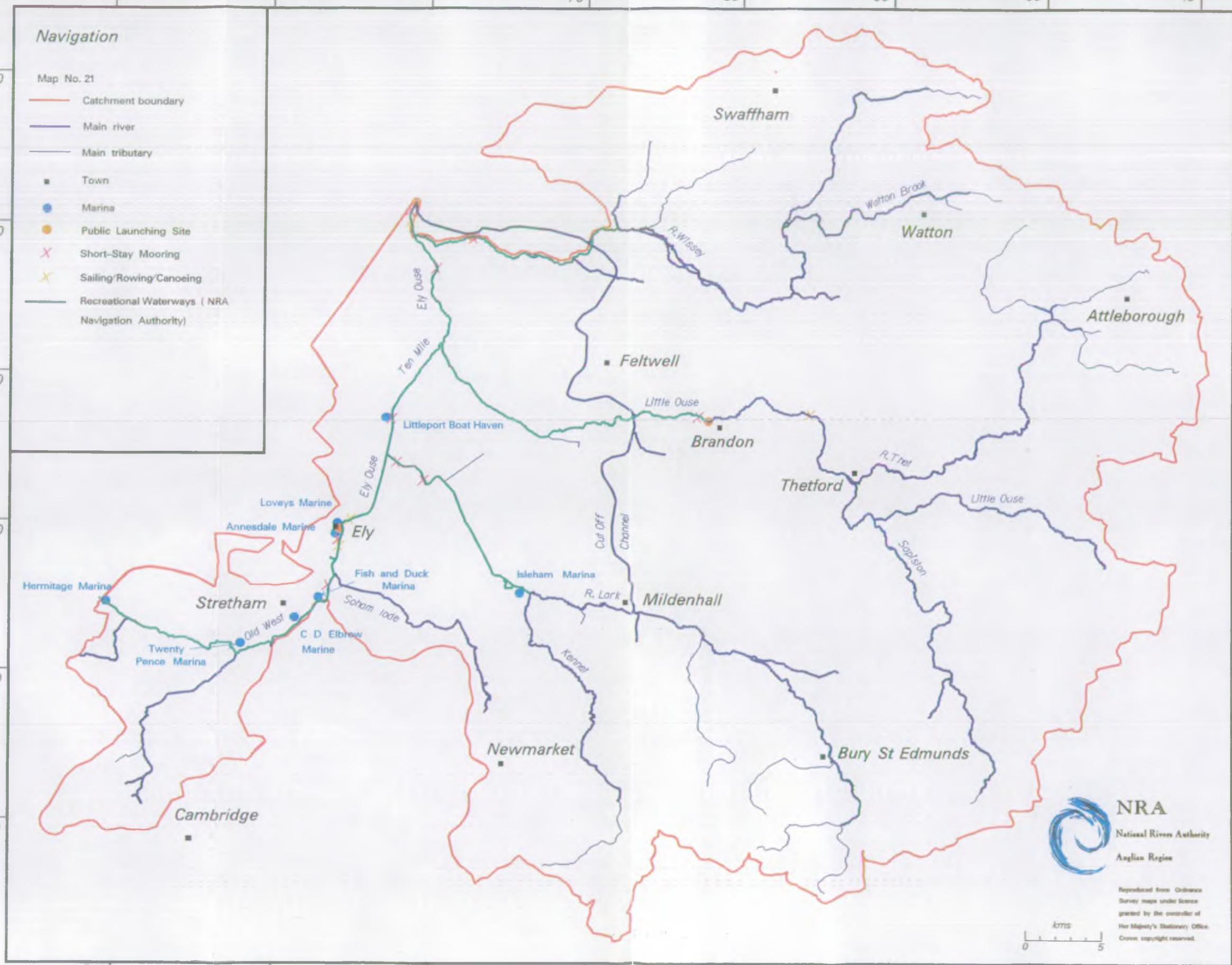
3.18.4 Environmental Objectives

To maintain water quality, water resources and river conditions so as to provide suitable conditions for these activities.

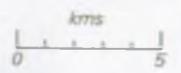
Navigation

Map No. 21

-  Catchment boundary
-  Main river
-  Main tributary
-  Town
-  Marina
-  Public Launching Site
-  Short-Stay Mooring
-  Sailing/Rowing/Canoeing
-  Recreational Waterways (NRA Navigation Authority)



Reproduced from Ordnance Survey maps under licence granted by the controller of Her Majesty's Stationery Office. Crown copyright reserved.





3.19 NAVIGATION

3.19.1 General

As a consequence of the 1989 Water Act the NRA was empowered with various legal responsibilities for inland navigations and inherited various powers under earlier Acts of Parliament made for specific river, estuary and harbour navigations. It also has bye-law making powers for inland waters in England and Wales where there is a public right of navigation and while no other authority legitimately exercises navigation powers.

Within the Region, the Anglian Water Authority Act of 1977 provides the legal framework. The NRA acknowledges the existence of the Zone One Strategy Report for Water Recreation prepared by the Eastern Council for Sport and Recreation.

3.19.2 Local Perspective

The following lengths of river within the catchment are defined in Schedule 1, Part III of the 1977 Act as waterways in respect of which the NRA is the navigation authority and which are recreational waterways:-

- i) The River Great Ouse, from Denver Sluice to Popes Corner upstream of Ely.
- ii) The Old West River from Popes Corner to Hermitage Lock at its confluence with the Hundred Foot River.
- iii) The River Little Ouse from Brandon Stauch to its confluence with the River Great Ouse.
- iv) The River Lark from Judes Ferry to its confluence with the River Great Ouse.
- v) The River Wissey from one mile upstream of Stoke Ferry Bridge in the Parish of Stoke Ferry to its confluence with the River Great Ouse.

The River Lark upstream of Judes Ferry was previously navigable as far as Bury St Edmunds and attempts have been made in the past by Inland Waterways Association to restore part or all the length for navigation purposes. Major restoration work would be necessary if the proposal was to be pursued. Similarly the River Little Ouse upstream of Brandon Stauch was navigable as far as Thetford and interest has been shown to restore some of the length for navigation. Pollution and aesthetic problems associated with

navigation activities need to be resolved.

3.19.3 Environmental Requirements

To take due regard of the Eastern Council for Sport and Recreation Regional Strategy for Water Recreation, Zone One Report on the Great Ouse and its Associated Waterways.

- to develop and implement an NRA navigation strategy taking account of other navigation authorities views.
- to enforce navigation statutes and bye-laws and to regulate through a consistent series of licences.
- to seek to recover from users, as far as practicable, the specific identifiable costs of providing navigation facilities.
- to undertake programmes of repair and maintenance on NRA navigation.
- to achieve optimal use of NRA navigation and consider the need for the NRA to seek under S158 (2) of the Water Act 1989 to make navigation bye-laws for waters where it is not otherwise the statutory navigation authority.

3.19.4 Environmental Objectives

Water Quality:

- To promote and encourage with external bodies provision of pump out facilities at strategic locations.
- To promote, with British Waterways and Inland Waterways Association, boat safety standards to meet present day environmental needs.
- To ensure that litter collection requirements as legislated within the Environmental Protection Act 1990 are carried out.
- To ensure that weedcutting operations during summer months meet environmental needs and legislative requirements.

Water Quantity:

- To maintain river retention levels to at least as good a standard for the purpose of navigation as that to which they

were maintained in the period of nine months immediately preceding 8th December 1975.

Physical Features:

- Maintain depth of water at navigation level and allow permissible headroom at bridges.
- Maintain existing public launching sites.
- Provide short stay moorings.

3.20 BOATING AND IMMERSION SPORTS

3.20.1 General

This use deals with water based recreational activities, such as sailing, motor boat cruising, canoeing, rowing, water skiing and swimming. The NRA acknowledges the existence of the Zone One Strategy Report for Water Recreation, prepared by the Eastern Council for Sport and Recreation.

The NRA discourage swimming in all rivers, primarily because of the risk of drowning, but also because of the possibility of contracting water borne diseases. It is also recommended that those involved in any watersport which results in contact with the water, take sensible precautions to avoid water borne diseases.

3.20.2 Local Perspective

Sailing within this catchment is to some extent limited by frequent bridges which require the mast to be lowered. The relatively narrow channel width found in all tributaries and the embanked nature of most navigable sections also pose particular problems to sailing craft. There is however, a popular dinghy sailing club at Roswell Pits in Ely.

The navigable watercourses are used extensively by motor powered craft, both privately owned and hire boats. In addition to the cruising opportunities within the catchment, the Ely Ouse River and Old West River provide a link between the Bedford Ouse and the Middle Level system. This route has the attraction of avoiding a long passage on the tidal river.

There are facilities for canoeists on the Little Ouse at Santon Downham, although canoe users elsewhere are discouraged at weirs and sluices on safety grounds. Informal canoe use occurs at a low level throughout the navigable section of the catchment. In other, non-navigable areas, there is no general right of navigation and access must therefore be negotiated with riparian land owners.

Rowing is a popular activity in the Ely area of the Ely Ouse River. Kings School have a boathouse at Ely and the local river is also used for training by the Cambridge University Boat race team.

Speed restrictions mean that there are no areas in which water skiing or jet skiing can take place.

3.20.3 Environmental Requirements

To maintain and where desirable promote the recreation use of waterways, so as to:

- (i) Safeguard those involved in immersion sports.
- (ii) Provide suitable conditions for all water based recreational activities.

3.20.4 Environmental Objectives

To maintain water quality, water resources and river conditions so as to:-

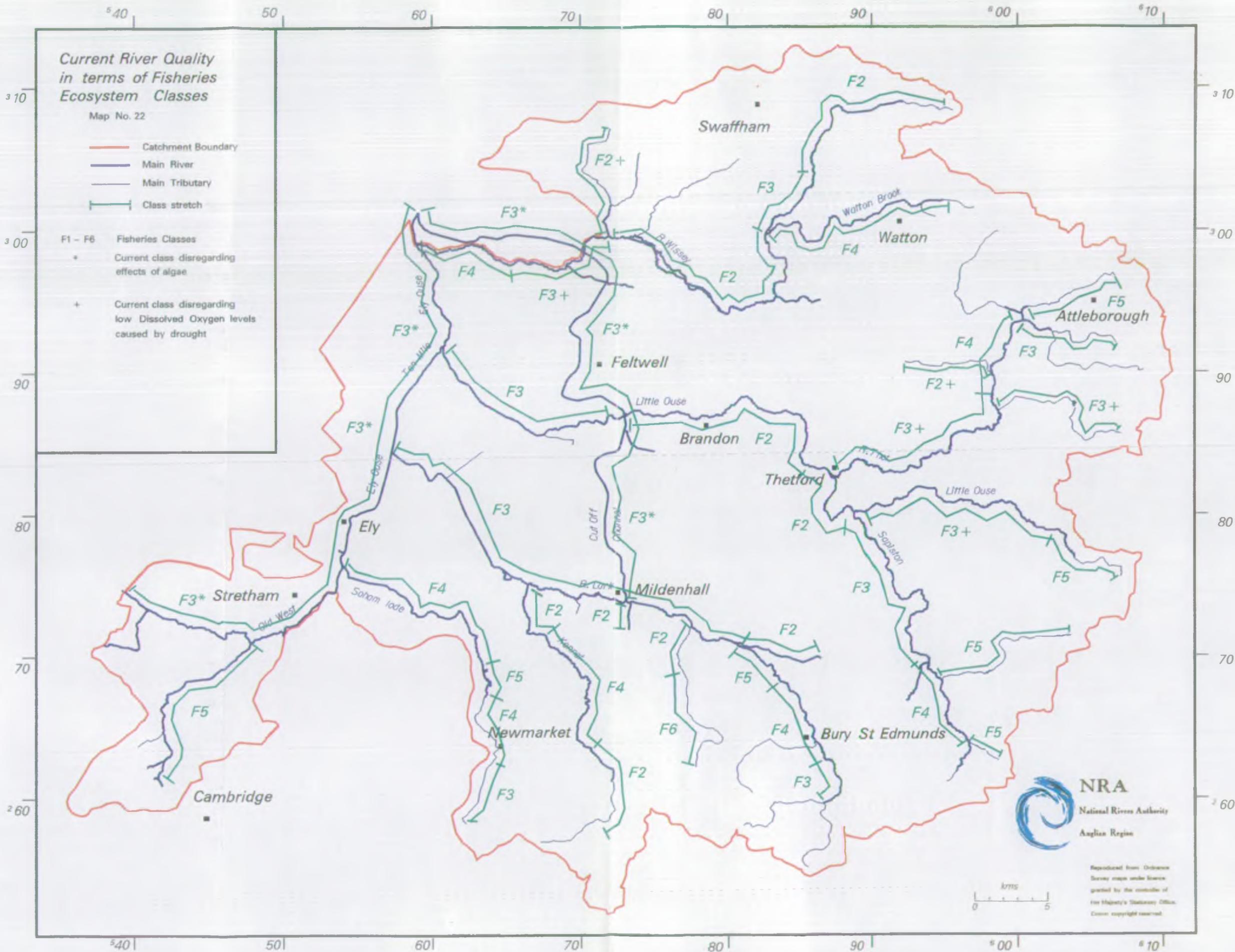
- protect those involved in immersion sports;
- provide suitable conditions for these activities.

