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LOWER NENE CATCHMENT MANAGEMENT PLAN CONSULTATION REPORT

NRA

National Rivers Authority
Anglian Region

October 1993

Don Gresswell Ltd., London, N.21 Cat. No. 1208 DG 02242/71

NATIONAL RIVERS AUTHORITY

ANGLIAN REGION

LOWER NENE CATCHMENT MANAGEMENT PLAN

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FOREWORD

Established in 1989 the National Rivers Authority has as it's 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.

Key issues in this plan are considered to be :-

1. The catchment has a deficiency of resources to meet demands which can currently be expected to occur on average one year in five. This frequency is expected to increase as abstraction for public water supply increases.

2. The tidal River Nene is grossly polluted for most of its length. Effluent improvement plans are identified as the recommended option.

This is the fifth 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

LOWER NENE CATCHMENT MANAGEMENT PLAN

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1. **CONCEPT**

The National Rivers Authority 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 and to emergencies resulting from flooding.

ii) Control pollution by working with dischargers to achieve improvements 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) To assess, manage, plan and conserve water resources.

This draft Catchment Management Plan consolidates the policies, objectives and options for the Lower Nene Catchment for the overall improvement of the water environment. The Plan is drawn up as follows :-

1. Uses of the Catchment.

   The identified uses of the water environment, text is produced supported by a map indicating where in the catchment each use occurs.

2. Catchment Current Status

   Objectives for the uses are identified and targets set (where applicable) in terms of water quality, water quantity and physical features.

3. Catchment Targets

   By taking the targets for individual uses, overall targets for water quality, water quantity and physical features are set for the catchment.

4. Current Shortfalls of the Catchment

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

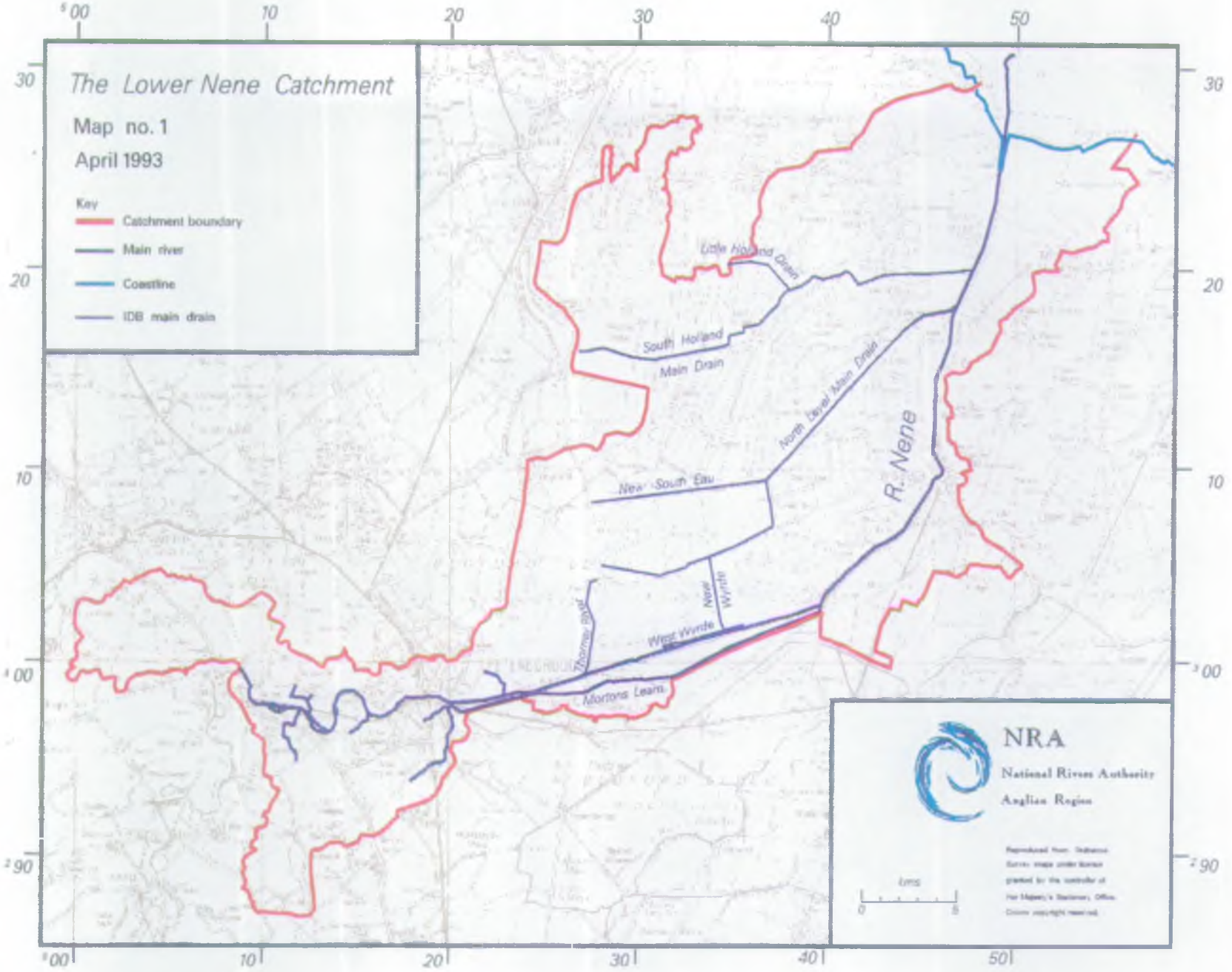
5. Issues and Options

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

The NRA acknowledges the valuable assistance provided by representative groups of catchment users involved in pre-consultation meeting on 30 March 1993. At this meeting a preliminary list of issues and options were discussed and advantages and disadvantages of the options debated. These comments have been included in the plan.

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 and 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 Lower Nene Catchment
Map no. 1
April 1993
Key
Catchment boundary
Main river
Coastline
IDB main drain
Little Holland Drain
South Holland Main Drain
North Level Main Drain
R. Nene
New South Eau
Nene Wyrde
West Wyrde
Morton's Leam
NRA
National Rivers Authority
Anglian Region
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2. OVERVIEW

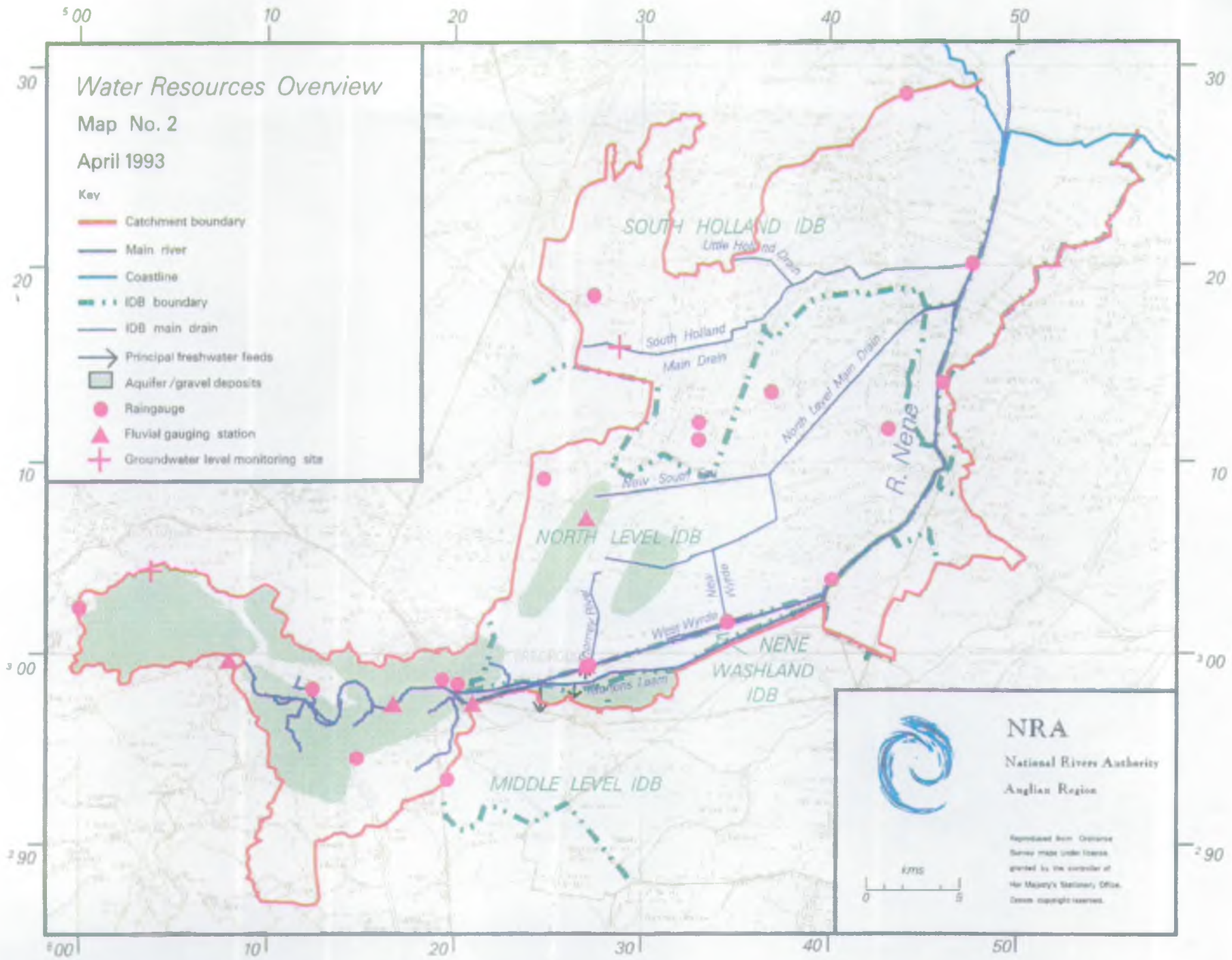
2.1 INTRODUCTION

The Lower Nene catchment is principally a lowland area with very fertile alluvium and fen deposits particularly in the east of the catchment. Consequently the catchment is rural in nature providing arable farming products. Peterborough provides a centre for industry at the upper end of the catchment while Wisbech is a focus for agriculture and is served by the River Nene navigation.

Much of the Catchment lies below mean high spring tide level and therefore flood defence is vital. An artificial drainage network has been established, the maintenance of which is the responsibility of local Internal Drainage Boards.

The Catchment lies in an area of relatively low rainfall and of increasing population. Riverflows sometimes fall to zero and therefore the management of the limited water resources is also important.

The upstream extremity of the catchment has been taken to be Anglian Water Services Ltd Wansford abstraction point for Rutland Reservoir, since this controls both the quality and quantity of water entering the catchment.


Water Resources Overview
Map No. 2
April 1993
Key
Catchment boundary
Main river
Coastline
IDB boundary
IDB main drain
Principal freshwater feeds
Aquifer /gravel deposits
Raingauge
Fluvial gauging station
Groundwater level monitoring site
SOUTH HOLLAND IDB
Little Holland Drain
South Holland Main Drain
North Level Main Drain
R. Nene
NORTH LEVEL IDB
West Wynde
Nene Wynde
Guyhirn Road
Wisbech Town
NENE WASHLAND IDB
MIDDLE LEVEL IDB
NRA
National Rivers Authority
Anglian Region
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2.2 WATER RESOURCES

The River Nene catchment covers an area of 2363 km² of which 830 km² comprises the Lower Nene catchment. The hydrology of the Lower Nene catchment can be divided into two parts; upstream and downstream of Peterborough. The area upstream of Peterborough is characterised by the upland topography of limestone outcrop and downstream of Peterborough the fenland area (740 km²) is heavily dissected by IDB drains.

The catchment has a network of hydrometric monitoring stations that measure rainfall, groundwater levels and river flows. These are shown on Map xx. Average annual rainfall in the catchment is 625mm of which around 450mm is lost through evaporation and transpiration.

The major water resource is the River Nene. The River Nene has very little natural baseflow but dry weather flows are influenced by effluent returns to the river. Between Wansford and Orton Sluice there are a few minor tributaries but their contribution to flow is small during summer periods. Downstream of Peterborough is a fenland area of alluvial deposits which includes zones of water bearing gravels around Thorney, Crowland and Whittlesey. Drainage of the lowland areas is carried out by Internal Drainage Boards.

There are gravity and pumped discharges to the River Nene and also gravity feeds to the IDB drain system from the Rivers Nene and Welland.

There are no significant groundwater resources in the catchment, since the aquifers in the area are thin and offer little development potential.

The major water demands in the catchment are as follows:

a) a surface water intake works operated by Anglian Water Services at Wansford where water is abstracted and pumped via a pipeline to fill Rutland Water.

b) summer demand from the River Nene via Stanground Lock to support irrigation and maintain navigation levels in the Middle Level drain system.

c) summer demand for irrigation use in the fenland area.

The balance between water availability and water abstraction is of key importance in this catchment.

The majority of water abstractions are controlled by licences issued by the NRA under the Water Resources Act 1991 (previously the Water Resources Act 1963). In this catchment there are a number of major water transfers from the River Nene which are unlicensed, or which have effectively unlimited abstraction.

An abstraction licence is only issued by the NRA if there is sufficient water available, the need for water is justified, all rights of existing users are protected, and the water environment, eg. river, springs, and wetland sites, is not unacceptably affected.

Abstraction made by private individuals for their own 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.

2.3 WATER QUALITY

Catchment management for the River Nene has been split into two, the Lower and the Upper Nene. It is important to note that water quality in the Lower Nene Catchment will be influenced substantially by water quality in the Upper Nene Catchment.

Water quality in the Lower Nene Catchment may be described by separating requirements of the Nene upstream of Peterborough from those downstream of Peterborough, and the Internal Drainage Board systems.

The Nene is heavily utilised for drinking water abstraction, supplying Rutland Water. Protecting water quality in the Nene is of great importance, as Rutland Water forms a major part of Anglian Water Services drinking water supply strategy.

Downstream of Peterborough a number of significant discharges occur which, combined with the high abstraction demands for this catchment, make water quality planning a complex issue. Approximately 40km of the River downstream of Dog in a Doublet Sluice is tidal.

Low lying areas are served by Internal Drainage Board systems which convey drainage from a number of small sewage treatment works, agricultural and developed land areas. Salt water ingress can have a severe detrimental influence on water quality in these systems.

2.4 FLOOD DEFENCE

The lower Nene characterises two distinct methods of flood control. Upstream of Peterborough City the river retains a natural quality with regular extensive use being made of the flood plains found on either side of the watercourse for storage of water within the Nene valley. Downstream of the City the landscape becomes low lying fen with a straightened river contained within raised flood embankments.

The fen makes up the largest part of the lower Nene catchment. Drainage throughout this area is provided by 8 Internal Drainage Boards. The main river and its embankments are the responsibility of the NRA.

A number of small tributaries convey water from the hills surrounding the Nene valley to main river. Urban watercourses discharge to the Nene in Peterborough providing for approximately 50% of the City's drainage.

The tidal limit is some 7km downstream of Peterborough City. During periods of tidelock when discharge of floodwaters is precluded, the Nene Washlands becomes of strategic importance in preventing flooding of low lying areas in Peterborough City.

The tidal estuary is approximately 40km long. The channel crosses extremely low lying fenland. Flood protection embankments exist to provide protection from flooding by tidal waters.

2.5 NAVIGATION

Once operated as a commercial navigation the Nene is now used only for recreational boating from the tidal limit at the Dog in a Doublet Sluice downstream of Peterborough to its junction with the Grand Union Canal at Northampton.

Commercial operations are still ongoing on the tidal reach with 1,500 tonne ships using the port facilities at Wisbech and 3,500 tonne ships using the busy port at Sutton Bridge.

The NRA is the body responsible for navigation throughout the fluvial length of the river and along the tidal reach down to Bevis Hall, Wisbech.

2.6 FISHERIES

The fish population in the Lower Nene catchment is typical of lowland rivers in eastern England. In terms of biomass (ie. weight of fish) common bream, roach and eels are the dominant species in the catchment. No breeding trout populations occur.

The presence of the continental species zander in the River Nene around Peterborough is significant and carp have been recorded in the Nene from Northampton to Peterborough.

On the tidal section of the River Nene (downstream of the Dog in a-Doublet Sluice) a coarse fish population, dominated by eels, occurs but changes to species associated with brackish conditions below Sutton Bridge.

Angling, both for pleasure and in competition occurs throughout the catchment with particularly popular stretches being on the Nene from Wansford down through Peterborough to the Dog-in-a-Doublet Sluice, the South Holland Main Drain and the North Level Main Drain.

Commercial exploitation of eels occurs throughout the catchment.

2.7 CONSERVATION

The Lower Nene Catchment has two distinctive areas. In the upper section to the west of Peterborough the Nene meanders in semi-natural state through a rolling mixed landscape. East of Peterborough the Nene is a wide embanked highland carrier surrounded by low, flat, fen farmland.

Conservation interests are dominated by the Wash and the Nene Washes both large, internationally important wetlands. In total there are 14 SSSI's; (8 with wetland interests, 4 woodland and 2 geological), 8 County Wildlife Trust Reserves and 25 sites of nature conservation importance.

The quantity of water available to the catchment and its dynamic attributes are crucial to the character of the wetland and river habitats. Environmental demand for water to maintain a high summer watertable is growing concurrently with agricultural and public water supply demands. In the drought summer of 1992 the Nene effectively ceased to flow compromising water management regimes on the Nene Washes SPA.

2.8 LAND USE

The catchment is predominately rural with a major population centre at Peterborough, and with a number of other towns and main villages.

2.8.1 AGRICULTURE

The catchment has a highly developed modern farming industry which makes a major contribution to the national economy.

Agriculture is the main land use, 75% of the catchment being Grade 1 and 2 under the MAFF classification.

Arable farming is the primary use, with grazing limited to those areas with poorer soil types and less favourable topography.

2.8.2 URBANISATION

The total population of the catchment is approximately 230,500, with 208,400 located in the towns and main villages and the remainder in minor villages, hamlets and farms.

Industry is diverse, rural industry being centred around the main agricultural land use, but with general engineering, and processing to high technology, manufacturing bases.

Population growth is identified in the County Structure Plans covering the catchment, but is generally restricted to the towns and main villages.

2.9 INFRASTRUCTURE

The catchment is served by a good road network, particularly in the west around Peterborough, of trunk and 'A' roads serving the main population centres with by-roads linking the rural centres. There is a proposal to uprate the A1 trunk road, west of Peterborough, to motorway standard but other major highway proposals are limited to existing system maintenance and by-pass construction.

There is a limited rail network in the catchment, however the main population and industrial centre of Peterborough is served by the East Coast main line with easy access to London and the North East.

The River Nene is a navigable river with sea going commercial transport currently reaching Wisbech. There is access to the Grand Union Canal at Northampton, and to the Middle Level, and hence the River Great Ouse, at Stanground, Peterborough.

The infrastructure network conflicts little with the rivers systems, the only interference being at channel crossings which are well established.

The existing infrastructure and the current planned improvements provide adequately for the established catchment uses.

2.10 KEY DETAILS

Catchment Details

Area 830km2

	Existing	Predicted 2001
Population	230,500	253,000

Topography

Ground Levels	Maximum 95.00m AOD Minimum -1.20m AOD

Geology

West	Minor Limestones, clays, sandstones, and sand and gravels.
Central and East	Silts, clays and peats with areas of sand and gravel.

Administrative Details

County Councils	Cambridgeshire 55% Lincolnshire 40% Northamptonshire 5%
District Councils	East Northants Fenland Huntingdonshire Peterborough South Holland
NRA	Anglian Region - Northern Area
Water Companies	Anglian Water Services Ltd

Internal Drainage Boards :

North Level
Feldale
South Holland
Waldersey
Hundreds of Wisbech
Westside Marshes
Wingland
Nene Washland Commissioners

		Present Population
Main Settlements	Crowland	3292
	Elm	3260
	Eye	3170
	Long Sutton	3779
	Leverington	3980
	Moulton	3025
	Peterborough	157320
	Sutton Bridge	3957
	Whittlesey	7500
	Wisbech	19120

Utilities

East Midlands Electricity
Eastern Electricity
British Gas East Midlands
British Gas Eastern
British Telecom Peterborough & District

Major Waste Water Treatment Works :

Flag Fen - Peterborough
West Walton - Wisbech

Water Quality

Length of river in National Water Council (NWC) Class for 1992		Length of estuary in NWC Class	
Class:	km.	Class	km.
1A (very good)	N/A	A	0
1B (good)	N/A	B	0
2 (fair)	25	C	0
3 (poor)	N/A	D	40.3
4 (bad)	N/A		

Minor tributaries not included.

Water Resources

Availability :-

Groundwater	None reliably available
Surface water	Winter only reliably available.

Flood Protection

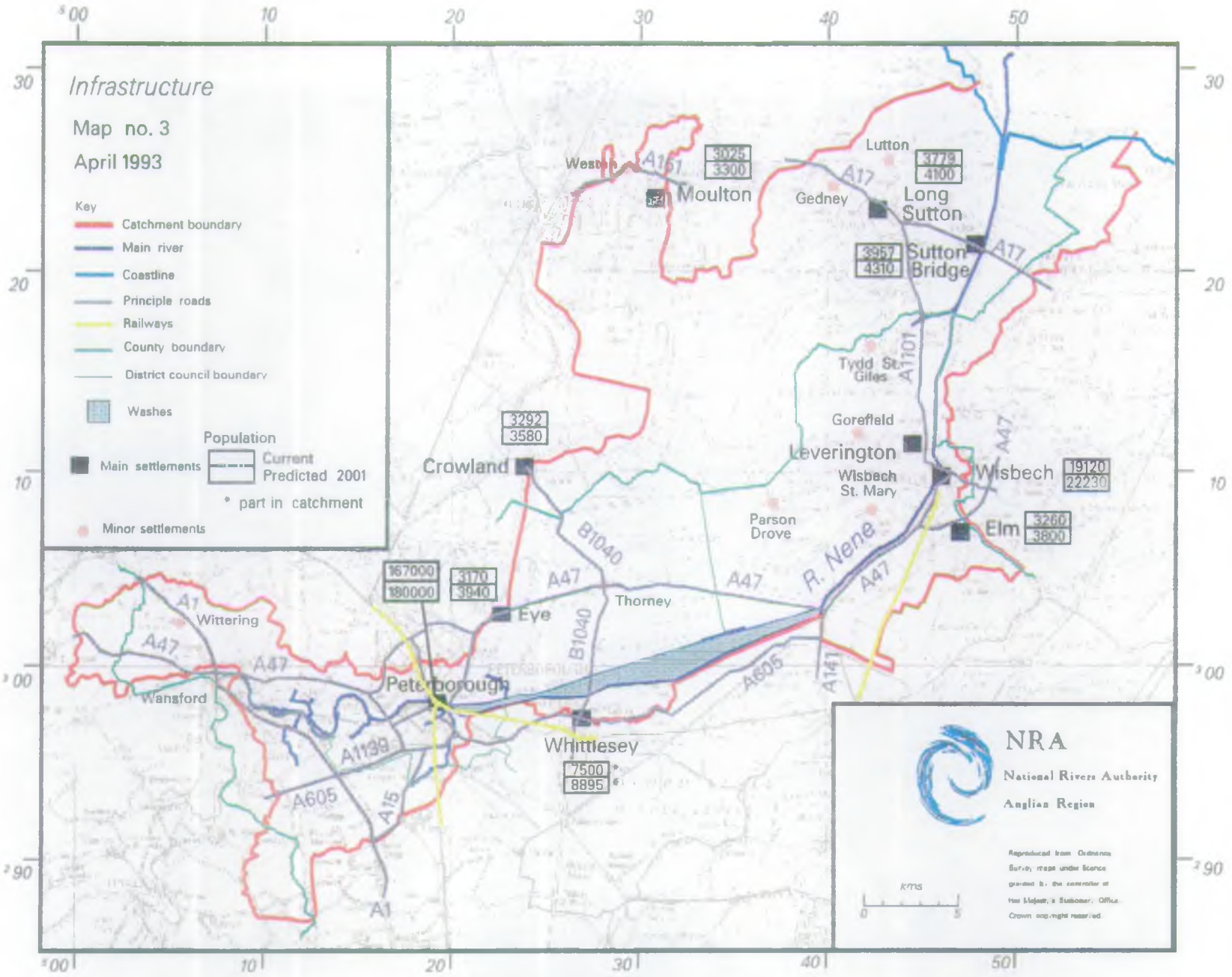
Length of Statutory main river (maintained by NRA)	108.6km.
Length of Tidal Main River	39.5km.
Area Protected from Tidal Flooding	688km^2
Area Protected from Fluvial Flooding	694km^2
Area of Natural Flood Plain	6km^2
Area of Designated Washland	14.5km2

Fisheries

Length of salmonid fishery	0km
Length of cyprinid fishery	142km

Conservation

Sites of Special Scientific Interest (SSSI) 14


Infrastructure
Map no. 3
April 1993
Key
Catchment boundary
Main river
Coastline
Principle roads
Railways
County boundary
District council boundary
Washes
Population
Main settlements
Current
Predicted 2001
* part in catchment
Minor settlements
Moulton
3025
3300
Lutton
3779
4100
Gedney
Long Sutton
Sutton Bridge
3957
4310
Tydd St. Giles
Gorefield
Leverington
Wisbech St. Mary
Wisbech
19120
22230
Parson Drove
Elm
3260
3800
Crowland
3292
3580
Thorney
Eye
167000
180000
3170
3940
Wittering
Wansford
Peterborough
Whittlesey
7500
8895
A1
A47
A605
A1139
A15
A1101
A141
B1040
R. Nene
NRA
National Rivers Authority
Anglian Region
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3.0 CATCHMENT USES

3.1 DEVELOPMENT - HOUSING. INDUSTRY AND COMMERCE

General

Development must be considered when planning the use of a river catchment. This use relates to existing and predicted future residential, commercial and industrial development which is identified in adopted and draft County Structure and District Local Plans. These plans identify policies against which the Planning Authorities consider development proposals.

