

# UPPER NENE CATCHMENT MANAGEMENT PLAN CONSULTATION REPORT



**NRA**

*National Rivers Authority  
Anglian Region*

**February 1994**



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**UPPER NENE CATCHMENT  
MANAGEMENT PLAN**

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# UPPER NENE CATCHMENT MANAGEMENT PLAN

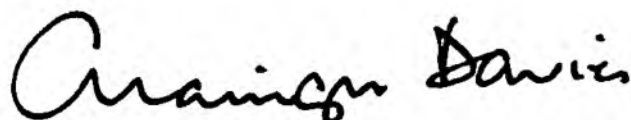
## FOREWORD

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 scale of past and future development within the catchment is bringing intense pressure to bear on all aspects of the water environment, there is consequently a need:-
  - To incorporate pollution prevention measures into new development to protect water quality.
  - To control and effectively regulate landfill activity within the catchment.
  - To incorporate flood defence and environmental considerations into new development.
  - To assess the environmental impact closed landfill sites are having upon water quality.
2. The quality of rivers within the catchment many of which are eutrophic.
3. The commitment of water resources to meet current and future Public Water Supply demands.
4. The threats to the catchment's environmental assets.



**GRAINGER DAVIES**  
Regional General Manager

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## 1. CATCHMENT MANAGEMENT PLANNING - CONCEPT AND PROCESS

1.1 The NRA is responsible for protecting and improving the water environment within England and Wales. It has a wide range of responsibilities which include:

- Flood Defence, including the protection of people and property
- Effective management of water resources
- Control of pollution and improving the quality of rivers, groundwaters and coastal waters
- Maintenance and improvement of fisheries
- Conservation of the natural water environment

To achieve its aims, the NRA must work with or seek to influence central government, industry, commerce, farming, environmental organisations, riparian owners and the general public. Successful management of the water environment requires consideration of a wide range of interests and requirements which may sometimes be in conflict.

To assist in its work, the NRA has developed the concept of **Catchment Management Plans (CMP's)**. These allow the full range of water management issues to be identified and considered within a geographical area which is relevant and meaningful.

This draft Catchment Management Plan consolidates the policies, directives and options for the Upper Nene Catchment for the overall improvement of the water environment.

The plan has been drawn up in the following sections:

- Overview: an introduction to the catchment.
- Catchment uses: identifies water related uses of the catchment and overall directives to be met.
- Current status: discusses the existing state of the catchment in terms of Water Resources, Water Quality, Physical Features and Flood Defence.
- Targets: (i) discusses the criteria used by the NRA in the setting of targets.  
(ii) identifies the specific targets to be applied within this catchment.
- Current Shortfalls of the Catchment: specifies the issues raised which need to be addressed if the NRA is to meet its catchment targets.

- Issues and Options: looks at the issues raised and puts forward options for their solution.

The NRA acknowledges the valuable assistance provided by representative groups of catchment users involved in a pre-consultation meeting on 16 November 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 a Final Plan for the Catchment.

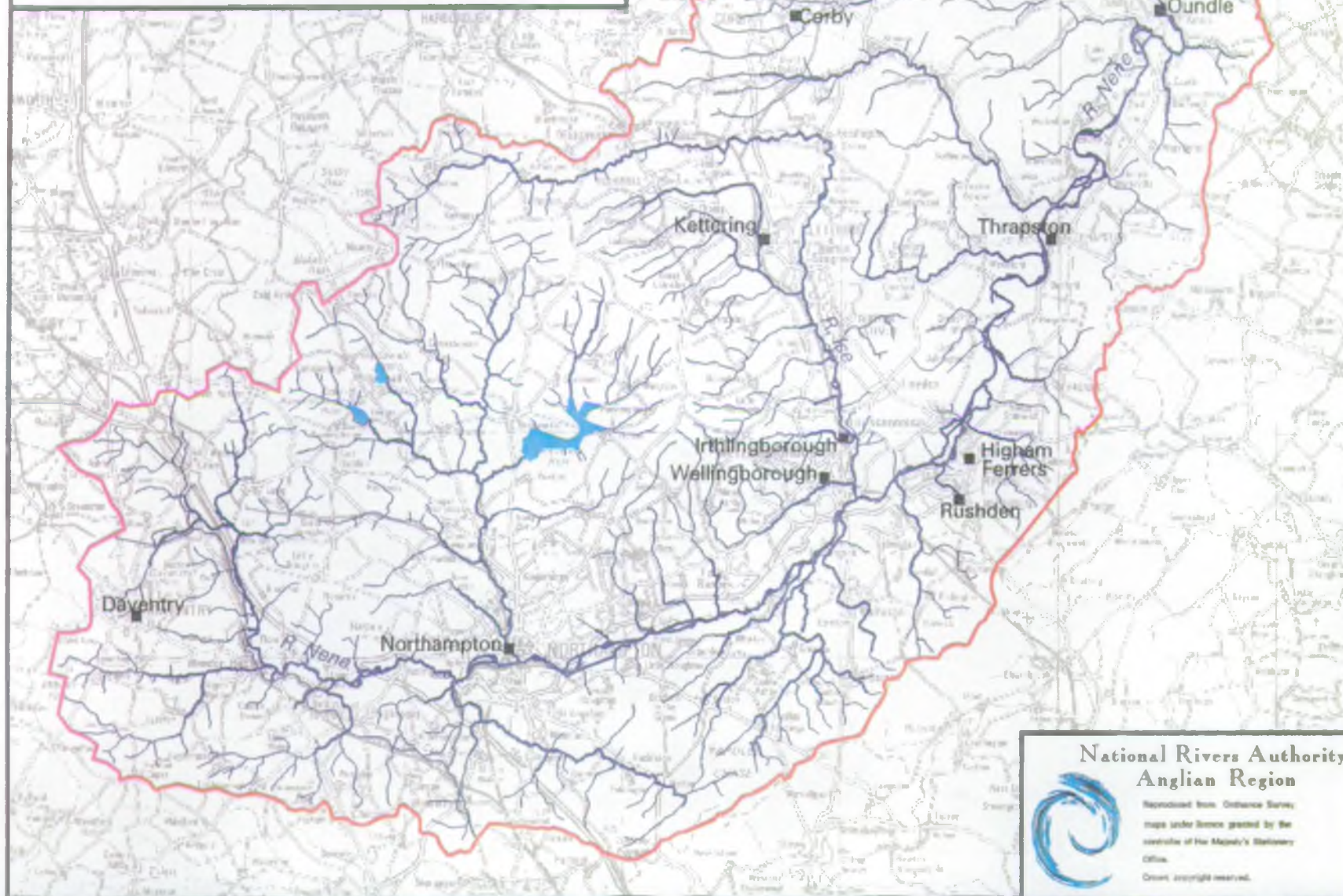
The **Final Plan** will be produced following consultation and will have regard to the comments received. The Final Plan will form a basis for the NRA's actions within the catchment and also provide a public document which will form a framework for the NRA's interaction with other organisations. The NRA will be seeking commitment to planned actions by others wherever possible.



# The Upper Nene Catchment

Map No. 1  
Dec 1993

- Main river
- Catchment boundary
- NRA regional boundary
- Town
- Minor river
-  Reservoir



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2.0 OVERVIEW

2.1 INTRODUCTION

The Upper Nene Catchment 94% of which lies within the boundaries of Northamptonshire is an upland area of beauty and contrast.

Historically this catchment is predominantly agricultural, its rolling hills set with picturesque stone villages and thatched roofs in a landscape dominated by the valley of the river Nene with its wide floodplain - subject to regular inundation - and the meandering course of the Nene and its backwaters. The industrial base of the catchment is linked to agriculture i.e. milling and leather related industries - tanneries, shoe making etc.

Superimposed on this rural backdrop are the recently expanded urban developments such as Northampton, Wellingborough and Daventry which have brought with them a wider industrial base the most notable of which in visual terms are possibly the steel industry at Corby now in decline and sand and gravel extraction between Northampton and Thrapston.

**It is this feature of ongoing development which particularly impacts upon the catchment in terms of flood protection, water quality and conservation.**

Within the catchment, water reservoirs at Pitsford, Ravensthorpe and Hollowell supply the bulk of demand for water within Northamptonshire. There are no great abstractive demands for water by either agriculture or industry within the catchment. Anglian Water Services however rely heavily upon the waters of the Nene both for Pitsford Reservoir within the catchment, and for Rutland Water which lies outside this catchment the water for which is abstracted at Wansford. The Upper Nene Catchment provides a significant source of water for Public Water Supply both within and outside of the Catchment.





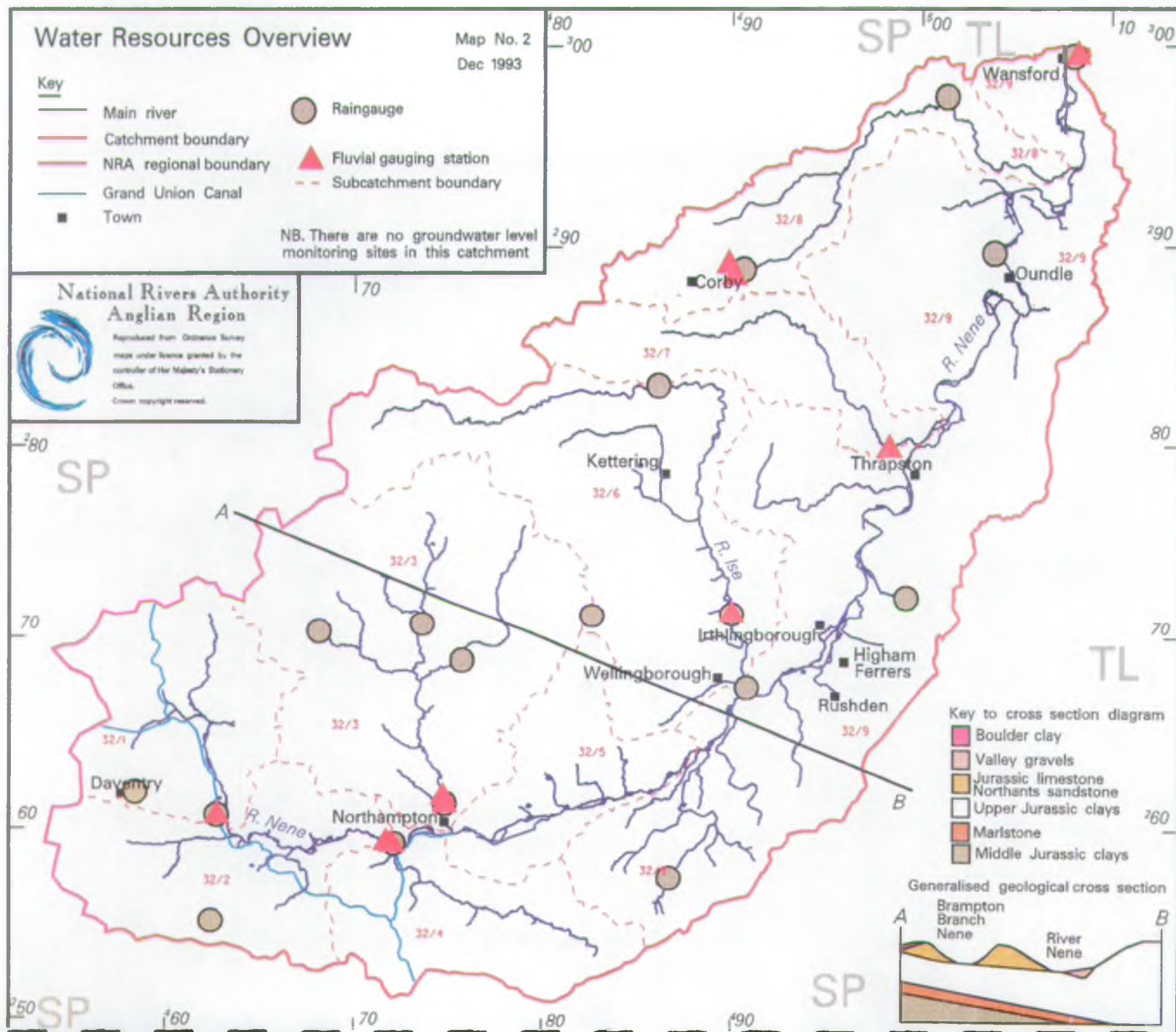
# Water Resources Overview

Map No. 2  
Dec 1993

## Key

- Main river
- Catchment boundary
- NRA regional boundary
- Grand Union Canal
- Town
- Raingauge
- ▲ Fluvial gauging station
- - - Subcatchment boundary

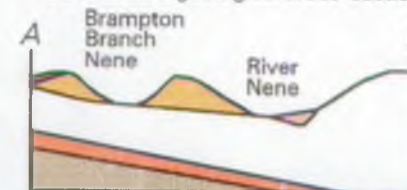
NB. There are no groundwater level monitoring sites in this catchment



## Key to cross section diagram

- Boulder clay
- Valley gravels
- Jurassic limestone
- Northants sandstone
- Upper Jurassic clays
- Marlstone
- Middle Jurassic clays

## Generalised geological cross section



## 2.2 WATER RESOURCES

The River Nene catchment covers an area of 2363 km<sup>2</sup> of which 1510 km<sup>2</sup> comprises the Upper Nene catchment.

The catchment has a network of hydrometric monitoring stations that measure rainfall and river flows. These are shown on the map opposite. Average annual rainfall in the catchment is 630 mm of which around 450 mm is lost through evaporation and transpiration. Rainfall decreases northeastwards across the catchment, from 675 mm in the south west to 600 mm in the north east.

The major water resource is the River Nene. The River Nene has low natural baseflow but during periods of dry weather flows are supported by effluent returns to the river (primarily from Northampton, Wellingborough and surrounding developments and Corby).

Groundwater resources in the catchment are limited; the aquifers that are present tend to be relatively thin and discontinuous with little potential for development. There are several minor Jurassic aquifers present over large parts of the catchment of which the most significant are the Northampton Sand/Ironstone and the Marlstone. In addition the main River Nene valley contains extensive deposits of alluvial sands and gravels which form a shallow aquifer, often connected with the river. The overview map shows a typical geological cross section.

The minor Jurassic aquifers and shallow sands and gravels are used for some industrial supplies particularly in the Northampton area and for general agricultural and domestic supplies in widely scattered parts of the catchment. They also support a large number of small springflows over a widespread area. These springflows are locally important for fishery, conservation and amenity purposes and to provide baseflows to rivers to support abstraction.

The surface water resources of the catchment are principally committed to meeting current and future Public Water Supply demands. This restricts the availability of water to meet other demands in this and the downstream catchment.

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

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



The major water demands in the catchment are as follows:

- a) the major 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) operation of three reservoirs for public water supply by Anglian Water Services at Pitsford, Ravensthorpe and Hollowell. These reservoirs are filled partly by natural inflow and in the case of Pitsford supplemented by pumping from a river intake at Duston Mill on the River Nene.
- c) abstractions associated with gravel workings at a number of sites in the main Nene valley. The water is used mainly for gravel washing and is largely re-circulated on site, so the net demand on water resources is low.

There is no forecast deficiency in the overall availability of water to meet current and future water demand for the next 10 years, however the level of reliability for some water uses is less than the NRA's current target.

## 2.3 WATER QUALITY

Catchment management for the River Nene has been split into two, the Lower and the Upper Nene. In contrast to the Lower Nene Catchment, watercourses in the Upper Nene Catchment tend to be faster flowing and respond quickly to run off from the developed catchment they drain.

Differences in water quality exist between the many small tributaries and backwaters that enter the Nene and the canalized section of main river between Northampton and Wansford.

A large component of flow is derived from major Sewage Treatment Works discharges and this is a contributory factor to one of the principal issues in the catchment, that of Eutrophication.

Water quality in the catchment is influenced by run off from large urban and industrialised areas, which sometimes causes pollution.

Historic land uses within the Catchment such as Iron and Steel works and Iron ore quarrying, have a number of related problems and residual affects upon water quality.

There are a significant number of landfill sites several of which have the potential to cause pollution of surface and groundwaters; some are located within the Nene floodplain and these need to be closely monitored.

Protecting water quality in the Nene, particularly controlling Eutrophication, is of great importance, as Rutland Water and Pitsford reservoir form a major source of potable water supplies for the area.