**Current River Quality
in terms of Fisheries
Ecosystem Classes**

Map No. 22

- Catchment Boundary
- Main River
- Main Tributary
- Class stretch

- F1 - F6 Fisheries Classes
- * Current class disregarding effects of algae
 - + Current class disregarding low Dissolved Oxygen levels caused by drought



Reproduced from Ordnance Survey maps under license granted by the controller of Her Majesty's Stationery Office. Crown copyright reserved.



4.0 CATCHMENT TARGETS

4.1 WATER QUALITY

4.1.1 River Quality

Historically, river quality in Anglian Region has been assessed against a variety of criteria.

- (a) Compliance with relevant EC Directives
- (b) Compliance with Regionally derived River Quality Objectives (RQOs)
- (c) National Water Council (NWC) target classes
- (d) Biological target classes

EC Directives set standards for relevant parameters which the directives seek to control, for example the Surface Water Directive (abstraction for drinking water) and the Fisheries Directive (protection of fish). The Government is responsible for ensuring compliance with these standards.

In order to ensure that EC Directives are met and that water quality is maintained and where necessary improved, the Department of the Environment has published proposals for a statutory scheme of water quality objectives. This is based on recommendations from the NRA.

The scheme sets out the water quality requirements for various river uses:

- a) Fisheries Ecosystem
 - Class 1: High Class salmonid/coarse fishery
 - Class 2: Sustainable salmonid/high class coarse fishery
 - Class 3: High Class coarse fishery
 - Class 4: Sustainable coarse fishery
 - Class 5: Fish present but not a sustainable fishery
 - Class 6: Fish unlikely to be present
 - b) Abstraction for Drinking Water Supply
 - c) Industrial/Agricultural Abstraction
 - d) Special Ecosystem
 - e) Water Sport Activity
- and relevant EC Directives

The Fisheries Ecosystem Use represents levels of water quality able to support not just fish, but the other river life on which they depend. It does not directly relate to the actual presence or absence of any particular species of fish.

The NRA's proposals for Fisheries Ecosystem Classes in the Ely Ouse catchment are shown on Map 22 ; these represent current quality, and deterioration from these levels should not be permitted. Map 23 shows the target Classes: the time scale for improvements to reach these targets will be considered within a framework of regional priorities. Only those rivers which appear in the National Water Council survey have been included at present; other rivers will have local water quality objectives applied.

Unlike the agricultural abstraction classification, which will apply to stretches of river, the classifications for drinking water and industrial use will apply only at the point of abstraction. The criteria for Special Ecosystem and Water Sport Activity are not yet fully developed and hence there are no detailed proposals for these uses at present.

The scheme is currently being used for water quality planning purposes; at present only criteria for fisheries and abstraction uses are being proposed. The classification will only become statutory following designation by the Secretary of State for the Environment, and will be introduced on a catchment basis. It is unlikely that the Ely Ouse will be among the first to be designated.

4.1.2 Groundwater

There are at present no general criteria for assessing groundwater quality. Where water is abstracted for potable supply, many of the parameters in the EC Drinking Water Directive are used.

The EC Groundwater Directive requires that groundwater is protected against pollution. Once polluted, groundwater is difficult and expensive to recover.

The NRA introduced its Groundwater Protection Policy in December 1992. Now operational, it will be used by all those whose activities may affect or be affected by groundwater quality as a guide to assist and influence planning and strategy decisions. Besides the rationale behind the policy, it will contain specific guidance on waste disposal to land, the use of sludge and slurries on land, physical disturbance of aquifers, contaminated land, diffuse pollution and unacceptable activities in high risk areas.

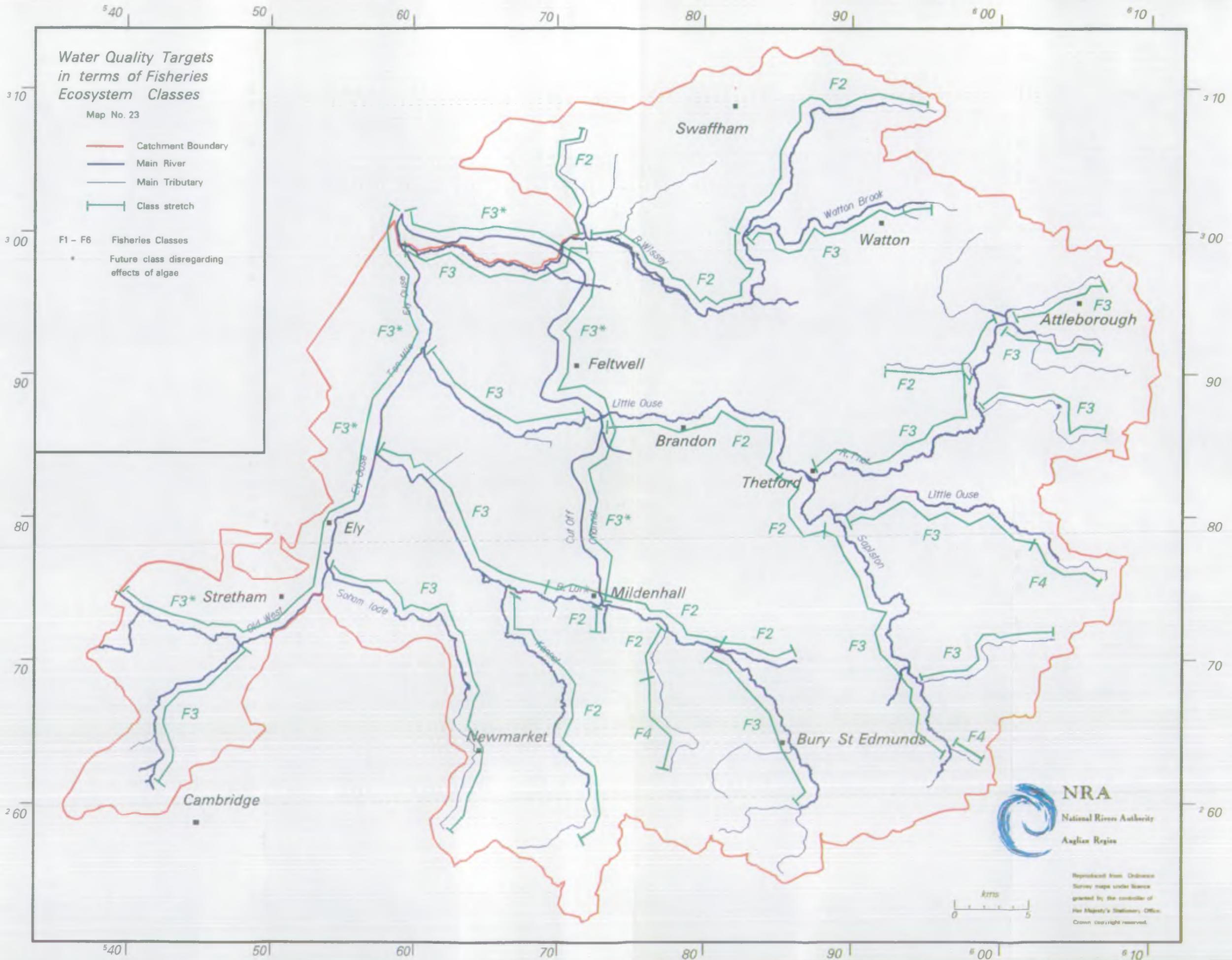
The EC Nitrate Directive requires the identification of groundwaters which have nitrate levels in excess of 50 mg/l; this is currently under way. Plans to control the input of nitrate will then be required which may include the statutory imposition of Nitrate Sensitive Areas.

**Water Quality Targets
in terms of Fisheries
Ecosystem Classes**

Map No. 23

-  Catchment Boundary
-  Main River
-  Main Tributary
-  Class stretch

- F1 - F6 Fisheries Classes
-  Future class disregarding effects of algae



Reproduced from Ordnance Survey maps under licence granted by the controller of Her Majesty's Stationery Office. Crown copyright reserved.

4.2 WATER QUANTITY

4.2.1 General

This section considers the requirement for meeting existing and future water abstraction demand in the catchment whilst protecting the existing uses and users of water.

The Water Quantity targets (given in chapter 3 and repeated below) constitute the general NRA statutory objectives.

- a) To protect aquifers and surface waters from over-commitment and ensure abstraction does not have an unacceptable effect on existing abstractors and environmental waters.
- b) To ensure the proper use of water resources.
- c) To conserve water resources.
- d) To augment and/or redistribute water resources, where appropriate to meet water demands to appropriate standards of reliability.

4.2.2 Local Perspective

The future targets for this region and this catchment have been listed under each target heading.

- a) To protect aquifers and surface waters from over-commitment and ensure abstraction does not have an unacceptable effect on existing abstractors and environmental waters.

NRA Anglian Region is actively reviewing the methodology used for the allocation of water resources between human and environmental uses. In addition, the calculations are being reviewed in light of the 1989-1992 drought statistics.

A groundwater computer model has been written for the Lark catchment, the calibration of which will be reviewed. A similar model for the Thet and Little Ouse catchment is planned. Such models are useful management tools with respect to groundwater allocation.

The NRA aims to carry out extensive ecological and hydrological studies to examine the existing ecology of the river system and to define the minimum water level, flow

and quality required to maintain the system. Such "in river needs" studies will use data already available as well as further field work. Such a study is currently being undertaken in the Wissey sub-catchment. This study is expected to report in 1993. Similar studies for the Lark, Thet and Little Ouse will follow.

There is a need to identify the water catchment areas for the wetland sites of conservation interest in order to better regularise the protection of these sites.

In addition, Anglian Region will review and update the Great Ouse Resource Model, which also covers this catchment. The model is a means of calculating the Naturalised Flow for a river stretch, ie, the flow that occurred before abstraction or effluents.

All these studies will enable the NRA to identify Minimum Residual Flows for the catchments.

b) To ensure the proper use of water resources.

The NRA will give prior (and equal) priority to existing protected rights to abstract and to established environmental needs before allocating any further water for abstraction.

The NRA must decide on whether the future requirement for water meets "reasonable needs". The consideration of alternative supplies or demand management must be shown as well as consideration of recycling. Specific requirements according to each use, are as follows:

Public Water Supply

The licensing horizon is currently year 2011; it is not considered reasonable to allocate water for needs beyond this. The water company must have demonstrated that they have carried out effective demand management, reduced leakage to economic rates and, where water resources are under stress, at least considered metering of domestic use before extra water resources are allocated.

Spray Irrigation and Agriculture

The requirements of water needed with respect to the type of crops and soil conditions or stock types and numbers are taken into account.

Industrial

The process is considered as well as the expected life of the plant.

c) To conserve water resources

The NRA encourages the storage of winter surface water in reservoirs.

Efficient water use is encouraged and where possible re-use for purposes appropriate to the quality of the resource.

The NRA encourages groundwater abstraction in preference to summer surface water abstraction, other than at or near the tidal limit of the river.

The 1989-1992 drought has served to develop better practice of water resource management both by the NRA and the abstractors. The promotion of efficient water use will continue in the future.

A future target for the whole of the NRA is to seek to revoke unused licences and to reduce under-used ones.

The NRA will set discharge consents appropriate to anticipated future flow regimes, rather than historic flow regimes.

There are benefits to water quantity (ie the impact of abstraction upon river flows will be minimised) if the discharge of water is made within the catchment and as far upstream as possible. However, water quality objectives often preclude this as an option.

d) To augment and/or redistribute water resources, where appropriate to meet water demands to appropriate standards of reliability.

The NRA already operates raw water transfer schemes in this catchment. The further enhancement of such schemes will continue to meet the needs for water both within the catchment and for export. Extra boreholes are to be drilled in the Sapiston sub-catchment primarily to ameliorate local low flow problems.

The Anglian Region is producing a Water Resource Strategy

to define how future demands will be met in the Region. The key options include:-

- demand management
- consideration of the reduction of the MRF at Denver
- further groundwater abstraction in Norfolk
- the transfer of water from the River Trent into the region, and
- the construction of a storage reservoir

The options are currently under consideration, with a consultation document produced in Spring 1993, but any outcome may have an effect on the future allocation and management of water resources in this catchment.