The NRA is a statutory consultee, on certain proposals, 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 land use change 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 concerns in determining proposals.

Irrespective of a proposal obtaining planning consent the NRA may use its relevant powers to control the nature of development proposals.

Local Perspective

The catchment is situated across the border between the counties of Lincolnshire and Cambridgeshire, with the extreme western boundary crossing into Northamptonshire. The catchment covers parts of the districts of South Holland, Fenland, Huntingdonshire, East Northants and the City of Peterborough.

The County Structure Plans covering the catchment recognise a need for growth and identify appropriate levels of allocation of land for residential, commercial, industrial and associated social development to meet those predicted needs up to the year 2001. The Local Authorities are currently addressing this need for growth in their production of District Wide Local Plans, which are required to accord with government directions on land use planning.

Much of this growth is likely to be accommodated in the existing towns and main villages, with limited in-filling in the existing rural villages. The Draft Peterborough City Plan identifies development which accords generally with the overall development identified in 1970 with fine tuning to meet changing demand.

The NRA, in meeting its responsibilities, is pro-actively pursuing its aims and policies in respect of land use changes by requesting that the NRA's policies are reflected in the policies adopted for the District Wide'plan-led' land use planning system.

Protection against flooding from rivers and the sea, protection of water resources, protection of ground and surface waters from pollution and conservation of the water environment is of particular concern to the NRA and this draft plan will identify objectives in this catchment.

Development - Objectives

Flood Protection:

To ensure new development is not at risk from flooding and does not increase flood risk elsewhere which could endanger life and damage property.

To ensure any works which are needed to reduce flood risk created by land use changes 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 inland, coastal and groundwaters from pollution.

To ensure that adequate pollution prevention measures are incorporated into development and that development is appropriately situated and is consistent with the Groundwater Protection Policy.

Water Resources:

To protect surface waters and groundwaters from derogation arising from development.

Development - Policy Summary

Flood Protection:

Development will be resisted 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:

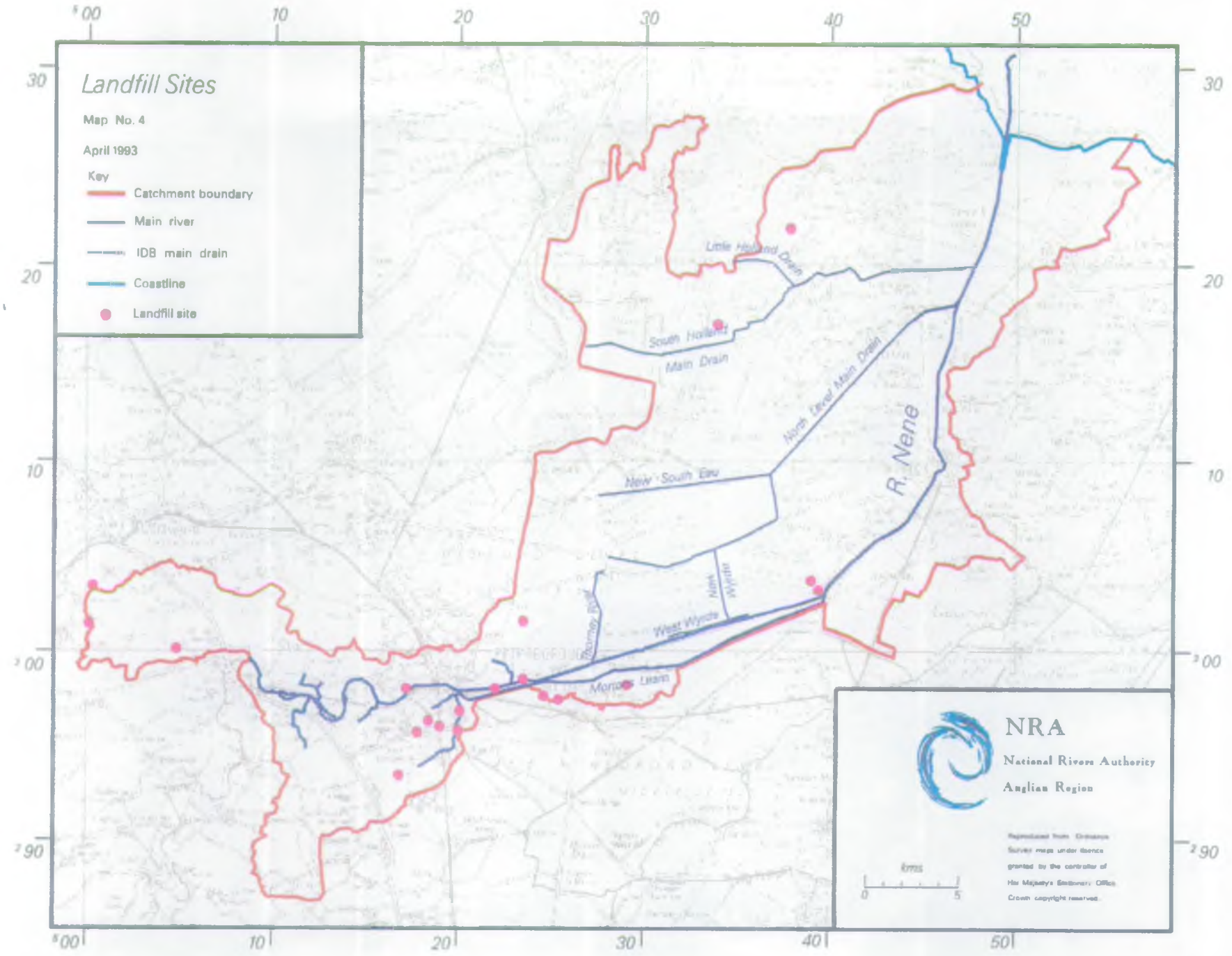
Development, including changes in land use, which will be detrimental to wildlife, landscape and archaeological features associated with rivers, ponds, lakes, estuaries etc. will be resisted, whereas enhancement will be encouraged and supported.

Water Quality:

Development, including changes in land use, will be resisted where, in the opinion of the NRA, such development would pose an unacceptable risk to the quality of ground and surface waters.

Water Resources:

Development, including changes in land use, will be resisted where, in the opinion of the NRA, such development will have a detrimental impact on water resources.


Landfill Sites
Map No. 4
April 1993
Key
Catchment boundary
Main river
IDB main drain
Coastline
Landfill site
Little Holland Drain
South Holland Main Drain
North Level Main Drain
R. Nene
New South Eau
Ramsey Rise
Horn Wyche
West Wyche
Monks Leam
NRA
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3.1.1 LANDFILL SITES/CONTAMINATED LAND

General

The NRA is a statutory consultee on Waste Disposal matters. It is also a consultee of Planning Authorities under the Town and Country Planning Acts. A valid planning permission is required before a waste disposal licence can be issued. The planning permission is the means by which aftercare provisions on closed landfill sites can be regulated. The waste disposal licence relates to the operational phase of any site.

It is recognised that a wide range of waste disposal operations require a waste disposal licence. These include scrap yards, transfer stations, incinerators, waste storage etc. Often the greatest threat to groundwater quality is posed by landfill activities.

In recognition of the particular need to protect groundwater reserves the NRA has produced a National Groundwater Protection Policy which seeks to influence planners, developers and industrialists on how best they may achieve their objectives without placing precious groundwater reserves at risk.

Local Perspective

Each site is considered on a case by case basis, the location of a site must not pose an unacceptable risk to water resources. The fate of incident rainfall and any leachate generated must be known and fully evaluated. Each landfill site, with potential to cause pollution, must be closely monitored to provide assurance that its impact on the environment remains acceptable.

The catchment contains a number of clay pits produced as a result of brick making in the area. Such pits when utilised for landfill, present a lower risk to environmental waters than quarries in aquifer outcrop areas and are therefore to be favoured as landfill sites.

In most large towns and cities areas of contaminated land may be found. In general these are a legacy of the past, a problem which the NRA seeks to reduce by implementing the recommendations made in its Groundwater Protection Policy. The NRA will seek the co-operation of the landowners or occupiers in reclaiming areas of contaminated land. This policy has been successful on a number of occasions.

Objectives

- To ensure landfill activity does not compromise water quality or water resources and proceeds in accordance with advice given in the NRA's Policy and Practice for the Protection of Groundwater document.

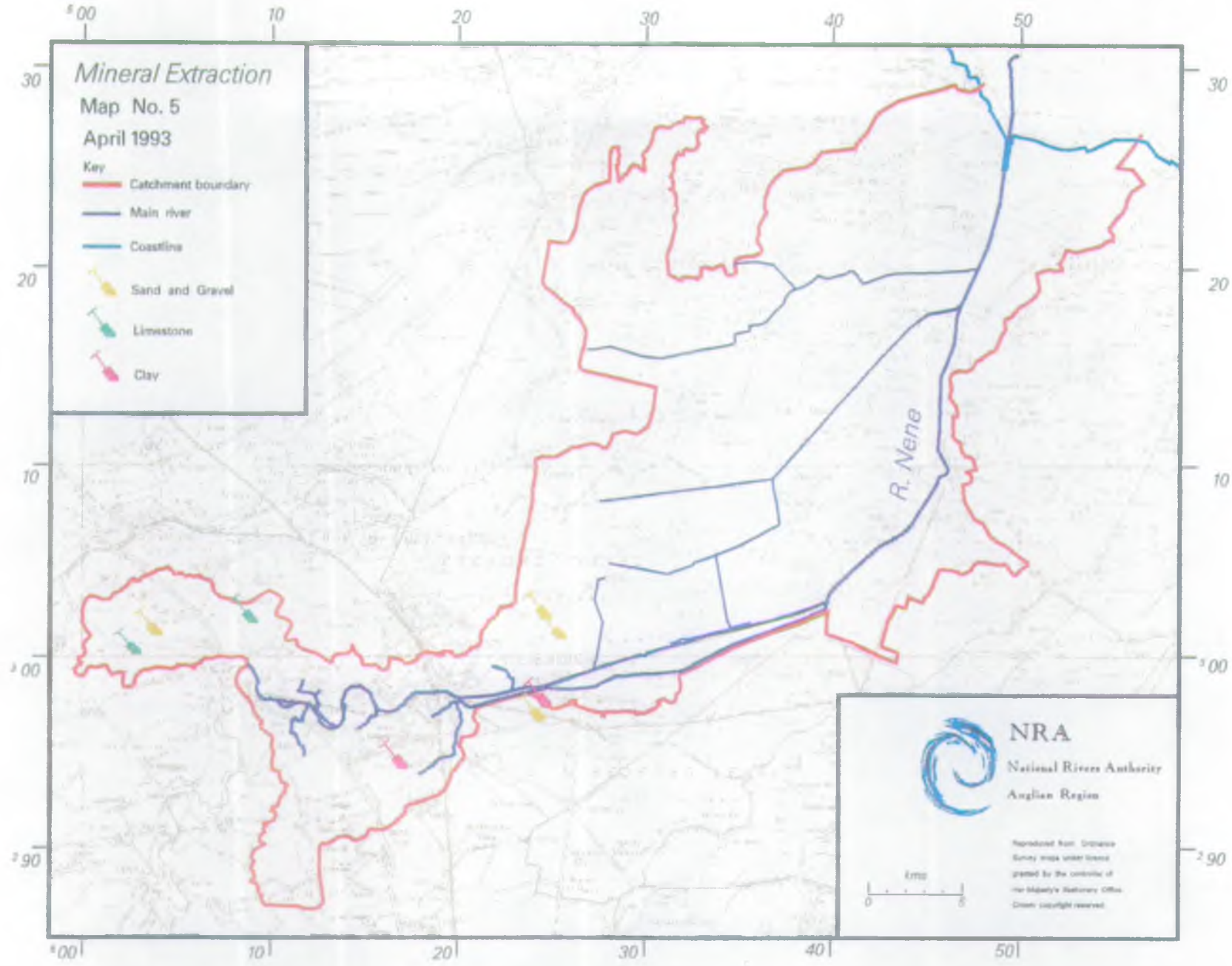
- To reduce the risk of land becoming contaminated.

- Compliance with EC Directives on dangerous substances discharged to groundwaters.

- Prevention of pollution of controlled waters.

- Appropriate monitoring of effects on surface and groundwater.

- Restoration of all sites to an acceptable environmental standard and in accordance with NRA policy requirements in relation to flood plains and flood risk.


Mineral Extraction
Map No. 5
April 1993
Key
Catchment boundary
Main river
Coastline
Sand and Gravel
Limestone
Clay
R. Nene
NRA
National Rivers Authority
Anglian Region
Kms
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3.1.2 MINERAL EXTRACTION

General

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

Local Perspective

Mineral workings are restricted to the western part of the catchment. Working is undertaken to extract limestone, sand and gravel and brick clay. Limestone and sand and gravel provide for the general construction industry whilst the working for clay provides for the well established brick production centred at Peterborough and Whittlesey.

Objectives

- Surface and ground waters must be conserved and protected. Mineral working must be operated within the requirements of the Authority's Groundwater protection Policy.

And there should be :-

- No deterioration of ground or surface water quality.
- No detriment to the availability of water resources.
- No visual impact on the landscape and general environment.

3.1.3 GROUNDWATER PROTECTION

General

Groundwater must be protected, it accounts for a large proportion of our drinking water. Making the best use of this essential resource, conserving it and balancing the competing needs of abstractors and the water environment is a prime responsibility of the National Rivers Authority.

There are many threats to groundwater quality, and once polluted, groundwater is difficult if not impossible to recover. Groundwater pollution is insidious, it cannot be seen, and it is difficult to monitor. The National Rivers Authority has produced a Policy for the Protection of Groundwater which provides guidance to developers, planners and industrialists on how groundwater pollution may be avoided. The policy addresses all aspects of groundwater pollution prevention. Implementation of the advice given should ensure that groundwaters are protected.

Local Perspective

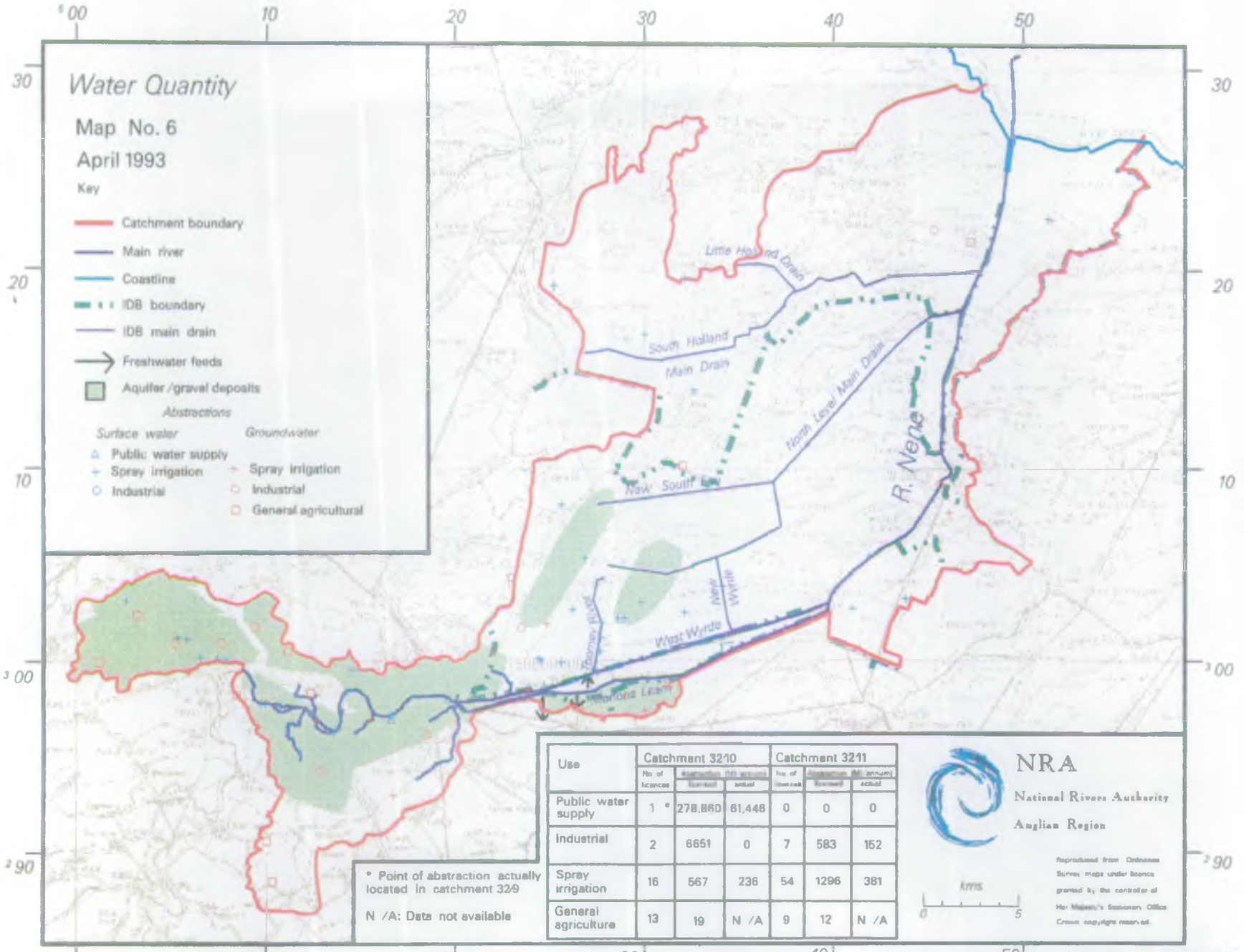
Groundwater provides baseline river flows, if polluted those surface waters receiving polluted groundwater will themselves become contaminated.

This aspect of the need to protect groundwater quality has particular significance in the Lower Nene Catchment. Groundwater inputs to the Nene upstream of the Wansford abstraction for Rutland Reservoir, must not be allowed to become polluted.

Objectives

- To encourage planning authorities, developers and industrialists to follow the advice given in the Groundwater Protection Policy.

- Compliance with EC Directive on dangerous substances discharged to groundwaters.



Use	Catchment 3210			Catchment 3211		
	No of licences	Abstraction (Ml annum) licensed	Abstraction (Ml annum) actual	No of licences	Abstraction (Ml annum) licensed	Abstraction (Ml annum) actual
Public water supply	1 *	278,860	61,448	0	0	0
Industrial	2	6651	0	7	583	152
Spray irrigation	16	567	236	54	1296	381
General agriculture	13	19	N /A	9	12	N /A

* Point of abstraction actually located in catchment 329

N /A: Data not available

NRA
National Rivers Authority
Anglian Region

kms
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3.2 WATER RESOURCE USAGE

3.2.1 POTABLE WATER SUPPLY - GROUNDWATER

General

This use relates to the abstraction of water from groundwater sources for domestic water supply purposes (ie drinking, washing etc). Water abstracted from wells and boreholes is used in only very small quantities principally in the area to the west of Peterborough. These abstractions by individual householders are for their own domestic use.

Local Perspective

There are no areas of major groundwater resources or development potential in the catchment. Minor aquifers present include the Lincolnshire Limestone, Northampton Sands and Sand and Gravel deposits. There are no groundwater abstractions for public water supplies in the Lower Nene catchment.

Within the catchment there are a small number of groundwater sources used for private domestic supply. These abstractions are principally from the Limestone and Sandstone aquifers and local Sands and Gravel deposits. These abstractions depend upon small but reliably available resources and good water quality conditions.

Objectives

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

- To ensure the best utilisation of water resources in the catchment.

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

- To ensure the proper use of groundwater resources.

- To conserve water resources by encouraging efficient water use and leakage control.

3.2.2 POTABLE WATER SUPPLY - SURFACE WATER

General

This use relates to the abstraction of water from surface water sources, ie rivers and springs for domestic potable use. The principal abstractor is the statutory water company (Anglian Water Services Ltd). Public water supply from surface water constitutes 97% of all licensed water abstraction in the catchment.

Local Perspective

There is one surface water abstraction operated for public water supply in the catchment. This is a major surface water intake located at the upstream end of the catchment, at Wansford, where water is abstracted by Anglian Water Services Limited and pumped via a pipeline, to fill Rutland Water reservoir. (Another surface water intake is located in the adjacent catchment at Tinwell, near Stamford on the River Welland, which is also used to fill Rutland Water). The greater proportion of the surface water abstracted to fill Rutland Water is derived from the River Nene at Wansford.

Anglian Water Services Ltd operate Rutland reservoir in connection with a number of other pumped storage reservoirs outside the catchment to form the Ruthamford (Rutland, Grafham, Pitsford) water supply system. Rutland Water supplies water to domestic customers in Peterborough and the Lower Nene catchment as far as Wisbech in addition to a very large area outside of the catchment.

Licensed abstraction is geared to meeting the design yield of Rutland Reservoir. The licence authorises abstraction of 199 million cubic metres per year. Actual abstraction in 1991 was around 22% of the total licensed abstraction. The licence includes a condition requiring a minimum residual flow of 136 tcmd (thousand cubic metres per day) to be maintained downstream of Orton Sluice.

There is no forecast deficiency in resources to meet PWS demand from the River Nene via Rutland Reservoir to the planning horizon (2015).

There are a small number of spring sources within the catchment which are used for private domestic supplies. These are not significant in quantity terms.

Objectives

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

- To ensure the best utilisation of water resources in the catchment

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

- To ensure the proper use of surface water resources.

- To conserve water resources by encouraging efficient water use and leakage control

- To set minimum residual flows (MRF's) and minimum control levels (MCL's) to protect environmental river needs

- To ensure compliance with existing MRF's and MCL's

3.2.3 AGRICULTURAL ABSTRACTION

General

This use relates to the abstraction of water from ground and surface water for general agricultural purposes (eg. stock watering, crop spraying) and spray irrigation. All uses excepting very small general agricultural uses from surface waters require a licence. The total agricultural abstraction constitutes 0.5% of all licensed water abstraction in the catchment (principally spray irrigation).

Local Perspective

General Agriculture

There are 22 licensed abstractors for this purpose in the catchment, principally from groundwater sources, although a number of small surface water abstractions (not licensable) do occur. Licensed abstraction totals 31tcma, which is less than 0.01% of the total licensed abstraction in the catchment.

Spray irrigation

There are a significant number of spray irrigation abstractors across the catchment as a whole, though the main active abstraction zone is in the Fen areas downstream of Peterborough. Some of these licences have minimum residual flow and minimum control level cessation conditions preventing abstraction under low flow conditions.

There are currently 74 licensed abstractions for this use authorising abstraction up to 1,863tcma, which is around 0.5% of the total licensed abstraction in the catchment. Actual abstraction in 1991 was around 33% of the licensed quantity.

The current forecast is for future demand for agricultural purposes for general spray irrigation uses to increase by 13% and 40% respectively in the next 10 years.

Objectives

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

- To ensure the best utilisation of water resources in the catchment

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

- To ensure the proper use of surface water resources.

- To conserve water resources by encouraging efficient water use and leakage control

- To set minimum residual flows (MRF's) and minimum control levels (MCL's) to protect environmental river needs

- To ensure compliance with existing MRF's and MCL's

3.2.4 INDUSTRIAL ABSTRACTION

General

This use relates to the abstraction of water from ground and surface waters for industrial use. Industrial abstractions include uses for industrial process, cooling and sand and gravel washing.

Local Perspective

There are 9 licensed industrial abstractors in the catchment principally in the Peterborough urban area. All abstract from the River Nene or from local groundwater aquifers, and around 50% of the water abstracted is used for cooling purposes. Licensed abstraction totals 7234tcma which is around 2.5% of the total licensed abstraction in the catchment. Actual abstraction in 1991 was around 2% of licensed quantity.

The current forecast is for future demand for industrial purposes to increase by around 1% per annum. Future growth in industrial demand is however difficult to predict.

Objectives

- To protect aquifers and surface waters from over-commitment and ensure abstraction does not have an unacceptable effect on existing abstractors and environmental waters.
- To ensure the best utilisation of water resources in the catchment
- To augment and/or redistribute water resources, where appropriate, to meet water demands to appropriate standards of reliability.
- To ensure the proper use of water resources.
- To conserve water resources by encouraging efficient water use and leakage control
- To set minimum residual flows (MRF's) and minimum control levels (MCL's) to protect environmental river needs
- To ensure compliance with existing MRF's and MCL's

3.2.5 LIVESTOCK WATERING/WET FENCING

General

Streams with this identified use are safeguarded to provide water of suitable quality for livestock watering. Bacteriological quality is not guaranteed, however. Statutory Water Quality Objectives will provide a standard for agricultural use.