The NRA's principal aims in relation to water quality, within its duties and powers, are to :-

- achieve a continuing overall improvement in the quality of rivers, estuaries and coastal waters through the control of pollution; and
- ensure that dischargers pay the consequences of their discharges.
- ensure that there shall be no deterioration in surface water quality below the fisheries ecosystem target levels when set.

## 2.4 FLOOD DEFENCE

The NRA has a general supervisory role relating to all flood defence matters and a duty to carry out surveys to ascertain flood defence needs (S.105(2) W.R.A. 1991).

In practice, the NRA's operational role is confined to watercourses designated as Statutory Main River, as shown on Map No 10. District Councils are the drainage authorities for those watercourses in this catchment not designated Main River.

There are no Internal Drainage Boards within the catchment.

There are two distinct methods of flood defence within the catchment. In rural areas extensive use is made of floodplains - bi-annual inundation on the Nene, is not uncommon. In urban areas, flood defence relies heavily upon the storage of floodwaters for controlled release of flows within the capacity of the downstream channel.

The majority of urban flooding problems associated with main river have been addressed by past improvement schemes although the standard of protection these afford is not necessarily consistent with current policy targets. Continuing development pressures can lead to the need for further works to maintain the status-quo in respect of existing standards of protection.

Flood defence standards are maintained by an ongoing programme of works wherein certain operations, eg weedcutting, are carried out annually in order to maintain channel capacities, while others, eg dredging to remove accumulated silt, are carried out in cycles appropriate to individual watercourses.

## 2.5 RECREATION AND NAVIGATION

The rivers of the Nene catchment are an important recreational resource within the catchment.

The Nene itself is a navigation between Northampton and the Wash and gives access to the Grand Union Canal and Middle Level systems. There are 34 locks along the Nene valley between Northampton and Wansford, 9 of which are used to discharge waters as a method of flood control. The navigation therefore serves in a dual function i.e. both for recreational purposes and land drainage/flood protection purposes.

The Nene Way footpath follows the river from upstream of Northampton down to Wansford and the gravel lakes alongside the river are used for a variety of water based recreational activities including sailing, angling and windsurfing.

The River Nene between Northampton and Wansford is an extremely valuable pleasure and match fishing area - many habitats types exist from rapid shallow fast moving backwaters to broad deep meandering reaches offering opportunities for both specimen hunter and pleasure/match fisherman alike.

## 2.6 FISHERIES

The fish population in the main river is typical of lowland rivers in eastern England. In terms of biomass common bream, roach, dace, chub, and pike are the dominant species. Notable species in the Upper Nene are carp and barbel. Barbel was recorded in fishery surveys of the River Nene for the first time in 1989. In 1993 a programme of barbel restocking was initiated.

Brown trout populations exist in both the Kislingbury and Brampton branches of the Nene, where little angling pressure occurs. The larger tributaries of the Nene, the Ise and the Willow Brook both have sections which are stocked with trout on a regular basis. In the Ise a very small population of Grayling has recently been supplemented by restocking.

## 2.7 CONSERVATION

The Upper Nene and its tributaries are an important part of Northamptonshire's wildlife resource. Though managed and influenced by man over many centuries, long stretches of semi-natural river with its associated landscape, flora and fauna still exist.

The catchment contains 46 SSSIs, 28 County Wildlife Trust Nature Reserves and 379 SNCIs.

The quantity and quality of water available in the catchment and its dynamic attributes are crucial to the character of the wetland and river habitats. During high flow periods the Nene spreads over the floodplain which maintains many valuable wet meadows. The numerous tributaries that feed the Nene provide a variety of instream and riparian habitats. In general terms this a diverse and valuable catchment.

## 2.8 LAND USE/URBANISATION

The catchment is predominantly rural with major population centres at Northampton, Wellingborough, Corby, Daventry, Kettering and Rushden. The significant urban development over the past 3 decades looks set to continue.

Agricultural land use is evenly split between pastoral and arable farming; industry is diverse, no longer being dominated by the shoe and leather factories, the major employment in the catchment being from the service sector.

## 2.9 INFRASTRUCTURE

The catchment is served by an improving road network, the M1 which traverses to the west of the catchment, looks likely to be the subject of a road widening scheme, the A1-M1 link road due shortly for completion, along with improvements to the A45/A605 between Northampton and Oundle will complement the existing road infrastructure.

Two rail routes cross the catchment i.e. the London Leicester line via Kettering and Wellingborough and the London-Rugby line via Northampton. Both provide links into London, the Midlands and beyond.

The River Nene is a navigational river between Northampton and the Wash, with access to the Grand Union system at Northampton and to the Great Ouse via the Middle Level system at Peterborough; the Nene is used as a recreational rather than as a commercial waterway.

## OVERVIEW

### 2.10 KEY DETAILS

#### Catchment Details

Area 1510 km<sup>2</sup>

	<u>Existing</u>	<u>Predicted 2001</u>
<u>Population</u>	519,656	587,225

<u>Ground Levels</u>	Maximum	AOD	224m
	Minimum	AOD	10.5m

#### Administrative Details

<u>County Councils</u>	Northamptonshire	95 %
	Cambridgeshire )	
	Bedfordshire )	5 %

<u>District Councils</u>	East Northants
	North Bedfordshire
	South Northants
	Daventry
	Peterborough City

<u>Borough Councils</u>	Northampton
	Wellingborough
	Kettering
	Corby

<u>NRA</u>	Anglian Region - Northern Area
	Kettering District

<u>Water Companies</u>	Anglian Water Services Ltd
	Severn Trent Water Service Ltd

Main SettlementsPresent Population

Burton Latimer	6486
Desborough	7351
Kettering	46628
Rothwell	7070
Wellingborough	42893
Earls Barton	4917
Finedon	4051
Irchester	5001
Wollaston	3003
Northampton Borough	184600
Irthlingborough	6310
Oundle	3996
Raunds	7493
Rushden	23592
Thrapston	3117
Higham	5345
Daventry	24529
Moulton	4349
Long Buckby	4375
Brixworth	3810
Corby	50,500

Utilities

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

Major Sewage Treatment Works:

Broadhome - Wellingborough & Kettering  
Billing - Northampton  
Whilton - Daventry  
Corby STW

Water Quality

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

Class:	km.
1A (very good)	13.2
1B (good)	69.9
2 (fair)	162.7
3 (poor)	28.7
4 (bad)	6.8

Minor tributaries not included.

## OVERVIEW

### Water Resources

#### Availability:-

Groundwater	Non reliably available
Surface water	Only reliably available during winter

### Flood Protection

Length of Statutory main river (maintained by NRA)	427km
---	-------

No of NRA Flood Storage Reservoirs	15
------------------------------------	----

### Fisheries

Length of cyprinid fishery	190km
Length of salmonid fishery	41km

### Conservation

Sites of Special Scientific Interest (SSSI)	46
---	----

Water dependent SSSIs	18
-----------------------	----

#### No of structures maintained

- locks:	34
- weirs:            )	
- sluices:           )	100+

Length of navigable river	79km
Length of canal	65km



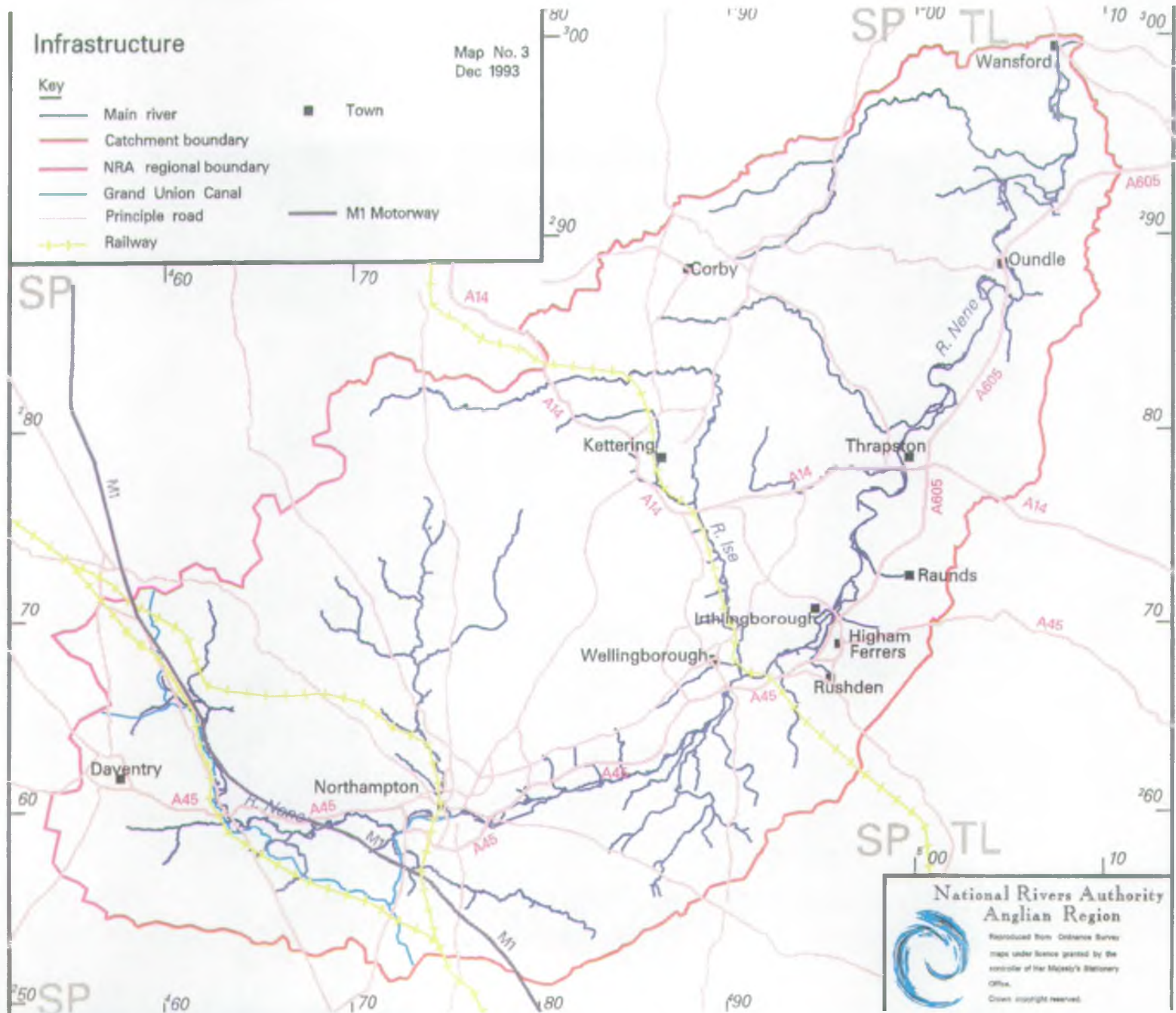


# Infrastructure

## Key

- Main river
- Catchment boundary
- NRA regional boundary
- Grand Union Canal
- Principle road
- + + Railway
- Town
- M1 Motorway

Map No. 3  
Dec 1993



### 3.0 CATCHMENT USES

#### 3.1 DEVELOPMENT

##### 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 condition or restrict development proposals.

On a less formal basis the NRA influences the sensitive environmental restoration and recreational development of worked out sand and gravel workings along the Nene Valley through its association with the Nene Valley Project Group.

##### Local Perspective

The catchment is situated predominantly within the administrative boundaries of Northamptonshire with its boundary crossing 'briefly' into Bedfordshire and Cambridgeshire.

The catchment covers parts of the Districts of Daventry, East Northamptonshire and South Northamptonshire, and the Boroughs of Wellingborough, Kettering, Northampton and Corby.

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 2006. 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.

A feature of this catchment has been the extensive development over the past 20-30 years and its impact upon the water environment. This expansion has been a consequence of government New Town Policy which identified Northampton and Corby as new towns and led to a population growth across the Catchment between 1961-1991 of +21.7% (compared with a national growth of +0.33% for the same period). The predicted population growth for this catchment to the year 2006 is +13%. The pressures on the water environment are obviously set to continue.

In the late 1970s the Northampton Washlands were constructed to ensure that in terms of flood risk downstream of Northampton the town could be developed without any increase of that risk caused by increased surface water run-off. The capacity of the 'Washlands' to compensate for future development has now been reached. Proposals now under consideration - such as the South West Development Proposals, which involve urbanising an area of approximately 1200 hectares in Northampton, and the Whitworths proposals at Wellingborough 95 hectares - will also require compensatory works to be undertaken, these developments are also indicative of the intense pressure to develop within the floodplain of the River Nene as land availability diminishes.

The cost of such flood defence works - £2.5m in the case of the South West Development Proposals highlight the need for a strategic approach to be adopted at the planning stage. Patently individual companies are unlikely to be able to fund such works and a piecemeal approach to development and compensatory flood defence works would not be feasible. The foresight of councils such as Kettering Borough who have taken a pro-active approach by funding improvements to the Slade Brook in order to facilitate future development should be applauded.

Future development of the natural mineral resource within the catchment will have an obvious impact on the environment in terms of loss of habitat for flora and fauna; it will also have a more insidious impact upon water quality and resources. The likely future use of worked out gravel and sand pits as landfill sites poses an additional possible threat to the water environment.

#### 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.

To promote facilities for sport and other forms of recreation.

Water Quality:

To protect inland, coastal and groundwaters from pollution.

To ensure that adequate pollution prevention measures are incorporated into development proposals 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.





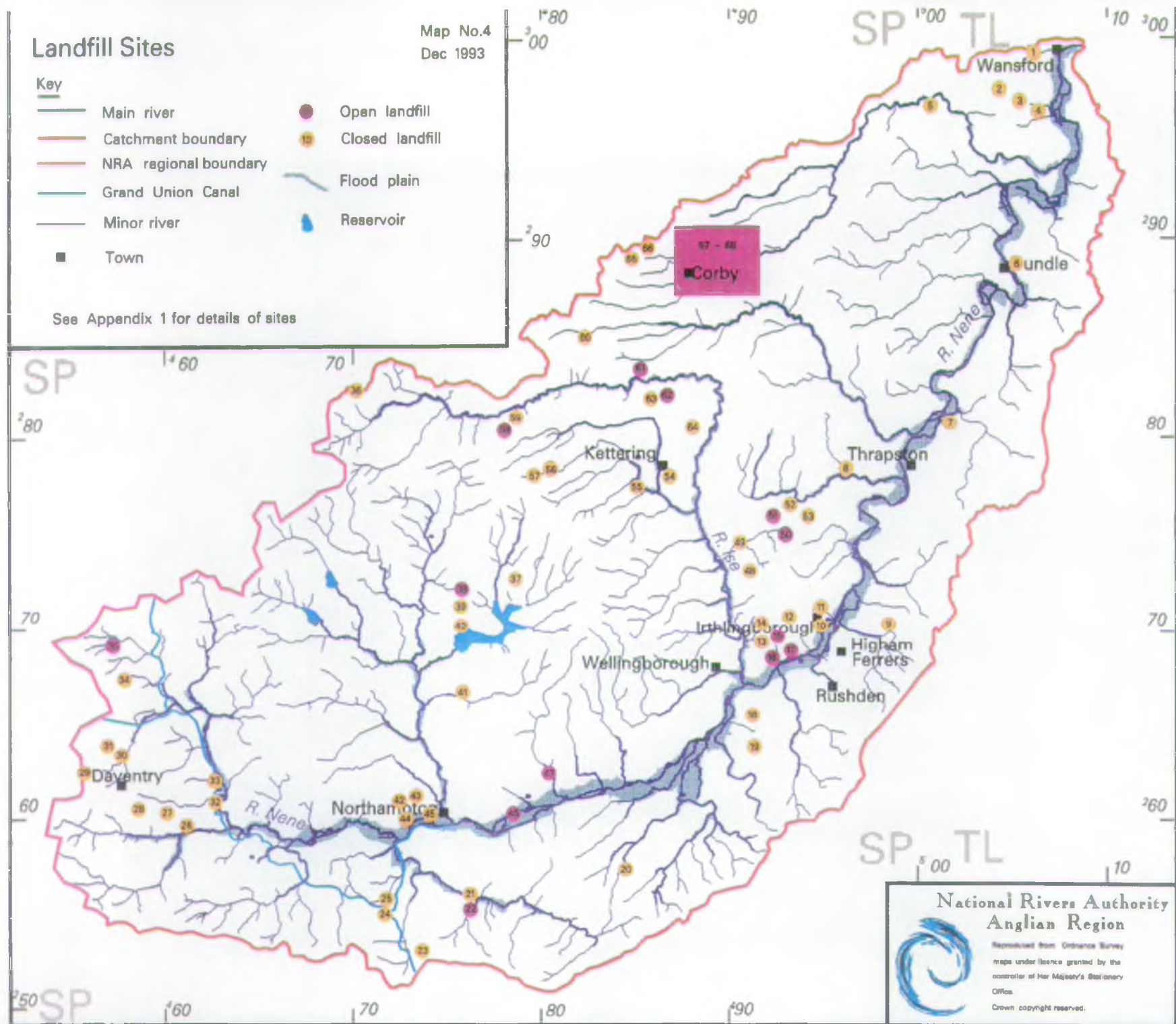
# Landfill Sites

Map No.4  
Dec 1993

## Key

- Main river
- Catchment boundary
- NRA regional boundary
- Grand Union Canal
- Minor river
- Town
- Open landfill
- Closed landfill
- Flood plain
- Reservoir

See Appendix 1 for details of sites



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## 3.2

**LANDFILL SITES/CONTAMINATED LAND****General**

The Northamptonshire County Council is the Waste Regulatory Authority for this catchment and 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. Both operating and closed landfill sites can pose a significant threat to groundwater quality.