The appropriate standards for each use are given as follows:

Public Water Supply

The NRA accepts the operational standards given by OFWAT for public water supply. These are:-

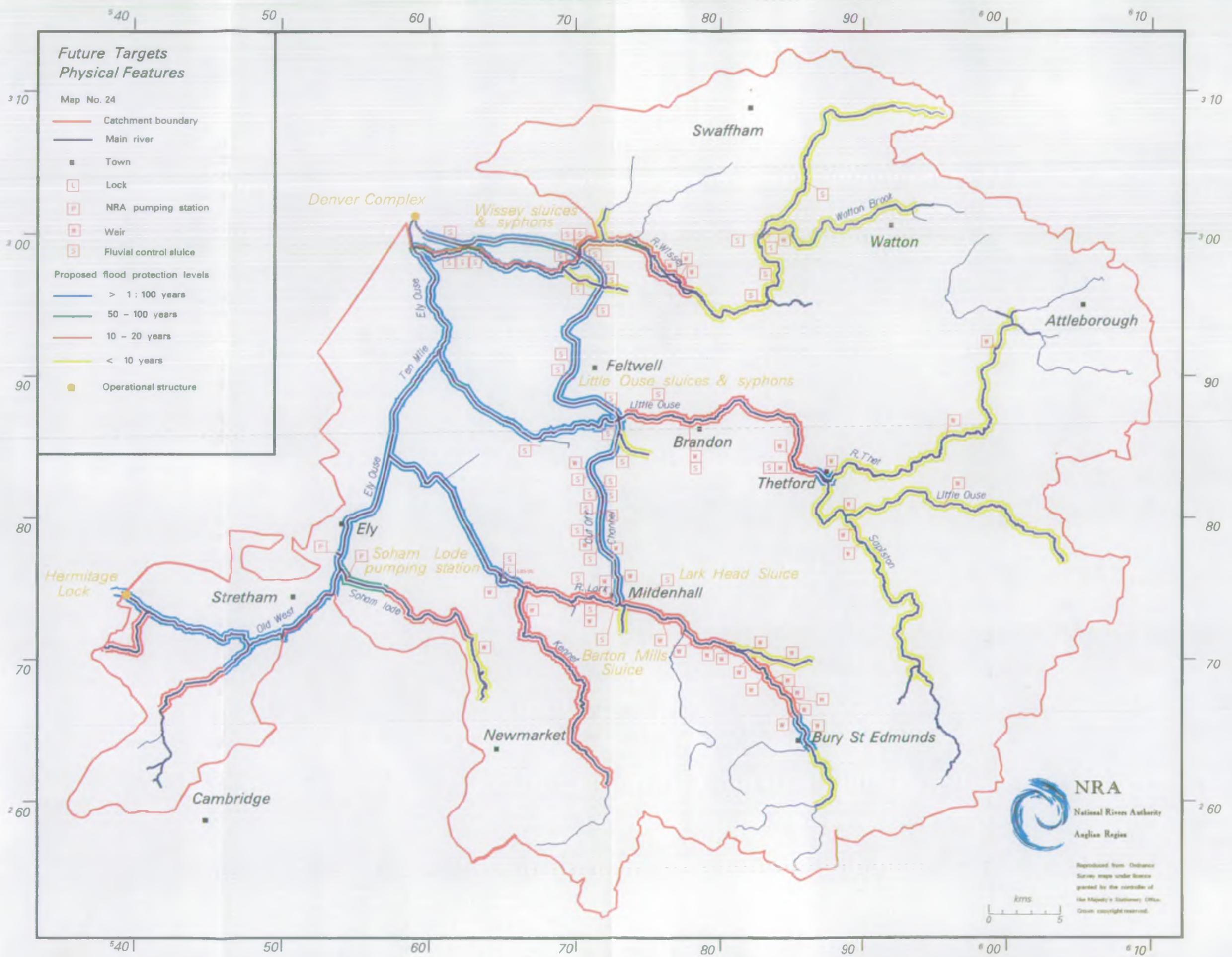
- A hosepipe ban on average not more than once every 10 years,
- The need for voluntary savings of water on average not more than once in 20 years,
- The risk of rota cuts or use of standpipes on average not more than once in 100 years.

Spray Irrigation

The Regions target level of service for spray irrigation is that there should be risks of shortages not more than once in 12 years on average.

Others - Industrial, Agricultural etc

There is no specific target level of service for these uses.



**Future Targets
Physical Features**

Map No. 24

- Catchment boundary
- Main river
- Town
- Lock
- NRA pumping station
- Weir
- Fluvial control sluice

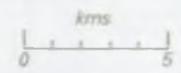
Proposed flood protection levels

- > 1:100 years
- 50 - 100 years
- 10 - 20 years
- < 10 years
- Operational structure



NRA
National Rivers Authority
Anglian Region

Reproduced from Ordnance
Survey maps under license
granted by the controller of
Her Majesty's Stationery Office.
© Crown copyright reserved.





4.3 PHYSICAL FEATURES

4.3.1 General

This section considers the requirements for physical features on rivers and river corridors in the catchment. The physical features targets for the identified catchment uses are combined to give a map representing targets for the whole catchment.

4.3.2 Local Perspective

Conservation

- To analyse the information on the RED to identify species rich areas, species rarity and areas with only poor species diversity.
- Flood defence activities to continue to be closely monitored with environmental maintenance and enhancement required.
- To conserve and enhance in river features such as riffle-pool areas, river cliffs, marginal plant growths and bankside trees.

Mineral Extraction

- No obstruction to flood flows for those extractions within flood-plains both during and after working and following final reinstatement.
- No detriment to areas of ecological or archaeological value.
- Potential for development to enhance conservation and water based recreation should be maximised.

Weirs and Sluices

- To maximise the flood capacity of embanked channel structures to meet flood defence standards of service.
- Ensure correct operation of relevant sluice gates and other river control structures.
- Incorporate environmental features within operational requirements to enhance recreational and conservation interests.

Maintaining Channels

- Maintain all lengths of main river within specific categories to meet flood defence standards of service and protect people and property from flooding.
- To maintain the capacity and integrity of embanked channels to prevent flooding.
- To maintain millstreams free of silt, obstructions and weedgrowth sufficient to enable continued use.
- Maintain all channels with due consideration for the enhancement of conservation as identified by RED.

Flood Protection

- To provide adequate flood defences throughout the catchment to the highest economic standard.
- To maintain the effectiveness of structures at the fluvial/tidal interface (Denver) to prevent tidal flooding and to facilitate maximum fluvial discharge.
- Encourage the use of flood plains to store flood water.

Channel Cross Section

- The channel cross-section should be appropriate for the prevailing flow regimes of the river, whilst protecting wherever possible its environmental features.

Fisheries

- Ensure river maintenance of a diverse habitat to maximise the production of fish. This would include features such as riffle/pool sequences, overhanging trees and instream plant cover.
- Consideration to be given for the provision of fish passes for sea trout and eels.

Angling

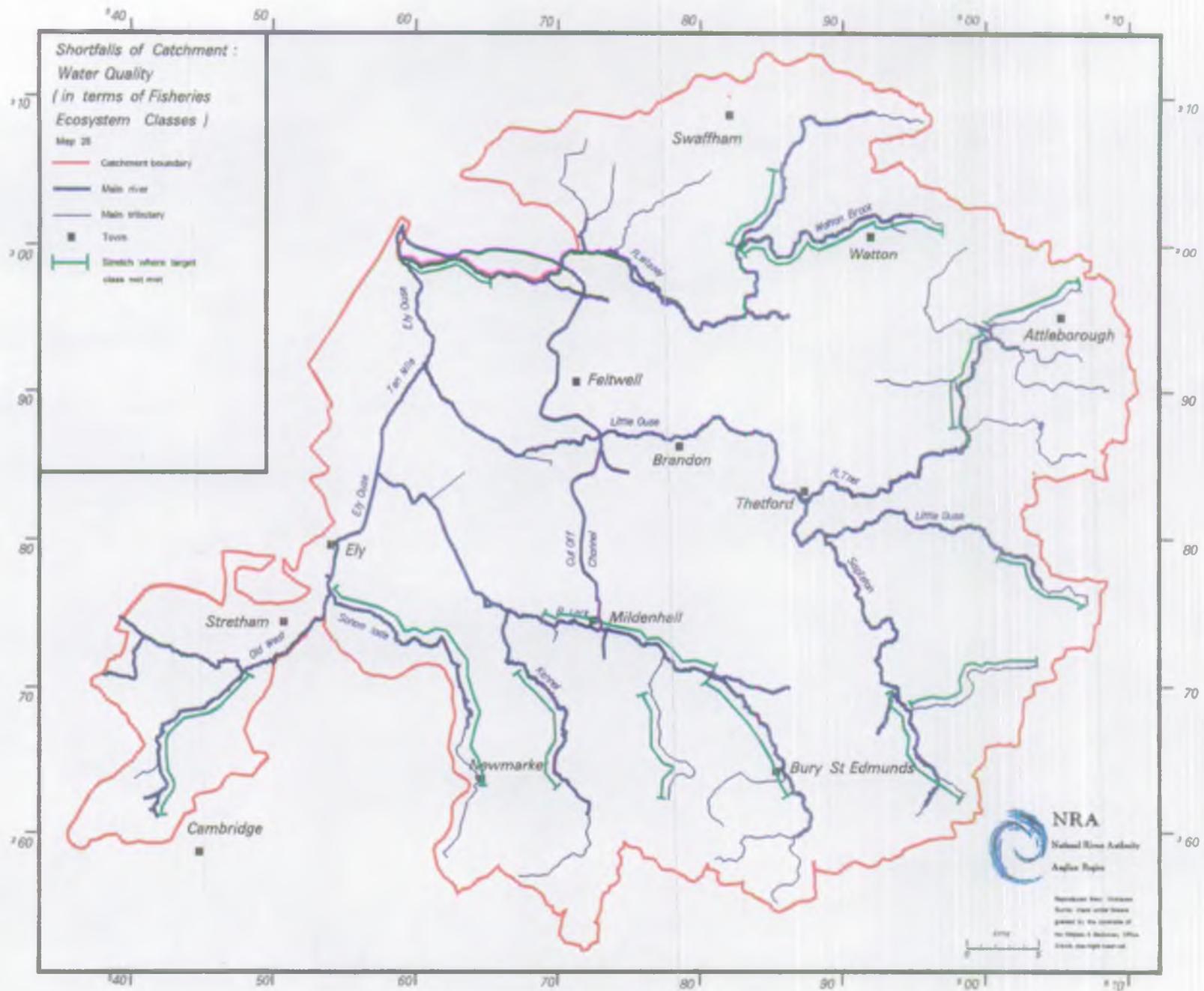
- River weed growth maintenance to balance the needs of river ecology and successful angling.
- Provide better angler access on identified lengths of river.

Navigation

- To ensure that all navigations are maintained to the requirements of local legislation.
- Maintain all navigation structures and facilities to meet the requirements of the Health and Safety at Work Act 1976.

Recreation and Amenity

- Promote public access to rivers and NRA owned land.
- Provide recreational facilities at Denver Complex.





5.0 CURRENT SHORTFALLS OF CATCHMENT

5.1 WATER QUALITY

5.1.1 General

Having set targets for water quality, it is important to assess the state of the catchment against the targets using data from routine monitoring, and identify the causes of any failure to achieve those targets.

5.1.2 Issues

Many of the upper reaches of the watercourses in the catchment currently show the impact of the recent drought: typically low dissolved oxygen levels associated with low flows. This effect has been disregarded when assessing current quality, otherwise it would have resulted in several stretches being assigned to lower Fisheries Ecosystem Classes than would really represent their quality.

Further, many lengths of the lowland watercourses would be in lower Fisheries Ecosystem Classes than might be expected if notice were taken of the high levels of Biochemical Oxygen Demand (BOD) caused by algae. The Cut-Off Channel is the worst affected, but the Old Westand the Ely Ouse also suffer. The issue of eutrophication (enrichment by nutrients with associated enhanced plant and algae growth) is under investigation: research is going on to quantify the causes and identify possible courses of action.

The proposals for water quality targets highlight the following issues:

a) Cottenham Lode (Issue 1)

Extensions at Cottenham STW have improved water quality to a degree, but further improvements are necessary to meet river targets in the Cottenham Lode.

b) Soham Lode (Issue 2)

This has been one of the worst quality watercourses in the Anglian Region for many years. However, following major extensions to Newmarket STW which were completed in 1991, a great improvement in river water quality is being seen. There still appear to be problems downstream of Soham STW: an issue which was previously masked by the impact of Newmarket STW effluent and is currently under investigation. However it is expected that Soham Lode will

achieve its target in the near future.

c) River Lark (Issue 3)

The upper stretches of the River Lark are affected by run-off from agricultural land and to a greater degree from Bury St Edmunds, however the major impact comes from the STW. While the effluent from the STW is good by comparison with most others, the fact that it discharges to a watercourse with high targets, where it makes up 50% of the flow on average and 80 to 90% at times of low flow, means that exceptionally high standards are required of the discharge. Improvements to the STW are needed.

d) River Kennett (Issue 4)

The middle section of the River Kennett is adversely affected by the effluent from Gazeley STW, although the impact has been exacerbated by the drought.

e) Cavenham Stream (non main river) (Issue 5)

In most years the upper section of the Cavenham Stream dries up, and the effluent from Barrow STW makes up the majority of the flow for much of the year. Major improvements are needed in the Barrow STW effluent.

f) River Little Ouse (Issue 6)

There have long been water quality problems at the top end of the Little Ouse. Typically they involve low dissolved oxygen levels with occasional elevated ammonias: BOD levels are nearly always within target. Despite considerable investigative work over the years, no cause has been established. The low DOs appear to be related to natural factors such as chalybeate water (iron rich water).

g) River Sapiston (Issue 7)

The upper sections of the River Sapiston suffer from the impact of effluents from Elmswell STW and Farm Kitchen Foods. Improvements have already been made to both discharges.

h) Stowlangtoft Stream (Issue 8)

The water quality here is affected by general agricultural run-off and also possibly by farm discharges. Further investigations are planned.

i) River Thet (Issue 9)