Local Perspective

The majority of streams and drains in the catchment have a potential to be used for livestock watering purposes. However, with the predominantly arable nature of the agricultural land use such watering use is limited. There is a demand for water which used to provide wet fences in areas of the catchment eg. Nene Washes.

Objectives

- To meet the quality criteria of the Statutory Water Quality objective.

3.2.6 OTHER ABSTRACTIONS

General

There are two significant categories of currently unlicensed water abstraction from the catchment. These relate to navigation/land drainage and conservation uses and they represent an abstractive demand from the River Nene. One significant abstraction transferring water to the Middle Level System represents a water export from the catchment. These uses, of which the export from the catchment is the major one, constitute around 1% of all licensed water abstraction in the catchment.

Local Perspective

a) Slacker abstractions feed IDB drains for navigation, land drainage and water quality purposes and the support of spray and sub-irrigation. (Slackers are pipes, valves, siphons, old sluices/structures that can be operated to allow the passage/transfer of water. They are unlicensed and not within the NRA's control).

The principal abstraction occurs at Stanground Lock where the Middle Level Commissioners operate the lock structure to transfer substantial quantities of water into the Middle Level lowland system. This abstraction, which ranges from around 75-135 tcmd in the summer months, is transferred principally to maintain the navigation level. The navigation level is lowered as a consequence of slackers being operated which allows the draining of water from the Middle Level main drain to minor drains. This water is then used for spray irrigation. The Middle Level Commissioners claim rights to water under the Nene Navigation Act 1753 and the Middle Level Act 1848.

A smaller abstraction occurs just upstream of the tidal sluice and feeds into the North Level IDB system. In low flow periods, a flow of 5-10 tcmd is effected. The North Level IDB claim 'rights' to a freshwater supply to the Thorney River and these were recognised when the Dog-in-a-Doublet sluice was reconstructed.

b) Slacker and piped abstraction feeding conservation areas in the Nene Washes on behalf of riparian owners, RSPB and English Nature.

The abstraction occurs just upstream of the tidal sluice and feeds the Moretons Leam and the lowland system of the Nene Washland Commissioners. An increasing part of the Wash is being developed for conservation purposes and the site is designated a RAMSAR site. Water is required to maintain water levels for riparian purposes and for migrating birds. Flows of 10-40 tcmd may be necessary to sustain these needs. There is likely to be an increase in the area of land managed for these purposes.

The Nene Washland Commissioners claim to "rights" to water transfers under drought conditions. The RAMSAR site designation makes special reference to the need for water supplies to the Washes to be maintained.

In addition there are slacker abstractions from the River Welland feeding into the North Level and South Holland IDB systems, again of the order of 5 tcmd each.

The above abstractions have historically been considered exempt from abstraction licence regulations by virtue of their connection to land drainage uses, which is exempt from licensing regulations.

The water transfers to the Middle Level system support spray irrigation demand within that catchment of 2620 tcma. Whilst this is equivalent to only around 1% of licensed water abstraction within the Lower Nene Catchment, the transfer does at times exceed the available riverflow in the Orton to Dog-in-a-Doublet tidal section, and it represents 60% of the spray irrigation demand on the Lower Nene's water resources. The transfer also supports substantial under-irrigation in the Middle Level system.

An increase in water demands for each of these uses is forecast.

Objectives

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

- To ensure the best utilisation of water resources in the catchment

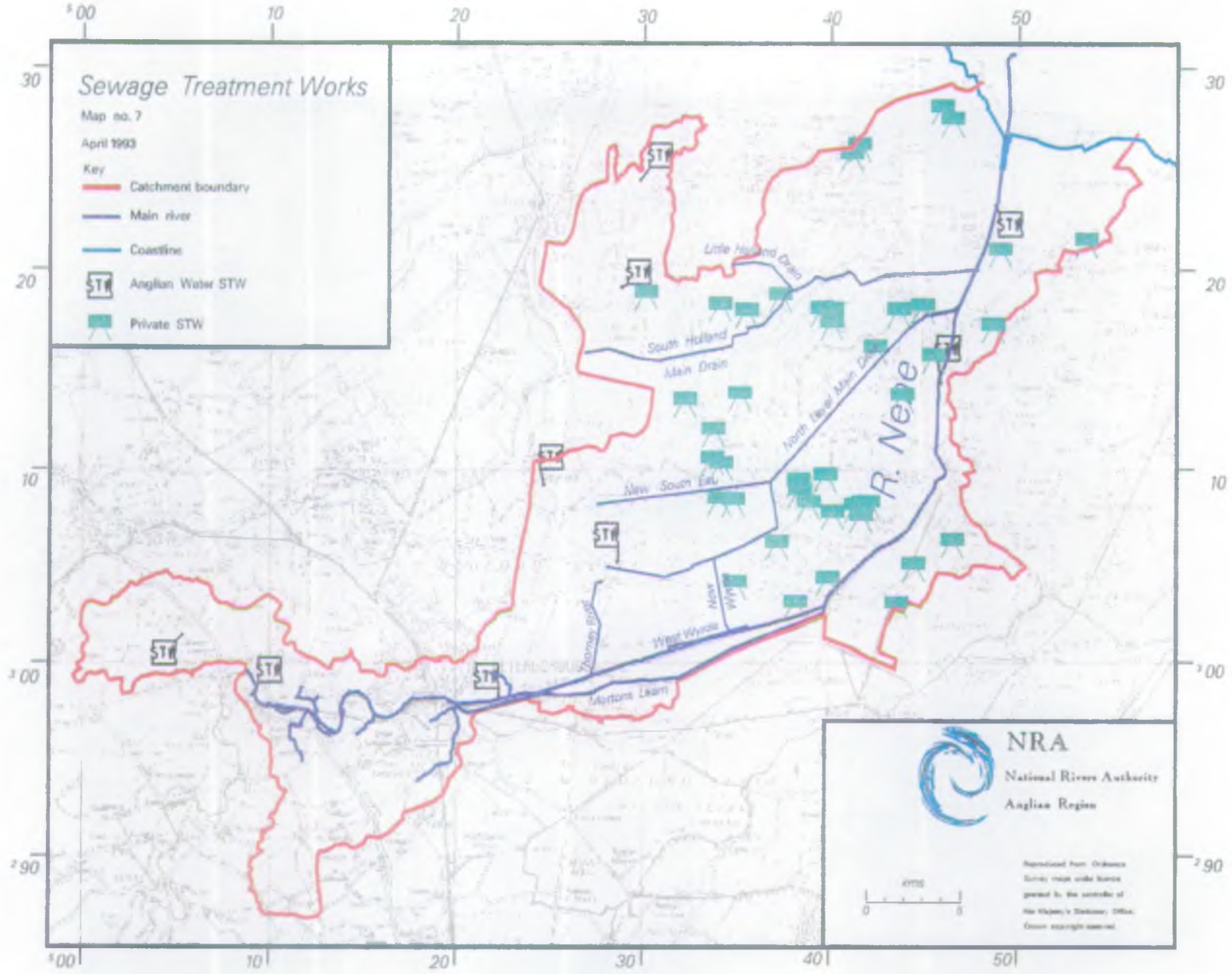
- To augment and/or redistribute water resources, where appropriate, to meet water demands to appropriate standards of reliability.

- To ensure the proper use of water resources.

- To conserve water resources by encouraging efficient water use and leakage control

- To set minimum residual flows (MRF's) and minimum control levels (MCL's) to protect environmental river needs

- To ensure compliance with existing MRF's and MCL's


Sewage Treatment Works
Map no. 7
April 1993
Key
Catchment boundary
Main river
Coastline
Anglian Water STW
Private STW
Little Holland Drain
South Holland Main Drain
North Level Main Drain
R. Nene
New South Eau
West Wyrde
Thorney Eau
Morton's Leam
NRA
National Rivers Authority
Anglian Region
kms
0
5
500
10
20
30
40
50
300
290

3.3 WASTE WATER DISPOSAL

3.3.1 SEWAGE TREATMENT WORKS

General

The criteria which must be complied with by discharges to controlled waters are regulated in a consent granted by the National Rivers Authority. Consents are calculated taking into account upstream water quality and the dilution available in the receiving watercourse. Consents are designed to ensure that downstream water quality remains acceptable for its many uses and compliant with prescribed water quality standards.

Local Perspective

There are 51 Sewage Treatment Works located within the Catchment. Details of the results of our monitoring programme are available from the Water Resources Act Register, enquiries should be directed to our Regional Headquarters in Peterborough Tel: (0733) 371811.

The greatest influences on water quality are those made by the discharges from Flag Fen STW, serving Peterborough, West Walton STW serving Wisbech and Sutton Bridge STW.

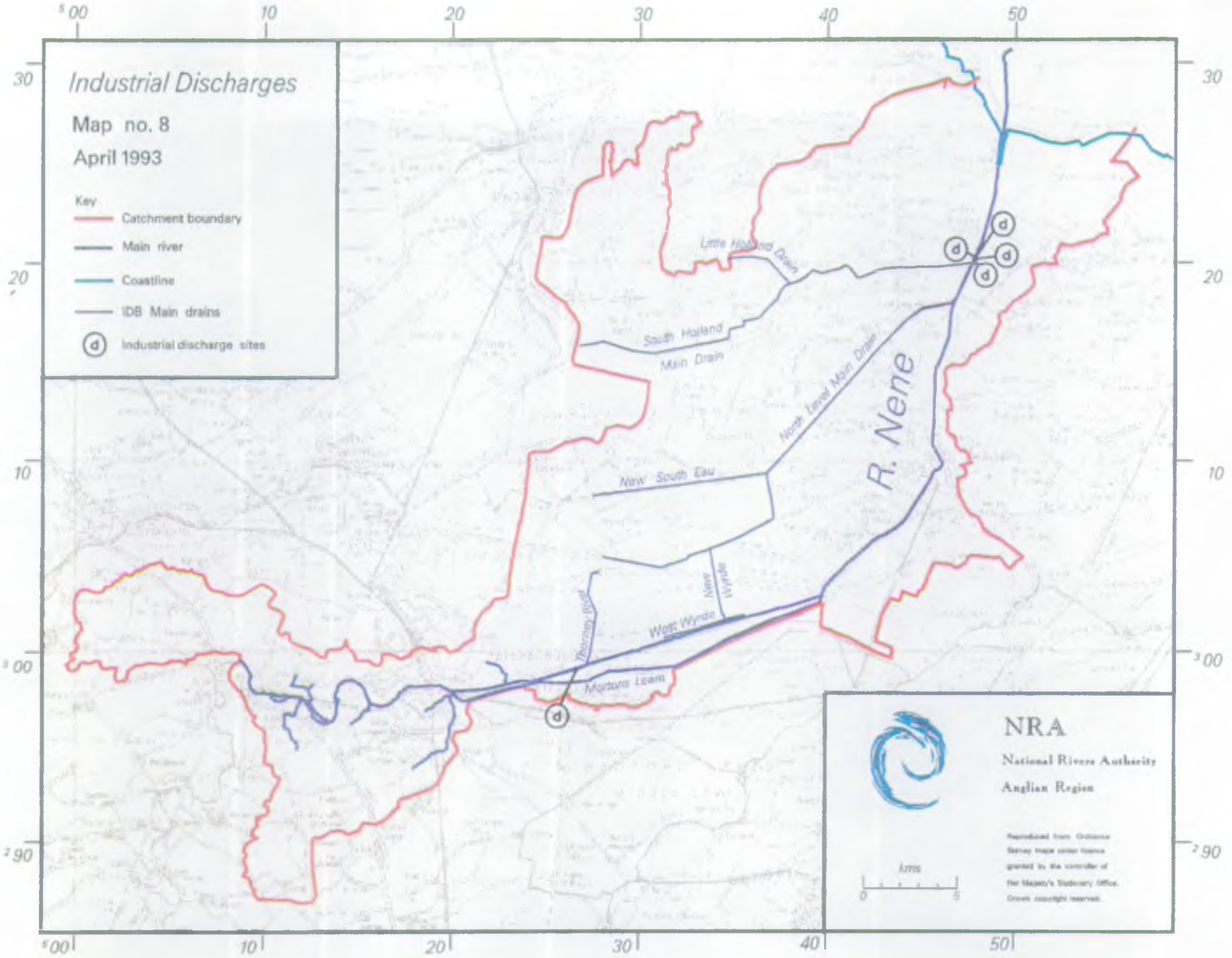
A number of storm sewage overflows occur which from time to time become contaminated and cause pollution.

Sewerage facilities in some small villages are inadequate in areas where either the soil conditions are unsuitable for septic tank drainage, or the density of development is too high.

Objectives

- To ensure that river quality standards are complied with and requirements for discharge improvements are identified and pursued.

- Implementation of an effective monitoring programme of surface waters and discharges to establish compliance with appropriate standards.


Industrial Discharges
Map no. 8
April 1993
Key
Catchment boundary
Main river
Coastline
IDB Main drains
Industrial discharge sites
Little Holland Drain
South Holland Main Drain
North Level Main Drain
R. Nene
New South Eau
New Wyrde
West Wyrde
Thorney Road
Mortons Leam
NRA
National Rivers Authority
Anglian Region
kms
0
5
5 00
10
20
30
40
50
30
20
10
3 00
2 90

3.3.2 INDUSTRIAL DISCHARGES

General

The criteria which must be complied with by discharges to controlled waters are stipulated in a consent granted by the National Rivers Authority. Consents are calculated taking into account upstream water quality and the dilution available in the receiving watercourse. Consents are designed to ensure that downstream water quality remains acceptable for its many uses and compliant with prescribed water quality standards.

Local Perspective

Within the Catchment there are 7 major industrial discharges:-

McCains
Haywards Foods
D.C.A.
Turners Turkeys
Potato Marketing Board
K.F.F. Potatoes
Russell Burgess

There are a number of industrial areas near most principal towns in the Catchment eg Peterborough, Wisbech and Long Sutton. Foul sewage and trade effluent are usually treated at Sewage Treatment Works operated by Anglian Water Services Ltd. However a number of major trade effluent discharges are made, after treatment, directly to watercourse.

Surface water run off from industrial areas can have a significant impact on water quality. Developers and industrialists must be aware of this and provide adequate pollution prevention measures for surface water disposal systems.

Objectives

To ensure that industrial development does not compromise water quality in controlled waters.

- To provide advice to developers and industrialists on measures to be taken to reduce the risk of pollution at their sites.

- To ensure consent conditions adequately safeguard water quality and prevent exceedance of EC Directives and Water Quality Objectives.

- Implementation of an effective monitoring programme of

surface waters and discharges to establish compliance with appropriate standards.

3.3.3 DIFFUSE SOURCES

General

Water quality problems are sometimes caused by pollutants being discharged to watercourses over a wide area, as a consequence of land use eg farming or high salinity groundwaters.

Excessive nutrient concentrations, nitrates and phosphates, can sometimes lead to a condition known as "Eutrophication". The algal population in a watercourse becomes dominant and the natural balance of water quality is destroyed.

Pesticides, Herbicides and Biocides can also be regarded as diffuse pollutants. They sometimes remain active in the environment for long periods of time, and are gradually washed into our river systems, where they may cause exceedance of water quality specifications.

Some groundwaters have a naturally high chloride concentration. As the groundwater table rises discharge to surface water occurs. This results in "brackish" freshwater systems which are generally poor fisheries and do not support healthy diverse freshwater biological life. This problem occurs in some low lying land drainage systems operated by Internal Drainage Boards. Saline intrusion by this means must not be confused with the more direct form of salt water ingress, caused by overtopping of tidal structures or operation of sea doors.

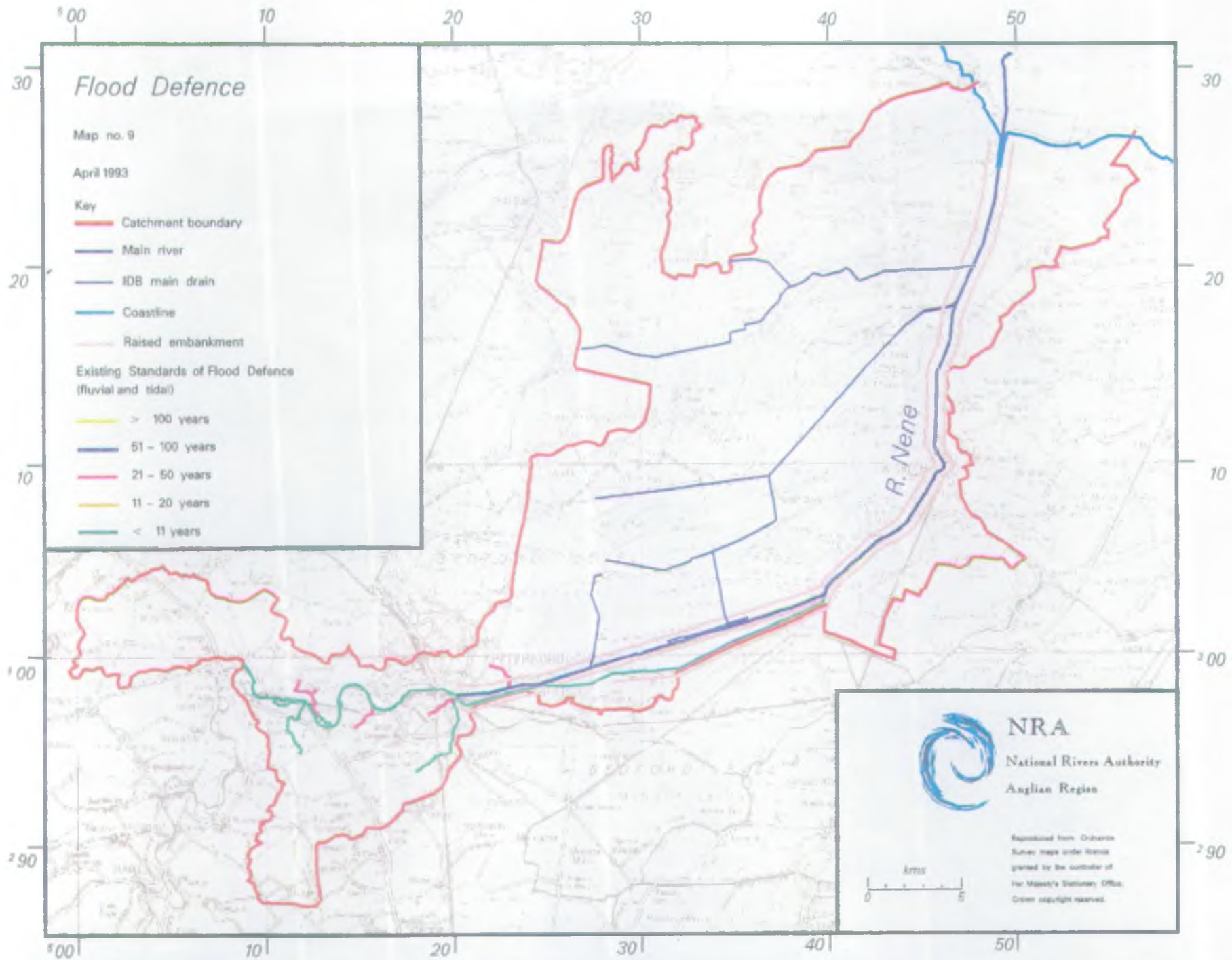
Local Perspective

A large part of the Lower Nene Catchment is intensively farmed, particular attention must be given to farming practices to avoid diffuse source pollution.

Controlling diffuse source pollution may require long-term strategies for change in land use and development. Pollution of the catchment by nutrients (eutrophication) is seen as a key issue.

Objectives

- Implementation of the EC Nitrate Directive will bring about many changes designed to address the problems caused by diffuse source pollution.


Flood Defence
Map no. 9
April 1993
Key
Catchment boundary
Main river
IDB main drain
Coastline
Raised embankment
Existing Standards of Flood Defence
(fluvial and tidal)
> 100 years
51 – 100 years
21 – 50 years
11 – 20 years
< 11 years
R. Nene
NRA
National Rivers Authority
Anglian Region
kms
0
5
Reproduced from Ordnance Survey maps under licence granted by the controller of Her Majesty's Stationery Office. Crown copyright reserved.
500
10
20
30
40
50
30
20
10
100
290

3.4 FLOOD DEFENCE

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 eg. 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 efficiency for the defences. The existing standards of flood protection are shown on the plan opposite.

Under the Water Resources Act 1991 the NRA have a general duty to oversee and have powers to control obstructive works on any watercourse. Internal Drainage Boards have similar powers for watercourses within their areas.

For the purposes of management, certain reaches of the river are formally designated as the "Statutory Main River". On the Main River, the NRA have special powers to carry out works or control the actions of others. Any proposal that could interfere with the bed or banks or obstruct the flow in the river requires formal consent from the NRA.

The nature of the works carried out for flood defence means that this use can come into conflict with other river uses - notably fisheries and conservation. Consultations are carried out and, where feasible, methods are devised whereby the river can achieve its flood protection target, and provide significant habitat enhancements.

Local Perspective

The upstream boundary for the catchment has been drawn at Wansford although natural flows originate much further upstream beyond Northampton. The Nene acts as the major carrier for the catchment receiving all drainage waters from the area as it flows in an easterly direction to its outfall in the Wash.

The river retains the natural characteristics of an upland watercourse along its length from Wansford to Peterborough. Minimum water levels are maintained by a system of weirs, sluices and locks. Downstream of Peterborough City the river becomes highly canalised with the channel trained and embanked. The tidal limit is at Dog in a Doublet Sluice, some 9km downstream of Peterborough and about 40km from the outfall to the Wash.

The tidal range at the mouth of the river varies between about 6.5m and 2.9m on spring and neap tides respectively. The range at the tidal limit depends on the freshwater flow in the river but is rarely greater than about 2.5m.

The land surrounding the river below Peterborough is below mean sea level and except through Wisbech earth embankments are provided on both sides of the channel to prevent flooding when water levels are high. The height of the embankments depend on the natural ground level but is generally between 2m and 4m. Embankments are set back from the edge of the main river channel, the width of the berm being up to 150m but more generally being less than 25m. The level of the berm is generally about the high water level of mean spring tides and is above the level of the surrounding land.

Through Wisbech the main river channel is trained between vertical sheet pile walls with crests set at about mean high water spring tide level. Flood protection is provided by sheet pile or brick walls set a short distance back from the edge of the main channel.

All of the land downstream of Peterborough is drained by local Internal Drainage Boards. The Boards maintain a 'main drain' network to control water levels across this low lying area of land. The Boards 'main drains' discharge waters to the tidal Nene by either pump, or gravity when tidal conditions permit.

The fen area is rich in land drainage history. The first major modifications to the Nene being made in 1274. Successive works involved the cutting of new channels and extensive straightening of former channels.

Much of the drainage system in operation today was originally designed and built by Vermuyden in the early 1600's. Although there has been no major changes to the alignment of the river this Century.

The productivity of the land throughout the catchment varies from grade 3 upstream of Peterborough to predominantly grade 1 with some grade 2 across the fen to the Wash.

The Authority maintains the "main river" Nene and the upland tributaries together with urban watercourses in Peterborough City. Serious and occasionally catastrophic flooding has taken place several times each century, in the past with the town of Wisbech suffering frequently. These floods were generally caused by extreme meteorological events, either heavy rainfall or high tide levels. However there are several mentions in the records of floods resulting from the defences being allowed to fall into disrepair, pointing to the need for a strong overseeing body with adequate funding to ensure that the defences are properly maintained.

Within the last 50 years extensive floods occurred in 1947, 1953, (although the flooding in the area of the Nene was not as serious as elsewhere on this occasion), 1968 and 1978. The floods of 1947 and 1968 were caused by storm surges raising high tide levels.

A number of schemes have been carried out in recent years to repair and upgrade parts of the river bank along the tidal reach. Continued investment is planned to maintain the adequacy of these defences.

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

The NRA provides information and advice to the County Police Force for the purpose of giving them sufficiently advanced warnings of areas likely to be affected by flooding, both tidal and fluvial.

The warnings are colour coded messages indicating the expected severity of an event and its impact on land and property which may be affected. Any one of three colour pre-fixed messages may be issued to warn of the following degrees of seriousness: -

Yellow - minor flooding of some roads only.

Amber - flooding of certain roads and some isolated property.

Red - Full flood situation with property and major roads at risk.

Fluvial events in this catchment, are substantially affected by the coincidence or otherwise of the peak flow and high tide. The objective is to provide reports on the developing situation and warnings by the colour phase system at the earliest opportunity.

Forecasts of flooding are compiled using tidal, rainfall and riverflow data collected from outstations by the regional telemetry system.