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**

For new landfill sites proposals 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 gulleys left by mining of iron ore for the steel industry. The Northampton ironstone is commonly overlain by limestone. In the area there are also some quarries left by excavation of limestone only. The majority of landfilling takes place in the gulleys with less landfilling in the limestone quarries. Where landfilling has occurred in unlined sites there is a risk of pollution to groundwater, and to surface waters via pollution of springs.

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 floodplains and flood risk.



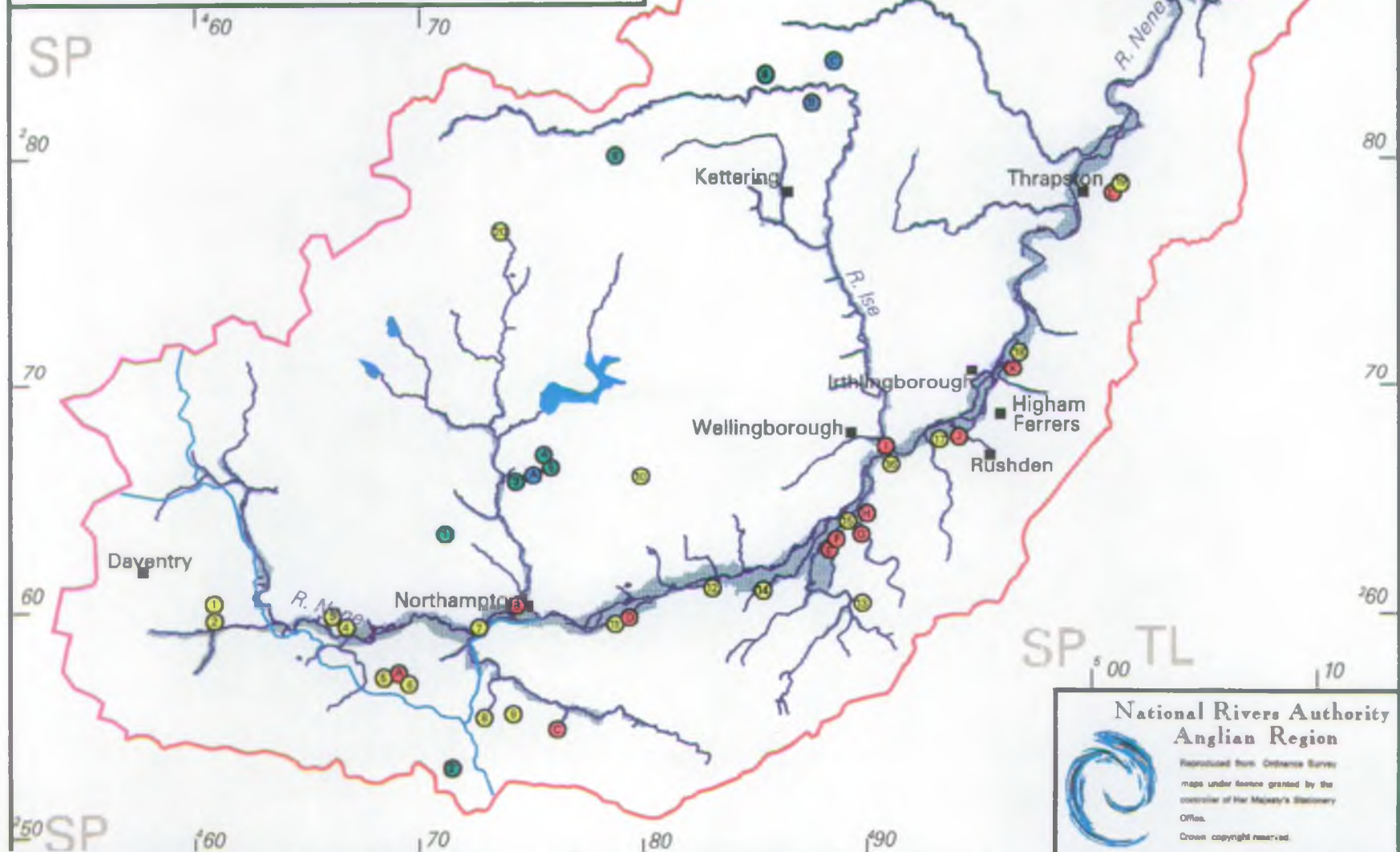
# Mineral Extraction

Map No. 5  
Dec 1993

## Key

- |   |   |
|---|---|
|  Main river            |  Sand and gravel commitments |
|  Catchment boundary    |  Sand and gravel proposals   |
|  NRA regional boundary |  Limestone commitments       |
|  Grand Union Canal     |  Limestone proposals         |
|  Minor river           |  Ironstone permissions       |
|  Town                  |   |
|  Flood plain           |   |

See Appendix 2 for details of sites



National Rivers Authority  
Anglian Region



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### 3.3 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 can pose a significant threat to water quality.

#### Local Perspective

Under the provisions of the Town and Country Planning Act 1990, Northamptonshire County Council as Mineral Planning Authority is responsible for all mineral planning matters in the Upper Nene catchment apart from very small areas of Bedfordshire, Buckinghamshire and Cambridgeshire, of which only the latter has one small limestone working within the catchment area.

Sand and gravel is the most significant mineral extracted in Northamptonshire since the working of ironstone for steel making ceased in 1980. The good quality sand and gravels in the Nene valley give a high yield per hectare and of the 13 sites with planning permission, 9 of them are within the Nene floodplain. Limestone is extracted at 11 sites within the catchment, 3 of these are former Ironstone workings and a further 1 is proposed. Six other Ironstone planning permissions contain economically workable ironstone and/or limestone and these may be worked during the Northampton Mineral Plan period.

Due to the high demand for sand and gravels in recent years, it was estimated that reserves with planning permission in 1991, would last for approximately four years at their present rate of extraction. There is therefore a need to find new sources of sand and gravel and Northamptonshire County Council in their 1991 - 2006 minerals local plan have proposed 24 sites for future development of which 20 are within the Upper Nene catchment and 10 are either partly or wholly within the floodplain. The NRA are consultees in the planning application process and will comment on these proposed mineral extraction areas taking into account the recommendations made in the Authority's Groundwater Protection Policy.

Within the minerals plan for Northamptonshire the NRA's concerns over the affect of mineral extraction on water quality, water resources and nature conservation areas including Sites of Special Scientific Interest (SSSI's), have been incorporated in sections NMLP 20 part J, 31 parts Q -S and 33 parts Q - R.

Where mineral extraction has ceased, the sites are either restored by landfilling or left as open bodies of water for recreational purposes. Both of these restoration methods can increase the risk of pollution occurring, and therefore require careful development control.

Mineral extraction sites that are to be restored by landfilling, may be restricted, depending on the type of waste to be deposited, the sites proximity to the floodplain and the nature of the underlying bedrock (aquifer protection zone).

#### 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.

### 3.4 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

In the Upper Nene catchment a large proportion of river flow is derived from Sewage Treatment Works effluent, however groundwater can sometimes provide significant baseline river flows, if surface waters receive polluted groundwater they themselves will become contaminated.

Surface water abstractions for public water supply are taken from the Nene at Wansford and at Duston. It is important that discharges into the Nene upstream of these abstractions are effectively controlled so as to ensure that this important use is protected.

The Upper Nene catchment does not provide major groundwater resources for public water supply, however there are many small private abstraction boreholes which must be protected.

The Northampton Sand is of limited value for public water supply due to the less extensive nature of the aquifer and the inherent high iron concentration.

The NRA is currently developing a groundwater monitoring strategy which will improve its understanding of groundwater quality and identify areas where improvement is required.

There is a strong link between the need to protect the Water Quality of groundwaters and Conservation, there are several critical spring fed sites within the catchment, the most significant in terms of numbers and diversity of fauna is Sywell Brook, other watercourses notable for their flora and fauna include the River Ise, Grendon Brook and Everdon Brook.

#### 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.





# Water Resources - Catchment Uses

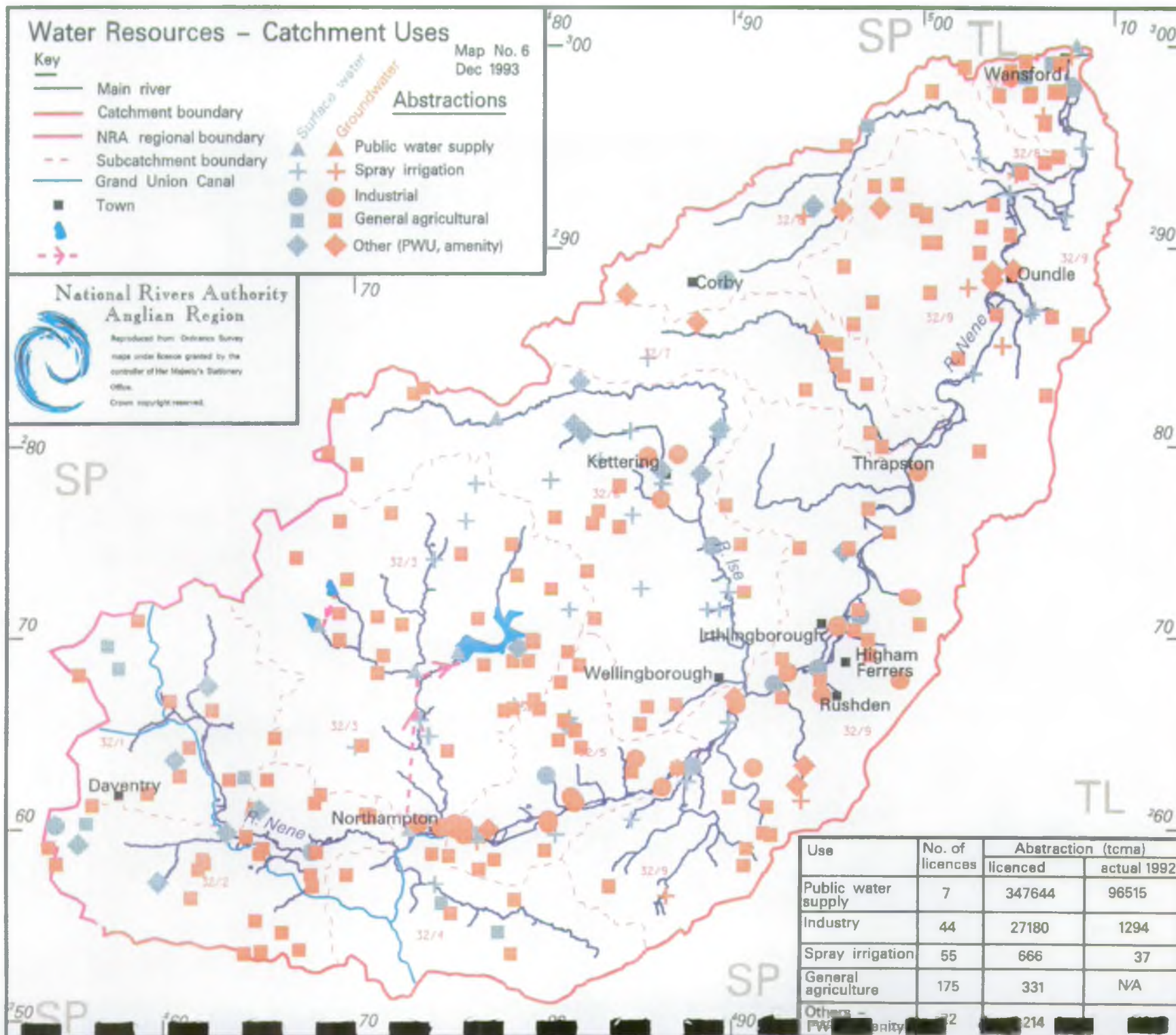
Map No. 6  
Dec 1993

## Key

- Main river
- Catchment boundary
- NRA regional boundary
- - Subcatchment boundary
- Grand Union Canal
- Town
- >—

## Abstractions

- ▲ Surface water
- ▲ Public water supply
- + Spray irrigation
- Industrial
- General agricultural
- ◆ Other (PWU, amenity)



Use	No. of licences	Abstraction (tcma)	
		licenced	actual 1992
Public water supply	7	347644	96515
Industry	44	27180	1294
Spray irrigation	55	666	37
General agriculture	175	331	N/A
Others - PWU, amenity	22	214	



### 3.5 POTABLE WATER SUPPLY - GROUNDWATER

#### General

This relates to the use of groundwater for domestic water supply purposes (ie drinking, washing etc). Water abstracted from wells and boreholes is used in only very small quantities in the catchment for this purpose, it accounts for less than 1% of all licensed abstraction in the catchment.

#### Local Perspective

Groundwater resources in the catchment are limited. The aquifers in the catchment are thin and discontinuous with little potential for development.

There are no current groundwater abstractions by Anglian Water Services for public water supplies in the Upper Nene catchment (a licenced source at Brigstock is not used). The gravels and Northampton Sands were previously used for public supply, but these sources have been discontinued due to quality and reliability difficulties.

Water is abstracted from wells and boreholes constructed into the minor Jurassic aquifers and from shallow wells in the sands and gravels. These abstractions are principally by individual householders for their own domestic use. The total amounts abstracted are small and at widely scattered rural locations throughout the catchment.

In addition there are minor private water undertakings such as hospitals and schools. There are also a small number of industrial abstractions, mostly in the Northampton area, which use water from aquifers for food processing and brewing.

All these uses depend on small but locally reliable resources of high quality groundwater.

The location of licensed abstractions and summary abstraction information is shown on the map opposite.

#### 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.

### 3.6 POTABLE WATER SUPPLY - SURFACE WATER

#### General

This use relates to the abstraction of water from surface water sources, ie rivers and springs for domestic water supply purposes (ie drinking, washing etc). It includes abstraction both by water companies and private individuals.

The surface water resources of the catchment are principally used for Public Water Supply. This use constitutes 92% of all licensed water abstraction in the catchment.

#### Local Perspective

The principal abstraction is a major surface water intake located at the downstream end of the catchment at Wansford, where water is abstracted by Anglian Water Services Ltd and pumped via a pipeline to fill Rutland Water reservoir. (Another surface water intake is located in the adjacent catchment at Tinwell 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 to form the Ruthamford (Rutland Grafham Pitsford) water supply system. Rutland Water supplies water to domestic and industrial consumers in the Upper and Lower Nene catchments in addition to a large area outside the catchments.

Licensed abstraction is geared to meeting the design yield of Rutland Reservoir. The licence authorises abstraction of 278809 tcma (thousand cubic metres per annum). The licence includes a condition on requiring a minimum residual flow of 136 tcmd (thousand cubic metres per day) to be maintained downstream of Orton Sluice (located in the Lower Nene Catchment).

Within the Upper Nene catchment there are three major surface water supply reservoirs operated for public water supply. These are the reservoirs at Pitsford, Hollowell and Ravensthorpe operated by Anglian Water Services. Water is abstracted from the Upper Nene at Duston Mill immediately upstream of Northampton, and pumped via pipelines to supplement the natural inflows to Pitsford reservoir. Hollowell and Ravensthorpe reservoirs are filled by natural inflows only. These abstractions are subject to conditions to protect minimum flows in the river downstream

Pitsford reservoir is by far the biggest of the three reservoirs within the catchment and forms part of the much larger Ruthamford supplying a wide area within and beyond the Nene catchments.