The upper reaches of the River Thet have a history of poor water quality. Following recent prosecutions for illegal discharges, there have been significant improvements.

j) River Wissey (Issue 10)

The upper Wissey is affected by the quality of the discharge from Swaffham STW, and until recently by that from South Pickenham STW which is now closed. The impact of the effluents was exacerbated by the drought. The lower Wissey is affected by the effluent from the British Sugar factory at Wissington.

k) Watton Brook (Issue 11)

This is affected by urban and agricultural run-off, and also by the effluents from Watton (Ex-RAF) and Watton (Thrextan) STWs.

l) Unsewered Villages (Issue 12)

There are several areas where water quality is affected locally by ineffective septic tank soakaway systems in un-sewered or partially-sewered villages, for example Kenninghall and Carbrooke.

m) Groundwater (Issue 13)

Generally groundwater quality in the chalk aquifer is very high, however there are areas of concern:

i) Nitrate

Some Public Water Supply sources have nitrate concentrations above the 50 mg/l limit set for human consumption. These are either blended or treated before supply. There are also private sources and wetland conservation sites that cannot be blended.

ii) Solvents

There are several areas of local contamination by chlorinated solvents. These are generally associated with military airbases, industrial areas and laundries. Remedial work is already underway in one case, and others are being investigated in more detail at present.

iii) Pesticides

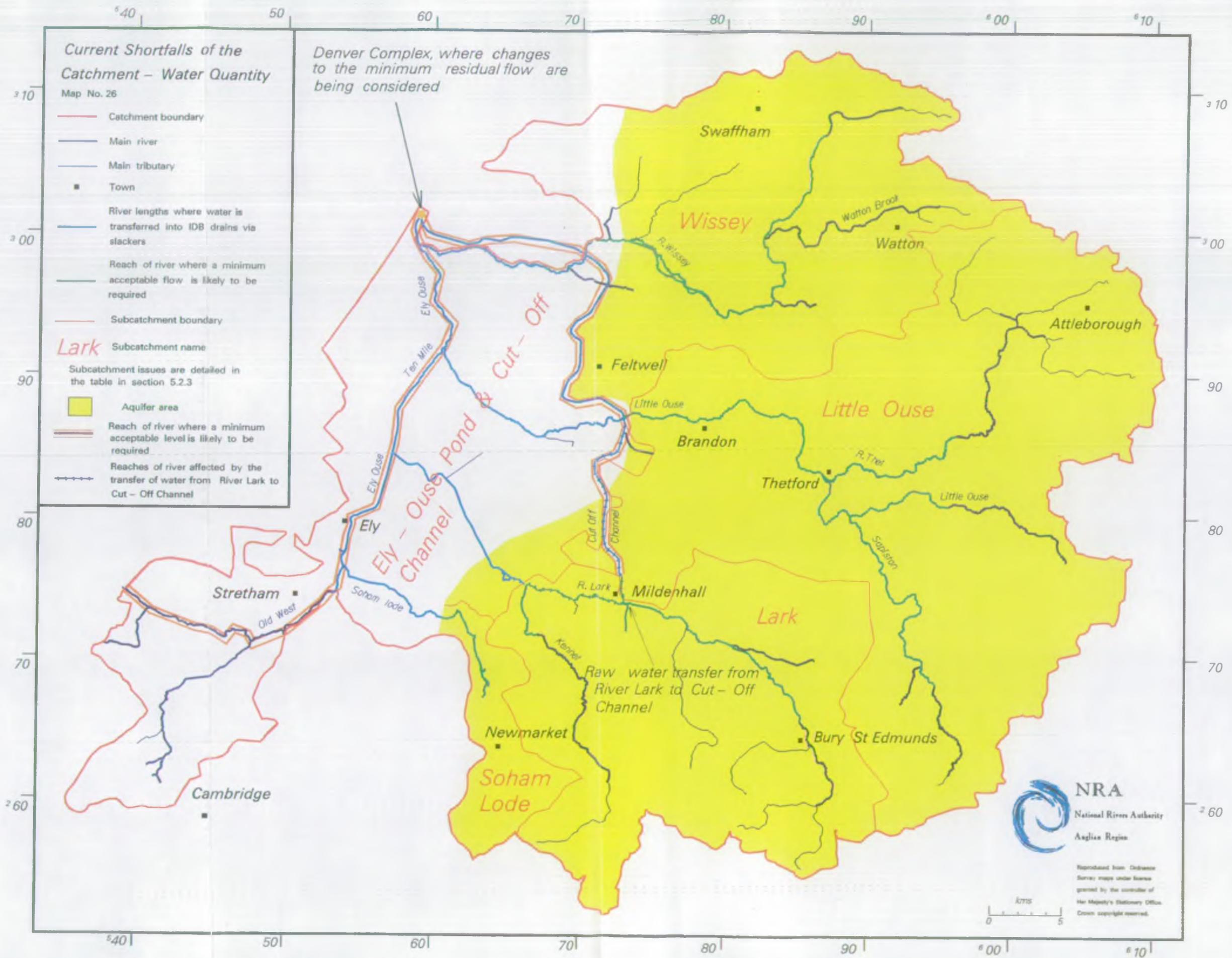
There are a few cases of contamination by pesticides. The sources are difficult to define and in general are of diffuse origin, both from agricultural and non-agricultural sources.

iv) Waste Disposal

There are two landfill sites where groundwater contamination is confirmed: Ingham and Barton Mills. For many other sites, it is not possible to be confident that there is no pollution at present, or that any will not arise in the future.

n) Oil Discharges from Surface Water Sewers (Issue 14)

Impervious areas within conurbations and associated industrial areas tend to become contaminated with oil arising from leakages and spillages. During periods of rainfall, this oil is often discharged via surface water sewers to watercourses and results in a large number of complaints from members of the public.





5.2 WATER QUANTITY

5.2.1 General

This section details the water quantity shortfalls compared with the future targets, as described in Section 4.

5.2.2 Local Perspective

The issues identified are:

- a) Any future abstractive demands cannot be met from groundwater or summer surface water. (Issue 16 and 17)

Future demands for water in the Anglian Region are progressively rising. Future demand for public supply is assessed by examining predicted changes in population and consumption habits as well as the potential for demand management practises such as leakage control and metering policies. Future growth in industrial and agricultural needs are also allowed for. The NRA Anglian Region is producing a Water Resources strategy to define the options on how future demands will be met.

- b) The transfer of water from the major watercourses into IDB drains via 'slackers' is not controlled by the Water Resources Act 1991. (Issue 18)

This results in a high proportion of the flow into the 'south level pond' being transferred during critical low flow periods.

- c) "In-River Needs" are not quantified and Minimum Acceptable Flows need to be defined. (Issue 19)

Extensive ecological and hydrological studies are required to define the existing ecology of the river system and to establish the minimum water level, flow and quality (i.e. in-river needs) required to maintain the ecosystem.

The Water Resources Act 1991 requires the NRA to set Minimum Acceptable Flows (MAFs) on rivers. To date this requirement has not been fulfilled either Regionally or Nationally. However, the Anglian Region NRA have set Minimum Residual Flow (MRF) targets at a number of points on rivers in the catchment. In essence these are similar to the concept of MAFs but without the legal status. MRFs are used for river management and to guide decisions

on licence applications to protect other existing uses and users of the rivers within the catchment.

- d) Catchment Areas for wetland sites of conservation value need to be defined. (Issue 20)

The wetland sites exist where the geomorphology, geology and land use allow a concentration of surface and groundwater flows and levels. The proportion of these contributing factors will vary for each site and hence this adds to the complexity of the study of wetlands. The area of groundwater contributing to the wetland site can be defined as the wetland catchment area. Therefore, the protection of wetlands will exclude areas of the catchment where future abstraction boreholes can be sited. The NRA will discourage any future abstractions that will cause unacceptable effects to a wetland site of conservation interest.

- e) Transfer of water from River Lark to Cut-Off channel. (Issue 21)

The Cut-Off channel is a man-made watercourse which, over much of its length, intersects the chalk aquifer and its associated watertable. During periods of low groundwater level the Cut-Off channel loses water and a transfer is made into the channel from the River Lark in order to maintain the water level. This maintains the environmental and amenity requirements of the channel, but the transfer could be to the disbenefit of the downstream reaches of the River Lark.

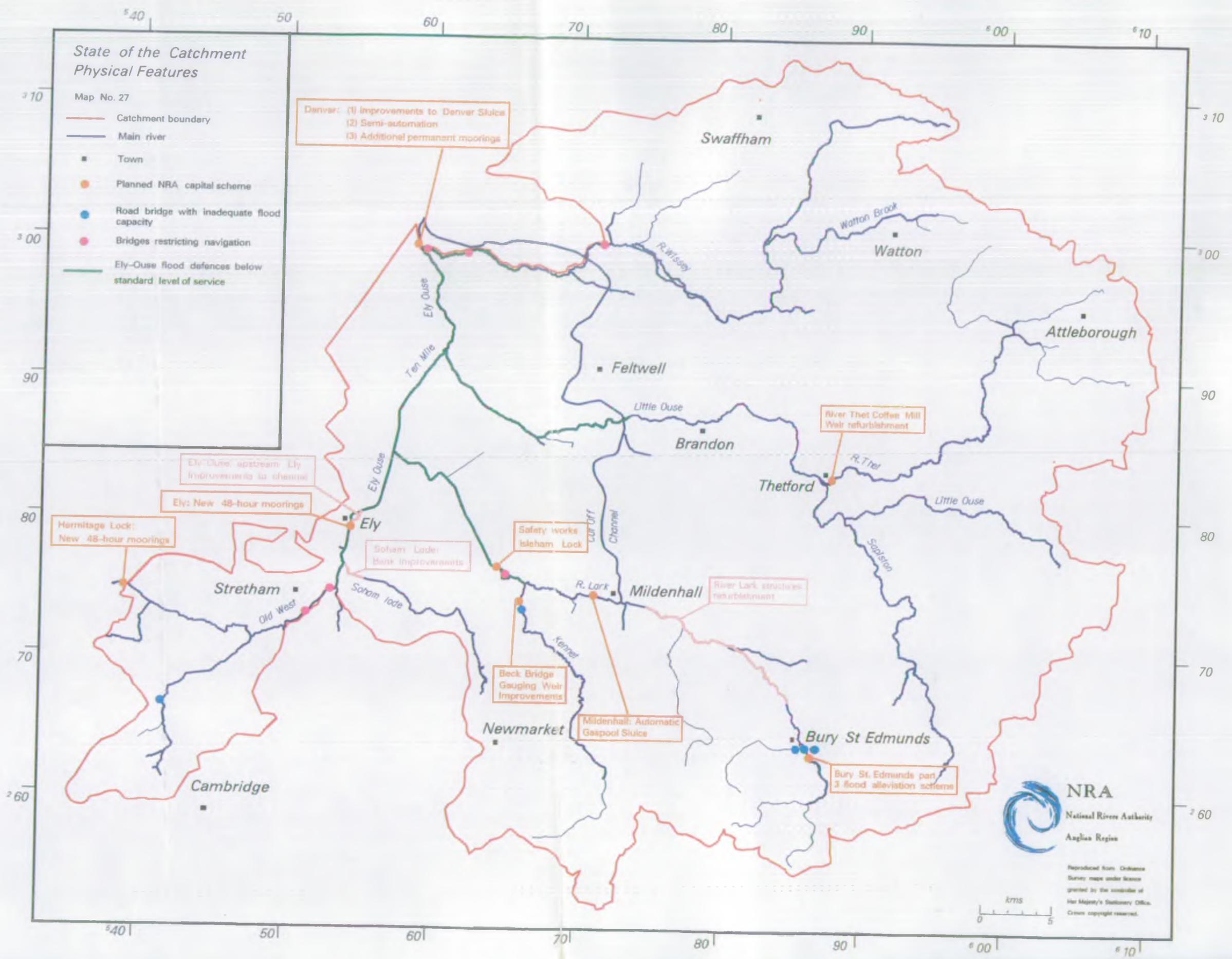
- f) Reduction of the Ely-Ouse Minimum Residual Flow at Denver. (Issue 22)

The Anglian Region is producing a Water Resource Strategy to define how future demands will be met in the Region. This is one of the key options and Consultants undertaking an environmental assessment are due to report in May 1993. The major impact of this option will be in the Tidal River Ouse and/or Estuary, with a minimal impact within the Ely Ouse Catchment.

5.2.3 In conclusion; these issues are identified for each sub-catchment in the Table below. The Wissey, Little Ouse (including the Thet and Sapiston), Lark and Soham Lode are chalk groundwater sub-catchments whereas the Ely-Ouse Pond and cut-off channel sub-catchment represents the area of non-aquifer in the Fens where surface water issues prevail.

Sub-Catchment	Reassessment of Resource Balance	"In River Needs" study	Definition of MAFs	Definition of wetland Catchment Areas	Great Ouse Resource Model Update	Viability of River Support for local river needs
	Issues 16+17	Issue 19	Issue 19	Issue 20	Issue 16+17	Issue 19
Wissey	*	Currently under way	*	*	*	If identified by "in river needs" study
Little Ouse	*	*	*	*	*	Continue development of existing scheme
Lark	Complete	*	*	*	Complete	If identified by "in river needs" study
Soham Lode	*	Complete	*	Complete	*	Works under construction
Ely/Ouse Pond and Cut-Off Channel (non aquifer)	*	N/A	*	N/A	N/A	N/A

Note : "*" indicates that work is required.