Objectives

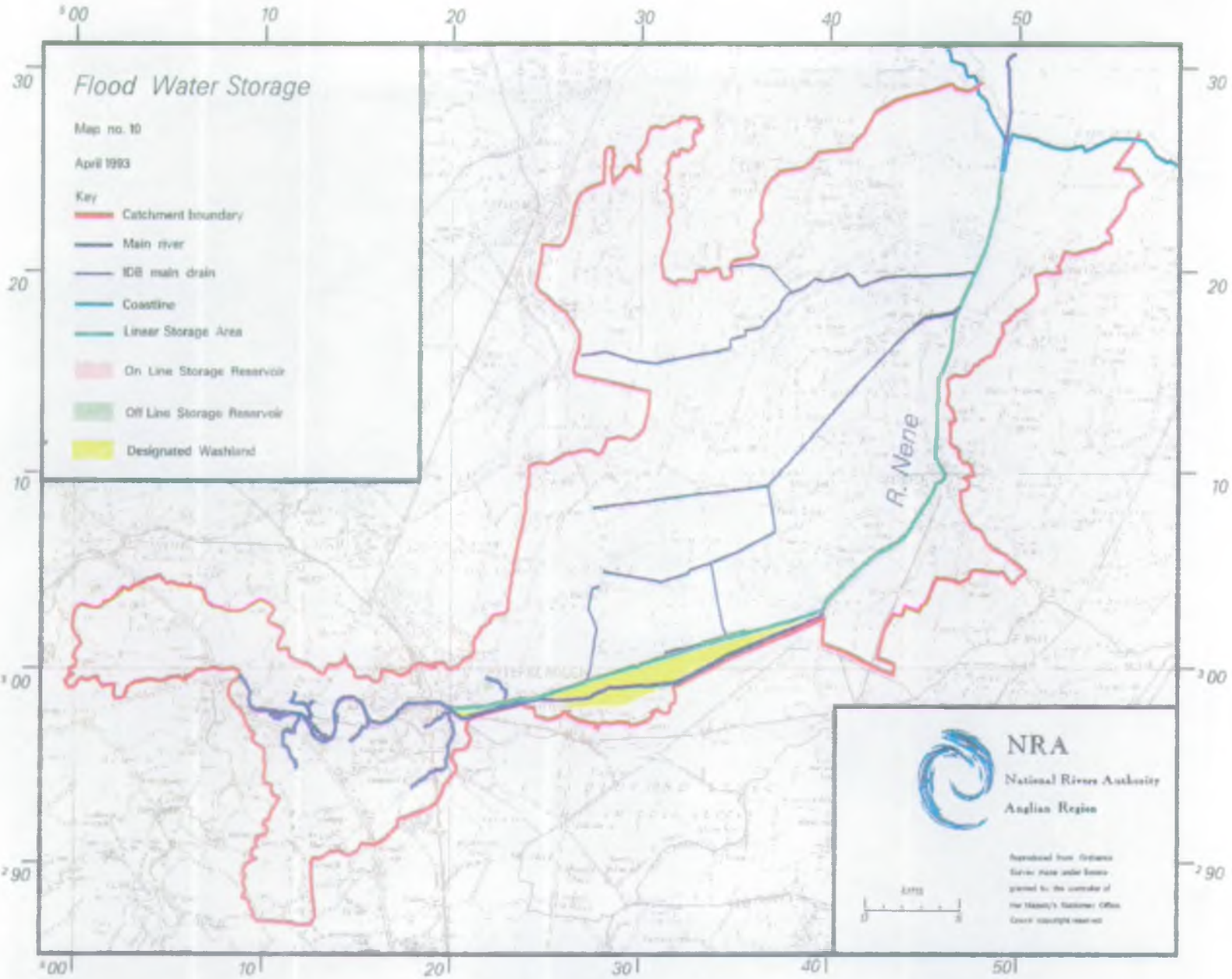
- To provide effective defence for people and property against flooding from rivers and the sea. The standard of protection to be appropriate to the land use, where this is economically viable. (See Appendix 2 for Anglian Region's Interim Levels of Service).

- To provide adequate arrangements for flood forecasting and warning.

- Carry out weed cutting 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 pumping stations.

- Carry out flood defence works with reference to environmental needs and requirements.


Flood Water Storage
Map no. 10
April 1993
Key
Catchment boundary
Main river
IDB main drain
Coastline
Linear Storage Area
On Line Storage Reservoir
Off Line Storage Reservoir
Designated Washland
R. Nene
NRA
National Rivers Authority
Anglian Region
0
5
5 00
10
20
30
40
50
30
20
10
3 00
2 90

3.4.1 FLOOD WATER STORAGE

General

This section covers the methods employed throughout the catchment for dealing with the storage of flood water when the system is in spate following precipitation.

Local Perspective

The Nene upstream of Peterborough together with upland tributaries rely entirely on utilisation of natural flood plain areas for the storage of flood waters. Site attenuation, off-line or on-line flood storage reservoirs are provided for urban developments in areas susceptible to flooding.

Downstream of Peterborough City the watercourse is embanked over of distance of approximately 48km, of which 40km is tidal. This embanked channel crosses the lowland coastal area and acts in effect as a flood storage area during periods of tidal surge when greater volumes of sea water pass up the estuary.

Tidal conditions play a major part in influencing fluvial response during periods of high flow. Discharge to the sea can be severely interrupted by a rising tide. Under these conditions water may be stored in the adjoining Nene Washland. This embanked area covers some 1450 Ha of agricultural land and can provide storage for up to 20 million m^3 of flood water. It is usually flooded to varying depths most winters.

Objectives

Water Quality and Quantity:

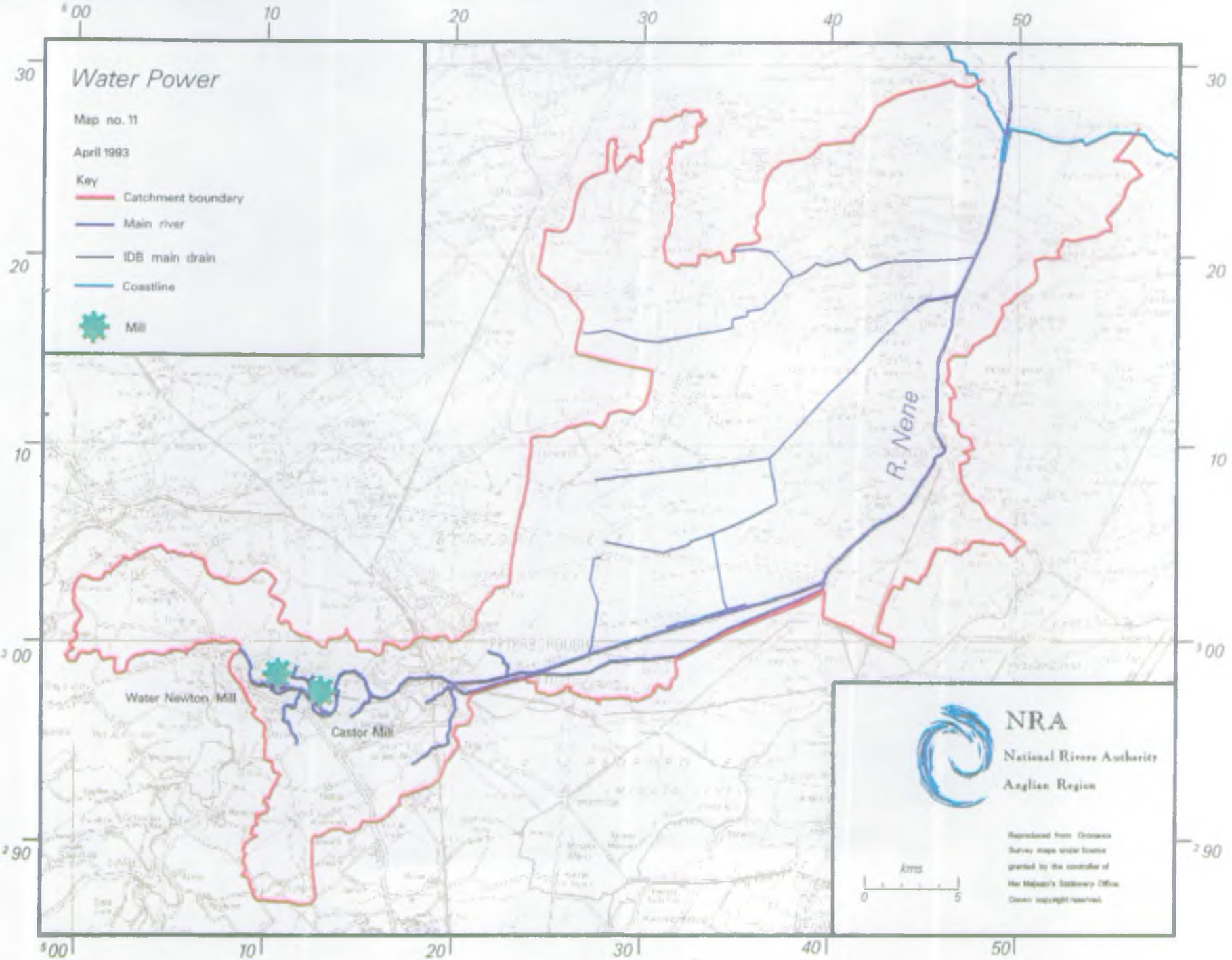
- The Nene Wash is a designated SSSI and is in the process of achieving RAMSAR status. Regular routine winter flooding of this area is regarded as beneficial to the continued importance of this site.

- To maintain the capacity and integrity of embanked channels to prevent flooding.

- To maintain the effectiveness of structures at the fluvial/tidal interface 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.


Water Power
Map no. 11
April 1993
Key
Catchment boundary
Main river
IDB main drain
Coastline
Mill
R. Nene
Water Newton Mill
Castor Mill
NRA
National Rivers Authority
Anglian Region
kms
0
5

3.4.2 WATER POWER (including Mill Rights)

General

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

Local Perspective

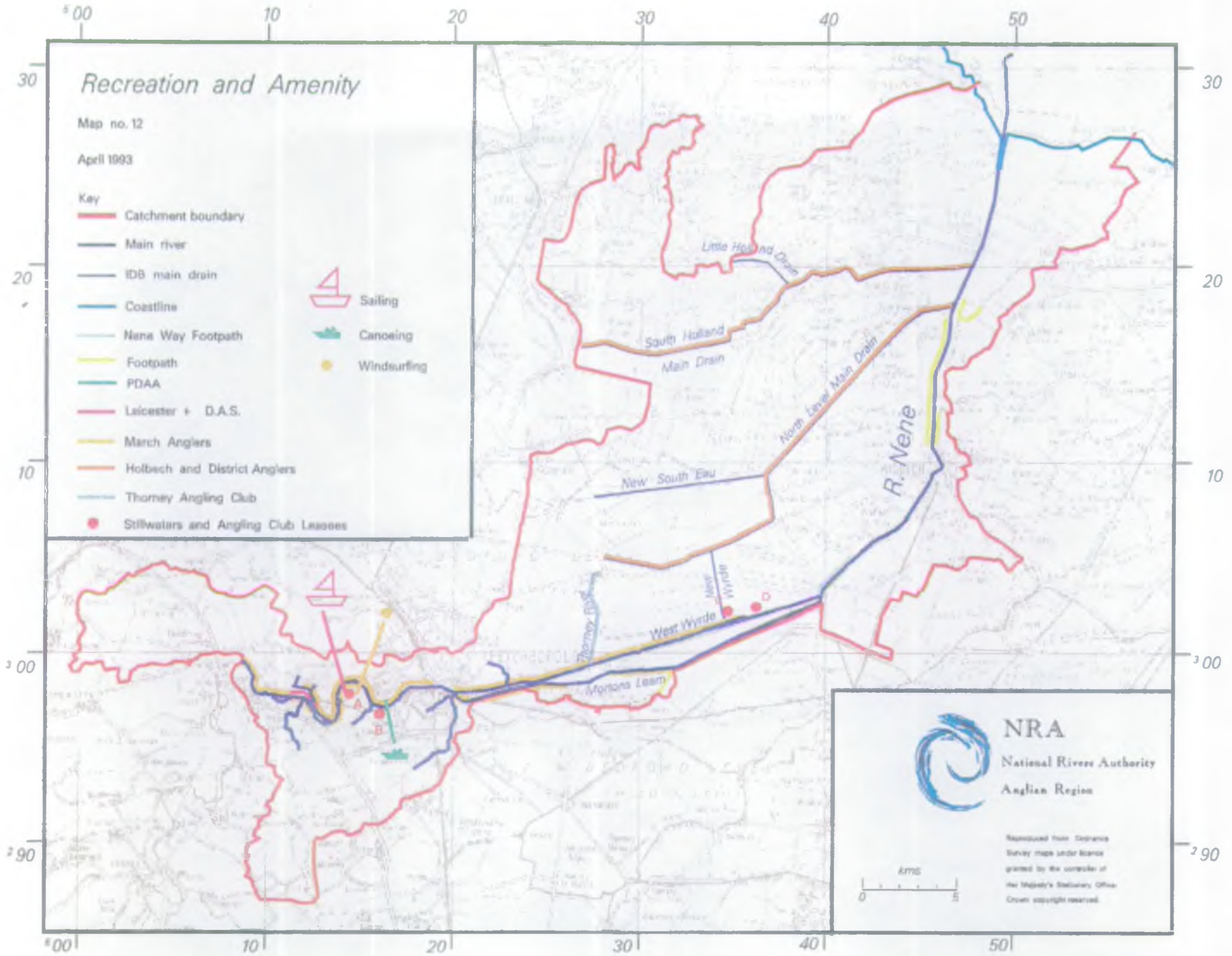
At present there are no sites within the catchment using water power to generate energy. The following are redundant mills in the catchment:

Water Newton Mill: Originally a traditional water wheel now defunct. The mill has been converted into a residential flat development. It has the potential for domestic power generation.

Castor Mill: An old traditional water mill now converted to a residential house. No use is made of the old mill wheel at present but it does have the potential for domestic power generation.

Objectives

- To maintain water quality to the standard necessary to permit the use of the mills if required.
- To maintain sufficient quantity of water to enable the prescribed use to be made.
- To maintain millstreams free of silt, obstructions and weed growth.


Recreation and Amenity
Map no. 12
April 1993
Key
Catchment boundary
Main river
IDB main drain
Coastline
Nene Way Footpath
Footpath
PDAA
Leicester + D.A.S.
March Anglers
Holbech and District Anglers
Thorney Angling Club
Stillwaters and Angling Club Leasees
Sailing
Canoeing
Windsurfing
Little Holland Drain
South Holland Main Drain
North Level Main Drain
R. Nene
New South Eau
New Wyrde
West Wyrde
Thorney Rise
Morsons Leam
A
B
NRA
National Rivers Authority
Anglian Region
Kms
0
5

3.5 RECREATION, AMENITY & TOURISM

General

This use deals with general recreational activities such as walking, horse riding, camping etc, associated with the water environment and the aesthetic aspects of the water. Boating, angling, immersion sports and wildfowling are treated separately.

Local Perspective

Many people live adjacent to water courses in the catchment and many people come to visit to undertake general recreational activities. The visual appearance and colour of waters is therefore of particular importance. The significance of the amenity value may range from high amenity eg. a watercourse passing through an area often frequented by the public to a low amenity watercourse passing through remote inaccessible countryside.

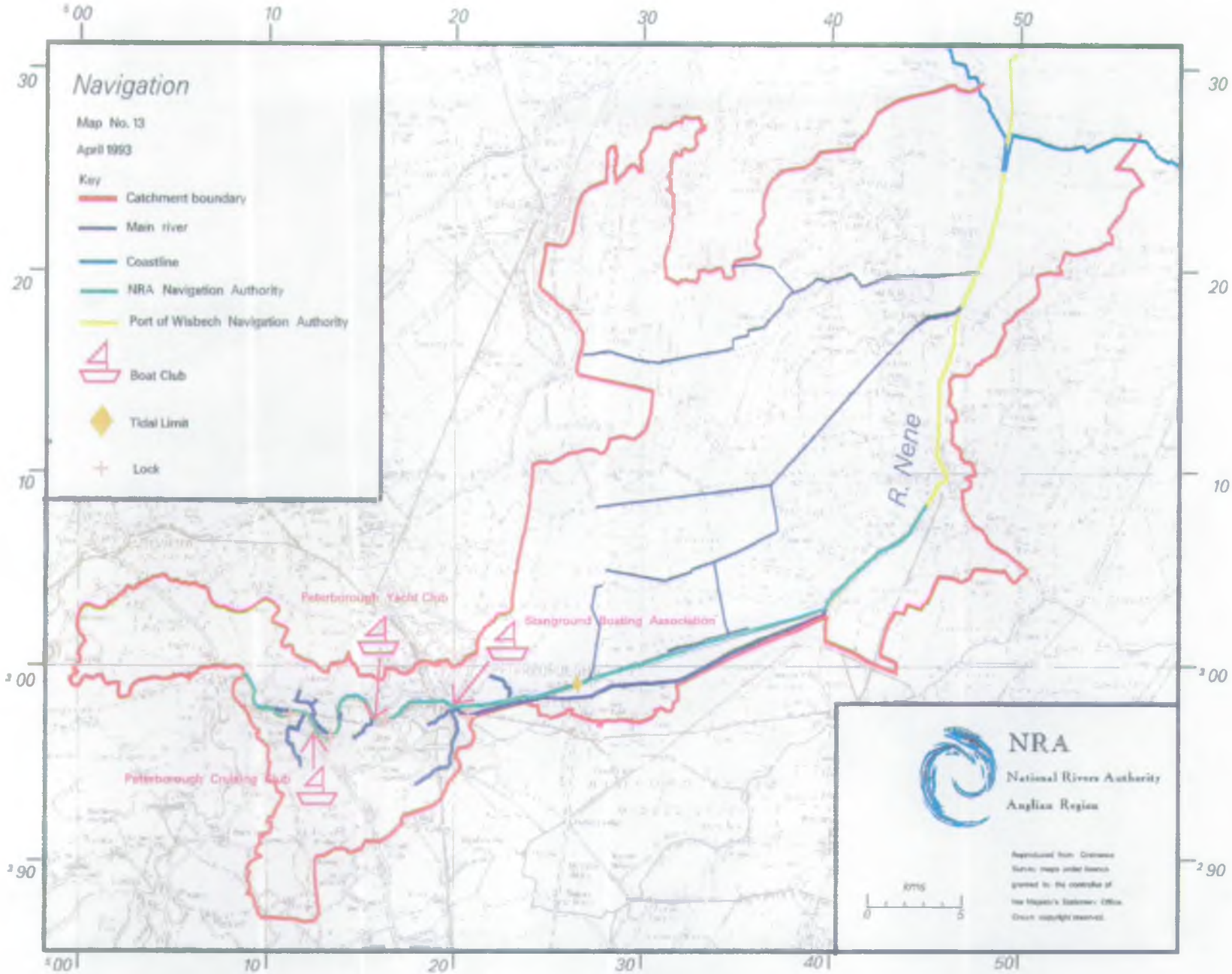
Many river banks in the catchment have access available to the general public and public footpaths are shown. The Nene Way passes through much of the catchment and follows the river from Wansford to downstream of Guyhirn.

Objectives

To maintain and improve water quality in order that the amenity value of the watercourses may be enhanced and protected.

To develop the recreational potential of NRA owned land either directly or in conjunction with local authorities and developers.

To maintain existing footpaths and existing access points.


Navigation
Map No. 13
April 1993
Key
Catchment boundary
Main river
Coastline
NRA Navigation Authority
Port of Wisbech Navigation Authority
Boat Club
Tidal Limit
Lock
R. Nene
Peterborough Yacht Club
Stanground Boating Association
Peterborough Cruising Club
NRA
National Rivers Authority
Anglian Region
kms
0
5

3.5.1 NAVIGATION/BOATING

General

This use relates to waterways providing navigation facilities and recreational boating and sailing on rivers and tidal waters.

Local Perspective

The Nene from Bevis Hall, Wisbech to Northampton is a "Recreational Waterways" defined in the Anglian Water Authority Act 1977 and National Rivers Authority is the Navigation Authority. Downstream of Bevis Hall, Wisbech to the Wash the Navigation Authority is the Port of Wisbech owned by Fenland District Council.

Wisbech Port continues to operate as a commercial concern handling vessels up to 1500t. Port Sutton Bridge located some 5km from the Wash came into operation in 1988 and can accommodate vessels up to 3500t. No commercial traffic now extends above Wisbech to Peterborough although limited use was made of the river in the past.

Access to the Nene can be gained from the sea by way of the Wash, or for pleasure boats a link exists with the Grand Union Canal at Northampton or the Middle Level system via Stanground at Peterborough.

Including the tidal limit at the Dog in a Doublet there are 4 locks on this length of the lower Nene which consist of pointing doors upstream and a vertical steel gate at the lower end. The exception to this is the Dog in a Doublet lock which consists of 3 vertical steel gates. The maximum dimensions for craft wishing to pass along the river are length 23.8m, beam 4m, draught 1.2m headroom 2.1m.

There are at present approximately 1300 pleasure boats registered on the entire length of the Nene between Northampton and Bevis Hall, Wisbech. A number of visiting craft also use the river during the summer season entering the system either via the Middle Level system at Stanground, Peterborough or via the Grand Union Canal at Northampton.

Most registered boat owners are members of a local boat club and are represented by The Association of Nene River Clubs. Most of the craft using the river are powered by diesel or petrol engine with some steam, sail or oar.

Facilities are provided for boat users along the length of the river and include drinking water, toilets, sewage disposal points. Most boat clubs also provide facilities for their Club members.

In addition to the main navigation the Ferry Meadows Country Park has sailing and overnight mooring facilities on a lake complex with direct access to the River Nene upstream of Peterborough.

Objectives

- Maintain all lock structures in operating condition
- Maintain the quantity and quality of the water suitable for all types of boating.
- Maintain sufficient depth of water to permit the use of suitable boats.
- Maintain sufficient residual flows to ensure tidal length of the Nene does not silt up thereby limiting the period of use of seagoing boats.
- Provide suitable facilities for the safe use of the navigation by members of the public.
- Provide suitable facilities to adequately deal with onboard wastes produced by boats.
- Improve operation of locking facilities by powering lock sites.

3.5.2 ANGLING

General

This use specifically relates to the use of the catchment by anglers.

Local Perspective

Angling for coarse fish occurs throughout the catchment on rivers/drains and lakes. Trout fishing only occurs on some lakes. The principal river/drain coarse fisheries and their lessees are shown. Angling on the River Nene is aided by the ease of access to much of the river length. On waters where access in more limited coarse angling tends to be concentrated around bridge and other access points where car parking is available.

Objectives

To protect and enhance fish stocks.

To provide suitable and safe access for angling.

3.5.3 IMMERSION SPORTS

General

This use deals with those sports such as canoeing, water-skiing, wind surfing, sailing and swimming where intimate contact with the water occurs.

Local Perspective

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.

Within the catchment immersion sports principally occur in and around Peterborough. Sailing and windsurfing occur at Ferry Meadows. There is a canoe slalom at Orton Lock although elsewhere canoe use is discouraged at weirs and sluices on safety grounds. Informal canoe use occurs at low levels throughout the navigable section of the catchment. In other non-navigable areas there is no general right of navigation and consequently access must therefore be negotiated with riparian land owners.

A speed limit of 7 m.p.h. applies throughout the navigation except for the de-restricted mile on the Nene (downstream of Peterborough) where no speed restriction applies. This stretch begins at the double span "Fitzwilliam Bridge" and extends 1 mile downstream, the length is clearly signed at both ends. Water skiing can occur within the mile because of the lack of speed restriction. Outside the mile water ski boats are unable to attain sufficient speed to operate.

Objectives

Rivers:

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

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

Tidal Waters:

To maintain quality to standards set down for bathing waters in accordance with the EC Bathing Waters Directive.

3.5.4 WILDFOWLING

General

This use covers the shooting of wildfowl on the river systems in the catchment.

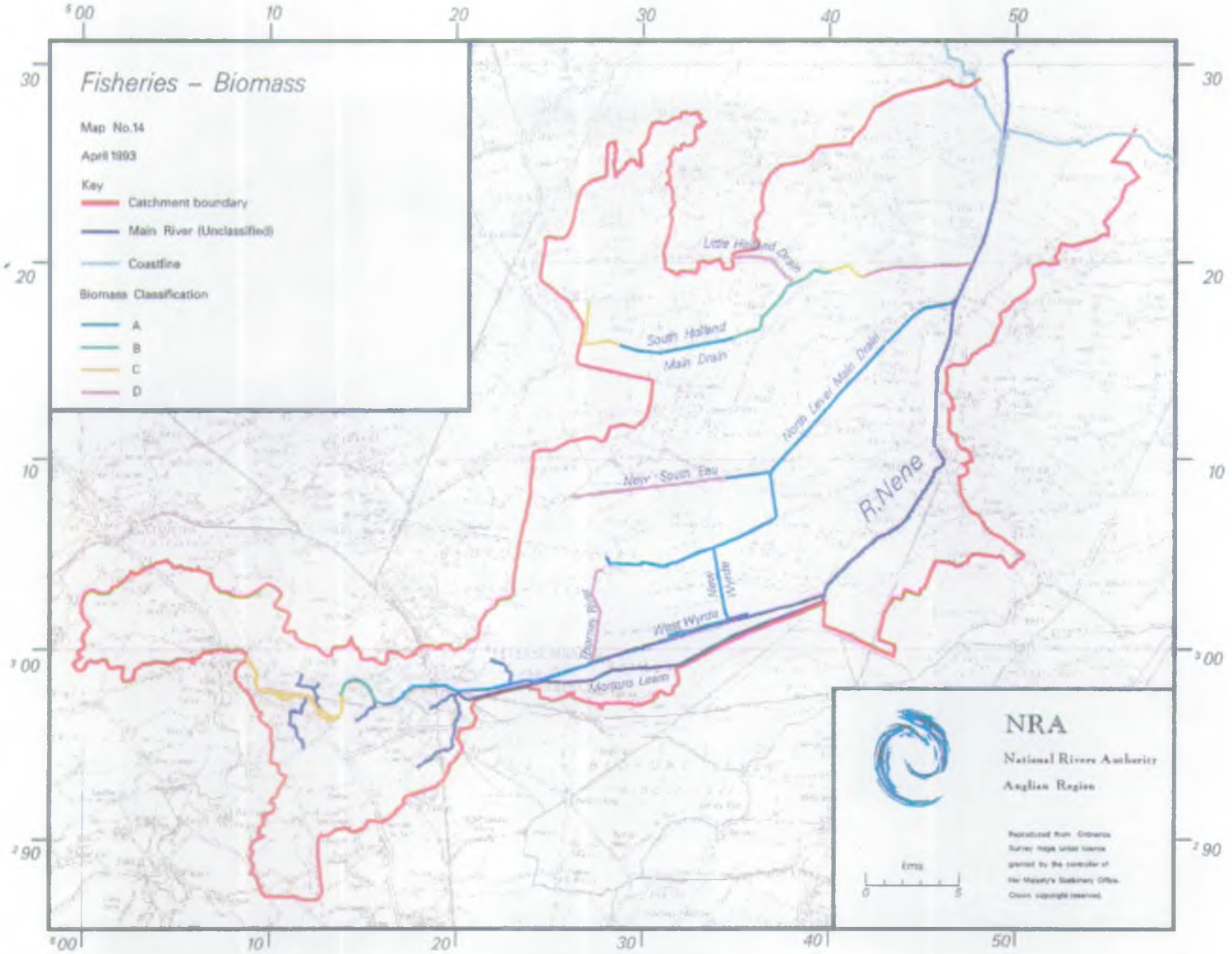
Local Perspective

Wildfowling has historically been looked upon by those living in the catchment as providing both food and sport. For many centuries on the Wash professional "Longshoremen" earned a living though shooting and fishing. Wildfowling generally involves the shooting of duck and geese flighting to and from their roosting and feeding grounds. Within this catchment the main species shot include mallard, wigeon and teal with the occasional pink footed goose.