A summary of licensed abstractions is shown below:

Site	Licensed abstraction tcma
<u>Transfers to reservoirs</u>	
Duston Mill (Nene)	38551
Merry Tom (Brampton Branch)	No longer ) 3578
Harrington (River Ise)	used ) 386
Wansford (Nene)	278809
Total transfer abstraction	321324
<u>Abstractions from reservoirs</u>	
Pitsford	19912
Ravensthorpe )	
Hollowell )	5910
Total reservoir abstraction	25822
Total licensed abstraction	347146

These surface water abstractions totalling 347146 tcma represents 92% of all licensed water abstraction in the catchment. Abstraction of water for Public Water Supply from both inside and outside the catchment leads to effluent returns to the river.

Actual abstraction in 1992 was around 28% of licenced abstraction.

There are a small number of spring sources within the catchment which are used for private domestic supplies. The quantities abstracted for this use are very small.

Demand for water for Public Water Supply in the catchment, given its active urban and industrial development, is increasing - however there is no forecast deficiency in resources to meet PWS demand from the existing surface water resources to the planning horizon (2015).

The location of licensed abstractions and summary abstraction information is shown on the map No 6.

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 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.

### 3.7 AGRICULTURAL ABSTRACTION

#### General

This use relates to the abstraction of water from ground and surface waters for agricultural use including spray irrigation and general agricultural use (stock watering, crop spraying etc). All uses, except general agricultural abstractions of less than 20 cubic metres per day from surface waters, require a licence.

The total agricultural abstraction consists of <1% of all licensed water abstraction in the catchment (principally spray irrigation).

#### Local perspective

##### **General Agriculture**

There are 175 licensed abstractions for this purpose in the catchment, principally from groundwater sources, although a number of small surface water abstractions do occur - licensed abstraction for this purpose is 331 tcma which is only <1% of the total licensed abstraction in the catchment.

##### **Spray Irrigation**

There are a small number of spray irrigation abstractions across the catchment, the main abstractions are from the Nene and its tributaries downstream of Northampton. Some of these licences have minimum residual flow conditions preventing abstraction under low flow conditions.

There are currently 55 licensed abstractions for this use - totalling 666 tcma. Actual abstraction in 1992 was 37 tcma.

The current forecast is for future demand for agricultural purposes for spray irrigation uses to increase by 1-2% per annum.

The location of licensed abstractions and summary abstraction information is shown on Map No 6.

#### 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.

## USES

- 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.

## INDUSTRIAL ABSTRACTION

### General

This use relates to the abstraction of water from surface and groundwater sources, for industrial processing, cooling and sand and gravel washing. All such abstractions are controlled by abstraction licences issued by the NRA.

Industrial abstraction represents 8% of the total licensed abstraction in the catchment.

### Local Perspective

Although the catchment is mainly rural in character, there are significant industrial developments in Northampton and the towns of Corby, Kettering, Wellingborough and Irthlingborough. The industrial demands for water in these towns are met partly by direct abstraction through the public water supply system.

Direct industrial abstraction takes place from minor Jurassic aquifers and shallow sand and gravel sources particularly around Northampton, and from the River Nene and its tributaries. There are a small number of large abstractions from the River Nene and gravels associated with sand and gravel workings.

The total licensed abstraction for industrial use is 27180 tcma from 44 licensed sources, abstraction is principally from surface waters.

Actual abstraction in 1992 was 1294 tcma.

The current forecast is for future demand for industrial purposes to increase by around 1% per annum.

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



## USES

- 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.

**LIVESTOCK WATERING****General**

Streams with this identified use are safeguarded to provide water of suitable quality for livestock watering. Bacteriological quality is not guaranteed however, Standard 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.

**Objectives**

- To meet the quality criteria of the Statutory Water Quality Objectives when developed.

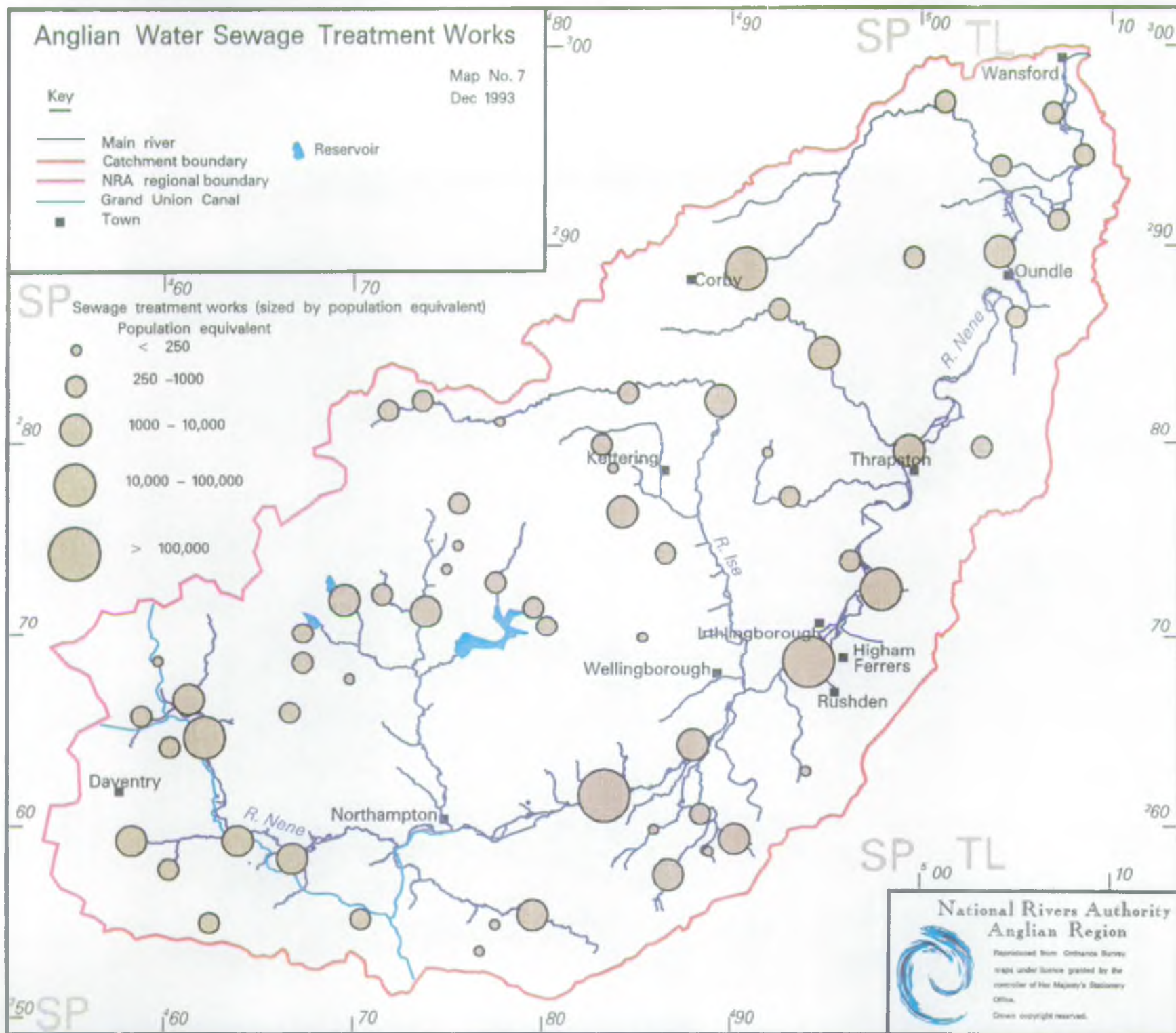
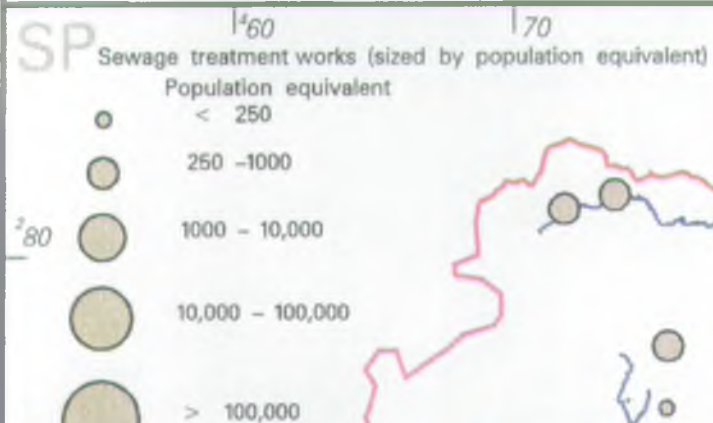


# Anglian Water Sewage Treatment Works

Map No. 7  
Dec 1993

## Key

- Main river
- Catchment boundary
- NRA regional boundary
- Grand Union Canal
- Town
- Reservoir



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Anglian Region



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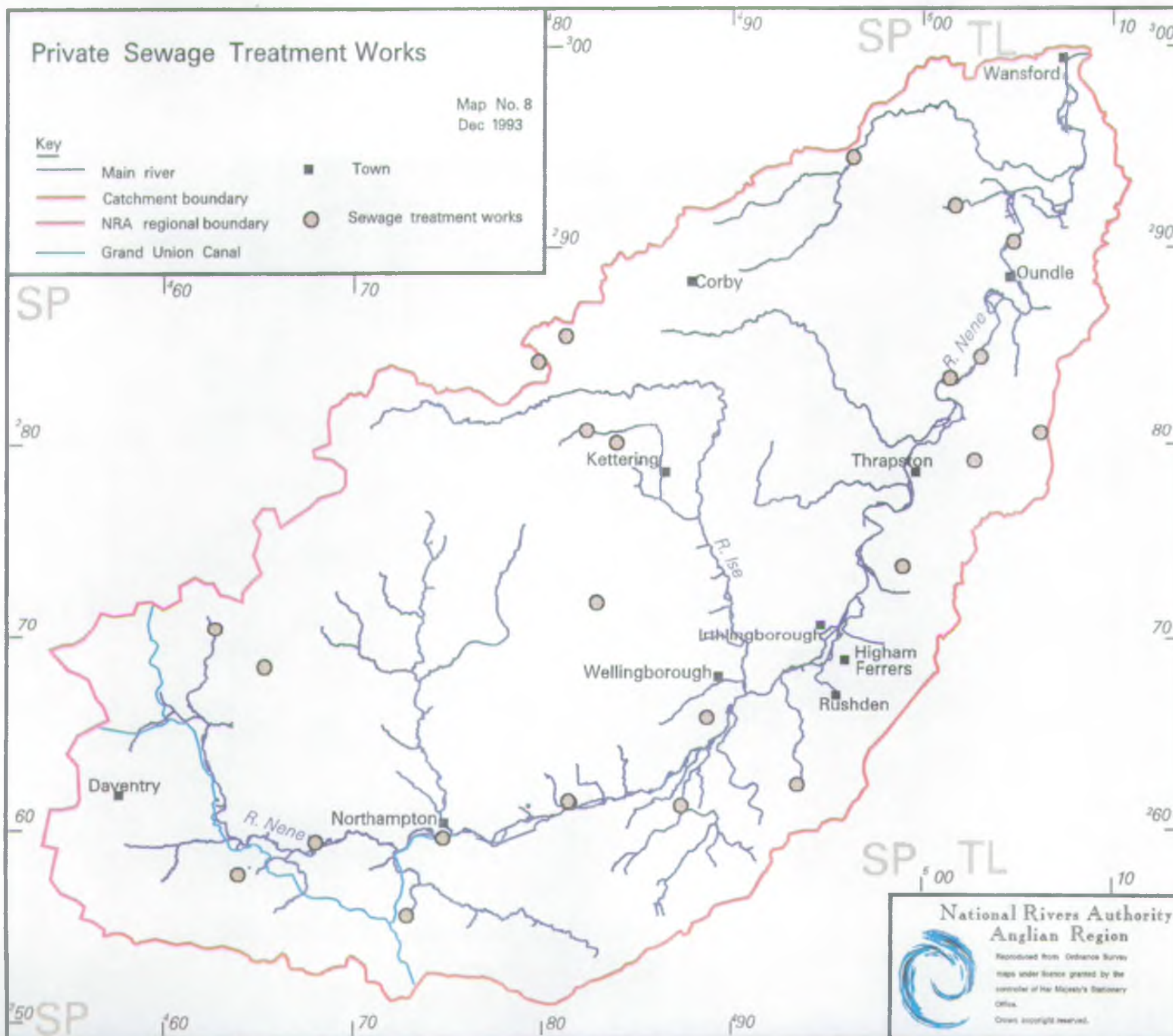


# Private Sewage Treatment Works

Map No. 8  
Dec 1993

## Key

- |   |                       |   |                        |
|---|-----------------------|---|------------------------|
|  | Main river            |  | Town                   |
|  | Catchment boundary    |  | Sewage treatment works |
|  | NRA regional boundary |   |                        |
|  | Grand Union Canal     |   |                        |



National Rivers Authority  
Anglian Region



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### 3.10 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 66 Sewage Treatment Works operated by Anglian Water Services and 24 private ones 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.

A large component of baseline river flow particularly during drought periods is derived from sewage treatment works effluent. It is therefore of great importance that effluent quality standards are complied with to ensure water quality in the Nene is protected.

#### 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.
- To ensure that dischargers pay the costs of the consequences of their discharges.

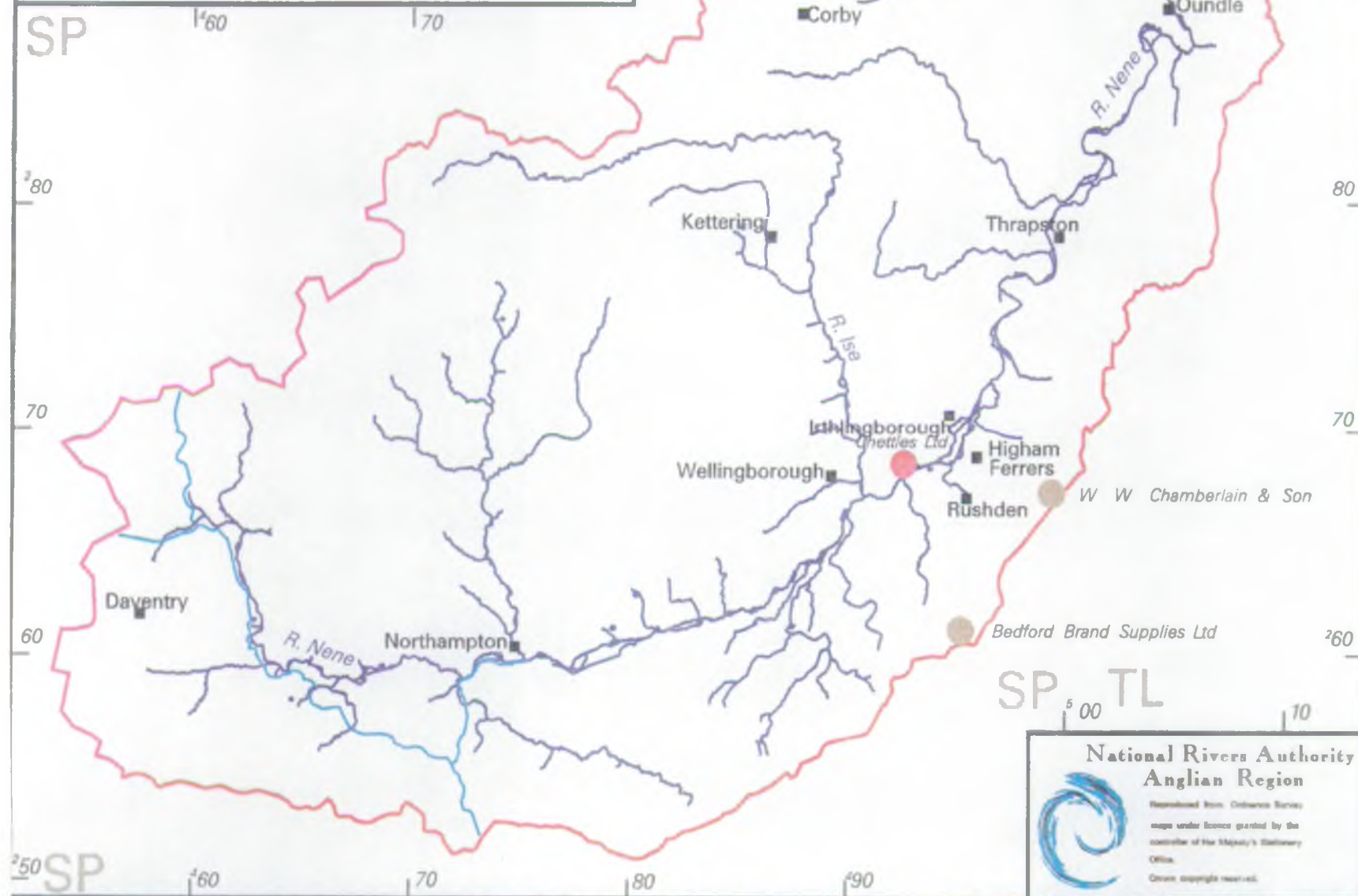


# Industrial Discharges

Map No. 9  
Dec 1993

## Key

- |   |                       |   |                              |
|---|-----------------------|---|------------------------------|
|  | Main river            |  | Town                         |
|  | Catchment boundary    |  | Major industrial discharge   |
|  | NRA regional boundary |  | Smaller industrial discharge |
|  | Grand Union Canal     |   |                              |



### 3.11 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 21 industrial discharges, 7 associated with sand and gravel extraction and 2 major industrial discharges:-

British Steel  
Chettles Ltd

There are a number of industrial areas near most principal towns in the Catchment eg Northampton, Corby and Kettering. Foul sewage and trade effluent from these areas 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. Tracing pollutions in surface water drainage systems is difficult and manpower intensive. Problems are often best traced using biological criteria. Developers and industrialists must be aware of the pollution potential of their sites and provide adequate pollution prevention measures for surface water disposal systems, such as oil interception units and bunding for tanks containing potentially polluting substances.