**State of the Catchment
Physical Features**

- Map No. 27
- Catchment boundary
 - Main river
 - Town
 - Planned NRA capital scheme
 - Road bridge with inadequate flood capacity
 - Bridges restricting navigation
 - Ely-Ouse flood defences below standard level of service

Danvers: (1) Improvements to Denver Sluice
(2) Semi-automation
(3) Additional permanent moorings

Ely/Ouse: upstream Ely
Improvements to channel

Ely: New 48-hour moorings

Hermitage Lock:
New 48-hour moorings

Soham Lode:
Bank improvements

Safety works
Isleham Lock

River Lark structures
rehabilitation

Beck Bridge
Gauging Weir
Improvements

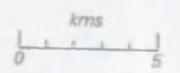
Mildenhall: Automatic
Gaspool Sluice

River Thet Coffin Mill
Weir refurbishment

Bury St. Edmunds part
3 flood alleviation scheme



Reproduced from Ordnance
Survey maps under license
granted by the controller of
Her Majesty's Stationery Office.
© Crown copyright reserved.





5.3 PHYSICAL FEATURES

5.3.1 General

The map opposite identifies current shortfalls as assessed against the future targets of the previous section.

5.3.2 Local Perspective

5.3.2.1 Conservation and Fisheries

- Strategic use of RED to identify reaches which support species rich in plant communities and also identify species rarity and species poor areas. (Issue 23)
- Where appropriate seek to enhance in-stream habitat diversity by re-creating riffle pool sequences in overwidened river channels. (Issues 24 and 25)
- Where appropriate seek to re-create wetland areas adjacent to watercourses. Collaborative projects with riparian landowners receiving either ESA or countryside stewardship payments will form an integral part of this process. (Issue 27)
- Examine the impact of routine in-river weed cutting and establish an appropriate compromise between sometimes conflicting uses. (Issue 26)
- Examine the floodbank grass cutting regime to minimise ecological impact of this work. The identification of sensitive areas will form an important component of this study. (Issue 26)
- To achieve the long term target of Class A fish biomass in specific river lengths. (Issue 40)

5.3.2.2 Recreation and Amenity

- Lack of access to recreational facilities on NRA owned land. (Issue 37)
- Develop Denver Complex. (Issue 37)

5.3.2.3 Land Use

- To encourage farmers to use the NRA's 9 metre wide statutory byelaw strip alongside "main river" for conservation purposes.

5.3.2.4 Bridges

- To remove hazards (bridges with restricted headroom) to navigation. This will be dependent on the reconstruction of the structure by outside agencies.
- To ensure that existing standards of flood protection are not diminished by a new watercourse crossing and that navigation standards are met where applicable.

5.3.2.5 Flood Defence

The map No.27 shows sites that have already been identified to have improvement works carried out. Details of these schemes will be included in the Action Plan.

- Reduced capacity of flood plains within embanked channels. (Issue 35)
- Short term storage of flood water. (Issue 34)
- New standards of service for main river to be defined. (Issue 36)
- Localised flooding of property due to inadequate or lack of drainage infrastructure. (Issue 39)

5.3.2.6 Navigation

- Improvements to lock structures for increased boat capacity on river system. (Issue 32)
- Provision of increased pump-out toilet facilities. (Issue 32)
- Increased awareness of boat safety to national standards. (Issue 33)

- Provision of litter collection on NRA owned land. (Issue 38)
- Increase length of navigable waterway. (Issues 30 and 31)

5.3.2.7 Development

- To ameliorate the impact that development pressures can have upon the water environment. (Issue 28)
- Alteration of the Local Authorities Planning application form to facilitate the assessment of planning proposals in terms of water resources. (Issue 29)

6.0 ISSUES AND OPTIONS

6.1. General

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. 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 are not shown in priority order, not costed and to any timescale. After publication of this Consultation Draft Document, the NRA will prepare an Action 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.

6.2 Issues and Options

ISSUE NO. 1. COTTENHAM LODE (Section 5.1.2A).
FAILURE TO ACHIEVE FISHERIES ECOSYSTEM CLASS 3

Options	Responsibility	Advantages	Disadvantages
Further improvements to Cottenham STW for effluent discharge to Cottenham Lode	NRA/AWS	Restore to NWC Class 2 and F2 Fishery	Potential Cost to AWS

Options	Responsibility	Advantages	Disadvantages
River Support via borehole	NRA	Prevents river drying up	Only partial solution. Increased abstraction from groundwater.
Regulation of IDB abstractions to reduce quantity abstracted	NRA/IDB	Maintains flow and level	Restriction of existing licence holders in IDB Areas.
Revocation of licences within IDB area.	NRA	As above	As above. Cost of licence revocation.
Revocation of ground water abstraction licences elsewhere in catchment	NRA	Assist in restoration of baseflow. Improvement in river ecology.	Cost of licence revocation.
Increase winter storage	NRA/Licence Holders	Better use of water resources. More reliable water supply in summer. Potential to create conservation habitat. Potential for development to commercial fishery.	Cost to licence holders.
Improve effluent quality from Soham and Newmarket STWs	NRA/AWS	Improved quality of receiving watercourse.	Potential cost to AWS

ISSUE NO. 3. RIVER LARK (Section 5.1.2C).
 FAILURE TO ACHIEVE FISHERIES ECOSYSTEM CLASS 3/2
 FROM BURY ST EDMUNDS TO MILDENHALL

Options	Responsibility	Advantages	Disadvantages
Improvements to Bury St Edmunds STW	NRA/AWS	Improved quality of discharge to receiving watercourse	Cost to AWS
Revocation of groundwater abstraction licences	NRA	Improved river flows. Benefit to ecology	Cost
River support schemes from outside the catchment	NRA	Increased river flows	Cost of transfers. Possible ecological harm from imported water.
Control polluting run-off from Bury St Edmunds	NRA/AWS	Improve quality of discharges	Very high manpower cost to investigate.

ISSUE NO. 4. RIVER KENNETT (Section 5.1.2D).
 FAILURE TO ACHIEVE FISHERIES ECOSYSTEM CLASS 2

Options	Responsibility	Advantages	Disadvantages
Review consent and improve Gazeley STW	NRA/AWS	Improve quality of receiving watercourse	Cost to AWS
River support	NRA	Prevents river drying up	Only partial solution.
Revoke groundwater abstraction licences	NRA	Improved river flows. Benefit to ecology.	Cost.

**ISSUE NO. 5. CAVENHAM STREAM (Section 5.1.2E).
FAILURE TO ACHIEVE FISHERIES ECOSYSTEM CLASS 4**

Options	Responsibility	Advantages	Disadvantages
Review discharge consent at Barrow STW	NRA	Improved quality of discharge to receiving watercourse	Cost to AWS
Revocation of surface and groundwater abstraction licences	NRA	Improved river flows	Cost to NRA
River support	NRA	Prevents river drying up.	Only partial solution.

**ISSUE NO. 6. LITTLE OUSE (Section 5.1.2F).
FAILURE TO ACHIEVE FISHERIES ECOSYSTEM CLASS 4 IN
BOTESDALE TO BLO NORTON FORD STRETCH**

Options	Responsibility	Advantages	Disadvantages
More investigative work to identify actual causes	NRA	More study will allow further action or revised classification	Investigations have already been undertaken without concrete results

**ISSUE NO. 7. RIVER SAPISTON (Section 5.1.2G).
FAILURE TO ACHIEVE FISHERIES ECOSYSTEM CLASS 4**

Options	Responsibility	Advantages	Disadvantages
Improve Elmswell STW	AWS	Improved quality of discharge to receiving watercourse.	Cost to AWS
Improve Farm Kitchen Foods effluent quality	Farm Kitchen Foods	Improved quality of discharge to receiving watercourse.	Cost to AWS.

ISSUE NO. 8. STOWLANGTOFT STREAM (Section 5.1.2H).
FAILURE TO ACHIEVE FISHERIES ECOSYSTEM CLASS 3

Options	Responsibility	Advantages	Disadvantages
Undertake exhaustive investigations and pollution prevention visits	NRA	Improved river quality.	Cost to NRA

ISSUE NO. 9. RIVER THET (Section 5.1.2I).
FAILURE TO ACHIEVE FISHERIES ECOSYSTEM CLASS 3

Options	Responsibility	Advantages	Disadvantages
Continue enforcement action if appropriate	NRA	Improved river quality.	Cost to NRA

ISSUE NO. 10. RIVER WISSEY (Section 5.1.2J).
FAILURE TO ACHIEVE FISHERIES ECOSYSTEM CLASS 3

Options	Responsibility	Advantages	Disadvantages
Improve British Sugar Factory effluent	British Sugar	Improved quality of discharge to receiving watercourse.	Cost to British Sugar.
Improve Swaffham STW	AWS	Improved quality of discharge to receiving watercourse.	Cost to AWS

ISSUE NO. 11. WATTON BROOK (Section 5.1.2K).
FAILURE TO ACHIEVE FISHERIES ECOSYSTEM CLASS 3

Options	Responsibility	Advantages	Disadvantages
Improve Watton STW (Watton Ex-RAF to close)	AWS	Improved quality of discharge to receiving watercourse.	Cost to AWS.
Control polluting run-off	NRA	Improve quality of discharges.	Cost to NRA.

ISSUE NO. 12. UNSEWERED VILLAGES WHERE SEPTIC TANKS DISCHARGE TO WATERCOURSES EG KENNINGHALL AND CARBROOKE (Section 5.1.2L).

Options	Responsibility	Advantages	Disadvantages
Installation of first time rural sewage scheme	AWS/Councils /Householders	Cessation of pollution	Cost to householders and district councils
Renew soakaway systems	Householders	As above	Cost to householders. May be ineffective due to local ground conditions.

ISSUE NO. 13. QUALITY PROBLEMS IN GROUNDWATER (Section 5.1.2M).
13i) GROUNDWATER CONTAMINATION BY NITRATES

Options	Responsibility	Advantages	Disadvantages
For public water supply, blend or treat before supply	Water Companies	Compliance of drinking water with EC Directive	Cost to Water Companies
For private supply, connect to mains	Householder/ Environmental Health (to enforce)	Compliance with regulations issued by DoE for quality of private supplies	Cost to Householder
Reduce agricultural application of nitrates	Farmers/ MAFF	Improve quality of groundwater both for supply and conservation/ ecology	Requires change in agricultural practice. Cost to farmers.

ISSUE NO. 13ii) GROUNDWATER CONTAMINATION BY SOLVENTS

Options	Responsibility	Advantages	Disadvantages
Stop disposal into/onto land	Site owners/MAFF /Health and Safety Executive/ NRA	Reduce risk of groundwater pollution	Cost to industry
Undertake investigative studies and take appropriate action and enforce legislation	NRA	Improved groundwater quality. Reduced spread of pollution.	Cost to site owner
Increased pollution prevention activity to forstall future problems	NRA	Reduced incidence of contamination	Additional resources and expertise required by NRA.

ISSUE NO. 13iii) GROUNDWATER CONTAMINATION BY PESTICIDES

Options	Responsibility	Advantages	Disadvantages
Improved method of disposal	Site owners/MAFF /Health and Safety Executive/ NRA	Reduced risk of groundwater pollution	Cost to Industry/ agriculture
Further investigations are required at sites as they are identified, remedial action taken and legislation enforced.	NRA	Reduce impact of pollution	Cost to site owners. Requires change in agricultural practice.
Encourage changes in pesticide type and methods of use	NRA/MAFF	Reduce impact of pollution	Cost to site owner. Requires change in agricultural practice and chemicals used.

ISSUE NO. 13iv) GROUNDWATER CONTAMINATION FROM WASTE DISPOSAL SITES AT INGHAM AND BARTON MILLS

Options	Responsibility	Advantages	Disadvantages
Investigations into improved containment and effluent control	Site operator	Reduce likelihood of groundwater contamination	Cost

ISSUE NO. 13v) IMPACT OF WASTE DISPOSAL SITES GENERALLY ON WATER QUALITY

Options	Responsibility	Advantages	Disadvantages
Improve monitoring activities	Council/Site Operators/ NRA	Improve management and identification of leachate effect on water quality	Cost to NRA and others in manpower resources

ISSUE NO. 14. LITTLE OUSE AND LARK - OIL DISCHARGES FROM SURFACE WATER SEWERS (Section 5.1.28).n.

Options	Responsibility	Advantages	Disadvantages
AWS to investigate and consider viability of oil interceptors	AWS	Reduce the number of incidents	Cost to AWS

ISSUE NO. 15 HIGH NITRATE CONCENTRATIONS IN RIVER WISEY

Options	Responsibility	Advantages	Disadvantages
Reduce agricultural application of nitrates within locality of River Wissey and tributaries	NRA/MAFF	Reduction in nitrate concentration. Environmental benefits. Water quality at existing PWS intake improved.	Requires change in agricultural practice. Reduction in crop yields. May require change in legislation. Long term solution only.