Three wildfowling clubs operate within the catchment namely, Whittlesee wildfowling Association, Gedney Drove End Wildfowling Association and Fenland Wildfowling Association.

Objectives

To provide suitable and safe access to permit wildfowling.


Fisheries – Biomass
Map No.14
April 1993
Key
Catchment boundary
Main River (Unclassified)
Coastline
Biomass Classification
A
B
C
D
Little Holland Drain
South Holland Main Drain
North Level Main Drain
New South Eau
R.Nene
New Wyrde
West Wyrde
Morgans Leam
NRA
National Rivers Authority
Anglian Region
Kms
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3.6 FISHERIES

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.

This use covers:-

Coarse fisheries ie. the maintenance of breeding populations of coarse fish species.

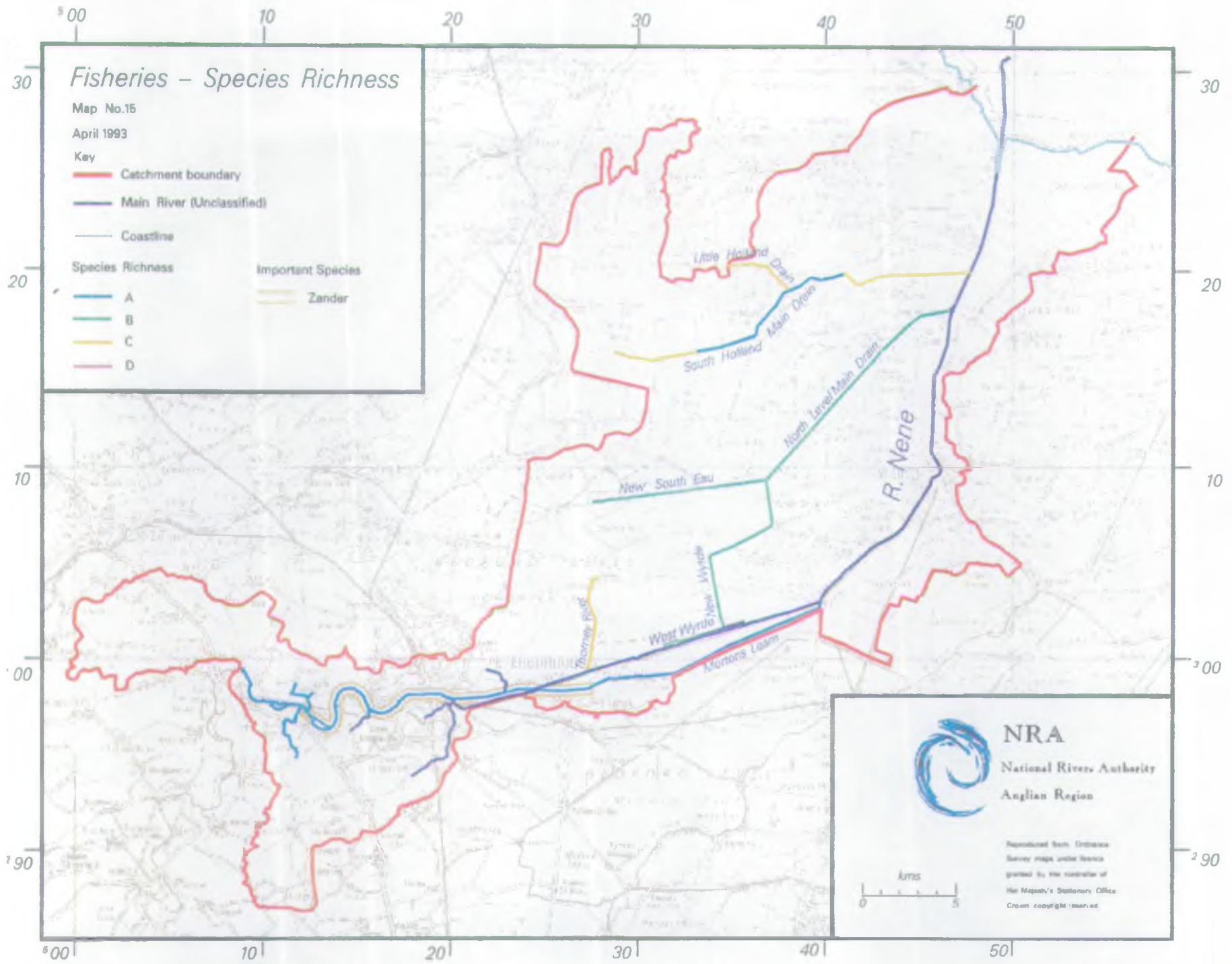
Local Perspective

The NRA undertake fish population surveys on major rivers on a 3 year rolling programme. Within this catchment surveys are conducted on the River Nene, Moreton's Leam, the South Holland Main Drain, the North Level, New South Eau, New Wryde Drain, Newborough Drain and the Thorney River. Extensive data has been collected on these systems and this has been used to calculate 2 fisheries classification systems. (see maps)

Traditionally fisheries classification has been based purely on fish biomass but this has been extended to include physical river features, namely width and gradient. The diagrams grade rivers on a A to D scale for biomass (diagram 1) and species richness (diagram 2).

All the rivers/drains in this catchment contain coarse fish populations and no breeding trout populations occur. Roach and common bream tend to be the dominant species present.

The River Nene contains a rich fish fauna (A/B) at a good biomass (A/B), although a biomass of class C occurs from Wansford to Water Newton. Species richness in the Mortons Leam is again excellent (A) but the biomass levels are variable and generally poor. The North Level Main Drain contains an excellent fish population both in terms of species richness and biomass. The Lower reach of the South Holland Main Drain shows both a poor species composition and abundance, however, the population significantly improves upstream of Foremans Bridge.


Fisheries – Species Richness
Map No.15
April 1993
Key
Catchment boundary
Main River (Unclassified)
Coastline
Species Richness
A
B
C
D
Important Species
Zander
Little Holland Drain
South Holland Main Drain
North Level Main Drain
R. Nene
New South Eau
West Wyrde
New Wyrde
Thorney River
Monors Leam
NRA
National Rivers Authority
Anglian Region
kms
0
5

The presence of Zander in the Nene is notable. The Zander is a continental species which was introduced into England to Woburn Abbey Lakes in 1878 and has since spread through much of the East Anglian Fens. Zander were known to have been introduced into the Great Ouse system in the late 1960's and their presence in the Nene has been known since 1984. Zander are thought to have colonised the Nene either by illegal stocking or via the Kings Dyke which connects the Nene to the Middle Level system.

At present the Zander population is relatively small consisting of a few large fish and considerably greater numbers of small immature fish. Zander are concentrated around Peterborough in particular around Ferry Meadows and survey results have recorded them upstream to Castor and downstream to Dog-in-a-Doublet. The NRA's policy with regards to Zander is that Zander caught during fisheries surveys should be removed and killed.

It is notable that carp are present in a significant length of the Nene (Northampton to Peterborough).

Objectives

- The overall objective is to sustain a natural fish population appropriate to the catchment and achieve class A on both classification systems.

- Water quality not to deteriorate below the limits for pollutants as specified in the EC Fisheries Directive (78/659/EC) for coarse fish species.

- Compliance with NRA quality objectives and statutory water quality objectives for fisheries.

- A variable flow regime where the monthly average reflects the natural flow conditions in the river. The natural mean monthly flow not to decline below the historic monthly Q95 except during drought conditions. Under spate conditions the release of water through sea doors to be gradually increased in order to minimise the sudden flushing of fish out of the river system.

- A diversity of natural river features to ensure a variety of habitat to maximise the production of fish populations including pool/riffle sequences and weedbeds for feeding, spawning etc.

- The presence of bankside vegetation to provide adequate shade and cover.

- To ensure that river maintenance operations have minimal deleterious impact on fish populations and enhance river habitat diversity where practical.

3.6.1 COMMERCIAL FISHERIES

General

This use relates to the use of the catchment by commercial eel fisherman but also includes details of commercial "fisheries" in the Wash.

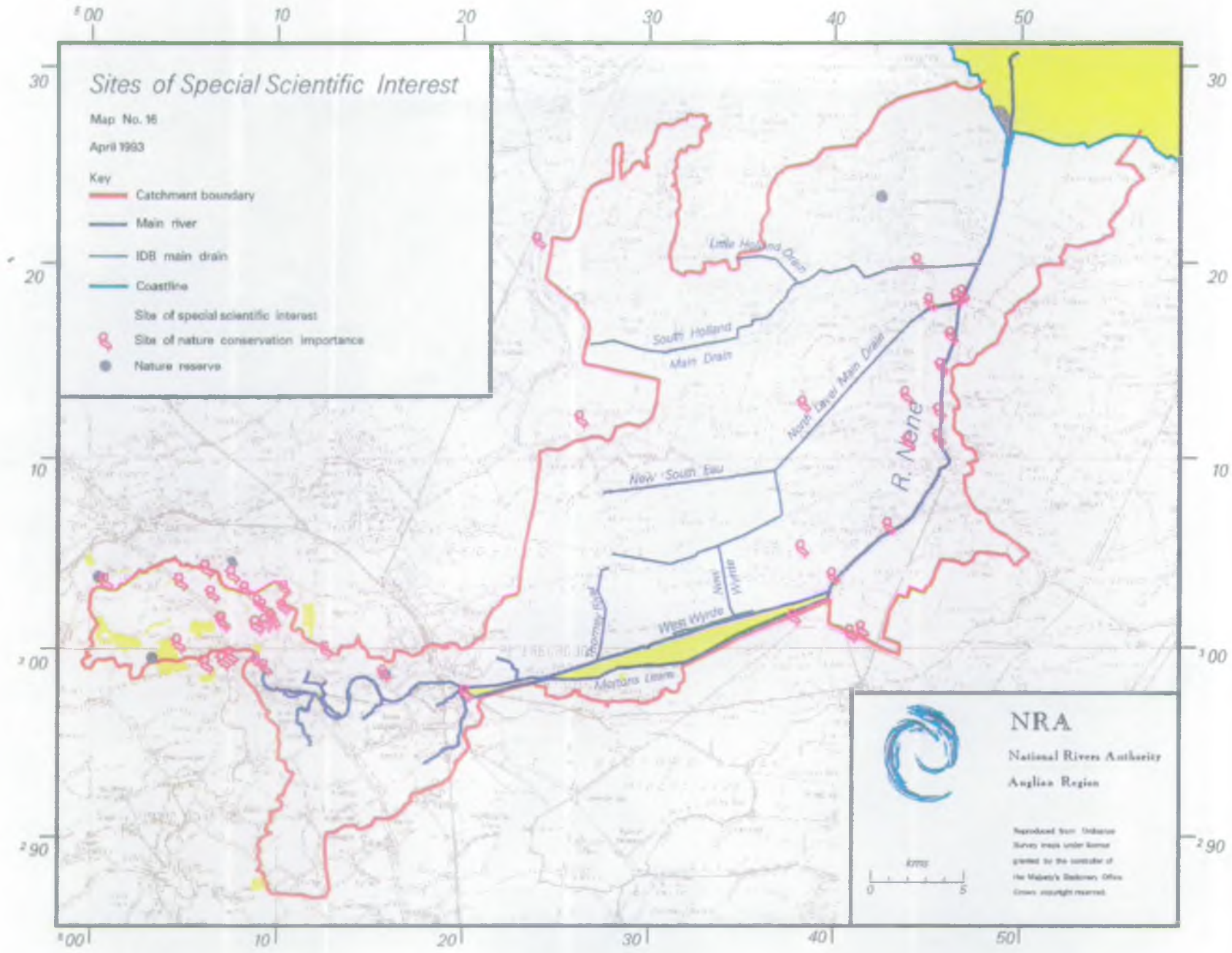
Local Perspective

Commercial eel fishing occurs throughout this catchment and some waters are leased to specific fisherman. Eel fishing is undertaken with a variety of licensed traps but principally with a fyke net, which is a conical net (with inscales) that has 1 or 2 leaders. Fyke nets are set on the bed of the river, generally in deep water. The season of eel fishing is from spring to late autumn, and in autumn "silver" eels ie. eels migrating back to sea) are caught in addition to "brown" eels.

The fishing for sea fish, crabs, lobsters and shellfish comes under the jurisdiction of the North Eastern Sea Fisheries Committee. They are responsible for enforcing parts of the sea fishery legislation, including the Sea Fisheries Regulations. The NRA has a responsibility under the Salmon and Freshwater Fisheries Act for salmon, trout, freshwater fish or eels in tidal waters out to six nautical miles. A small number of net licences have been issued in the past to fish for salmon and sea trout.

Objectives

- To protect and enhance fish stocks.
- To provide suitable and safe access to permit commercial eel fishing.


Sites of Special Scientific Interest
Map No. 16
April 1993
Key
Catchment boundary
Main river
IDB main drain
Coastline
Site of special scientific interest
Site of nature conservation importance
Nature reserve
Little Holland Drain
South Holland Main Drain
North Level Main Drain
R. Nene
New South Eau
New Wyrde
West Wyrde
Morton's Leam
NRA
National Rivers Authority
Anglian Region
kms
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3.7 CONSERVATION - ECOLOGY

General

The NRA has a statutory duty when exercising all its functions to further the conservation of flora, fauna. This includes wildlife such as kingfishers, may-flies and water violets which are truly dependent upon the river for their existence, to those species that simply exploit the river corridor. When formulating its own proposals or considering proposals from other parties it must take into account:-

- The protection of areas formally designated as being of particularly high conservations value eg. RAMSAR sites, Special Protection Areas (SPA), Environmentally Sensitive Areas (ESA), National Nature Reserves (NNR), sites of special scientific interest (SSSI)

- The protection of sites while although valuable in ecological terms, are not formally protected eg. County Trust Nature Reserves and Sites of Nature Conservation Interest (SNCI).

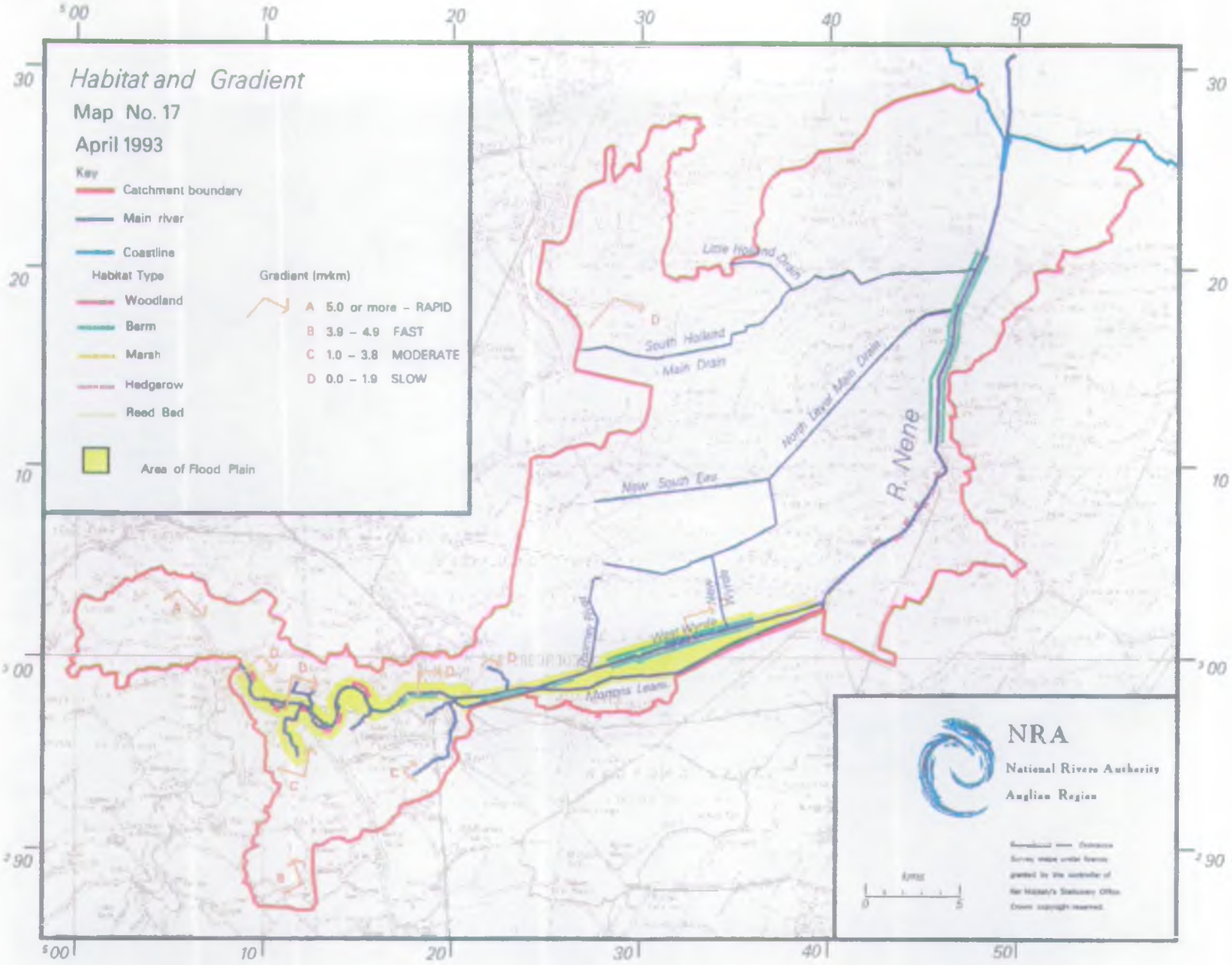
- Consultations with outside organisations where NRA work or consent is likely to impact on the sites above.

Local Perspective

The Lower Nene catchment can be divided into two distinctive areas, to the West of Peterborough it is predominantly a rolling landscape of limestone hills. Here mixed farming land is interspaced by large woodland blocks, west of which are designated SSSI's and include the Collyweston Great Wood and Easton Harmstocks NNR, noted for its outstanding range of semi-natural woodlands.

In this section the Nene meanders in a semi-natural state over a narrow floodplain. It is joined by three main rivers and a multitude of minor becks and brooks. The river side is well wooded and flanked by a combination of improved, semi-improved and unimproved grasslands. The latter includes Castor Flood Meadows an SSSI noted for its floral richness and traditional management of hay cropping and grazing. There are an additional 4 similar Wet grasslands SSSI's on the non-main tributaries to the Nene in this area.

To the East of Peterborough the Nene becomes a wide highland carrier with parallel raised flood banks. This is surrounded by low flat peatlands mostly reclaimed from the "Fens" over the past 350 years, the majority of which is under intensive arable farming.


Habitat and Gradient
Map No. 17
April 1993
Key
Catchment boundary
Main river
Coastline
Habitat Type
Woodland
Berm
Marsh
Hedgerow
Reed Bed
Area of Flood Plain
Gradient (m/km)
A 5.0 or more – RAPID
B 3.9 – 4.9 FAST
C 1.0 – 3.8 MODERATE
D 0.0 – 1.9 SLOW
Little Holland Drain
South Holland Main Drain
North Level Main Drain
New South Eau
R. Nene
Morton's Leam
NRA
National Rivers Authority
Anglian Region
Kms
0
5
5 00
10
20
30
40
50
30
20
10
3 00
2 90

The dominating conservation interests of this area are the internationally important Nene Washes, SPA, SSSI and RAMSAR site, and the Wash itself, into which the river discharges. The Nene Washes support approximately 3% of the European wintering populations of Bewick Swan and nationally important numbers of teal, wigeon, pintail and shoveler.

In summer it is important for breeding waders such as redshank, snipe and black-tailed godwit. This system is reliant on winter flooding and high summer ground water tables.

The Wash at the Nene outfall is of exceptional biological interest and represents one of Britains most important wildfowl and wader feeding areas outside of the breeding season. Providing a rich supply of invertebrate food for internationally significant numbers of migrant birds.

Mortons Leam (SSSI) contains a valuable aquatic flora.

The saltmarsh and shingle communities are also of considerable botanical interest.

In addition to the above sites there are a further 3 SSSI's in this lowland area. Two of which are noted for their geological interest.

In the whole catchment there are also several county trust nature reserves and over twenty SNCI's.

Objectives

- To protect and further the conservation of river corridors and to safeguard the special conservation interest for which sites have been designated.

- A variable flow regime where the monthly average flow reflects the natural (historic) flow conditions in the river. The natural mean monthly flow not to decline below the historic monthly Q95 except during drought conditions.

- The water table to be maintained at a high level where possible but particularly where wetlands occur. Spate flows should inundate wetlands.

- Spate flows to naturally cleanse the river channel.

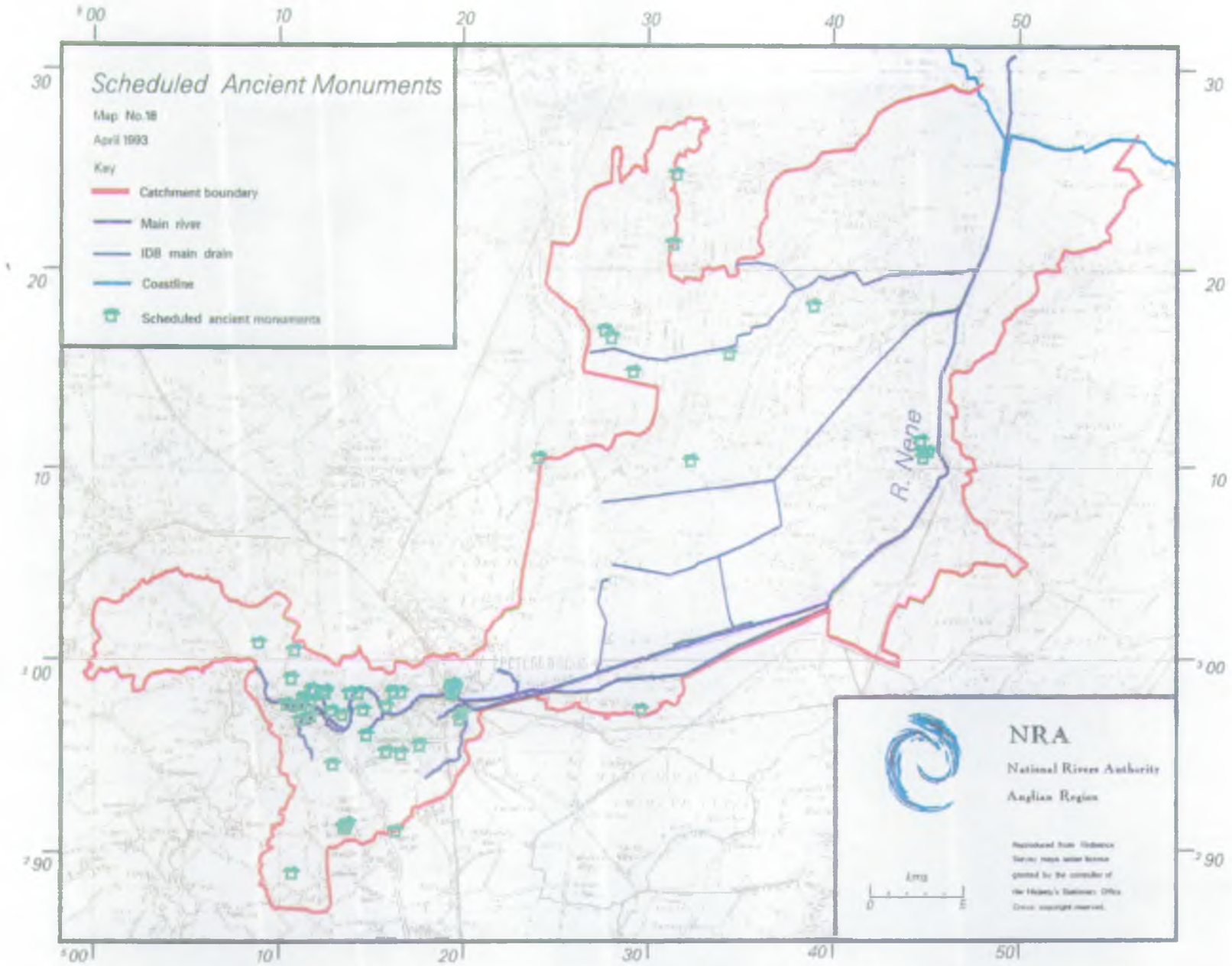
- The maintenance and enhancement of the diversity of natural river features such as meanders, pool/riffle sequences and the presence of aquatic vegetation. Also, the maintenance and enhancement of a diversity of river corridor habitats including marsh, fringe/overhanging vegetation, bankside trees and hedges, grassland. In addition the preservation of the features which contribute towards or give rise to the specific features of the designated conservation areas.