#### 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.
- To ensure that dischargers pay the costs of the consequences of their discharges.

### 3.12 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 contaminated land areas.

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 standards.

#### Local Perspective

A large part of the Upper Nene Catchment is mixed farming, and particular attention must be given to farming practices to avoid diffuse source pollution. Guidelines such as the Code of Good Agricultural Practice as issued by MAFF need to be followed, for example, to avoid over application of nitrate based fertilizers.

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

- The implementation of the EC Nitrate Directive will bring about many changes designed to address the problems caused by diffuse source pollution.
- To prevent and/or control diffuse pollution so as to protect water quality.



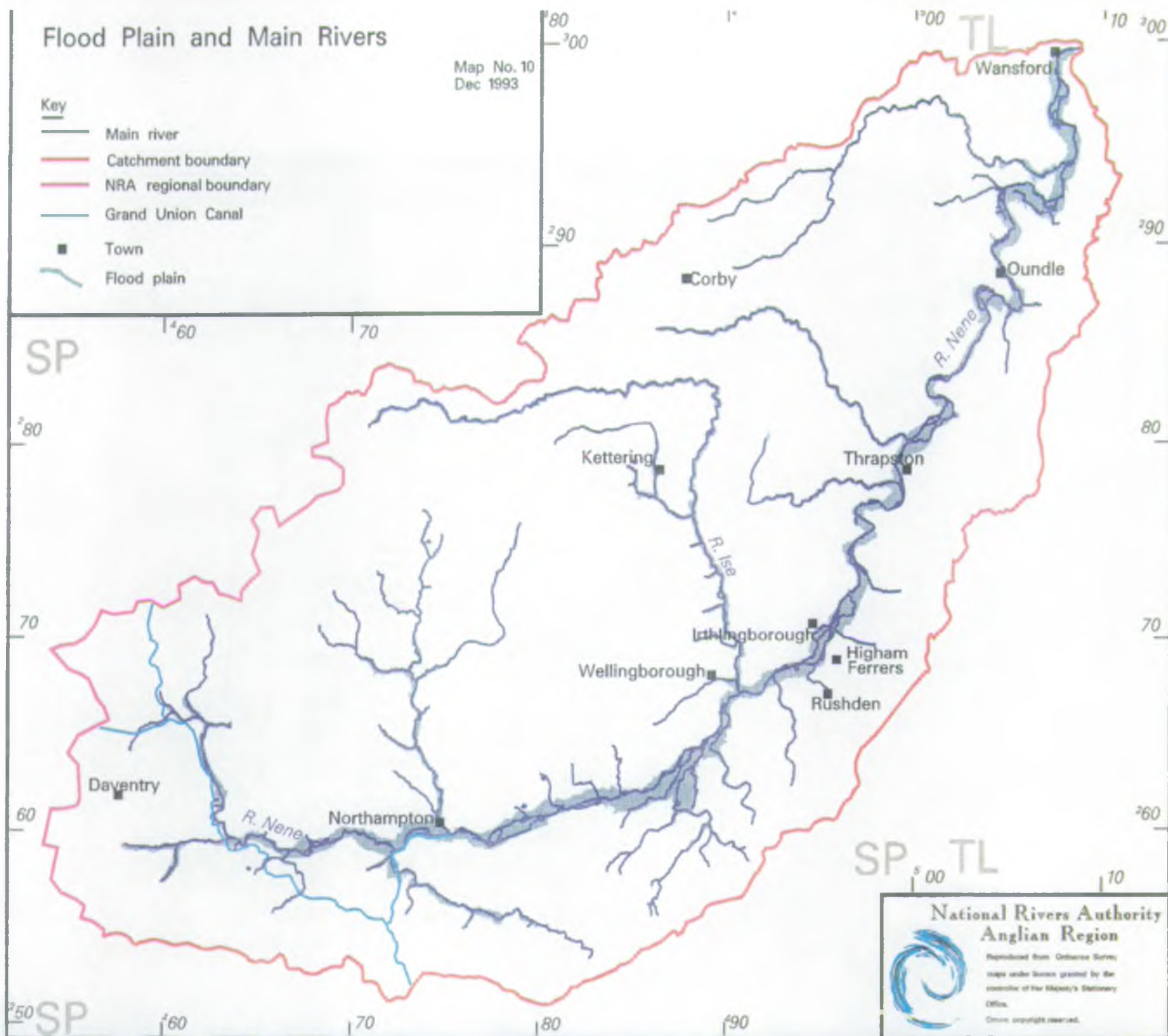


# Flood Plain and Main Rivers

Map No. 10  
Dec 1993

## Key

- Main river
- Catchment boundary
- NRA regional boundary
- Grand Union Canal
- Town
- Flood plain



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### 3.13 FLOOD DEFENCE

#### General

This use covers the provision of effective defence for people and property against fluvial flooding - normally resulting from very heavy rainfall or rapid snow melt. Flood events are described in terms of the frequency at which, on average, floods of certain severity are exceeded. This is expressed as a return period, eg 1 in 50 years.

The effectiveness of flood defences can be measured in terms of the return period up to which flooding is prevented. Generally the level of flood defence maintained/constructed by the NRA will depend upon the type of land being protected so for example urban flood defences are built to a higher standard (return period) than say defences for agricultural land. Map No. 27 shows existing standards of flood protection relating to Statutory Main River within the catchment.

#### Responsibilities and Powers

Responsibility for the maintenance of flow in any watercourse normally rests, in the first instance, with the riparian landowner however, the Water Resources Act 1991 places on the NRA a general duty of supervision on all matters relating to land drainage and flood defence regardless of the designated status of a watercourse.

Certain watercourses are formally designated Statutory Main River, on these the NRA has permissive powers to carry out works and to control the actions of others. Operational works carried out under these powers are generally targeted at maintaining past works to ensure that they function as required.

Any proposal for works - in, over or under a Main River requires the formal consent of the NRA as does the construction of weirs, dams, culverts or other like obstructions in all other watercourses.

Local Authorities and County Councils have powers, but no legal obligation, to carry out works on ordinary watercourses, subject to the NRA's consent.

The NRA operates a flood warning service whereby the Police and other organisations, eg NFU are advised in advance of areas likely to be affected by flooding. The warnings are phased, colour coded indicating the anticipated severity of an event and its impact on land and property.

The phased warnings are:-

Yellow - minor flooding affecting some roads only.

Amber - flooding of certain roads and isolated properties.

Red - full flood situation with significant numbers of property and major roads at risk.

Flood forecasts are compiled using Met. Office predictions together with rainfall and river level data collected from outstations via the Regional telemetry system.

### Conflicts

The nature of works carried out for flood defence sometimes conflicts with other catchment uses. Examples are in the regulation of flood flows where certain locks have a dual function, primarily a navigation aid they are also used as a means to discharge flood flows, this often results in the deposition of gravel shoals downstream which reduces the navigable depth of the watercourse.

Weedcutting and tree clearance to maximise channel efficiency in the discharge of flood flows can lead to the loss of vital habitat for flora and fauna.

In an effort to reduce such conflicts prior consultation with other users seeks to ensure that such works are executed without detriment to the environment and that wherever possible environmental enhancements are made, when carrying out flood defence works.

### Local Perspective

In the Upper Nene catchment, some 472 km of watercourse is designated main river.

Operational control of river levels is confined with one exception to the River Nene, this exception being a sluice on the River Ise at Weetabix Mills, Burton Latimer.

On the Nene between Wansford and Northampton, there are some 130 separate structures retaining levels for navigation and providing flood discharge capacity, all under the control of the NRA. Over 50% of these can be adjusted either automatically or manually while the remainder are fixed weirs.

At certain mill sites there are controls in private ownership, the operation of these is rare and in any event regulated by the Authority's Byelaws.

Past improvement schemes have been aimed at alleviating urban flooding mainly on the Nene tributaries. With the notable exception of Northampton Washlands, constructed in the late 1970's to store excess run-off from the town expansion, improvements on the Nene have been largely confined to replacement of structures at a limited number of sites.

#### Flood Defence Objectives

- To provide adequate defence for people and property against fluvial flooding. The standard of protection to be appropriate to land use wherever economically viable.
- To provide adequate arrangements for flood forecasting and warning.
- To maintain existing flood defences ensuring adequacy of purpose.
- To carry out maintenance and new works with due regard to environmental needs.



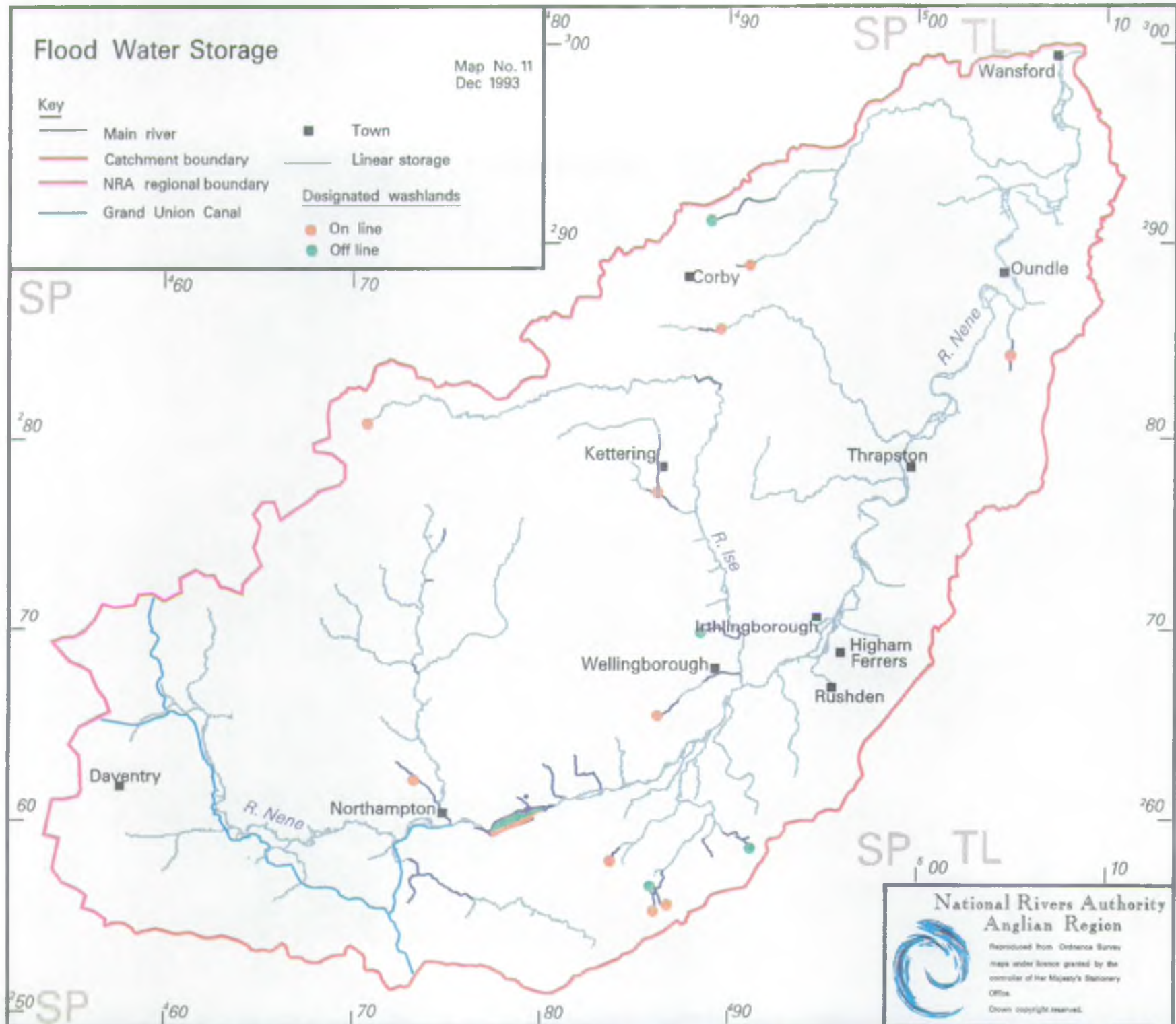


# Flood Water Storage

Map No. 11  
Dec 1993

## Key

- |                         |                             |
|-------------------------|-----------------------------|
| — Main river            | ■ Town                      |
| — Catchment boundary    | — Linear storage            |
| — NRA regional boundary | <u>Designated washlands</u> |
| — Grand Union Canal     | ● On line                   |
|                         | ● Off line                  |



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### 3.14 FLOOD WATER STORAGE

#### General

This section covers the use of land within the catchment to store flood water during events.

#### Local Perspective

A notable feature of the Upper Nene compared to the Lower Nene is the almost complete absence of embanked channels, with freeboard between retained water level and bank level as little as 460 mm in places. Consequently the Nene utilises its floodplain to the full.

In the Nene valley particularly between Thrapston and Northampton the naturally available storage is enhanced by numerous worked out gravel pits providing additional storage between the normally retained water level and ground level.

There are 15 purpose-built flood storage sites within the catchment situated on main river (shown opposite). These have been constructed as the most cost efficient manner of achieving a desired standard of flood protection where scope for increases in channel and structure flow capacities in urban areas has been severely limited. Many other storage sites exist in urban areas situated on ordinary watercourses and therefore outside the control of the NRA.

In general, the flood storage sites under NRA control have been provided to alleviate existing flooding problems, whilst those under Local Authority control have been provided to allow development to proceed without increasing the risk of flooding downstream.

In the case of flood storage for development, two distinct approaches have been taken. For example in Corby and Wellingborough a combination of separate storage sites have been provided, each site catering for a specific area or phase of development. In Kettering and Northampton, single major storage sites catering for potential development over the period of a Local Plan duration have been provided. This latter approach requiring significant prefunding.

#### Objectives

- To maintain existing purpose-built storage sites to ensure adequacy of purpose.
- To maintain the status quo in respect of available floodplain storage volume.