ISSUE NO. 16 INSUFFICIENT GROUNDWATER TO MEET FUTURE DEMANDS (SECTION 5.2.2A)

Options	Responsibility	Advantages	Disadvantages
Import water from other catchments	NRA/Licence holder/AWS	Reduces pressure on catchment resources. Possible environmental benefits.	Dependent on availability of outside resources. Cost of transfer. Possible detrimental effect on chalk river ecosystem.
Effective demand management by existing licence holders	NRA/Licence holder	Better use of existing resource. Allows future growth as predicted. Long term cost savings to abstractor. Potential for more reliable supply.	Cost to abstractor.
Licence revocation	NRA	Reduces pressure on catchment resources. Environmental benefits.	Cost to NRA in compensating licence holder. Politically sensitive.
Non-renewal of time limited licences	NRA	Reduces pressure on catchment resources. Environmental benefits.	Financial loss to licence holder.

Options	Responsibility	Advantages	Disadvantages
Provision of winter storage from surface water sources	Licence holder	Reduce pressure on catchment resources. More reliable water supply in summer. Potential to create conservation habitat. Potential for development to commercial fishery.	Cost to licence holders. Loss of agricultural land.
Recharge aquifer with surface water during wet periods	NRA/Licence holder	More efficient management of existing resources.	Cost. Risk of environmental damage.
Develop plan/models to improve understanding of groundwater mechanisms	NRA	Improve aquifer management.	Cost and timescale.

Options	Responsibility	Advantages	Disadvantages
Provision of winter storage	Licence holder	Reduce pressure on catchment source. More reliable water supply in summer. Potential to create conservation habitat. Potential for development to commercial fishery.	Cost to licence holder.
Import water from other catchments	NRA/Licence holder/AWS	Reduces pressure on catchment source. Possible environmental benefits.	Dependent on availability of outside resources. Cost of transfer. Detrimental effect on chalk river ecosystem.
Effective demand management ie restrict future growth	Licence holder	Better use of existing resource. Allows future growth as predicted. Long term cost savings to abstractor. Potential for more reliable supply.	Short term cost to abstractor.
Review licence controls and ensure minimum control levels are set	NRA	Balance demand on summer resource.	Possible cost of compensation.

Options	Responsibility	Advantages	Disadvantages
Control unlicensed surface water abstraction	NRA	Better management of existing resource. Benefit to river ecology. Better knowledge of actual demand.	Legal uncertainty of powers. Cost of implementation and monitoring. Politically sensitive.

ISSUE NO. 18 SLACKER DEMAND - NOT CONTROLLED BY WATER RESOURCES ACT 1991 (Section 5.2.2B).

Options	Responsibility	Advantages	Disadvantages
Voluntary agreement with IDBs over quantities abstracted	NRA/IDBs	Better management of existing resource. Benefit to river ecology. Avoids legal disputes.	Possible reduced quantity to existing licence holders. Cost of compensation. Politically sensitive.
Install and read meters	NRA	Better knowledge of actual demand. More effective control during summer period.	Cost and manpower implication. Legal uncertainty. Politically sensitive.
Change of legislation to clarify water resource and land drainage operational activities	NRA/MAFF/DoE	More effective control. Removes legal uncertainty.	Administrative costs.
Provide increased winter/flood water storage in IDB areas	IDBs/Licence holders	Reduce demand on summer resource. Environmental benefits. More reliable supply.	Cost of construction. Politically sensitive.

Options	Responsibility	Advantages	Disadvantages
Retention of higher levels in summer in IDB system	IDBs/MAFF	Better management of existing resource. Reduced cost of pumping to IDBs. Possible interference with farming activity.	Reduced storage capacity in IDB drains for summer floods.

ISSUE NO. 19 " IN RIVER NEEDS" ARE NOT QUANTIFIED AND MAFs NEED TO BE DEFINED (Section 5.2.2C).

Options	Responsibility	Advantages	Disadvantages
Carry out extensive ecological studies throughout the catchment.	NRA	Protects in-river ecology. Improved resource management. Verification of water resource availability. Satisfies legal requirements.	Cost and timescale. Possible restriction on existing abstractors.

ISSUE NO. 20 CATCHMENT AREAS FOR WETLAND SITES OF CONSERVATION VALUE NEED TO BE DEFINED (Section 5.2.2D).

Options	Responsibility	Advantages	Disadvantages
Carry out hydrological and hydrogeological studies	NRA	Provide effective protection of existing wetland sites. Improves water resource management.	Cost. Technical complexity of study.

TRANSFER OF WATER FROM RIVER LARK TO CUT-OFF CHANNEL FOR AMENITY AND ENVIRONMENTAL PURPOSES (Section 5.2.2E).

Options	Responsibility	Advantages	Disadvantages
Carry out environmental and hydraulic study of river needs	NRA	More effective resources management for environmental needs. Retention of existing water levels. Maintains existing amenity levels.	Cost of study. Depletion of River Lark in dry periods.
Sealing bed and banks of Cut-Off Channel for water retention	NRA	Retention of minimum water for environmental/amenity needs.	Cost. Loss of existing habitat. Reduction of groundwater percolation. Possible effect on river corridor.

REDUCTION OF ELY-OUSE MRF AT DENVER (Section 5.2.2F).

Options	Responsibility	Advantages	Disadvantages
Carry out environmental assesment of impact of reduction (Ongoing)	NRA	Increase raw water transfer to Essex.	Possible adverse environmental impact. Increase siltation to downstream tidal river affecting navigation.

Options	Responsibility	Advantages	Disadvantages
Analyse Rivers Environmental Database (RED) into a standardised classification.	NRA	Aids strategic planning within the catchment. Enhancement of river corridor habitat.	
Ongoing update of RED.	NRA	Continuous monitoring. Up to date information.	Cost.

Options	Responsibility	Advantages	Disadvantages
Recreate riffle/pool sequences	NRA(Main river) / IDB + Riparian Owners(non-main river) / District Council (award drain)/ County Council	Increased ecological diversity. Possible water quality improvement.	Cost. Possible flood defence implications.
Create two stage channels	As above	Improvements to instream and river margin habitat diversity. Improves self cleansing of river. Improved appearance.	Cost. Possible loss of land OR possible loss of flood capacity. Possible cost implications on changed maintenance requirements.
Construct current deflectors, groynes etc.	As above	As above	Cost (although cheaper than above). Small loss of flood capacity.

Options	Responsibility	Advantages	Disadvantages
Reduced routine channel maintenance	NRA(Main river) / IDB + Riparian Owners(non-main river) / District Council (award drain)/ County Council	Improvements to instream and river margin habitat diversity. Improves self cleansing of river. Improved appearance. Cost savings.	Short term land losses. Improvements may only be seen very long term.

ISSUE NO. 25 DEGRADED INSTREAM HABITAT - NAVIGABLE RIVERS (Section 5.3.2.1).

Options	Responsibility	Advantages	Disadvantages
Review weed cutting regime to retain wider margin	NRA	Reduces bank erosion. Creates habitat diversity. Possible cost savings.	Possible conflict with anglers and navigators.
Create "wet berms" when dredging	NRA	Reduces bank erosion. Creates habitat diversity.	Cost. Land Take (not high value)
Create off river refuge areas.	NRA	Increase habitat diversity.	Cost. Land Take (more than "wet berm" option, still not high value).
Soft option engineering to embanked watercourses. (already ongoing assessment)	NRA	Protect river margin habitat. Still provides adequate flood defence. Prevents erosion of berm by river traffic. Possible cost saving.	Possible conflict with anglers and navigators.

Options	Responsibility	Advantages	Disadvantages
Review grass cutting regimes - late cutting in sensitive non-grazed areas.	NRA	Increased conservation value of flood bank grassland.	Possible logistical complications.
Encourage tree planting in agreed areas.	NRA/ Riparian Owners/ County Councils	Increased habitat diversity. Landscape improvement.	Care required not to compromise flood defence needs. Cost.

Options	Responsibility	Advantages	Disadvantages
Construct riffle-weirs to increase water table locally. Landowner agreement to change agricultural practice, with compensation under ESA, Countryside Stewardship or Set Aside.	NRA/ Landowner/ MAFF/ Countryside Commission	Conservation enhancement to riverside meadows. Retains river levels. Possible recharge to groundwater.	Cost of construction.
Increase height of weirs/ sluices or amend operational controls on non-navigable main rivers.	NRA	As above. Increased flexibility from flood defence point of view.	Cost to increase height. No additional benefit to in - river habitat. Possible reduction in water quality upstream of structure.

ISSUE NO. 28 DEVELOPMENT IMPACTS ON THE WATER ENVIRONMENT
(Section 5.3.2.7).

Options	Responsibility	Advantages	Disadvantages
Whilst continuing with its statutory consultee role with the Planning Authorities, endeavour to persuade them to adopt the NRA Anglian Region Model Policies (see Appendix 1) as policies in their local development plans	NRA/Local Authorities	Ensure NRA interests are fully taken into account in all developments.	Implications on Local Authority Control. Cost implications to landowners/ developers.

ISSUE NO. 29 ASSESSMENT OF WATER SUPPLY/ SOURCE AT PLANNING APPLICATION STAGE (Section 5.3.2.7).

Options	Responsibility	Advantages	Disadvantages
To amend the form to include water supply source ie. mains/borehole	Local authorities	Enable the NRA to better assess planning proposals in terms of water resources and to advise accordingly.	Initial cost of change of administration to Councils.

ISSUE NO. 30 TO EXTEND THE LITTLE OUSE NAVIGATION TO BRANDON TOWN CENTRE (Section 5.3.2.6).

Options	Responsibility	Advantages	Disadvantages
Promote study to look at options	NRA/Local Authority/ IWA etc	Improve interest to head of navigation. Provide increase in tourist trade to Brandon. Possible increase of income. Increase in boat traffic may reduce weed growth.	Cost of alteration to Brandon Staunch to facilitate navigation upstream. Possible conflict with other river users. Possible risk of pollution due to increased boat traffic.
Alterations to Brandon Staunch to form lock for boats, plus moorings near Brandon Town Centre.	As above	As above	As above

ISSUE NO. 31 TO EXTEND RIVER LARK NAVIGATION TO MILDENHALL (Section 5.3.2.6).

Options	Responsibility	Advantages	Disadvantages
Promote study to look at options	NRA/ Local Authorities/ IWA etc.	Improve interest to head of navigation. Provide increase in tourism. Possible increase of income. Increased boat traffic may reduce weed growth.	Cost. Difficulty with maintaining navigation water levels. Impact on existing environment. Possible conflict with river users. Possible risk of pollution due to increased boat traffic.

Options	Responsibility	Advantages	Disadvantages
Improve lock capacity for boat traffic	NRA	Reduced traffic delays to customers. Improved level of service. Possible increase of income.	Cost of construction. Increased boat movement.
Provide increased number of toilet pump out facilities	NRA/ Marinas	Reduced risk of pollution. Overall water quality improvement. Increased amenity value of watercourse.	Cost of capital contribution from NRA to Marinas. Cost to boat owner.
Provide increased number of short stay moorings	NRA	Generate income. Improved level of service. Tourism benefits.	Cost of construction.
Provide increased number of public launch sites.	NRA/ Owners	Improved river access. Improved level of service. Tourism benefits from increased river usage.	Cost. Greater enforcement need. Increased boat traffic. Risk of abuse by river users.

Options	Responsibility	Advantages	Disadvantages
Improve boat safety standards	NRA/ BWB/ IWA/ Manufacturers	General safety of boaters. Reduced incidence of physical accidents.	Cost to manufacturers. Greater enforcement need.

ISSUE NO. 34 HOLD WATER ON FLOOD PLAINS (Section 5.3.2.5).

Options	Responsibility	Advantages	Disadvantages
Increase height of weirs/ sluices to retain more water on flood plain during flood event	NRA/ Landowners/ MAFF	Environmental improvement(see Issue 25). Possible improved aquifer recharge. Increased flood protection to downstream urban areas.	Closer monitoring of flow/levels required. Initial cost of raising weirs.

ISSUE NO. 35 REDUCED CAPACITY OF FLOOD PLAINS WITHIN EMBANKED CHANNELS (Section 5.3.2.5).

Options	Responsibility	Advantages	Disadvantages
Restore grazing	Landowner	Environmental benefits. Maintain flood plain capacity.	Stock not available in sufficient numbers because uneconomic. Cost.
Mowing	Landowner	Maintain flood plain capacity. Maintains grassland habitat (less effective).	Cost. Lower environmental benefits.
Increased channel capacity to offset loss of flood plain	NRA	Increase in river storage. Navigation benefits.	Excessive cost. Environmental damage.
Designate as Washlands	NRA	Regulation and enforcement for maintenance. Maintains flood plain capacity. Possible environmental benefits.	

Options	Responsibility	Advantages	Disadvantages
To assess the area at risk from flooding, the effective standard of service and the target standard of service.	NRA	Identifies planning gaps and enables capital and maintenance works to be prioritised. Utilizes resources to best effect.	Does not cover "non " main river.