- The channel cross section to be appropriate for the river flow regime.

- 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 of where the conservation value of wetland SSSI sites is adversely affected.

- Water quality should not adversely affect the conservation value of watercourses or any special conservation areas.


Scheduled Ancient Monuments
Map No.18
April 1993
Key
Catchment boundary
Main river
IDB main drain
Coastline
Scheduled ancient monuments
R. Nene
NRA
National Rivers Authority
Anglian Region
0
1
km

3.8 CONSERVATION/LANDSCAPE ARCHAEOLOGY

General

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

This use covers:-

- The protection of areas formally designated as being of value, i.e. areas of Outstanding Natural Beauty, Scheduled Ancient Monuments (SAMs) and Sites of Special Scientific Interest (SSSI's) of geological or physiographical value.

- The protection of areas which although valuable in landscape and archaeological terms are not formally protected.

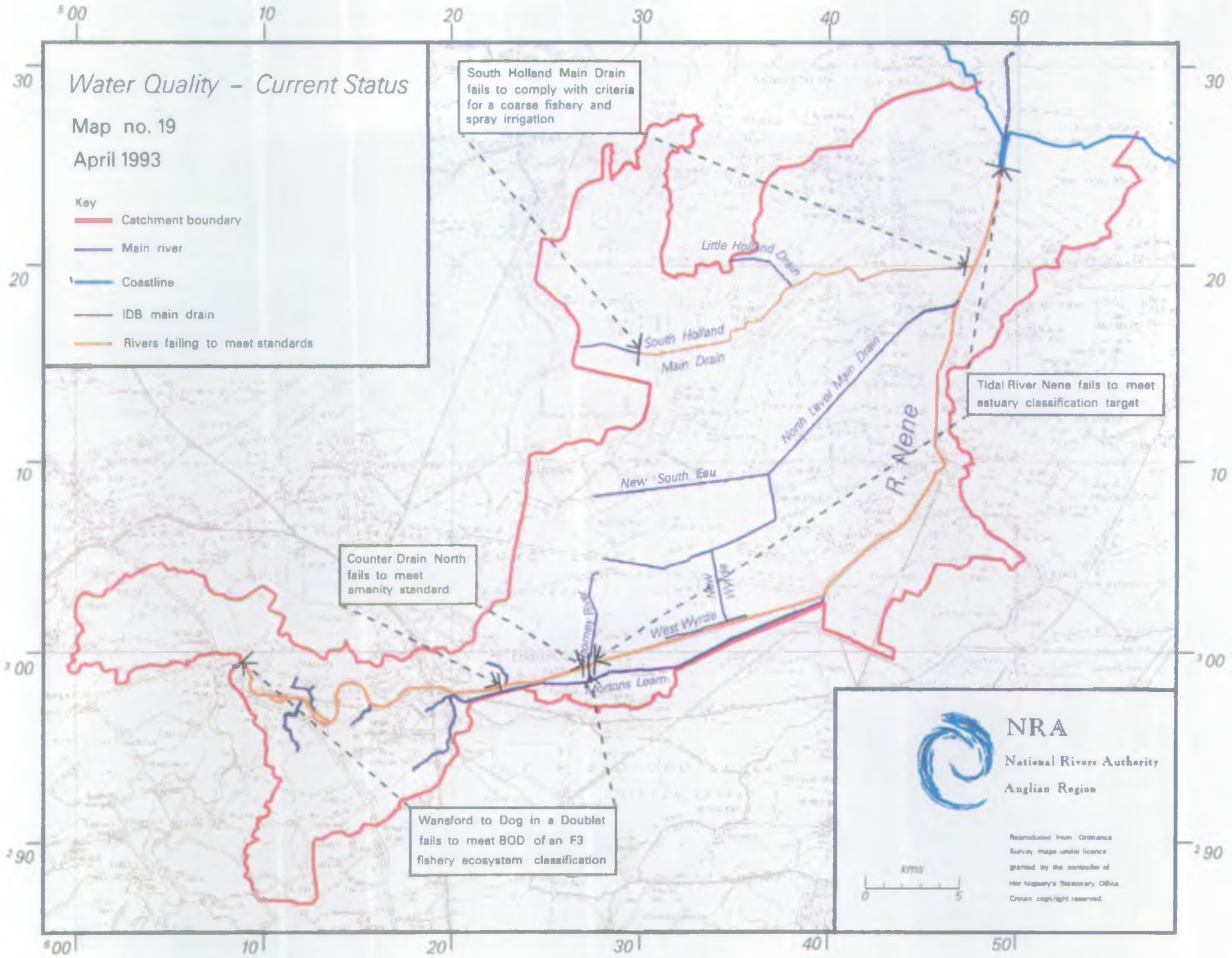
Local Perspective

Scheduled Ancient Monuments (SAMs) occur within the catchment and these are deemed to be of national importance. Apart from sites which could be physically damaged by NRA operations, the most sensitive sites are those on wetland/marshland areas. These sites could be damaged by the lowering of the water table and the drying out of the site.

Objectives

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

- The water table to be maintained at a high level in wetland/marshland areas.


Water Quality – Current Status
Map no. 19
April 1993
Key
Catchment boundary
Main river
Coastline
IDB main drain
Rivers failing to meet standards
South Holland Main Drain fails to comply with criteria for a coarse fishery and spray irrigation
Little Holland Drain
South Holland Main Drain
North Level Main Drain
R. Nene
Tidal River Nene fails to meet estuary classification target
New South Eau
West Wyrde
New Wyrde
Counter Drain North fails to meet amenity standard
Forsans Leam
Wansford to Dog in a Doublet fails to meet BOD of an F3 fishery ecosystem classification
NRA
National Rivers Authority
Anglian Region
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4. CATCHMENT-CURRENT STATUS

4.1 Water Quality:

4.1.1 General

Water quality throughout the catchment is variable. The Counter Drain (North) and the tidal River Nene are currently particularly notable for their poor quality. The recent drought has caused deterioration in some watercourses.

4.1.2 Local Perspective

River Nene

The River Nene at Wansford provides the first monitoring point on the Nene in the Catchment. Comparison of water quality at this point against appropriate targets concludes that the Biochemical Oxygen Demand target is exceeded.

This is repeated at all monitoring points down to the Dog-in-a-Doublet sluice which marks the tidal limit of the River Nene. The Biochemical Oxygen Demand specification of 6.0mg/l for an F_2 fishery is the main parameter exceeded. Reducing Eutrophication in the River Nene and/or improving flow are the means by which this situation may be reversed.

The Nene between Wansford and the Dog in a Doublet Sluice includes a rich assemblage of invertebrates which are particularly associated with marginal macrophytes. The saucer bug Aphelocheirus Montandune regularly occurs in low numbers at Wansford and this site is only one of two in the Northern Area. Aphelocheirus requires very good quality deep flowing water for its survival.

Water quality (as demonstrated by both chemical and biological monitoring) in the tidal River Nene, downstream of the Dog in a Doublet sluice is poor. In June 1992 80,000 fish (principally eels) died and 20,000 were rescued by the NRA, immediately downstream of the Dog-in-a-Doublet Sluice. This was due to high ammonia and low oxygen levels. If fish passage upstream of the sluice had been possible (ie. via a fish pass) then a considerable number of fish could have moved out of the area of poor water quality.

Mathematical Modelling of this section demonstrates that the major influences on water quality are the effects of effluents discharged to this section and tributary systems. Improvements in effluent quality must be achieved if water quality is to improve in this section of the River Nene. Major effluent improvement programmes are already underway at some sites.

At Stanground Sluice, which is 5km upstream of the Dog-in-a-Doublet Sluice, water is abstracted to the Middle Level System. During times of low river flows this can result in an almost stationary body of water between these sluices. During the summer of 1992 a minor fish loss (approximately 50 fish) occurred which was related to low oxygen levels.

Counter Drain (South)

The Counter Drain (TL 291 989 - TF 389 022) contains an exceptionally rich invertebrate and plant community. A wide diversity of invertebrates occur which include the red eyed damselfly (Erythromma najas), the water bug (Ilycoris cinicoides), the broad bodied chaser (Libellula depressa). Uncommon macrophytes included bladderwort and water violet.

Counter Drain (North)

The Counter Drain (TL 220 981 - TL 274 995) receives effluent from Flag Fen STW, serving Peterborough and a small amount of surface water drainage. The invertebrate community present in the Drain downstream of the STW is typical of that found in waters grossly polluted with organic effluent. In addition, field observations show that at times direct invertebrate mortalities occur. This is probably due to elevated concentrations of ammonia. The ammonia concentration in this watercourse fails to comply with appropriate standards and must be reduced.

Padholme Drain and Reservoir

The drain and reservoir convey surface water from industrial and urban areas. Water quality in the drain has been poor. The reservoir was constructed in 1970 as a flood storage reservoir for the Padholme drain, which passes through the Flag Fen Bronze Age site. With the co-operation of local industry, major sources of pollutant have been identified and removed or treated. It is now expected that water quality will steadily improve.

South Holland Main Drain

Water quality in the South Holland Main Drain has been adversely influenced by the drought in recent years. The lack of freshwater flow has highlighted the problems caused by 'natural and unnatural' salt water ingress. Modifications to the sluice should reduce the amount of sea water which is allowed to enter the system.

A reasonable quality invertebrate fauna is to be found at Weston Fen and upstream of Bridge House Farm Sluice. Some changes were detected downstream of Bridge House Farm Sluice. At Cliftons Bridge a very marked loss of diversity occurs with a loss of all salt intolerant groups and the dominance of large populations of salt tolerant or brackish water species being observed. Chemical monitoring of water quality confirms that higher concentrations of chloride are to be found nearer the sluice. The fish population in the lower reach were able to migrate upstream and through Coy Sluice to avoid saline water. However, in the summer of 1992 the sluice was shut to prevent saline intrusion upstream and as a consequence the NRA had to undertake a fish rescue and transfer fish over the sluice.

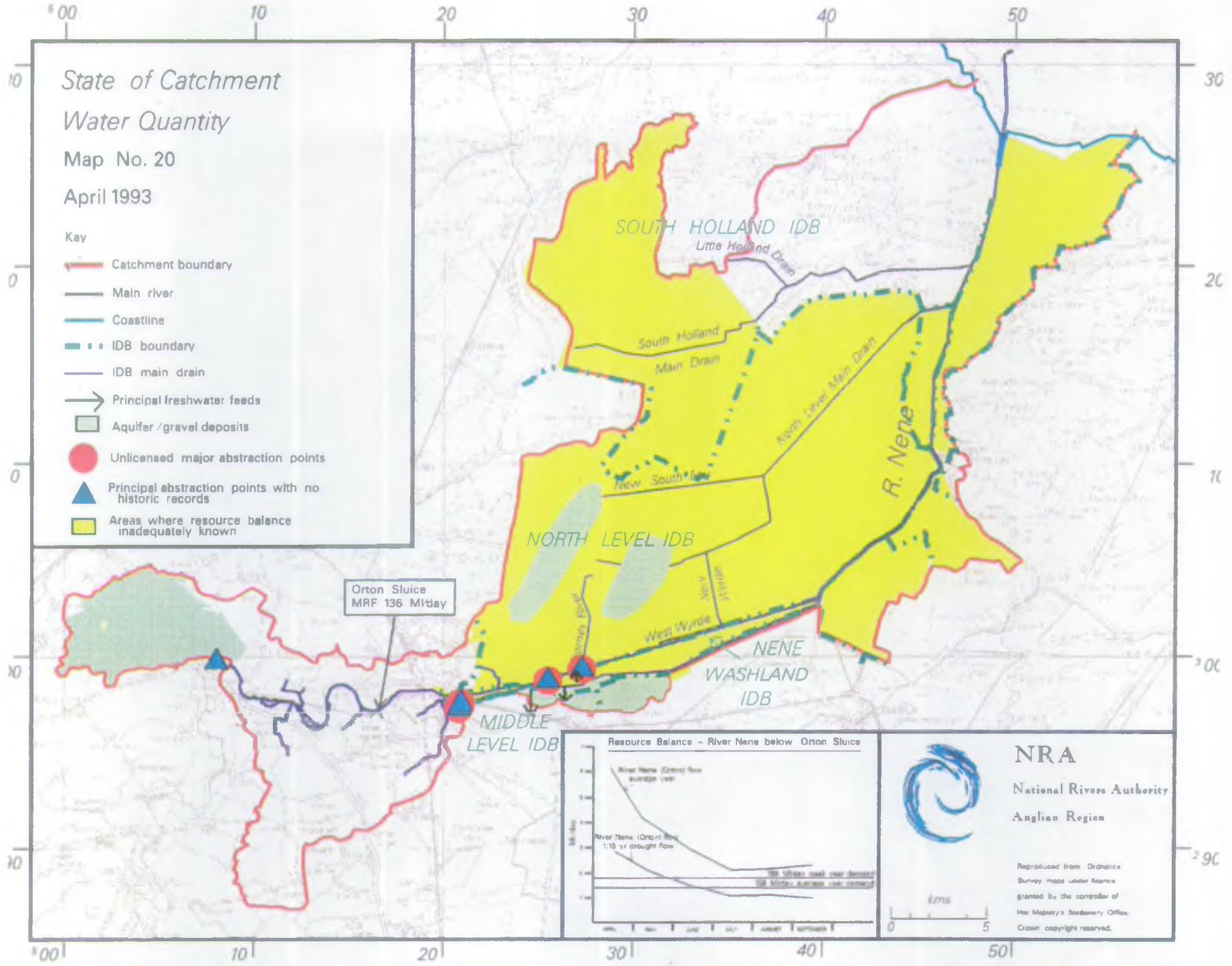
Saline intrusion via the sluice is believed to be the principal cause of water quality problems.

North Level

Water quality in the upper reaches of the North Level Drain supports an excellent fishery, in the lower reaches natural salt water ingress occurs.

Other Watercourses

Other watercourses in the Catchment are monitored biologically but supporting chemical monitoring data are not available. Biological monitoring implies poor quality in some watercourses which should be investigated further eg. Weasenham Lane area, Wisbech and the Padholme Drain.


State of Catchment
Water Quantity
Map No. 20
April 1993
Key
Catchment boundary
Main river
Coastline
IDB boundary
IDB main drain
Principal freshwater feeds
Aquifer / gravel deposits
Unlicensed major abstraction points
Principal abstraction points with no historic records
Areas where resource balance inadequately known
SOUTH HOLLAND IDB
Little Holland Drain
South Holland Main Drain
North Level Main Drain
New South Eau
R. Nene
NORTH LEVEL IDB
Orton Sluice
MRF 136 Ml/day
West Wyrde
NENE WASHLAND IDB
MIDDLE LEVEL IDB
Resource Balance – River Nene below Orton Sluice
River Nene (Orton) flow 1:10 yr drought flow
NRA
National Rivers Authority
Anglian Region
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4.2 CURRENT STATUS - WATER QUANTITY

4.2.1 GENERAL

This section summarises the total licensed and actual abstraction within the catchment compared with the available resource. Licensed and current actual usage have been estimated for each catchment or sub-catchment. In practice the River Nene and it's tributaries in the catchment can be regarded as a single catchment but the adjacent IDB systems are dealt with separately. The available resource is derived from effective rainfall (which contributes to surface water resources by surface run-off or to groundwater resources by recharge to the water table) and effluents returned to the surface water system. Both average and drought year available resources have been estimated. These totals are compared with the total annual licensed abstraction and the actual consumptive use in 1991.

The purpose of the above comparison is to illustrate the scale of water resource development within the catchment.

A key characteristic of the catchment is that in years with below average resource availability there is a deficiency in resources available to meet current demands including the need for protection of navigation and environmental interests in the Nene downstream of Peterborough.

4.2.2 LOCAL PERSPECTIVE

Surface water - River Nene

The water resources of the Nene upstream of Orton are principally committed to Public Water Supply by virtue of the licensed abstraction at Wansford to Anglian Water Services. This licence has no effective total quantity but abstraction is limited by pumped capacity to 764 tcmd and an MRF of 136 tcmd at Orton. The abstraction is geared to meeting the design yield of Rutland reservoir. AWS have sufficient resources to meet forecast water demands to the current planning horizon (2015). Current demand at 61 tcma (1991) is around 31% of licensed entitlement.

There is a modest in-river demand for water between Wansford and Orton, principally for industrial use, and is either for cooling and therefore returned to source or not currently maximised Current demand at 152 tcma (1991) is around 2% of licensed entitlement.

The riverflow passing Orton Sluice into the Orton Sluice to Dog-in-a-Doublet Sluice (tidal sluice) section is determined by the actual Wansford abstraction by AWS. Although the MRF is set at 136 tcmd there has historically been a greater flow even in the dry years 1989-1992.

There are a number of water demands in the Orton to Dog-in-a-Doublet section which are very significant in dry years. The demands include North Level IDB (up to 10 TCMD), Middle Level Commissioners (up to 135 tcmd) and RSPB/English Nature (up to 40 tcmd). Water demands downstream of Orton Lock gauging station exceeded available riverflows in 1990 and this led to zero flow at Dog-in-a-Doublet Sluice and a falling river level between Orton Sluice and Dog-in-a-Doublet Sluice. However, in an average year adequate flows are available to meet current demands and maintain water levels.

The effluent from Peterborough (around 60 tcmd) is discharged directly to the tidal Nene section and does not contribute to freshwater resources. Current water quality modelling indicates that significant and unobtainable freshwater flows to the tidal section would be necessary to achieve water quality targets. Consequently there are only minor freshwater demands from the tidal river section downstream of Dog-in-a-Doublet sluice.

In years of average or above average resource availability (river flow) the resource balance shows there are surplus water resources in the Nene to meet current and some future demands subject to limiting conditions to protect existing uses and users.

However, in years with below average resource availability there is a deficiency in resources available to meet current demands. During these periods actual demands cannot be met and river levels cannot be maintained. Based on a 50 year record of gauged riverflow at Orton Sluice the frequency of occurrence of the above resource deficiency period is around 1 year in 5 on average. In addition flows may fall below the current MRF of 136 tcmd also with the same frequency.

As public water supply demand increases abstraction from the River Nene at the upper end of the catchment to feed Rutland Water will increase. This will increase the periods during which the flows in the Orton Sluice to Dog-in-a-Doublet Sluice section will approach 136 tcmd (the current MRF) and fall below actual demand. This will therefore increase the frequency and duration of periods of resource deficiency.

Surface Water - IDB Catchments

There are four principal Internal Drainage Boards (or groups of Boards) relevant to the catchment - North Level, South Holland, Nene Washlands and Middle Level (external to the catchment).

These fen areas have few indigenous water resources other than rainfall storage, minor effluent discharges and minor groundwater seepage from sand and gravel deposits. Since in summer potential evaporation exceeds rainfall by some 150 mm there are effectively no reliable summer resources, particularly in dry years. To sustain drain levels and water demands in summer, water has to be imported from "high level" rivers. These water transfers, both to and within IDB areas, are via 'slackers'.

Water demand from the fen areas is principally in summer and consists principally spray irrigation and additionally agricultural use and under-irrigation.

Water balance studies have been made for the Middle Level fens but not for the North Level, South Holland or Nene Washland areas. Based upon correlations with the Middle Level, water balances have been estimated except for the Nene Washland which is considered separately.

In the IDB areas within the catchment, there is a surplus of resources in average and above average resource availability years. However, in a 1 in 10 year drought there is a deficiency in the North Level area of up to 19 tcmd. There is no deficiency in the South Holland area since there is little irrigation demand. In the Middle Level much greater deficiencies of up to 106 tcmd are indicated in a 1 in 10 year drought (a peak deficiency up to 135 tcmd recorded in 1991).

The IDB's currently seek to maintain levels within their areas by transfers of water from the "high level" rivers, which in this catchment places a significant demand on the River Nene. (North Level deficiencies are split between River Nene and River Welland). The resource balance of the River Nene has been described above. These water transfers are not licensed water under the Water Resources Act 1991.

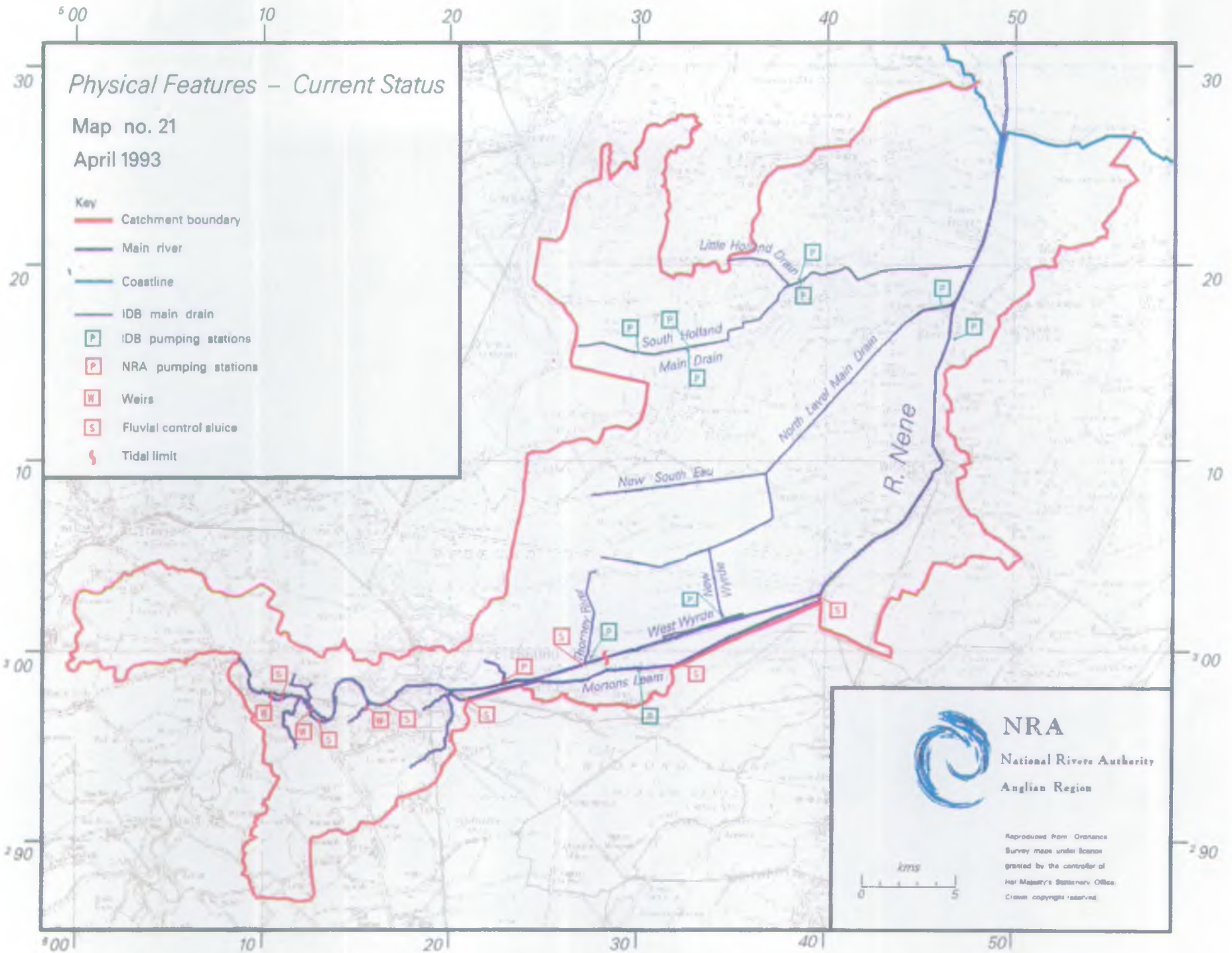
The pattern of resource balance in the Nene Washland area is considered to be similar to the other areas. Whilst there is some irrigation demand the principal demand is from RSPB/English Nature to meet environmental needs (suitable conditions for migratory birds) and to provide wet fencing for management of the Wash. These uses are currently not licensed. In below average resource availability years there is a serious resource deficiency within the Morton's Leam (SSSI) of up to 40 tcmd. This also creates demand for water transfer from the River Nene.