# Recreation and Amenity

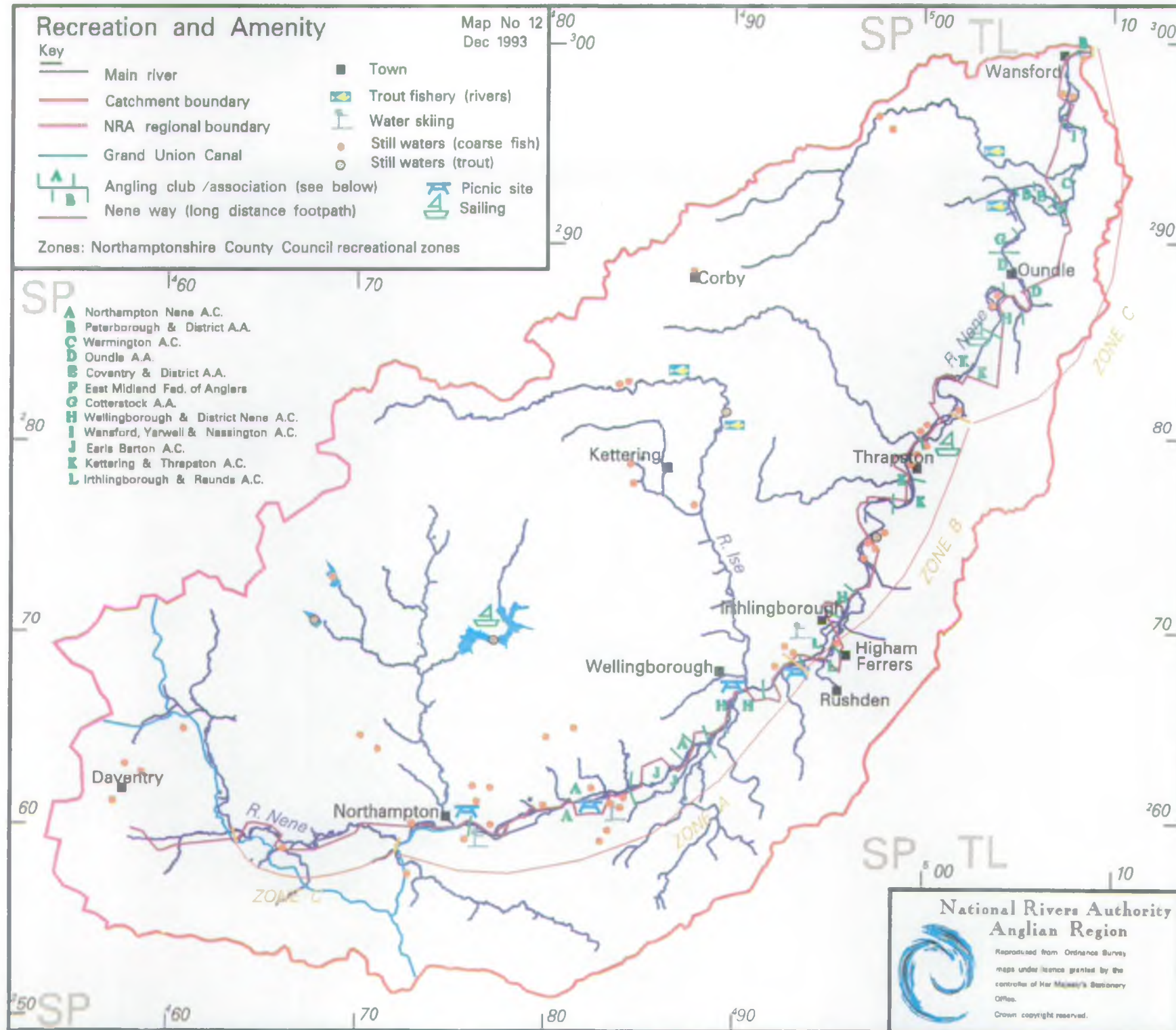
Map No 12  
Dec 1993

## Key

- |  |                                       |  |                            |
|--|---------------------------------------|--|----------------------------|
|  | Main river                            |  | Town                       |
|  | Catchment boundary                    |  | Trout fishery (rivers)     |
|  | NRA regional boundary                 |  | Water skiing               |
|  | Grand Union Canal                     |  | Still waters (coarse fish) |
|  | Angling club /association (see below) |  | Still waters (trout)       |
|  | Nene way (long distance footpath)     |  | Picnic site                |
|  |                                       |  | Sailing                    |

Zones: Northamptonshire County Council recreational zones

- SP
- |   |                                     |
|---|-------------------------------------|
| A | Northampton Nene A.C.               |
| B | Peterborough & District A.A.        |
| C | Warrington A.C.                     |
| D | Oundle A.A.                         |
| E | Coventry & District A.A.            |
| F | East Midland Fed. of Anglers        |
| G | Cotterstock A.A.                    |
| H | Wellingborough & District Nene A.C. |
| I | Wansford, Yarwell & Nasington A.C.  |
| J | Earls Barton A.C.                   |
| K | Kettering & Thrapston A.C.          |
| L | Irthlingborough & Reunds A.C.       |



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### 3.15 RECREATION & AMENITY

#### 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, canoeing, angling and immersion sports 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 upstream of Northampton to downstream of Wansford. Access for disabled people, for both recreational activities and general amenity is limited on the Nene.

Northamptonshire County Council in their County Structure Plan have subdivided the Nene Valley into zones for the restoration of sand and gravel workings in those areas of the Valley where agriculture cannot be reintroduced because of the high water table. The object of this zoning is to establish a co-ordinated approach to the Valley's restoration which specifically identifies areas (a) where intensive water recreation eg water skiing is allowed, as opposed to (b) those where more quiet recreational boating is allowed and (c) those where "peace and quiet" activities are encouraged (eg picnicking and nature study).

The County Council is actively encouraging the development of pocket parks a number of which are to be found alongside watercourses in the catchment.

#### Obiectives

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

To increase the use of the Nene corridor as a recreational facility without compromising other uses.

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.





# Location of Locks and Overnight Moorings

## Key

— Main river  
— Grand Union Canal

■ Town

All locks have temporary moorings

Map No. 13  
Dec 1993

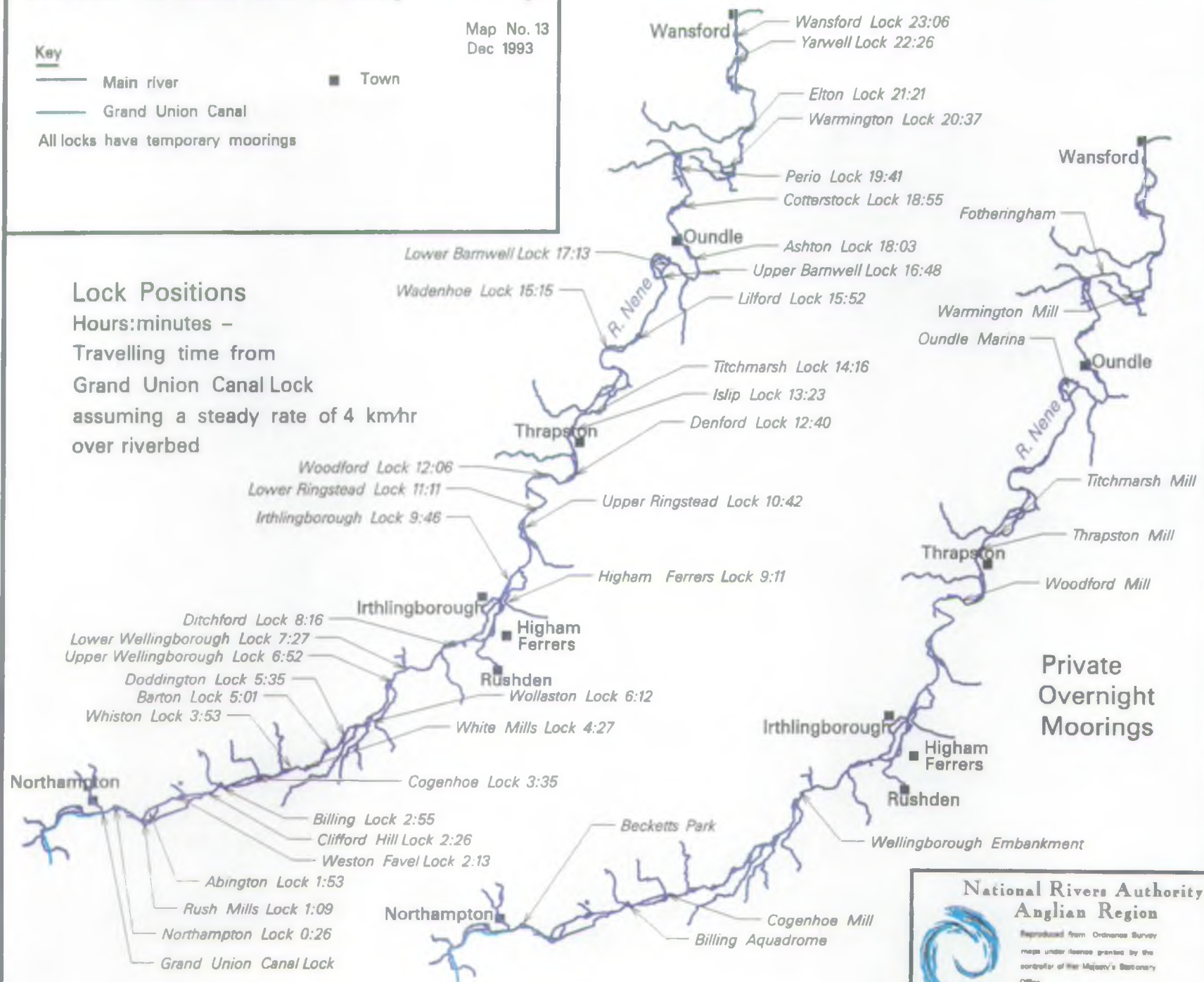
## Lock Positions

Hours:minutes –

Travelling time from

Grand Union Canal Lock

assuming a steady rate of 4 km/hr  
over riverbed



Private  
Overnight  
Moorings

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# Facilities on the Nene – Navigation

## Key

— Main river  
— Grand Union Canal

■ Town

Map No. 14  
Dec 1993

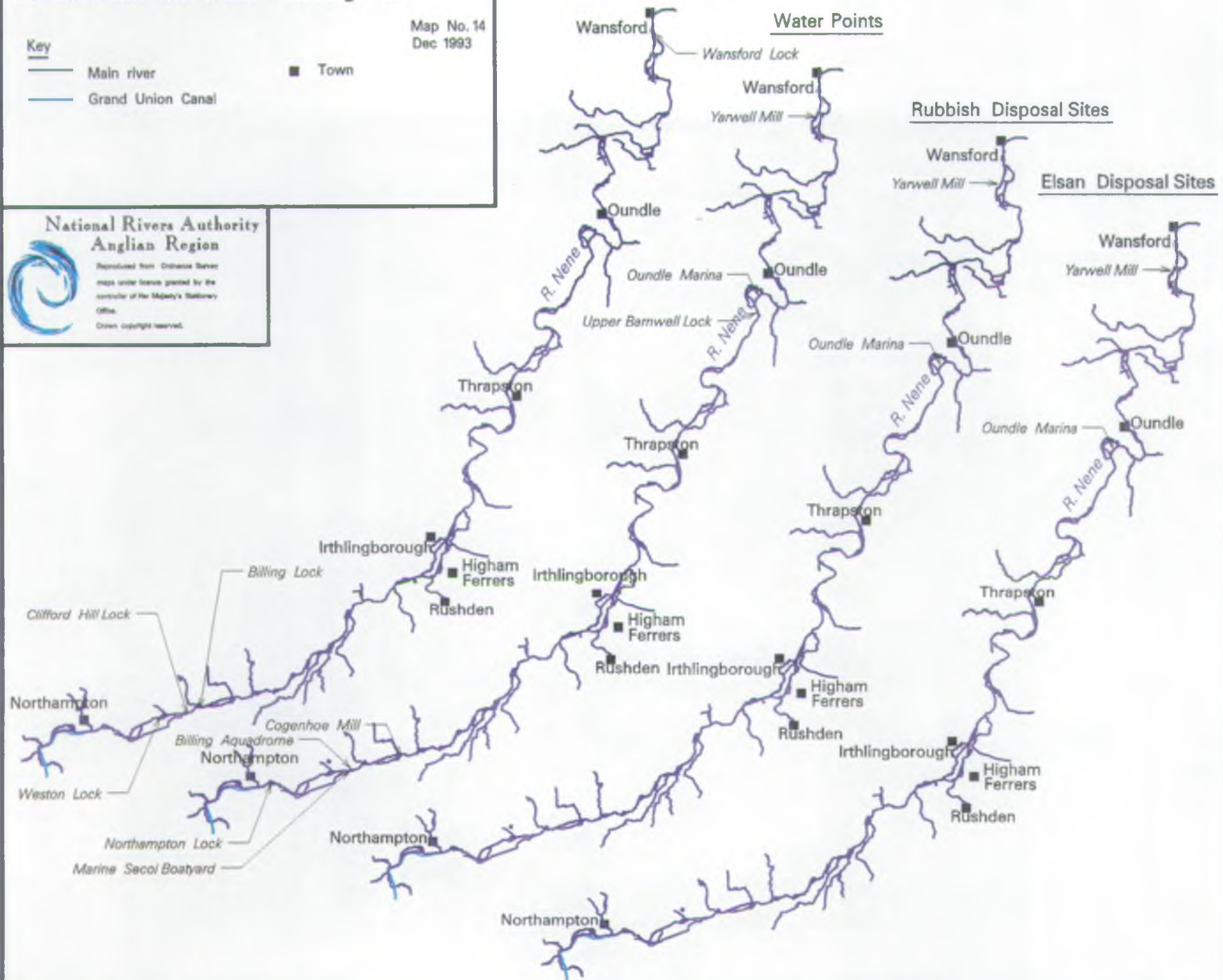


## Electrified Locks

## Water Points

## Rubbish Disposal Sites

## Elsan Disposal Sites



### 3.16 NAVIGATION/BOATING

#### General

This use relates to waterways providing navigation facilities and recreation boating and sailing.

#### Local Perspective

From Northampton to Wansford the Nene is a "Recreational Waterway" defined in the Anglian Water Authority Act 1977 and the NRA is the Navigation Authority.

Access to the sea, via The Wash, is possible for craft proceeding downstream from Wansford and connection to the canal system is possible via the Northampton Arm of the Grand Union Canal. Connection to the Middle Level system is also possible via Stanground at Peterborough.

There are 34 locks between Wansford and Northampton, the majority of which are conventional Nene Locks having a guillotine gate at the downstream end and pointing doors at the upstream end. The exceptions are Ditchford, which has a radial gate in place of the guillotine and Abington, Rush Mills and Northampton, which have pointing doors at each end. Four of the locks, Wansford, Billing, Clifford Hill and Weston Favell have electric operation of the guillotine gate.

Certain of the locks serve a dual function insofar as their discharge capacity is fully utilised as a method of flood control when circumstances warrant. During flood flows navigation is not advisable and in major flood situations is not possible.

Although the locks are 25.5m long and 4.6m wide the maximum dimensions of craft able to use the river should be regarded as length 23 m, beam 3.9 m, draught 1.2 m and headroom 2.1 m.

There are at present approximately 1300 pleasure boats and 90 canoes registered on the River Nene. A number of visiting craft also use the system either via the Middle Level or GUC connections. Most registered boat owners are members of local boat clubs.

The NRA provide no facilities along the Nene other than landing stages adjacent to the locks, comprehensive boating facilities do exist at the larger private marina complexes and boat clubs.

Canoeing takes place throughout the navigable length of the catchment although it is discouraged at weirs and sluices on safety grounds - plans have been submitted to construct a canoe slalom at Peaches Meadow, Northampton.

The Nene was once used extensively as a commercial navigation but this has now virtually ceased with only an occasional commercial narrow boat using the system. Some major companies, including one of the gravel operators within the Nene valley, have carried out feasibility studies into the possibilities of commercial navigation.

#### Objectives

- To increase the use of the Nene Corridor as a navigation facility for pleasure boats and canoes without compromising other uses.
- 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 (statutory duty).
- Ensure navigation is suitably safe for its purpose and for the general public.

3.17 ANGLINGGeneral

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

Local Perspective

Angling for coarse fish occurs throughout the catchment on rivers and lakes. Trout fishing also takes place on some backwaters of the Nene, some stretches of the Nene tributaries, lakes and reservoirs. The principal river fisheries and their lessees are shown on Map No 12. Stillwaters for both trout and coarse fishing are also indicated on the map. There are a large number of stillwaters adjacent to the Nene, which are the result of gravel extraction in the past.

The lack of embankment along the river Nene and the high level of water within the channel itself is a distinct advantage to the anglers who can fish the Nene from a flat safe position level with the water. Along much of the upper Nene and its tributaries access by road is limited. Where this is the case angling tends to be concentrated around bridges and other access points, where car parking is available.