Options	Responsibility	Advantages	Disadvantages
Develop Denver complex to accommodate marina, camping and caravan site and visitors centre.	NRA/ Developer	Generates income to NRA. Meets NRA objectives. Improved public awareness. Tourism benefits.	Loss of high grade agricultural land. Capital cost of outlay. Minimal loss of flood storage.
Improve public access to NRA owned land by statutory footpaths and bridleways.	NRA/ County Council	Promotes public image of NRA. Increased access to countryside.	Possible conflict with flood defence, anglers and agricultural tenants. Possible increase in litter collection.

ISSUE NO. 38 LITTER COLLECTION ON NRA OWNED LAND (Section 5.3.2.6).

Options	Responsibility	Advantages	Disadvantages
Introduce and implement standard of service to meet legal requirements. Imposing conditions to leasees.	NRA	Environmental enhancement to countryside. Reduces risk of pollution and damage to wildlife.	Cost.

ISSUE NO. 39 THE LOCALISED FLOODING OF PROPERTY DUE TO INADEQUATE OR LACK OF DRAINAGE INFRASTRUCTURE (Section 5.3.2.5).

Options	Responsibility	Advantages	Disadvantages
Improve existing or install new infrastructure.	County Councils/ District Councils/ AWS/ Riparian owners	Prevents flooding. Allows future development.	Cost. Need unified effort. Lack of legislation.
Ensure new development does not exacerbate existing flooding problems.	NRA/ District Council/ County Council/ AWS/ Developers	Prevents flooding	Cost.

Options	Responsibility	Advantages	Disadvantages
<p>Habitat enhancement to maximise the natural in river production of fish in the following stretches:</p> <p>River Wissey - downstream of Northwold, River Lt Ouse - downstream of Knettishall, River Thet - downstream of East Harling, River Sapiston - downstream of Ixworth.</p> <p>Using methods outlined in Issues 23 and 24.</p>	NRA	<p>Reduce dependency of restocking.</p> <p>Benefits conservation ecology of river.</p> <p>Self sustaining population levels.</p>	<p>Cost to NRA.</p> <p>Long term initiatives.</p>
<p>Water Quality improvements to Old West River</p>	NRA/ AWS	<p>Meets F2 Fishery Objective</p>	<p>Potential cost to AWS.</p>

PROTECTING AND IMPROVING THE WATER ENVIRONMENT

MODEL POLICIES



NRA

*National Rivers Authority
Anglian Region*

MODEL POLICIES FOR THE PROTECTION AND IMPROVEMENT OF THE WATER ENVIRONMENT

INTRODUCTION

The NRA, Anglian Region welcomes consultation with planning authorities during the development of Structure and Local Plans.

At this strategic level, liaison is a two way process with the NRA having input into structure and other plans and seeking input by the planning authorities into NRA's plans. The NRA will make recommendations to the local planning authorities for the inclusion of policy statements in their plans to protect the public interest and NRA assets in the longer term.

At local plan level, development of particular sites begins to be identified. This stage is possibly the most vital part of the planning process. The NRA will offer critical advice as to which areas suggested for development are subject to constraints such as flood plains, flooding problems, aquifers and sensitive catchments. The technical constraints will be clearly spelt out for each individual development whenever possible.

These model policies and explanatory notes are intended to assist Chief Planning Officers and their staff by explaining the reasons why it is necessary to include policy statements to protect and improve the water environment. NRA planning liaison staff will make further recommendations where appropriate during the consultation stage.

The policies are grouped under the following headings:

- 1 Flood protection
- 2 Conservation and enhancement of the water environment, including recreation, navigation and fisheries
- 3 Water quality and water resources



To ensure new development is not at risk from flooding and does not put other areas at risk of flooding which could endanger life and damage property.

To ensure any work which is needed to reduce the risk of flooding created by a new development is paid for by the developer and not the public.

SUMMARY POLICY STATEMENT

Flood Protection

Policy 1/1 There will be a presumption against development (including the raising of land) where, in the opinion of the Local Planning Authority after consultation with the NRA, such development would be likely to impede materially the flow of flood water, or increase the risk of flooding elsewhere, or increase the number of people or properties at risk.

KEY ISSUES AND POLICIES

Protection of the Flood Plain and Washlands

The floodplain is generally the area of low lying land adjacent to a watercourse which, by its very nature, is liable to flood under certain conditions. The floodplains are defined on maps held by the NRA. In addition some washlands, areas designed and maintained to provide storage of flood water, are defined in the NRA Anglian Region's Land Drainage and Sea Defence Byelaws. For a variety of reasons, some development has taken place on the floodplains of the region's rivers. Consequently people and property in these areas are at risk from flooding. These developments also reduce the capacity of the available floodplain and impede the flow of water, thereby increasing the risk of flooding elsewhere.

The Land Drainage and Sea Defence Byelaws specify a number of activities in the floodplain that require the prior consent of the NRA and inter alia give the NRA powers to protect an undeveloped strip of land along each main river bank.



Policy 1/2 In areas at risk from flooding (as defined by the NRA) there will be a general presumption against new development or the intensification of existing development. These areas will include defined washlands, natural floodplains and other areas adjacent to rivers to which access is required for maintenance purposes.

Policy 1/3 Appropriate flood protection will be required where the redevelopment of existing developed areas is permitted in areas presently having an unacceptable risk of flooding. The flood protection requirements for such redevelopments will be defined by the local planning authority in consultation with the NRA and funded by the developer.

Surface Water Run-Off

Unless carefully sited and designed, new development or the redevelopment of existing urban areas can exacerbate the problems of flooding in areas downstream through an increase in run-off from additional impermeable surfaces, such as roofs and paved surfaces. It is quite often the case that the effects of development in the upper parts of a river catchment are not apparent in the area within which such development occurs but have a significant effect in areas downstream.

Policy 1/4 Planning permission will not normally be granted for new development or redevelopment of existing urban areas if such development would result in an increased flood risk in areas downstream due to additional surface water run-off.

Policy 1/5 Where development is permitted which is likely to increase the risk of flooding, it must include appropriate attenuation or mitigating measures defined by the local planning authority in consultation with the NRA and funded by the developer. Works could be required at substantial distances from the development and the impact on conservation and recreation aspects will be considered.

Coastal and Estuarial Defences and Embanked Watercourses

A breach in the defences along an embanked watercourse, or coastal or estuarial defence can lead to significant flooding in areas of low lying land often well away from the location of the breach. In order to protect people and property from the effects of inundation, it is essential that the integrity of the defences and embankments is maintained. This should be determined in consultation with appropriate bodies, including the NRA. It is impracticable to prevent all flooding in extreme climatic

conditions. The NRA's aim is to protect people, property and land to standards which are practical and appropriate. A 'residual flooding hazard' is left after completion of any flood alleviation scheme.

The NRA Anglian Region Land Drainage and Sea Defence Byelaws specify a number of activities on sea defences that require the prior consent of the NRA and inter alia give the NRA powers to protect the sea defences from interference or damage.

Policy 1/6 Planning permission will not be granted for development which would adversely affect the integrity of tidal or fluvial defences.



Policy 1/7 In order to minimise the effects of tidal flooding, there will be a presumption against development on land to the seaward side of sea defences, including the siting of temporary holiday chalets and caravans. On land between a first line sea defence and the main defence, the siting of holiday chalets, caravans and camping sites may be permitted following consultation with the NRA. Time-limited occupancy conditions will be imposed and enforced preventing occupation during the period from November - March inclusive when the risk of tidal inundation is greatest.

Policy 1/8 On the landward side of sea defences and behind embanked watercourses, there will be a presumption against development in areas liable to flood unless the standard of defence is appropriate to the development proposed.

Policy 1/9 Where development is permitted in areas having substandard protection, appropriate increased protection must be provided in advance of the development as defined by the local planning authority in consultation with the NRA and funded by the developer.

Funding of Works

Lack of money means the NRA can only undertake flood defence schemes which are of the highest priority, those designed to protect life and property. Others, such as projects which would enable new development to take place, have the lowest priority and will not be carried out unless the developer pays for them. The NRA strongly recommends that if any work is needed to reduce the risk of flooding, the developer enters into a formal agreement with it or the local planning authority to provide the necessary flood protection work.

Policy 1/10 Developers will meet the cost of the physical infrastructure and facilities within the sites and the off site costs occurring as a direct result of the development. Developers and landowners will normally be expected to enter into a legally binding agreement with the NRA or local planning authority to provide the necessary flood protection work.

Aim:

To protect the water environment from any detriment due to development.

To enhance the water environment in conjunction with development.

SUMMARY POLICY STATEMENT

Conservation of the Water Environment

Policy 2/1 The conservation and enhancement of wildlife, landscape and archaeological features associated with rivers, ponds, lakes, estuaries etc will be encouraged.

KEY ISSUES AND POLICIES

Water Environment

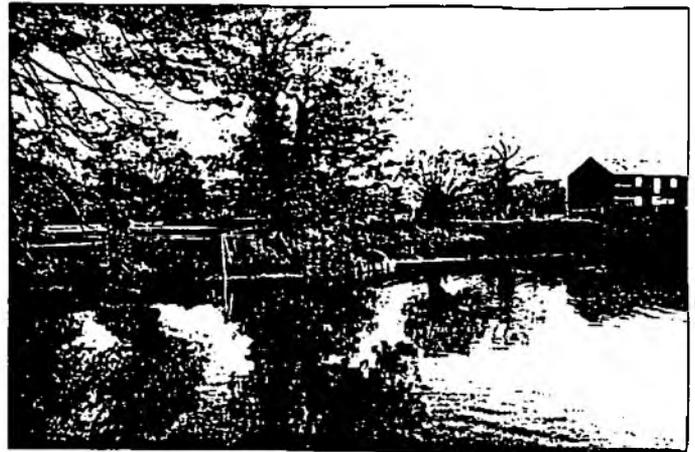
The NRA has a statutory responsibility under Section 16 of the Water Resources Act 1991 to manage the water environment so as to:

- further the conservation and enhancement of the natural environment;
- promote facilities for sport and other forms of recreation, including public access;
- further the conservation of buildings, sites and objects of archaeological, architectural or historic interest.

The NRA also has a duty under the Water Resources Act 1991 to maintain, improve and develop fisheries.

Policy 2/2 The Planning Authority, in consultation with the NRA, will seek to promote river corridors as important areas of open land by:

- conserving existing areas of value within river corridors and, wherever possible, seeking to restore and enhance the natural elements of the river environment;
 - supporting initiatives which will result in improvements to water quality;
 - where appropriate promoting public access in river corridors;
- and
- identifying appropriate locations for water related recreation along river corridors.



Policy 2/3 There will be a general presumption against any development which will have an adverse environmental impact on the water environment, particularly in relation to rivers, ponds, wetlands, public access in river corridors, and appropriate water-related recreation.

Environmental Assessment

All types of works in, under, over and adjacent to watercourses and sea defences need to be properly evaluated since uncontrolled works may lead to effects such as an increased risk of flooding, erosion of the watercourse or defence, increased danger to the public, restricted access for maintenance purposes, and damage to the water environment. The particular sensitivity of watercourses to drainage works is recognised by Statutory Instrument No. 1217 'The Land Drainage Improvement Works (Assessment of Environmental Effects) Regulations 1988'. This SI states that the drainage authority - NRA on main river and the District Council on non-main river - should not carry out any improvement works unless they have first completed the procedure prescribed by these regulations.

Policy 2/4 The planning authority, in consultation with the NRA, will seek to ensure that all works in, under, over and adjacent to watercourses and sea defences are appropriately designed and implemented. There will be a general presumption against the culverting of watercourses except those to enable reasonable access over a watercourse. When acting as the drainage authority, the planning authority, in consultation with the NRA, will consider the likely impacts of drainage proposals in accordance with the provisions of Statutory Instrument No. 1217 'The Land Drainage Improvement Works (Assessment of Environmental Effects) Regulations 1988'. Where works are proposed by an interested party which is not the drainage authority, the planning authority consultation with the interested party, will consider the likely impacts of drainage proposals in accordance with the same regulations.

To protect inland, coastal and groundwaters from pollution and derogation arising from development.

SUMMARY POLICY STATEMENT

Water Resources/Water Quality

Policy 3/1 There will be a presumption against development, including changes in land-use which in the opinion of the local planning authority after consultation with the NRA pose an unacceptable risk to the quality of ground or surface water.

KEY ISSUES AND POLICIES

Sewerage and Sewage Treatment Infrastructure

With increasing population and water use in the region, many sewerage systems and sewage treatment works are becoming overloaded. Where development continues despite overloading, pollution of watercourses will occur if additional infrastructure is not provided.

Policy 3/2 New development will only be permitted in locations where mains foul sewers, sewage treatment and surface water drainage of adequate capacity and design are available or can be provided in time to serve the development. Infill development where septic tanks are proposed will only be permitted where ground conditions are satisfactory and the plot is of adequate size to provide an adequate subsoil drainage system.

Surface Water Protection

The NRA has a duty to protect the quality and hence uses of inland and coastal waters. Currently recognised river uses are abstraction for potable supply, industrial water supply, fisheries, livestock watering, spray irrigation, and amenity and conservation. Statutory water quality objectives (use-related standards) are being introduced and the NRA will have a duty to ensure these are met. Discharge consents will not be granted where a proposed discharge is likely to cause a breach of the relevant standards.