Groundwaters

The available resources of the catchment are limited by relatively small areas of aquifer outcrop and the network of draining springs and surface watercourses. The total resource has not been quantified. In dry/drought years some local deficiencies in supply are likely. Given the nature of the resource only small local additional demands may be met, subject as necessary to controls to protect existing uses and users of water and to potential unreliability problems at times.

4.2.3 SUMMARY

The catchment has a deficiency of resources to meet abstraction for agricultural and conservation purposes and to sustain river levels for water quality and navigation purposes in its lower sections. As abstraction for public water supply purposes increases, for which there is not a resource deficiency, the frequency and duration of resource deficiencies will increase. Currently deficiencies can be expected on average 1 year in 5.


Physical Features – Current Status
Map no. 21
April 1993
Key
Catchment boundary
Main river
Coastline
IDB main drain
IDB pumping stations
NRA pumping stations
Weirs
Fluvial control sluice
Tidal limit
Little Holland Drain
South Holland Main Drain
North Level Main Drain
R. Nene
New South Eau
New Wyrde
West Wyrde
Thorney Rdf
Morrons Leam
NRA
National Rivers Authority
Anglian Region
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4.3 PHYSICAL FEATURES

4.3.1 General

The Lower Nene is readily split into two distinct river types, namely upstream and downstream of Peterborough. As a consequence of this the NRA has two distinct methods of flood control. Upstream of Peterborough the river maintains a semi-natural form gently meandering with regular extensive use of flood plains for storage of water. Downstream of Peterborough the landscape is low lying fen with straightened river contained within raised flood embankments. The NRA provides a level of flood protection appropriate to the land use where this is economically viable (appendix 2).

Major investments have been made in improvements to flood defences, particularly in providing protection from tidal flooding over the past 15 years. Continued investment is being made to ensure the maximum target levels of protection are maintained for main river within the catchment area by providing an ongoing programme of both new and maintenance works.

4.3.2 LOCAL PERSPECTIVE

Upstream of Peterborough

Passage of craft through the navigation locks requires significant effort in operating the vertical lift guillotine gates in particular, and to a lesser extent the pointing mitre doors on the upstream entry to the lock pen. A programme of powering lock sites to assist in their operation commenced in 1990.

The floodplain can in places be several hundred metres wide and much of it is permanent "improved" grassland with pockets of species rich, unimproved meadows.

In stream aquatic plants commonly present are, shining perforliate and fennel pondweeds, water-thyme, duckweed, and yellow water lily. The margins are generally dominated by reed sweetgrass, burreed and common reed with common but lesser occurrence of clubrush, hard rush and yellow iris.

Cover of the main channel by vegetation ranged broadly between 10-20% increasing or decreasing on side channels dependant on flow conditions. The higher bank side margins reflect the nature of disturbed ground with a dominance of ruderal plants such as nettles, docks, willow herb and thistles.

Behind this margin the river corridor is well wooded with crack, white, grey and goat willow, ash and hawthorn and to a lesser extent alder, poplar, elder, sycamore and chestnut.

All these habitats are well used by birds such as warblers, tits, finches, and thrushes in large numbers. Heron, Kingfisher, Grey Wagtail and Sparrow Hawk are also present.

Peterborough to Dog-in-a-Doublet Sluice

The continued effectiveness of the flood defences through the low lying fen area rely on maintaining the integrity of the raised flood embankments. Between these floodbanks and the river are berms (1 to 1.5 metres above mean average water levels). Much of the ecological interest is dependent upon the width of these, which in places are over a hundred metres wide eg. Guyhirn reedbed.

In stream aquatic plants are rare above the Dog-in-a-Doublet Sluice, with small patches of water-thyme, fennel pondweed and yellow water lily.

Downstream of Dog-in-a-Doublet Sluice

Recent low fluvial discharge from the Dog-in-a-Doublet Sluice has exacerbated a long standing siltation problem near the extreme tidal limit. Siltation problems at the tidal river outfall into the Wash also appear to have worsened over recent years.

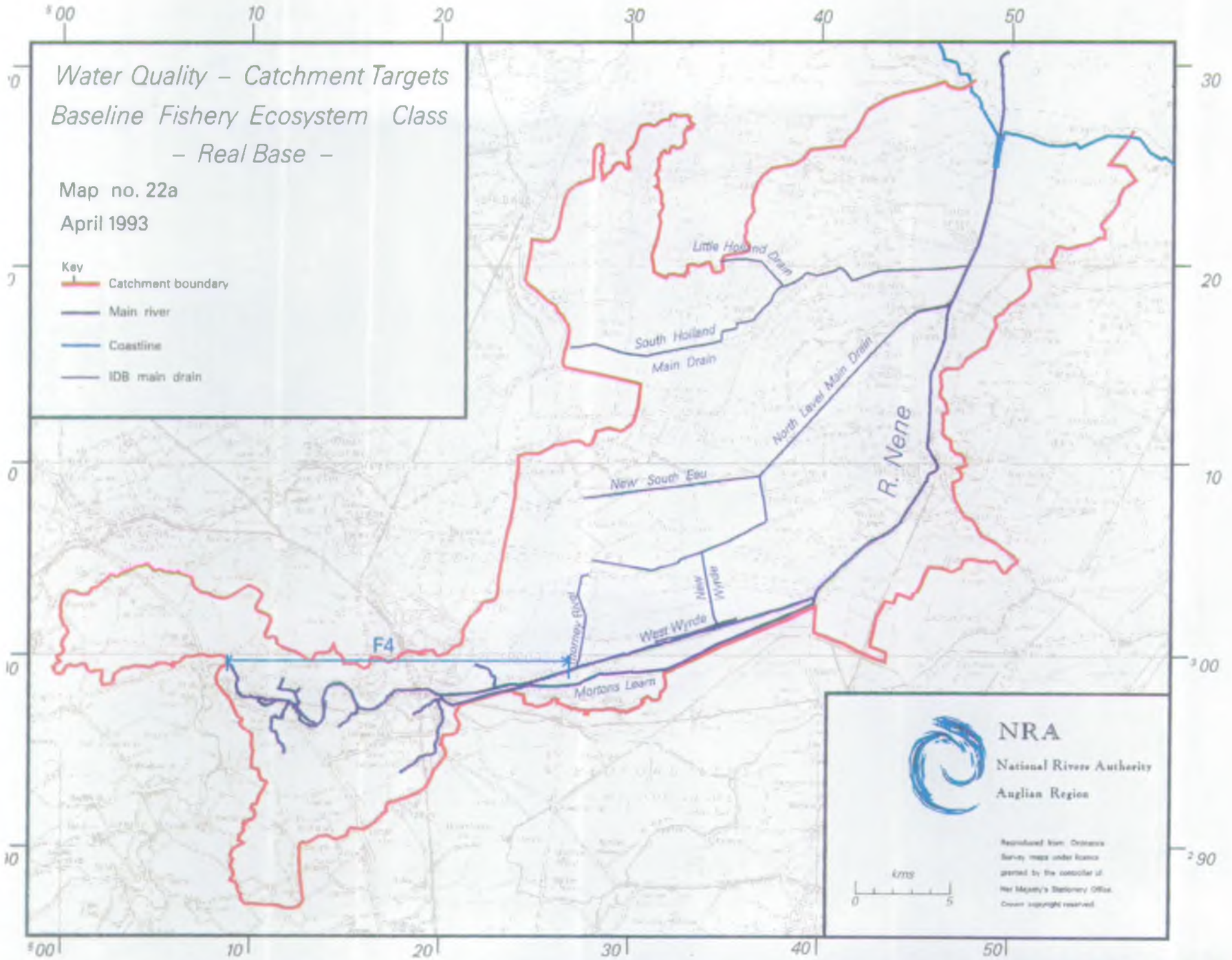
Aquatic plants are totally absent downstream of the sluice. Emergent vegetation is restricted to the berm slopes and tops, reed sweet-grass, reed canary grass and common reed dominate down to Wisbech where sea clubrush with common reed dominates. From here salinity begins to influence the plant community until, at Foul Anchour these maritime species are dominant with annual sea-blite, sea spurry, sea aster, sea beet etc.

The wide river banks vary in interest from species poor coarse grassland to species rich grazed or hay cropped areas. Rich grassland areas contain strawberry clover, lesser broom rape and pyramidal orchids, eg. RB near Sutton Bridge. Willow and hawthorn trees occur but are rare.

Birds reflect the open nature of the river and its adjacent washlands with lapwing, redshank, snipe and a variety of water fowl feeding and breeding within the corridor.

Additionally the Nene soak dykes are also botanically rich as is Morton's Leam and many of the washdykes all of which are in the Nene Washes SPA, SSSI (Appendix 1).

The Essex Skipper butterfly has also been recorded on the wash flood defence banks. This species relies on grasslands, not only as food for it's caterpillar stage but also for over-wintering.


Water Quality – Catchment Targets
Baseline Fishery Ecosystem Class
– Real Base –
Map no. 22a
April 1993
Key
Catchment boundary
Main river
Coastline
IDB main drain
Little Holland Drain
South Holland
Main Drain
North Level Main Drain
R. Nene
New South Eau
New Wyrde
West Wyrde
Thorney Eau
F4
Morton's Leam
NRA
National Rivers Authority
Anglian Region
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5. CATCHMENT TARGETS

5.1 WATER QUALITY

5.1.1 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.

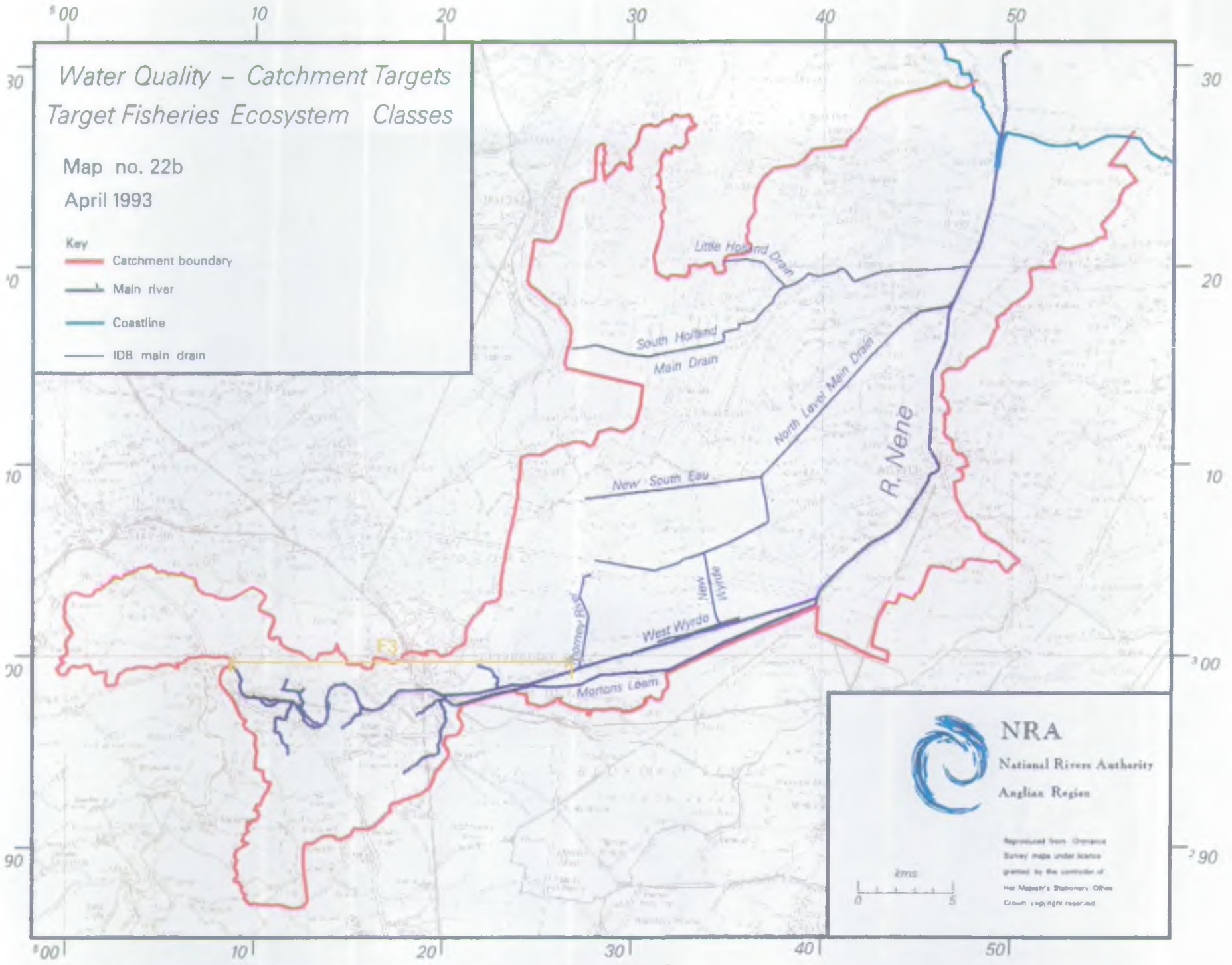
The Scheme sets out the water quality requirements for various river uses:

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 from 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.


Water Quality – Catchment Targets
Target Fisheries Ecosystem Classes
Map no. 22b
April 1993
Key
Catchment boundary
Main river
Coastline
IDB main drain
Little Holland Drain
South Holland Main Drain
North Level Main Drain
R. Nene
New South Eau
New Wyrde
West Wyrde
Morton's Leam
F3
NRA
National Rivers Authority
Anglian Region
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5.1.2 Local Perspective

The NRA's proposals for Fisheries Ecosystem Classes in the Lower Nene Catchment are shown on maps 22A and 22B. Map 22A represents current quality, deterioration from this Class should not be permitted. Map 22B shows target Classes, the timescale 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, these are indicated on map 22C.

Unlike the agricultural abstraction classification, which will apply to stretches of river, the classification 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 Lower Nene will be amongst the first to be designated.

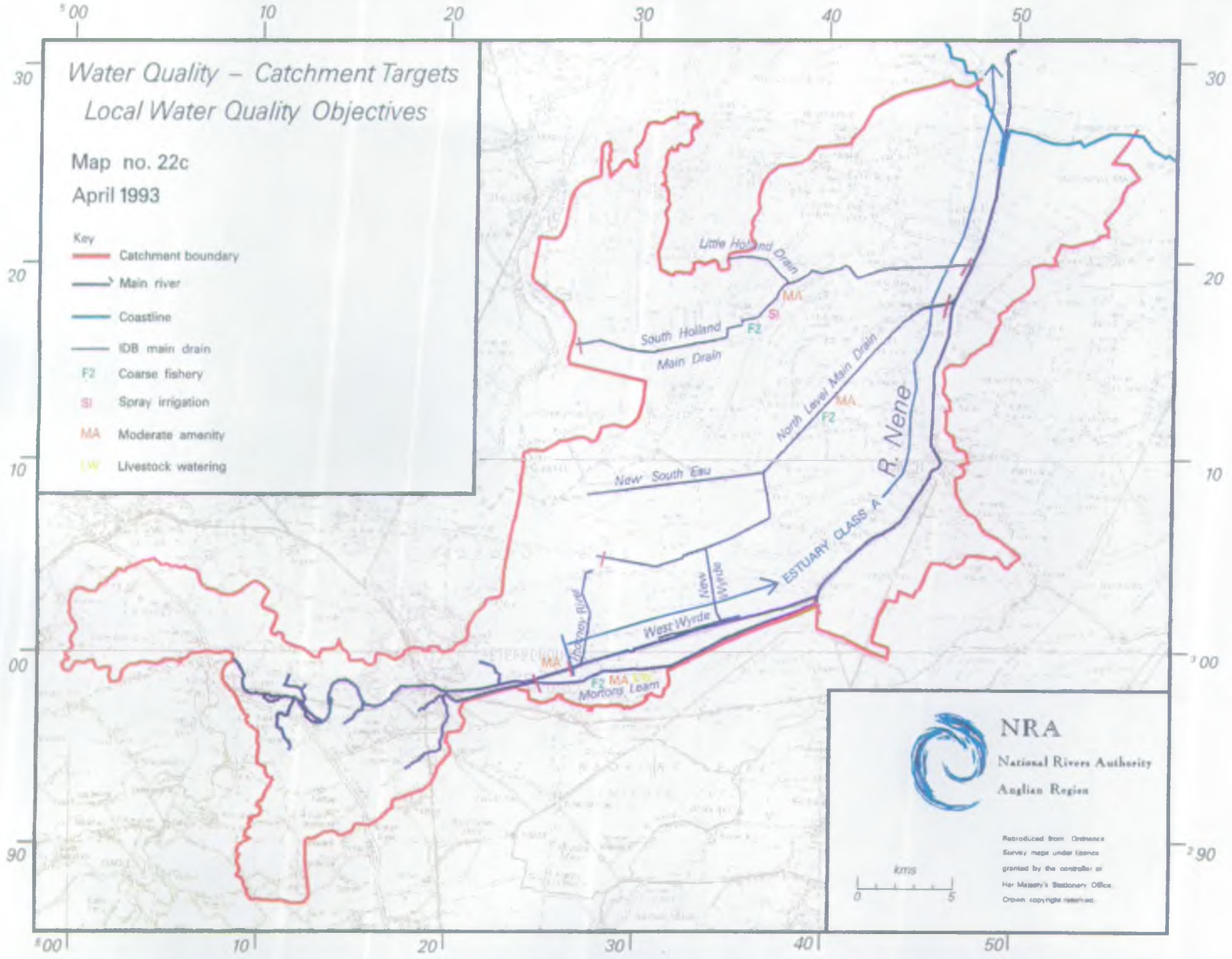
Groundwater

There are 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 underway. Plans to control the input of nitrate will then be required which may include the statutory imposition of Nitrate Sensitive Areas.


Water Quality – Catchment Targets
Local Water Quality Objectives
Map no. 22c
April 1993
Key
Catchment boundary
Main river
Coastline
IDB main drain
F2 Coarse fishery
SI Spray irrigation
MA Moderate amenity
LW Livestock watering
Little Holland Drain
South Holland Main Drain
North Level Main Drain
R. Nene
New South Eau
ESTUARY CLASS A
New Wyrde
West Wyrde
Morton's Leam
NRA
National Rivers Authority
Anglian Region
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River Nene

i) Upstream of Dog in a Doublet sluice eutrophication control is required.

ii) Downstream of Dog in a Doublet sluice effluent discharges have a major impact on water quality. Improved treatment of all major effluent discharges is essential.

Counter Drain (North)

Effluent discharged from Flag Fen STW must be improved, the concentration of ammonia in particular must be reduced.

Padholme Drain

Major improvements have been made in the catchment of this watercourse including renovation of the upstream section. Anglian Water Services Ltd control discharges from Surface Water Sewers to the Drain. These discharges require control so that they do not compromise a sustainable recovery.

South Holland Main Drain

Every effort must be made to reduce the influence on water quality arising from saline intrusion occurring via the tidal structure. Liaison with the Internal Drainage Board in considering and implementing improvement projects is necessary.

Monitoring

Many watercourses are monitored biologically, in some cases data obtained implies poor quality, however supporting chemical data are not available. The chemical monitoring network may need expanding to further investigate water quality deficiencies identified by biological monitoring eg. Weasenham Lane area, Wisbech and the Padholme Drain.

Sewerage Facilities

The discharge of sewage from storm overflows on sewerage systems sometimes occurs at times other than during storm conditions. The consequent impact upon the receiving watercourse is more severe and therefore the occurrence of these overflows must be minimised. The Nene between Orton Sluice and Fitzwilliam Bridge is affected by this type of discharge.

Improved sewerage facilities are needed in rural areas eg. the villages of Gorefield and Newton.

Objectives

i) All rivers to comply with the standards for amenity protection and aesthetic criteria and with the levels of List I and List II substances in the EC Directive 76/564.

ii) All to meet SWQO when set.

iii) 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.

iv) Groundwater quality should not deteriorate to a level where the conservation value of wetland SSSI sites is adversely affected.

v) 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.

5.2 WATER QUANTITY

5.2.1 General

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

A key target in the Lower Nene Catchment is to resolve the resource deficiency situation which occurs in dry periods.

The Water Quantity objectives 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 augment and/or redistribute water resources, where appropriate, to meet water demands to appropriate standards of reliability.

c) To ensure the proper use of water resources.

d) To conserve water resources by encouraging efficient water use and leakage control.

5.2.2 Local Perspective

The future targets for this catchment are related to each objective.

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.

- to secure control over abstractive demands from the River Nene.
- to set minimum residual flows (MRF's) and minimum control levels (MCL's) to protect riverflows for environmental protection and navigation purposes.
- to ensure in-catchment uses and users of water are protected from over commitment to external demands/transfers.
- to maintain flow regimes to protect conservation interests and low flows (reduction in flows to below Q95 to be limited to areas where conservation impact is minimal).
- to protect water levels for wetlands.
- to preserve spate flows for channel cleansing and wetland inundation.

b) To ensure the proper use of water resources

- to ensure all water abstractions and transfers are brought under regulatory control.
- to ensure all water abstractions and transfers are properly measured.
- to ensure all current and future licensed demands are properly justified.
- to ensure existing in-catchment protected rights to abstract water and to established environmental needs are protected before allocating water for further abstraction or export.

c) To conserve water resources

- to encourage the development of winter storage reservoirs to meet irrigation demand.
- to encourage efficient water uses, re-use of water where appropriate and effective leakage control.
- to seek to revoke unused abstraction licences and to reduce licensed quantities for under-utilized licences.
- to seek to maximise use of effluents to increase surface water resource availability.

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

- to meet existing in-catchment water demands to defined standards of reliability.
- to produce a water resource strategy to define how future demands will be met.
- to define the balance of resources and forecast demands in IDB areas.

The appropriate reliability standards for each use are set as follows :-

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

i) A hosepipe ban on average not more than one every 10 years.

ii) The need for voluntary savings of water on average not more than once in 20 years.

	iii) The risk of rota cuts or use of stand pipes on average not more than once in 100 years.
Spray Irrigation	The Region's target level of service is a risk of shortage not more than once in 12 years on average.
Others - industrial, agricultural etc.	There is no specific target level of service for these users.
Conservation sites and environmental flows	The NRA is committed to the protection of recognised water related conservation sites and to protect environmental flows from over commitment.

5.3 PHYSICAL FEATURES

5.3.1 General

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

The intention is not to identify specific requirements at particular locations but to indicate the major physical features, requirements for various reaches in relation to the uses concerned.

5.3.2 Local Perspective

There are a number of physical features in the catchment with their own physical features requirements.

The following are general requirements and are considered targets for the catchment.

- No increase in flood risk as a result of development.
- No new development in an areas where the existing level of service is considered below the standard required for the type of development proposed.
- Ensure provision of suitable access for maintenance of the river/channel and sea defence.
- Promote initiatives through routine maintenance that would increase the conservation value of the river corridor eg:.
    a) To the West of Peterborough good practices should maintain the present diverse habitat.
    b) To the East of Peterborough it is necessary to:-
        i) Improve instream habitat by for example, the use of marginal aquatic plants to minimise bank toe erosion.
        ii) Maximising Berm top potential, eg. scrapes reedbeds etc.
        iii) Identify a management mowing regime for all areas of NRA maintained banks, including Sea Walls.
        iv) Seek opportunities to create new wetland areas.
        v) Liaise with conservation bodies to maximise potentials.
- Promote the use of waters for recreational use.
- Operation of flood defence structures to ensure protection

of all identified uses.

- To ensure the passage of eels at Dog-in-a-Doublet Sluice, particularly during low flow conditions.

The requirements for the specific uses are detailed as follows :-

Uses	Requirements
Navigation	Maintain minimum depths of water sufficient for use as a navigable waterway. Maintain lock structures to enable uninterrupted use of the river for navigation purposes. Provide sufficient amenities for the boating public to comply with the duties of a Navigation Authority.
Water Power	Maintain millstreams free from silt, weed and obstructions.
Flood Water Storage	Maintain flood storage areas, wetlands and water meadow.
Flood Defence	Maintain and improve appropriately, flood defences to provide adequate level of service.
Riparian Habitats	During operational maintenance or capital works the adoption of sound environmental practises to ensure:-
	i) 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.
	ii) The channel cross section should be appropriate for the prevailing flow regimes of the river including low flow conditions.
Recreation	Maintain and develop the recreation potential of the catchment.

6. CURRENT SHORTFALLS AGAINST FUTURE CATCHMENT TARGETS

6.1 WATER QUALITY

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.

The principal shortfalls are as follows :-

River Nene

Fails to meet water quality standards as a cyprinid fishery caused by nutrient enrichment.

Tidal River Nene

Water quality in the tidal section of the River Nene has deteriorated from Estuary Class A in 1984 to Estuary Class D in 1992 - improvements in effluent required.

Counter Drain (North)

Fails to meet aesthetic/amenity standards - contaminated by sewage effluent.

Padholme Drain

Fails to meet aesthetic/amenity standards - contaminated by oil and heavy metals.

South Holland Main Drain

Affected by saline water ingress.

Sewerage

Inadequate and/or total and lack of sewerage facilities in parts of the catchment.

6.2 WATER QUANTITY

Principal shortfalls against future targets relate to the deficiency in resource availability and its impact in dry periods, and the current limitation to the NRA's control over water abstraction/transfer in the catchment.