Angling has been restricted in parts of the catchment due to prolific weed/algal growths. Particular difficulties have been experienced on Rushmere Lake (Blue Lagoon) at Northampton due to filamentous algae (and blue-green algae).

Objectives

To protect and enhance fish stocks.

To provide suitable and safe access for angling.

### 3.18 IMMERSION SPORTS

#### General

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

#### Local Perspective

The NRA discourages 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 are rather limited, with pleasure boating being the main recreational activity taking place on the river. However there is a sailing lake at Thrapston, and water skiing occurs at Grendon Lakes between Wellingborough and Northampton and on lakes near Higham/Rushden where jet skiing is also gaining in popularity.

A speed limit of 7 m.p.h. applies throughout the navigable section of the Nene, and therefore water ski boats are unable to attain sufficient speed to operate.

#### Objectives

- To comply with water quality objectives when designated.
- To make the public aware of the dangers of recreational activities along the watercourse.





**Fish Biomass**

Map No. 15  
Dec 1993

**Key**










- Catchment boundary
- NRA regional boundary
- Grand Union Canal
- Town
- Class A
- Class B
- Class C
- Class D
- Unclassified

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Map No. 15  
Dec 1993

### Key

-  Catchment boundary  
 NRA regional boundary  
 Grand Union Canal  
 Town
-  Class A  
 Class B  
 Class C  
 Class D  
 Unclassified

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# Habitat Zone & Species Richness Classification

Map No. 16  
Dec 1993

## Key

-  Main river
-  Catchment boundary
-  NRA regional boundary
-  Town

-  A
  -  B
  -  C
  -  D
  -  E
- Number of species varies according to gradient
- No fish species
- Species present
-  Grayling
  -  Stocked trout
  -  Wild trout





3.19 FISHERIESGeneral

The NRA has a duty 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 and non-migratory trout fisheries.

Local Perspective

The NRA aims to undertake fish population surveys on major rivers on a three year rolling programme. Within this catchment surveys are conducted on the River Nene, the River Ise, Alledge Brook, Harpers Brook, and Willow Brook. Extensive data has been collected on these systems and this has been used to calculate two fisheries classification systems.

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 rivers are graded on a A to D scale for biomass and species richness. (See maps 15 and 16.)

All the rivers in this catchment contain coarse fish populations. Breeding trout populations are present in the Kislingbury and Brampton branches of the upper Nene. The major Nene tributaries, the River Ise and the Willow Brook are both stocked with brown trout on a regular basis. Roach, chub, dace and common bream tend to be the dominant species present within the catchment.

The upper reaches of the Nene downstream to Earls Barton contain a good fish biomass (A/B). Between Earls Barton and Thrapston biomass is variable, downstream of Thrapston the biomass improves again. The lakes adjacent to the River Nene at Irthlingborough and the Washland scheme at Northampton have open connections to the river and these are important for the production of young fish.

The River Ise contains a good biomass downstream of Geddington, however it has a very low biomass upstream. The Willow Brook and the Harpers Brook also have poor fish stocks in their upper reaches.

Throughout the catchment the fish species richness is variable, but is particularly good (A/B) on the River Nene downstream of Thrapston. Stretches containing breeding populations of trout on the Dodford Brook, Brampton Branch, River Ise, Harpers Brook and Willow Brook are notable; the Ise can also boast a Grayling population.

The presence of carp in the Nene is notable. This species is found in the river as a consequence of their migration from lakes within the floodplain during flood events. Barbel is also a notable species within the river Nene. They were recorded in fisheries surveys for the first time in 1989, and in 1993 a programme of restocking was initiated.

### 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.
- 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.












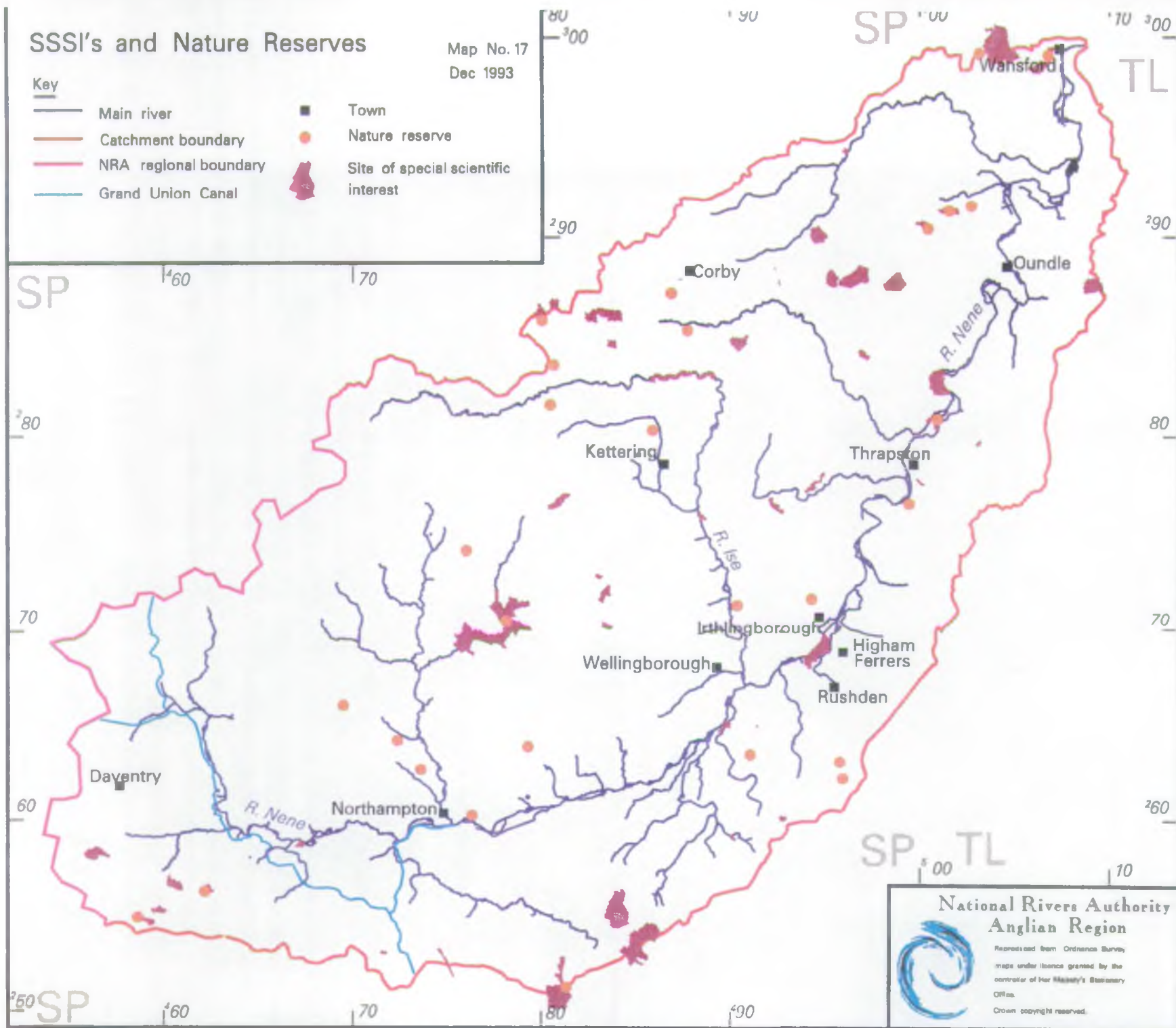
# SSSI's and Nature Reserves

Map No. 17

Dec 1993

## Key

- |   |                       |   |                                     |
|---|-----------------------|---|-------------------------------------|
|  | Main river            |  | Town                                |
|  | Catchment boundary    |  | Nature reserve                      |
|  | NRA regional boundary |  | Site of special scientific interest |
|  | Grand Union Canal     |   |                                     |



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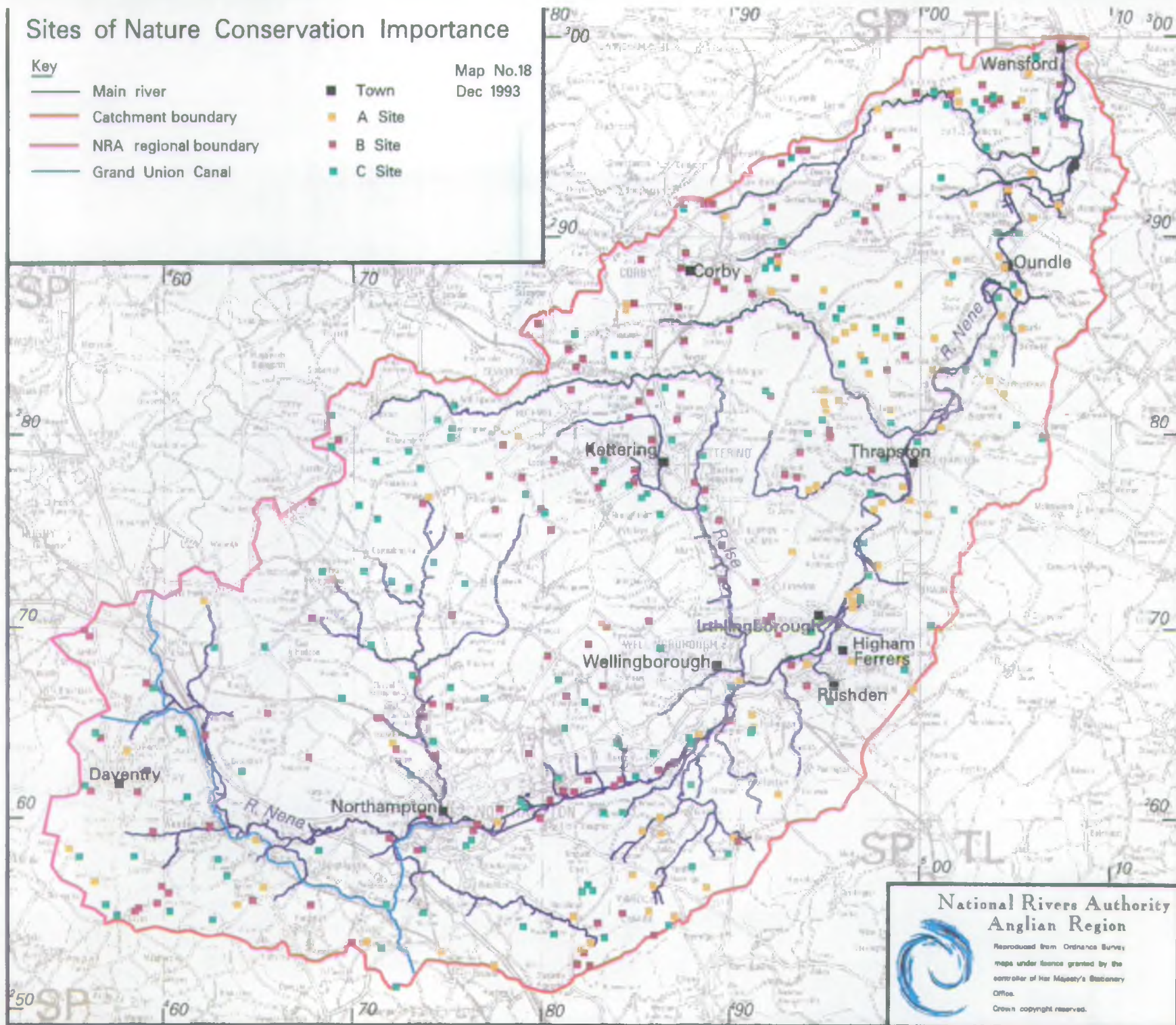
# Sites of Nature Conservation Importance

## Key

- Main river
- Catchment boundary
- NRA regional boundary
- Grand Union Canal

- Town
- A Site
- B Site
- C Site

Map No.18  
Dec 1993



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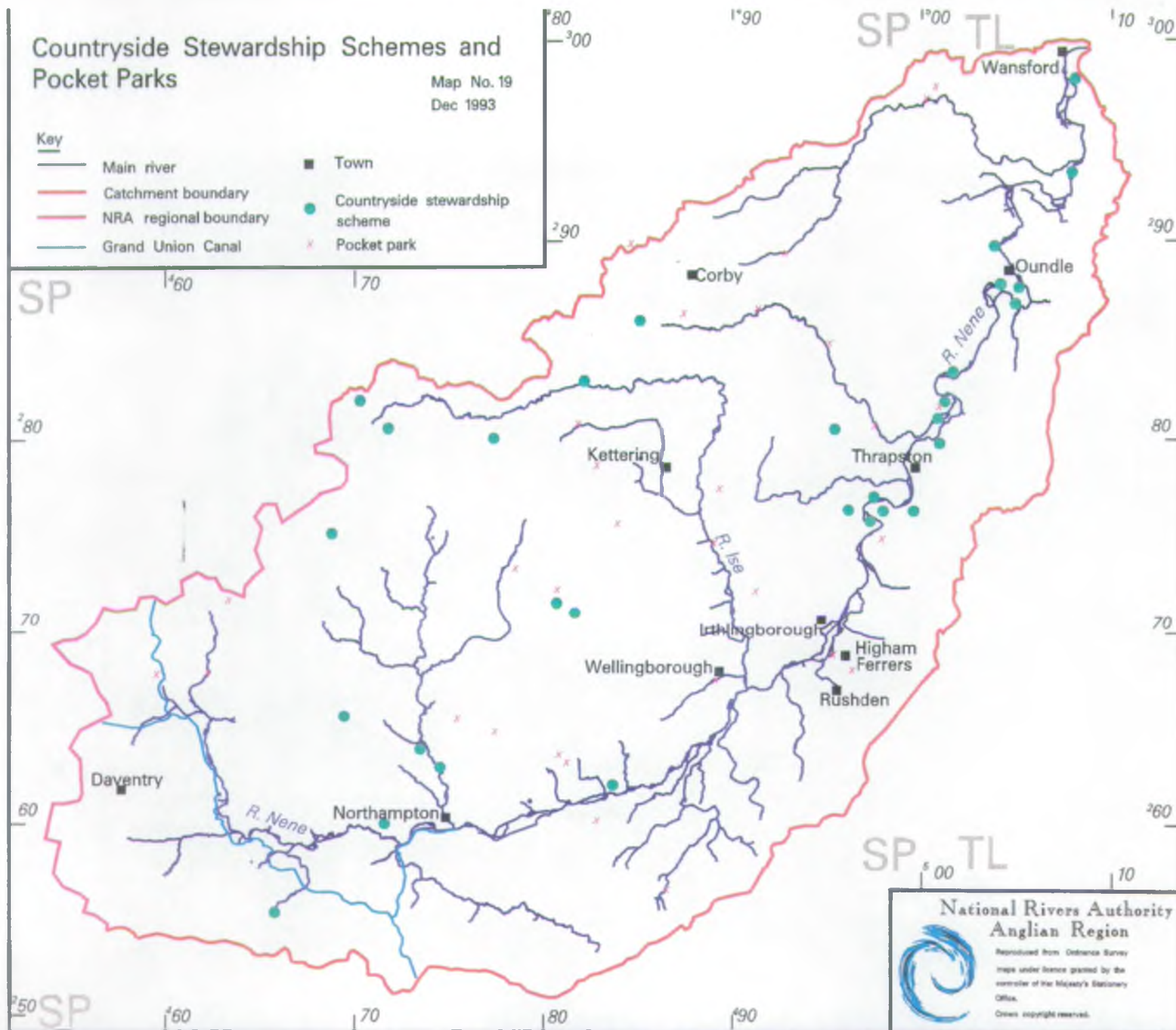


# Countryside Stewardship Schemes and Pocket Parks

Map No. 19  
Dec 1993

## Key

- |   |                       |   |                                |
|---|-----------------------|---|--------------------------------|
|  | Main river            |  | Town                           |
|  | Catchment boundary    |  | Countryside stewardship scheme |
|  | NRA regional boundary |  | Pocket park                    |
|  | Grand Union Canal     |   |                                |



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### 3.20 CONSERVATION - ECOLOGY

#### General

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

- The protection of areas formally designated as being of particularly high conservation 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 those sites which 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.

An illustration of this co-operation is the NRA's current involvement in restoration plans for old sand and gravel workings in the Nene floodplain at Stanwick near Wellingborough where a feasibility study is underway to assess the sites suitability as a nature reserve/study centre for the use of the public.