Aquifer Protection

The groundwater reserves of the Anglian Region are an invaluable source for public water supply, industry and agriculture as well as sustaining base flows in the rivers. The clean up of contaminated groundwater is difficult, expensive and sometimes impossible. It is therefore better to prevent or reduce the risk of groundwater contamination, rather than deal with its consequences.

The NRA has published an aquifer protection policy which contains a statement of the policy adopted to minimise the risks of contamination of underground water resources from the effects of development or land use policy.

Policy 3/3 Development will not be permitted within areas around potable groundwater sources or over vulnerable areas of aquifers which, in the opinion of the local planning authority after consultation with the NRA, pose an unacceptable risk to the quality of the underlying groundwater.

Availability of Water Resources

The development of water resources for water supply is becoming increasingly difficult in the Anglian Region. The NRA has a duty to ensure that provision of water for new development does not have a detrimental impact on existing users, nature conservation or recreation. Abstraction licences will not be granted in areas where water resources are fully developed and further abstraction would affect existing users or damage the environment. Consequently there is a growing need to transport water over long distances.

Policy 3/4 The provision of water resources will be coordinated with development plans to prevent a detrimental impact on existing users, nature conservation and recreation.

Mineral Abstraction and Waste Disposal

Mineral abstraction and waste disposal activities can affect the water resources and the environment if appropriate measures are not taken. The NRA may specify measures which will help to preserve the water resources in the area, including ensuring protection to adjacent licensed sources, and preserve sites of conservation interest.

Policy 3/5 New mineral workings or waste disposal sites will not be permitted where, after consultation with the NRA, it is considered there would be adverse effects on water resources or rivers and other waters.

Large Coniferous Forests

Large coniferous forests situated on aquifer outcrops significantly reduce the amount of aquifer recharge. The result is a reduction in the available groundwater resource. The NRA discourages the planting of new large forests in such locations in order to protect and ensure maximum groundwater recharge.

Policy 3/6 The planting of new large coniferous forests on aquifer outcrops will be discouraged.

APPENDIX 2 - CESSATION LEVELS/FLOWS

1. Denver combined low flow cessation level: (When notified by the NRA).
Combined flow March to August equal to or less than 113.652 tcmd.
September and October equal to or less than 318.226 tcmd.
2. Whitebridge Gauging Station.
Less than or equal to 2.622m AOD.
3. Northwold Gauging Station.
Summer : Less than or equal to 543 l/s
Less than or equal to 0.16m above crest
Winter : Less than or equal to 760 l/s
Less than or equal to 0.202m above crest
4. Redbridge Gauging Station.
Less than or equal to 110 l/s
Less than or equal to 20.12m AOD
5. Bridgeham Gauging Station
Less than or equal to 350 l/s
6. Euston County Bridge Gauging Station
Less than or equal to 84.6 l/s
Less than or equal to 13.471m AOD
7. Rectory Bridge Gauging Station
Less than or equal to 84 l/s
Less than or equal to 15.64/m AOD
8. Blackdyke Intake
Less than or equal to 99.60m SLD
9. Middle Weir
Less than or equal to 105.73, SLD
10. Tollgate Weir
Less than or equal to 40 l/s
Less than or equal to 110mm above crest

11. Beck Bridge Gauging Station

Less than or equal to 50 l/s
Less than or equal to 10.034m above crest

12. Fordham Gauging Station

Less than or equal to 145mm above crest

13. Hermitage Lock

Less than or equal to 101.58m SLD

14. IDB Control Levels for Abstraction from IDB Drains

(Catchments 36, 46, 47, 50)

APPENDIX 3: ANGLIAN REGION INTERIM LEVELS OF SERVICE

Land Classification Band	Minimum target standard of flood protection expressed as flood return period (years)	
	Fluvial	Tidal and Sea Defences
A	100	200
B	50	100
C	20	50
D	10	20
E	--	--

Band A

Areas of dense conurbations where widespread flooding would cause serious infrastructure failure and endanger life. Major trunk roads and/or motorways and railways may be included in this band.

Band B

Predominantly urban areas, including housing, industry and commerce. The flood plain will include 'A' and 'B' class roads. Little agricultural land is likely to be present.

Band C

High grade agricultural land suitable for cereal and cash crops. Residential and industrial property, as well as roads, amenity and/or navigation interests may also be prominent.

Band D

Typical land use incorporating average gross - margin crops, and permanent pasture. Little residential or industrial property will be present. Conservation and water ecology interests may significantly influence the standard of service to be applied.

Band E

This covers areas which are generally of low grade land use. Residential or industrial property is unlikely to be present. Agricultural use is likely to be limited to horse paddocks, forestry and scrubby grazing land. Land within this category may have a high conservation value requiring a lower standard of service than would be expected otherwise. Flood storage washlands or land which is deliberately allowed to flood may fall into this band.

APPENDIX 4: NAVIGATION INFORMATION

A) The following headroom at bridges and depth of water at navigation level apply:-

SOUTH LEVEL

Ten Mile River: Denver to Littleport Bridge

NOTE: Levels of lock cills and navigation levels are referred to a datum of 100m below Ordnance Datum Newlyn.

	<u>Depth at Navigation Level</u>
0.0 km - 2.4 km	5.8 m
2.4 km - 8.6 km (Southery Ferry)	5.5 m
8.6 km - 9.6 km	5.35 m
9.6 km - 12.8 km	5.2 m
12.8 km - 15.6 km (Littleport Bridge)	5.0 m

Denver Lock:

Normal navigation level: 101.43 m

Cill Level	U/S 99.39 m	Draught: 2.04 m
	D/S 98.78 m	

Length	29.5 m	Width: 5.4 m
--------	--------	--------------

Headroom:	U/S Footbridge - 4.75 m
	Roadbridge - 4.62 m

Headroom at Navigation Level - Bridges:

Railway Bridge	4.0 m
Hilgay Toll Bridge	3.2 m Minimum width: 26.5 m
Littleport Bridge	3.35 m

Ely Ouse: Littleport Bridge to Junction with Old West

	<u>Depths at Navigation Level</u>
0.0 km - 3.2 km	4.25 m
3.2 km - 7.6 km (Ely, Roswell Pits)	4.1 m
7.6 km - 9.6 km	3.8 m
9.7 km - 12.8 km	3.65 m
12.8 km - 14.6 km (Upstream junction with Old West)	3.35 m
	Minimum width: 16.6 m

Headroom at Normal Water Level - Bridges:
normal retention level 102.77 at Ely railway bridge

Sandhills bridge	3.2 m	Muckhill Rly. Bridge	3.3 m
Adelaide Road Bridge	3.6 m	Cutter Rly. Bridge	3.3 m
Adelaide Rly. Bridge	3.65m	Ely High Bridge	3.3 m
Beet Factory Pipeline	3.6 m	Newmarket Rly. Bridge	3.3 m
Beet Factory Footbridge	3.55 m		

River Wissey: Junction with Ten Mile to Stoke Ferry: normal retention level 101.5 at Hilgay

Depths at Navigation Level

0.0 km - 1.6 km	2.0 m
1.6 km - 8.0 km	1.8 m
8.0 km - 12.8 km	1.2 m
12.8 km - 17.2 km	0.9 m

Minimum Width: 14.6 m

Headroom at Normal Water Level - Bridges:

Hilgay Rly. Bridge	2.65m	Beet Factory Pipe	3.2 m
Hilgay Road Bridge	2.55m	Beet Factory Road Bridge	3.5 m
Beet Factory Rly. Bridge	3.0m	Wissey Sluice Bridge	2.4 m
Stoke Ferry Bridge	2.9m		

Little Ouse: Brandon Creek to Wilton Ferry: normal retention level 101.08 at Wilton Bridge

Depths at Navigation Level

0.0 km - 3.2 km	2.0 m
3.2 km - 11.2 km	1.8 m
11.2 km - 15.2 km	1.8 m
15.2 km - 16.4 km (Wilton Ferry)	1.8 m
Little Ouse Syphon	1.35 m

Minimum width: 7.55 m

Headroom at Normal Water Level - Bridges:

Brandon Creek Bridge	3.05 m	Wilton Bridge	3.3 m
St John's Road Bridge	3.15 m	F.P.S. Sluice (access	2.6 m
		bridge)	

River Lark: from Mouth to Jude's Ferry:

Depths at Navigation Level

0.0 km - 3.2 km	2.4 m
3.2 km - 12.8 km	2.6 m - 2.05 m
12.8 km - 16.0 km	0.45 m - 1.35 m

Isleham Lock: normal retention level - upstream 102.15, downstream 101.68

Length: 26.8 m
Width: 4.55 m
Draught: 1.0 m

Headroom: upstream gate 2.0 m

Headroom at Normal Water Level - Bridges:

Branch Bridge	3.35 m	Hiam's Footbridge	2.55 m
Prickwillow Rly. Bridge	3.1 m	Jude's Ferry Bridge	3.2 m
Prickwillow Road Bridge	2.95 m		

Old West: from Cam to Earith: normal retention level 101.7 at Twenty Pence Marina

Depths at Navigation Level

0.0 km - 14.4 km	1.05 m - 1.2 m
14.4 km - 16.0 km	1.7 m
16.0 km - 18.0 km	0.6 m

Minimum width: 9.15 m

B) PUBLIC LAUNCHING SITES

1. To RIVER OUSE at ELY (Waterside)
2. To RIVER WISSEY at HILGAY (D/S of Road Bridge)
3. To RIVER LITTLE OUSE at BRANDON (D/S of Brandon Stauch) LIGHT CRAFT ONLY
4. To RIVER OUSE at DENVER.

C) MECHANICAL TOILET PUMP-OUT SERVICES

1. Annesdale Marine, Annesdale, Ely, Cambridgeshire
Telephone (0353) 665420

D) SHORT STAY MOORINGS (48 hours)

River Ouse

Ten Mile Village (2 moorings)
Denver
Hilgay
Littleport
Ely - opposite Beet Factory
Ely - near Cutter PH
Ely - downstream of High Bridge
Little Thetford

River Lark

Padnal Pumping Station
Prickwillow Village

River Wissey

Hilgay

River Little Ouse

Brandon playing fields

E) LOCK HANDLES

With certain exceptions (mainly downstream of St Ives) Locks on the Great Ouse River System are unattended and can only be operated by the use of an NRA (Central) Lock Handle. These may be purchased either from certain marinas, or direct from the following offices of the NRA Unit (cost #10):

Brampton NRA, Anglian Region Central Area, Bromholme Lane,
Brampton, Huntingdon, Cambs, PE18 8NE (0480) 414581

Ely NRA, Anglian Region Central Area, Prickwillow Road, Ely, Cambs,
CB7 4TX (0353) 666660

Offices are not open on weekends, and it would be advisable to telephone the relevant office first to make arrangements to collect a lock handle.

The following locks however, are all attended ones, where lock handles are not needed:-

Denver Lock (Great Ouse: tel. Downham Market 382340)
Hermitage (Great Ouse: tel. Ramsey 841548)

Opening times for the above attended locks:

Jan	9 am - 4 pm	
Feb	9 am - 4 pm	
March	9am - 5 pm	
April	8 am - 7 pm	
May	8 am - 7 pm	
June	8 am - 8 pm	Lunch closing
July	8 am - 8 pm	1.00 pm - 2.00 pm
Aug	8 am - 8 pm	
Sept	8 am - 7 pm	
Oct	9 am - 5 pm	
Nov	9 am - 4 pm	
Dec	9 am - 4 pm	

Denver house vary slightly to suit local conditions.

Note: From November to March the attended locks close on Wednesdays, with the exception of Denver lock which are open 7 days per week.

F) BOAT CLUBS AND MARINAS

Fish and Duck Marina Popes Corner Ely, Cambridgeshire	Ely Cambridgeshire	Bridge Boatyard Cambridgeshire
Streatham (0353) 649580		Ely (0353) 663726 - Mr K Wenn
Annesdale Marine Annesdale Dock Ely Cambridgeshire		Loveys Marine Ely Marina Waterside Ely, Cambridgeshire
Ely (0353) 665420 - Mr G Carter		Ely (0353) 664622 - Mr J Loveys
Littleport Boat Haven Littleport Ely Cambridgeshire		Denver Cruising Club Mr P Bond, Secretary 5 Starlock Close Stretham Ely, Cambridgeshire
Ely (0353) 861969 - Mr R Payne		Ely (0353) 89538

Inland Waterways Association
Mr J Davis (Secretary)
Department of Anatomy
Cambridge University
Cambridge

Cambridge (0223) 333775

Great Ouse Boating Association
Mr J Soanes (Secretary)
8 Dendys
Hemingford Grey
Huntingdon
Cambridgeshire PE18 9EY

Hermitage Marina
Earith
Huntingdon
Cambridgeshire

Ramsey (0487) 840994

C D Elbrow Marine
Stretham
Cambridge

Cambridge (0223) 63692

Isleham Marina
Fenbank
Isleham
Cambridgeshire

Isleham (063878)663

Great Ouse Boatbuilders & Operators
Association
Mrs Synod (Secretary)
Fox's Boatyard
10 Marina Drive
March, Cambridgeshire

March (0354)52770

Twenty Pence Marina
Twenty Pence Road
Wilburton
Ely, Cambridgeshire

Cottenham (0954) 51118