Shortfalls have been identified as follows :-

- Current water demands from the River Nene for spray irrigation, industry and navigation uses cannot be met to target standards.
- Current water demands from IDB areas for spray irrigation cannot be met to target standards.
- Current water demands from the Nene Washes for conservation purposes cannot be reliably met in dry summer.
- Future water demands from IDB areas for spray irrigation and from the River Nene for spray irrigation, industry and navigation uses and from the Nene Washes for conservation uses cannot be met to target standards.
- There is no effective control over abstractive demands from the River Nene for public water supply, navigation, land drainage and spray irrigation uses.
- The development of a resource strategy for meeting demands in IDB areas is limited by an inadequate understanding of the balance of resources and forecast demands in these areas.
- The monitoring of riverflows and compliance with MRF's is limited by inadequate location and standards of flow measuring structures.
- The discharge of significant effluent quantities to tidal river sections does not maximise their use in quantity terms.
- Current in-catchment water uses are put at risk by water exports from the catchment.

6.3 PHYSICAL FEATURES

The following section identifies areas where the previously identified catchment targets are not currently being met.

The shortfall for specific uses are detailed in the table below :-

Uses	Shortfall
Navigation	Provision of landing stages to provide safe means of access and egress to boats using the locks.
	Provision of adequate sewage disposal points throughout the system.
	Provision of suitable overnight mooring facilities. Operating improvements to lock structures. Maintenance of adequate water depths downstream of the Dog-in-a-Doublet Sluice.
Flood Defence	Maintenance of a clear channel sufficient to allow maximum discharge of flood waters during flood events.
Fisheries	Provision of an eel pass on Dog-in-a-Doublet Sluice to ensure free passage of eels.
	Zander are present in the Nene around Peterborough.
Conservation	Habitat diversity is limited downstream of Peterborough.
Recreation	Recreational potential of the catchment may be under utilized.

ISSUE 1

THE RIVER NENE FAILS TO MEET ITS WATER QUALITY OBJECTIVES AS A CONSEQUENCE OF NUTRIENT ENRICHMENT IE. EUTROPHICATION

Options	Responsibility	Advantages	Disadvantages
Designate the River Nene upstream of Wansford as sensitive under the UWWT Directive.	NRA	Legislative support for requiring nutrient removal from discharges to the River Nene upstream of Wansford will be provided. River water quality in the Upper and Lower Nene will improve as the degree of Eutrophication decreases	The financial cost of nutrient removal will be borne by those responsible for making the discharge and their customers.
Maintain a positive residual flow at Dog-in-a-Doublet Sluice.	NRA	Marginal improvement in water quality.	This option on its own may not reduce the degree of eutrophication sufficiently. The catchment may not be capable of providing a minimum residual flow, and Anglian Water Services may claim compensation for loss of resource. The use of water for this purpose may be challenged as it could be perceived as not to be making best use of a water resource.
Discourage the use and formulation of phosphate rich detergents.	NRA/ detergent manufacturers/ members of the public.	Reduction in phosphates discharged through sewage treatment works to the River Nene.	Would only produce a partial solution to the problem.
Storage of water in the upstream catchment.	NRA	Reduces the potential for the conditions under which excessive algal growth develops.	Cost, partial solution.
Changes in land use.	NRA/ land owners.	Reduction in nutrient enhancement	Cost, restrictions in land use

ISSUE 2

WATER QUALITY IN THE TIDAL RIVER NENE FAILS TO MEET ESTUARY CLASS A STANDARDS.

Options	Responsibility	Advantages	Disadvantages
Require improvements in effluent quality for those effluents discharging to this section of the River Nene.	NRA/Consent holders.	Water quality will improve in the tidal section of the River Nene.	Significant capital investment will be required to meet improved effluent quality standards.
Maintain a positive minimum residual flow at the Dog-in-a-Doublet Sluice.	NRA	Marginal improvement in water quality	Derogation of existing users. Possibly not the best use of water resources. Only a partial solution.

ISSUE 3

WATER QUALITY IN THE COUNTER DRAIN (NORTH) FAILS TO MEET AMENITY STANDARDS.

Options	Responsibility	Advantages	Disadvantages
Require improvement in the quality of effluent discharged by Flag Fen STW.	NRA/AWSL	Water quality in the Counter Drain will improve.	Significant investment will be required to improve effluent quality in the Counter Drain, and the tidal Nene, into which the Counter Drain discharges.
Relocation of the discharge point.	NRA/AWSL	Water quality in the Counter Drain will improve. Water Resource improvement may be available, dependent upon the alternative discharge location.	Significant investment will be required to improve effluent quality to an acceptable standard for a discharge at an alternative outfall location.
Reduce the target quality specification for the Counter Drain.	NRA	Flag Fen STW improvement programme would not be required. The new target standard would be complied with.	Water quality in the Counter Drain would remain poor.

ISSUE 4

SURFACE WATER SEWERS DISCHARGING TO THE PADHOLME DRAIN REQUIRE CONTROL IN ORDER THAT THEY DO NOT COMPROMISE A SUSTAINED RECOVERY IN WATER QUALITY.

Options	Responsibility	Advantages	Disadvantages
Liaise with dischargers re: monitoring of the systems.	NRA/Dischargers.	Maintenance of water quality in the Padholme Drain. Improvement to amenity value of Flag Fen archaeological site.	Cost of monitoring.
Increase public awareness of the link between watercourse and surface drains.	NRA	Reduce pollutants input.	None.

ISSUE 5

SALINITY IN THE SOUTH HOLLAND MAIN DRAIN CAUSES FAILURE OF THE F_2 FISHERY STANDARD AND COMPROMISES ITS USE FOR SPRAY IRRIGATION.

Options	Responsibility	Advantages	Disadvantages
To ensure that saline intrusion via the tidal sluice is minimised.	IDB	Improved water quality will enhance the fishery potential of the watercourse.	The degree to which saline intrusion is minimised may require significant investment or even replacement of the tidal structure. Possibly only a partial solution.
To further evaluate the degree to which "natural" saline water ingress occurs from tributary land drain systems.	NRA/IDB	Improve management information.	Manpower resources (NRA and IDB) will be required to carry out this work.
Import water from the River Welland.	NRA	Improved water quality.	Insufficient water resources are available to sustain a transfer of water at all times.
Construct a bed weir.	IDB	Reduce the length of river affected by saline intrusion.	Cost

ISSUE 6

POLLUTION CAUSED BY OVERFLOWS FROM EXISTING SEWERAGE SYSTEMS.

Options	Responsibility	Advantages	Disadvantages
Provision of improved sewerage.	AWSL	Reduced frequency of sewerage overflows leading to improved water quality.	Reducing the frequency of overflow from public foul sewerage systems may require significant financial investment.
Reduce solids eg. plastics at source ie. bag it and bin it.	AWSL/members of the public/industrialists.	May reduce the frequency of overflows.	Unlikely to result in a complete solution to the problem.

ISSUE 7

POLLUTION CAUSED BY INADEQUATE SEWERAGE AND SEWAGE TREATMENT FACILITIES IN RURAL AREA'S CAUSING FAILURE OF AMENITY STANDARDS

Options	Responsibility	Advantages	Disadvantages
Provision of improved sewerage/sewage treatment systems	Local Councils/AWSL	Improved water quality	The financial cost of improved sewerage and sewage treatment will be borne by those responsible for making the discharge and their customers
Increase routine maintenance of sewerage system	AWSL	Reduce frequency of overflow	Cost
Object to relevant planning permission in affected areas	NRA/Planning Authority	Prevents additional pollution	Partial Solution. Restrictions on development

ISSUE 8

CURRENT AND FUTURE WATER DEMANDS CANNOT BE MET TO TARGET STANDARDS OF RELIABILITY.

SUB ISSUE 1

WATER DEMANDS FROM THE RIVER NENE FOR SPRAY IRRIGATION, INDUSTRY AND NAVIGATION PURPOSES CANNOT BE MET TO TARGET STANDARDS OF RELIABILITY.

Options	Responsibility	Advantages	Disadvantages
Restrict transfer of water to Middle Level catchment.	NRA/Middle Level Commissioners.	Current and future demands can be met.	Significant change to Middle Level IDB operation. Agricultural water demand in Middle Level not met. Navigation, fishery, recreation and conservation interests in the Middle Level may be affected. No available alternative source to meet Middle Level demand.
Increase minimum residual flow downstream of Orton Sluice.	NRA.	Increases water availability. Reduces deficit in dry drought periods.	Cost of providing new water source. Variation to Wansford licence impacts on AWSL and would require compensation. Partial solution.
Reduce demand by refusing applications to re-grant temporary abstraction licences.	NRA	Increases water availability. Reduces deficit in dry drought periods.	Reduces irrigation abstraction reliability in Middle Level. Fails to meet demand and/or requires development of winter storage (cost). Partial solution.

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ISSUE 8 - SUB ISSUE 1

Options	Responsibility	Advantages	Disadvantages
Develop winter storage reservoir to augment River Nene in Critical periods	NRA	Current and future demands can be met Conservation benefit Water Quality improvements	Cost Potential conservation impact
Reduce demand by achieving voluntary and/or compulsory restrictions	NRA	Reduces deficit in dry/drought periods	Reduced revenue to NRA from abstraction licences Needs legislative change and/or compensation (cost) Fails to meet demand and/or requires development of winter storage (cost) Requires widespread co-operation
Diverts effluents into freshwater section of the catchment	NRA/dischargers	Eliminate deficit in dry/drought periods Best use of catchment resource Increased NRA revenue from abstraction licences	Cost to improve effluent quality Cost to transfer Requires legislative change and/or co-operation of dischargers
Import water from River Trent to augment River Nene in critical periods	NRA	Eliminate deficit in dry/drought periods Meets future demand Increased NRA revenue from abstraction licences	Cost Potential unreliability of Trent water
Utilise Eyebrook Reservoir to meet selected IDB demands from River Welland and reduce demand from River Nene	NRA	Reduce deficit in dry/drought periods	Cost to IDB operators Partial solution Potential unreliability in critical periods

CONT./

CONT./ 3

ISSUE 8 - SUB ISSUE 1

Options	Responsibility	Advantages	Disadvantages
Relocate tidal limit to a point further downstream on the River Nene	NRA	Potentially eliminates deficit in dry/drought periods Potential reduction in saline intrusion Improvements to fisheries, recreation, amenity and conservation Increased NRA revenue from abstraction licences	Cost to provide new structure IDB capital and operating costs Costs to improve effluent quality Potential reduction in available winter habitat
Utilise NRA water allocation from Rutland Water to meet selected IDB demands from River Welland to reduce demand from River Nene	NRA/AWSL	Reduces deficit in dry/drought periods	Cost to IDB operations Partial solution Potential unreliability of NRA allocation Cost to NRA of utilising allocation

ISSUE 8

CURRENT AND FUTURE WATER DEMANDS CANNOT BE MET TO TARGET STANDARDS OF RELIABILITY.

SUB ISSUE 2

WATER DEMANDS FROM IDB AREAS FOR SPRAY IRRIGATION CANNOT BE MET TO TARGET STANDARDS OF RELIABILITY.

Options	Responsibility	Advantages	Disadvantages
As for Sub Issue 1 plus:-			
Develop winter storage reservoirs to replace direct summer abstraction.	NRA/MAFF/farmers.	Reduces deficit in dry/drought periods.	Cost of reservoir construction. Partial solution.
Increase drain storage in IDB areas.	IDB's.	Marginal increase in summer resource.	Flood Risk. Partial solution.

ISSUE 8

CURRENT AND FUTURE WATER DEMANDS CANNOT BE MET TO TARGET STANDARDS OF RELIABILITY.

SUB ISSUE 3

WATER DEMANDS IN WINTER AND SUMMER TO MEET INTERNATIONALLY IMPORTANT CONSERVATION PURPOSES ON THE NENE WASHES CANNOT BE MET TO TARGET STANDARDS OF RELIABILITY.

Options	Responsibility	Advantages	Disadvantages
As for Sub Issue 1 plus :			
Develop operational controls and procedures to better utilise available water resources on the Washes.	English Nature, landowners, Nene Washland Commissioners, NRA.	Reduces water demand. Better NRA control. Better use of water resources.	Requires abstraction licensing. Partial solution.

ISSUE 9

THE NRA DOES NOT HAVE EFFECTIVE REGULATORY CONTROL OVER WATER ABSTRACTIONS FROM THE LOW RIVER NENE

SUB ISSUE 1

ANGLIAN WATER SERVICES' ABSTRACTION LICENCE AT WANSFORD HAS NO EFFECTIVE DAILY OR ANNUAL ABSTRACTION LIMITS

Options	Responsibility	Advantages	Disadvantages
Review abstraction licence conditions	NRA	Achieves normal regulatory control Better resource management	Potential reduction in Rutland Water yield affecting AWSL Cost of compensation to AWSL Potential NRA revenue loss

ISSUE 9

THE NRA DOES NOT HAVE EFFECTIVE REGULATORY CONTROL OVER WATER ABSTRACTIONS FROM THE LOWER RIVER NENE

SUB ISSUE 2

THE CURRENT MINIMUM RESIDUAL FLOW CONTROL POINT ON ANGLIAN WATER SERVICES ABSTRACTION AT ORTON SLUICE IS REMOTE FROM THE ABSTRACTION POINT AND IS AN INACCURATE FLOW GAUGING STATION

Options	Responsibility	Advantages	Disadvantages
Make structural allocations to Orton Sluice to improve flow gauging accuracy	NRA	Improved regulatory control by NRA Improved abstraction management by AWSL	Cost Orton remains poor control location Orton remains principally a land drainage structure
Construct new flow gauging facility at Wansford, close to the Anglian Water Services abstraction point	NRA/AWSL	Much improved regulatory control by NRA Much improved abstraction management by AWSL	Cost

ISSUE 9

THE NRA DOES NOT HAVE EFFECTIVE REGULATORY CONTROL OVER WATER ABSTRACTIONS FROM THE LOWER RIVER NENE

SUB ISSUE 3

MAJOR WATER ABSTRACTIONS DOWNSTREAM OF ORTON SLUICE EFFECTED BY "SLACKERS" ARE NOT LICENSED AND ARE OUTSIDE THE REGULATORY CONTROL OF THE NRA

Options	Responsibility	Advantages	Disadvantages
Achieve operational agreements with "slacker" abstraction	NRA/Slacker operators	Improved liaison and operation. Preferred by "slacker" operators	Not legally enforceable Does not achieve regulatory control Requires co-operation of "slacker" operators
Achieve legislative change to bring "slacker" abstractions within abstraction licensing regulations	NRA	Achieves regulatory control Improved resource management	Opposed by "slacker" operators Requires legislative change

ISSUE 9

THE NRA DOES NOT HAVE EFFECTIVE REGULATORY CONTROL OVER WATER ABSTRACTIONS FROM THE LOWER RIVER NENE

SUB ISSUE 4

PRINCIPAL WATER ABSTRACTIONS FROM THE RIVER NENE ARE NOT MEASURED AND INFORMATION IS NOT AVAILABLE TO THE NRA IN CRITICAL RESOURCE PERIODS

Options	Responsibility	Advantages	Disadvantages
NRA to install measuring facilities	NRA	Achieves resource management information	Cost to NRA
Achieve operational agreements with abstractors to require installation of measuring facilities and make information available	Abstractors	Achieves resource management information Preferred by abstractors	Not legally enforceable Cost to abstractors Does not achieve regulatory control Requires co-operations of abstractors
Seek legislative change to require metering provisions under water abstraction licensing regulations	NRA	Achieves resource management information Achieves regulatory control	Cost to abstractors Opposed by abstractors Requires legislative change

ISSUE 10

WATER RESOURCE MANAGEMENT OF THE RESOURCE OF IDB AREAS IS LIMITED BY INADEQUATE UNDERSTANDING OF RESOURCE BALANCES

Options	Responsibility	Advantages	Disadvantages
Carry out resource investigations	NRA	Achieves improved understanding Improved prediction of future agricultural demands	Cost

ISSUE 11

LONG TERM SILTATION PROBLEMS IN THE TIDAL NENE ESTUARY

SUB ISSUE 1

EXCESSIVE SILTATION AT UPPER LIMIT OF ESTUARY

Options	Responsibility	Advantages	Disadvantages
Relocate tidal limit to new position downstream	NRA	Reduction in length of tidal defence Increased potential of freshwater resource Improved amenity value and potential for recreational and urban developments Increased length of Class 2 waterway Increased length of F_2 fishery Reduced cost of F D maintenance Reduced length of channel subject to excessive siltation	Increased risk of saline intrusion Pumped discharge required for Nene Wash Cost Possible effect on SSSI Possible affect on loss of tidal habitat Cost to discharges

ISSUE 11

LONG TERM SILTATION PROBLEMS IN THE TIDAL NENE ESTUARY

SUB ISSUE 2

EXCESSIVE SILTATION AT OUTFALL TO THE WASH

Options	Responsibility	Advantages	Disadvantages
Extend length of training walls into channel in Wash	NRA/Navigation Authority	Defined channel will prevent excessive siltation at mouth of river and aid discharge of flood waters Improved water depths will aid shipping Improved flow of tidal waters entering the Nene Estuary by assisting flushing improving water quality	Possible affect on SSSI Cost
Dredging to maintain clear channel	NRA/Navigation Authority	Will provide clear channel for navigation and flood discharge	Ongoing works necessary Limited effectiveness Disruption to river and surrounding land High revenue cost
Construct flushing reservoir at the tidal limit	NRA	Minimal operating costs Use of tidal water will guarantee availability of water at all times	Land purchase required Constructors cost high Likely benefit to upstream lengths of channel only

ISSUE 12

FACILITIES FOR SAFE ACCESS AND EGRESS TO LOCKS FROM BOATS NOT CURRENTLY AVAILABLE

Options	Responsibility	Advantages	Disadvantages
Improve existing/provide new landing stages at locks	NRA	River safety improved Improved level of service to boating customer	Cost

ISSUE 13

NAVIGATION OVERNIGHT FACILITIES ARE POOR

Options	Responsibility	Advantages	Disadvantages
Provide overnight moorings, NRA owned	NRA + developers/landowners	Improved level of service to boating customer	Cost Lack of NRA land ownership
Provide overnight moorings through joint ventures with landowners/DC	NRA	Cost sharing	

ISSUE 14

ADEQUATE SEWAGE DISPOSAL POINTS FOR BOATS NAVIGATING THE RIVER ARE NOT AVAILABLE

Options	Responsibility	Advantages	Disadvantages
Provide additional sites, NRA owned	NRA	Improved level of service to boating customers Reduction in pollution risk	Cost
Provide additional sites through joint ventures with others eg. boat club, DC	NRA +	Cost sharing	

ISSUE 15

RESTRICTED ACCESS TO DISADVANTAGED PERSONS DUE TO PHYSICALLY DEMANDING LOCK OPERATIONS

Options	Responsibility	Advantages	Disadvantages
Power guillotine gates	NRA	Ease of operation Improve speed of locking process	Cost Loss of traditional methods of operation Increased maintenance requirement
Power pointing doors	NRA	Operations by elderly or infirm improved	Cost Loss of traditional methods of operation Increased complexity of control system required leading to possible decrease in reliability Increased maintenance requirement
Use of lock keepers	NRA	Assistance available to river users Improved liaison with customer	Cost Availability when required

ISSUE 16

THE PRESENCE OF NON-NATIVE ZANDER IN THE NENE IS POTENTIALLY DAMAGING TO THE COARSE FISH POPULATIONS

Options	Responsibility	Advantages	Disadvantages
Monitor in normal 3 year fish survey programme	NRA	Gather additional information	Allow time for zander to increase range
Undertake specific detailed investigation into their impact on the Nene system	NRA	Gather detailed information and assess zander impact	Cost and allow time for zander to increase range
Undertake cull of zander	NRA	Reduce numbers and possibly range	Cost Impact of zander on the coarse - fish population is unknown

ISSUE 17

FREE PASSAGE OF MIGRATORY FISH IS PREVENTED BY DOG-IN-A-DOUBLET SLUICE DURING LOW FLOWS

Options	Responsibility	Advantages	Disadvantages
Construct a fish pass	NRA	Permit free passage and completion of life cycles Improve angling upstream of tidal sluice Provide fish access upstream during poor quality conditions in the Lower Nene	Cost Minimum flow is required down the fish pass

ISSUE 18

HABITAT DIVERSITY DOWNSTREAM OF PETERBOROUGH IS LOW

Options	Responsibility	Advantages	Disadvantages
Increase habitat diversity through routine maintenance and/or capital programme	NRA	Improve conservation and amenity value of the river	Cost

ISSUE 19

RECREATIONAL USE OF THE CATCHMENT MAY BE UNDER UTILISED

Options	Responsibility	Advantages	Disadvantages
Undertake study	NRA + other bodies	Quantify recreational potential	Cost
Develop Catchment User Group	NRA + other bodies	Quantify recreational potential	Cost

ISSUE 20

LAND-USE IMPACTS UPON THE WATER ENVIRONMENT

Options	Responsibility	Advantages	Disadvantages
To gain a direct influence in the planning process using existing legislation and adoption of NRA Anglian Region Model Policies	Local Authorities/ NRA/Developers/ Landowners	Ensure protection and enhancement of the water environment is taken into account and land-use	Implications on LA control Possible cost implications to landowners/ developers
Achieve legislative change in land-use approval system		Clear guidance for landowners/developers	Restrictions on land-use

8. GLOSSARY

AODN - Above Ordnance Datum Newlyn.

AONB - Area of Outstanding Natural Beauty

AQUIFER - A water-bearing stratum situated below ground level. The water contained in aquifers is known as groundwater.

BASE FLOW - The proportion of river flow that is provided by groundwater discharged from an aquifer.

CATCHMENT AREA - The area of land that collects the precipitate water flowing into a given reach of a stream, lake of reservoir.

COASTAL AND ESTUARINE WORKING PARTY CLASSIFICATION (CEWP) - A summary of the quality of estuarine waters based on points awarded for biological, aesthetic and water quality.

CONSENT - A statutory document issued by the NRA to indicate any limits and conditions on the discharge of an effluent to a controlled water.

CONTROLLED WATERS - All rivers, canals, lakes, groundwaters, estuaries and coastal waters to three nautical miles from the shore.

COUNTRYSIDE STEWARDSHIP - A scheme of grant aiding the retention and restoration of traditional countryside management practices suggested by the Countryside Commission.

CYPRINID FISH - Coarse fish eg. roach, dace, and bream.

ENVIRONMENTALLY SENSITIVE AREA (ESA) - An area where traditional farming methods may be supported by grant aid from the Ministry of Agriculture Fisheries & Food (MAFF) to support distinctive landscape, wildlife habitats or historic features.

EUTROPHIC - A description of water which is rich in nutrients. At worst, such waters are beset with unsightly growths of algae.

FYKE NET - A conical net used to trap eels.

GROUNDWATER - Water which saturates a porous soil or rock substratum (or aquifer).

HIGH LEVEL RIVER - Embanked watercourse conveying upland waters across low lying land. Normal water level is often above the surrounding natural land level.

MAIN RIVER - As defined by Act of Parliament.

MINIMUM ACCEPTABLE FLOW - The Minimum Acceptable Flow as defined in Section 21 of the Water Resources Act 1991.

MINIMUM RESIDUAL FLOW - The "hands-off" flow set by the National Rivers Authority for the stretches downstream of Public Water Supply Intakes.

NATIONAL NATURE RESERVE (NNR) - An area of national importance for nature conservation.

NATIONAL WATER COUNCIL (NWC CLASS) - A summary of the quality of river water based largely on the measured chemical quality for the purposes of classification and reporting, originally devised by the National Water Council.

OFWAT - Office of the Water Regulator.

RAMSAR - Wetland Site of International Importance that is designated under the RAMSAR convention.

RIFFLE - A shallow area in a river where the substrata is composed of gravel and the flow is faster.

RIVER CORRIDOR - The continuous area of river, river banks and immediately adjacent land alongside a river and its tributaries.

RIVER QUALITY OBJECTIVES (ROO) - The level of water quality that a river should achieve, in order to be suitable for its agreed use.

SALTINGS - An area of salt marsh.

SALMONID FISH - Game fish eg. trout and salmon.

SEA DEFENCES - Anything natural or artificial that prevents ingress by the sea.

SELF PURIFICATION - When an organic polluting load is discharged into a water body it is gradually eliminated due to the activities of micro-organisms. This self-purification requires sufficient concentrations of oxygen.

SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI) - A site given a statutory designation by English Nature or the Countryside Council for Wales because it is particularly important, on account of its nature conservation value.

STATUTORY WATER QUALITY OBJECTIVES (SWOO) - A quality objective given a statutory basis by Regulations made under the Water Resources Act 1991.

SURFACE WATER - Water collecting on and running off the surface of the ground.

TELEMETRY - A means of collecting data from remote sites, enabling current data to be interrogated remotely.

TCMD - Thousand cubic metres per day.

TCMA - Thousand cubic metres per annum.

TRANSMISSIVITY (T) - Transmissivity is an index of aquifer productivity/ $T = k \times b$, where k = hydraulic conductivity (md^{-1}), and b = saturated aquifer thickness.

TWO STAGE CHANNEL CONFIGURATION WITH LOW LEVEL BERM - A deeper channel for normal flows with a higher channel, formed by a low level berm, for flood flows.