The Government through the Countryside Commission is now encouraging farmers to combine their commercial farming practises with conservation awareness. The scheme called Countryside Stewardship allows farmers financial compensation for returning land to a more natural state - such as watermeadows. This has obvious environmental benefits and in some instances flood defence benefits for the NRA. Map No 19 indicates ongoing Countryside Stewardship schemes in the catchment.

#### Local Perspective

The Nene meanders in a semi-natural state through much of its floodplain which may be over a kilometre wide. The lower stretches are well wooded while the upper reaches are flanked by a combination of arable, improved and semi-improved grassland. Unimproved herb rich grassland is rare and confined mainly to SSSI's and Nature reserves.

The river's flow is generally sluggish to moderate, this combined with relatively low bank profiles has resulted in a wide and varied margin of aquatic plants. Dominant species are reed-sweetgrass, branched bur-reed and common clubrush but arrowhead, pond sedges and flowering rush are not uncommon. In open water areas starworts, lillies and pondweeds may predominate. The backwaters are particularly rich in flora.

The banksides of the river are pre-eminently covered in nettle, docks, thistle and rough grasses most often associated with disturbed ground, but also common are angelica, meadow sweet and hemp agrimony. Overhanging and bankside trees are crucial in the life cycle of many birds and insects and an important landscape feature. Long stretches of the Nene have willows, alders ash and oaks along one or both banks.

During high flow periods the river spreads out over large areas of the floodplain maintaining wet meadows such as at Wadenhoe Marsh and Achurch SSSI. On these sites birds such as snipe, lapwing and redshank feed and breed. Areas of this nature are now rare in the Anglian region.

The Nene is supported by several large and many small tributaries. These base-rich headwaters run through Northampton's rolling mixed landscape occasionally exposing the limestone beneath. These rivers contain stretches of fast to rapid flows creating riffle and pool sequences. This in turn creates habitats for plants and animals of a contrasting nature to those in slower water courses. On the River Ise SSSI common and river water crowfoots form patchy green mats along stone and gravel riverbeds which in turn support many specialised insects such as caddis, stone and mayfly.

The number of aquatic plants within the channel (map 25) is high for much of the River Nene, in particular downstream of Wellingborough. The Willow Brook, Harpers Brook and Grendon Brook show low diversity. The number of plants in the river corridor is variable throughout the catchment (map 26).

In addition to the natural and semi-natural riverine habitats in this catchment two manmade habitats also stand out as ecologically important. Large reservoirs such as Pitsford hold significant numbers of wildfowl during the winter months. Similarly Higham Ferrers gravel pits hold nationally significant numbers of wintering gadwall and regionally important numbers of pochard and teal. Both sites are designated SSSI.

The four SSSI's listed above illustrate a cross-section of riverine habitats to be found in this catchment. In total there are 46 SSSI in this area representing a wide variety of habitats. Additionally there are 28 nature reserves and 379 sites of Nature Conservation Importance (SNCI) as listed by the Northamptonshire Wildlife Trust.

The River Nene, its floodplain and its tributaries form a significant proportion of Northampton's wildlife assets. Planned sensitive management and the protection of water quality is critical in the conservation of this asset at a time when demand to utilise it is great and the resource limited. The following list contains stretches which have been identified as being important in conservation terms and the rivers should be of sufficient quality to maintain the high conservation value:





# Conservation Summary Map

Map No. 20  
Dec 1993

- Main river
- Catchment boundary
- NRA regional boundary
- Town
- Native crayfish
- Invertebrate conservation index
  - more than 20 excellent
  - 15 to 20 very good



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- 1) Stretches containing breeding trout and grayling populations.  
 Dodford Brook, upstream of Weedon  
 Brampton Branch, upstream of Spratton  
 River Ise, Geddington to Warkton - Isham area  
 Harpers Brook, Lowick to Nene  
 Willow Brook, Kingscliffe to Wood Newton
- 2) Stretch containing native crayfish population.  
 Brampton Branch, Spratton to Northampton
- 3) Stretches where the Invertebrate Conservation Index identified a high quality invertebrate community.  
 Sywell (Barton) Brook  
 River Ise  
 Grendon Brook  
 Thorpe Brook  
 Nene at Ringstead, Denford, Lilford

(See Table, page 49)

The Brampton Branch now contains the only known crayfish population in the catchment and its conservation is vitally important. The remaining native population has been decimated by a 'plague' which was spread by American crayfish introduced illegally into the catchment.

As late as 1957 the catchment was known to have a healthy otter population, however, a major decline in their numbers has occurred to the extent that there is now no evidence of a breeding otter population in the catchment, the Northampton Wildlife Trust has identified four priority areas where they might be re-established - between Wellingborough and Wansford on the Nene, on the Willow Brook, on Harpers Brook and on the Whilton Arm.

The following activities have major environmental implications in this catchment:

1. Development in the floodplain.  
 Leading to loss of habitats, and knock-on effects through loss of environmental margins up and downstream through tighter flood defence regime.
2. Unbalanced development.  
 Leading to rapid run-off and larger spates creating the need for additional flood defence works and loss of environmental margins.
3. Culverting.  
 Loss of open water habitats.
4. Gravel extraction.  
 Loss of floodplain habitat, especially wet herb rich meadows. Opportunities to enhance in restoration schemes however.
5. Water extraction.  
 Loss of wetlands through low levels/flows.

6. Agricultural impacts.

Drainage of wetlands, siltation from arable run-off, fertiliser run-off leading to eutrophication.

7. Navigation.

Growing demand for facilities, petrol/oil pollution bank wash/erosion. Weirs locks are obstacles to fish migration and can lead to loss of habitat.

8. Pollution.

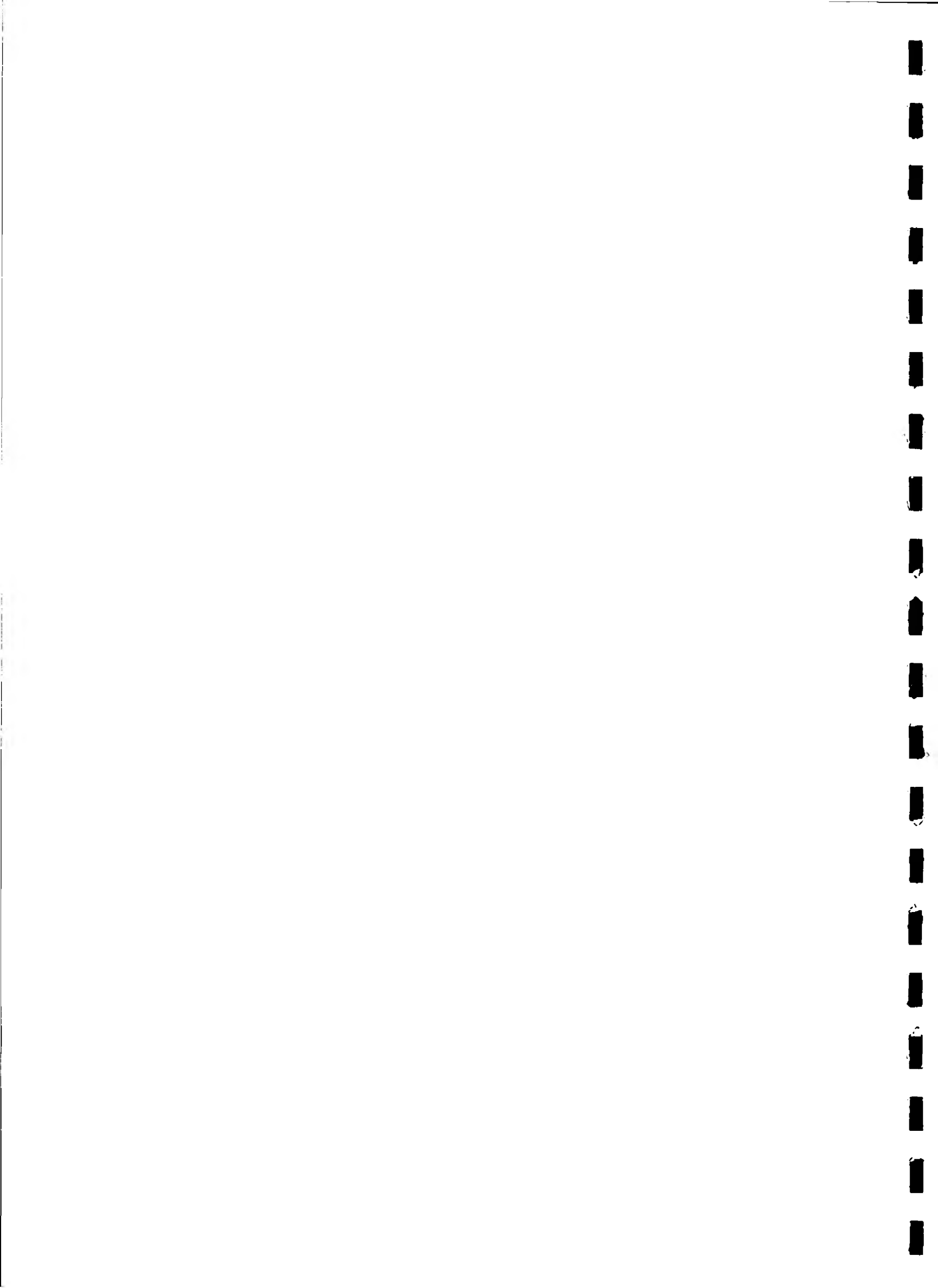
Discharges which lead to fish/invertebrate/bird kills etc.

Objectives

- To protect and further the conservation of river corridors and to safeguard the special conservation interest for which sites have been designated.
- To maintain 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.
- The channel cross section to be appropriate for the flow regime.
- Water quality should be maintained or improved to ensure that sensitive ecosystems do not deteriorate.
- Groundwater quality should not deteriorate to a level where the conservation value of wetland SSSI sites is adversely affected.
- To maintain and enhance the diversity of the natural river features such as meanders and riffle/pool sequences and other riverine habitats.
- To maintain and enhance the diversity of aquatic vegetation and of the river corridor in general.

NOTABLE INVERTEBRATES FOUND IN THE NENE CATCHMENT

River	Most Notable Species	Red Data Book Grade
Sywell Brook (Barton Brook)	<u>Lype reducta</u> - uncased caddisfly	RDB local
	<u>Chaetopteryx x villosa</u> - Cased caddisfly	"
	<u>Hdropsyche instabilis</u> - Uncased caddisfly	"
	<u>Plectrocnemia conspersa</u> - Uncased caddisfly	"
	<u>Crunoecia irrorata</u> - cased caddisfly	"
	<u>Tinodes unicolor</u> - uncased caddisfly	RDB notable
	<u>Scarodytes halensis</u> - beetle	"
	<u>Amphinemura standfussi</u> - stonefly	"
River Ise	<u>Valvata macrostoma</u> - snail	RDB 2
	<u>Cigar consina</u> - lesser waterboatman	RDB local
	<u>Lymnocea glabra</u> - snail	RDB 2
Grendon Brook	<u>Lymnaea glabra</u> - snail	RDB 2
Nene - Ringshead	<u>Lymnaea glabra</u> - snail	RDB 2
	- Denford	RDB 2
	<u>Valvata macrostoma</u> - snail	RDB 2
- Lilford	<u>Lymnaea glabra</u> - snail	RDB 2
	<u>Valvata macrostoma</u> - snail	RDB 2
	<u>Planaria torva</u> - flatwork	RDB notable
Thorpe Brook	<u>Agabus congener</u> - beetle	RDB local
	<u>Ilybius quadriguttatus</u> - beetle	"













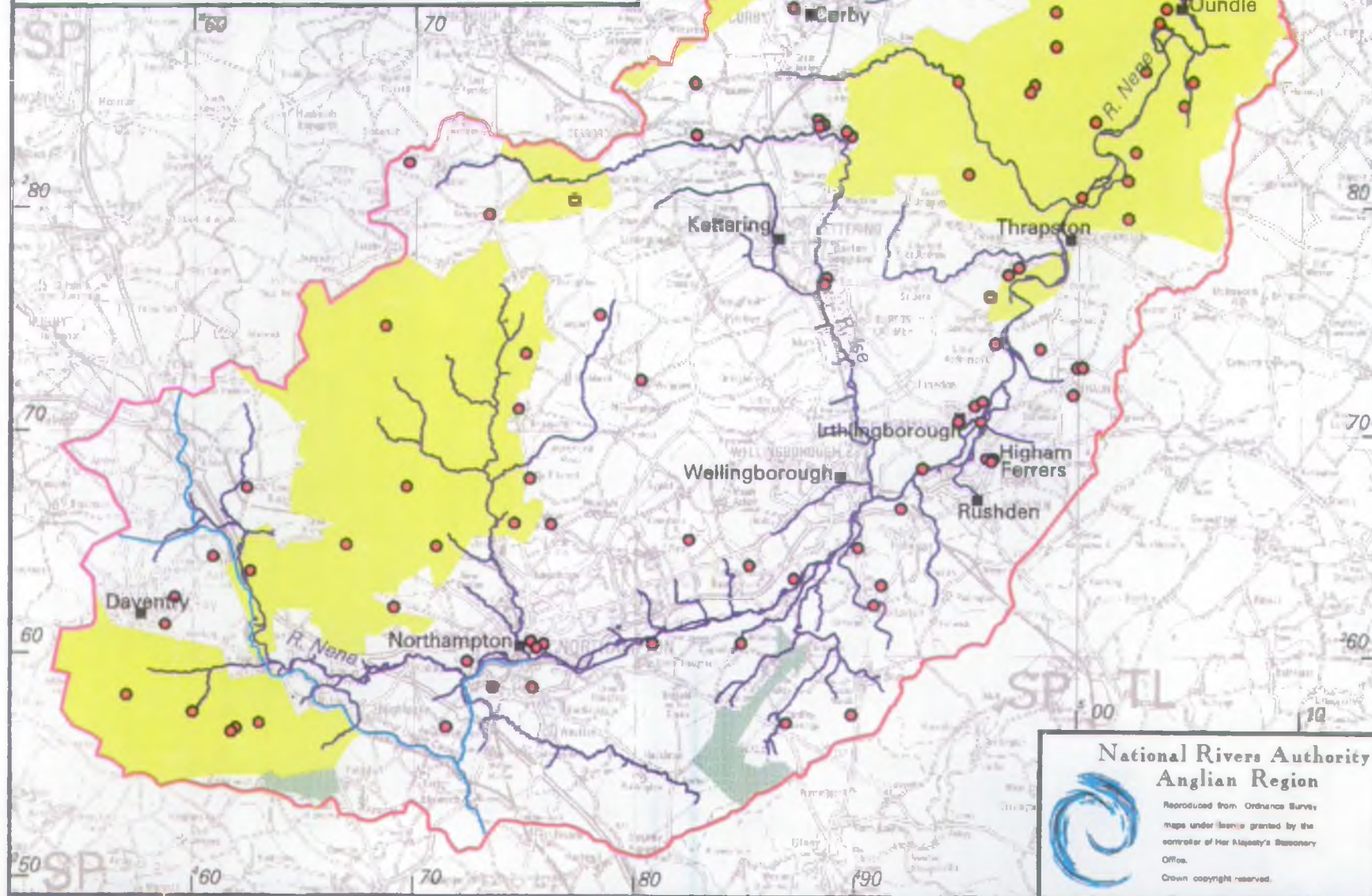


# Scheduled Ancient Monuments and Special Landscape Areas

Map No.21  
Dec 1993

## Key

-  Main river
-  Catchment boundary
-  NRA regional boundary
-  Grand Union Canal
-  Special landscape area
-  Proposed special landscape area
-  Town
-  Scheduled ancient monument



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3.21 CONSERVATION/LANDSCAPE ARCHAEOLOGYGeneral

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

- The protection of areas formally designated as being of value, ie areas of Outstanding Natural Beauty, Scheduled Ancient Monuments (SAMs), Sites of Special Scientific Interest (SSSIs), and Special Landscape Areas (SLA).
- The protection of areas which although valuable in landscape and archaeological terms are not formally protected. The SAMs include features such as Ditchford and Irthlingborough bridges, medieval earthworks and Roman settlement sites such as those at Irchester and Ashton.

Local Perspective

The Nene Valley is principally an agricultural landscape, although pasture land is still widespread, since 1945 the amount of arable land has significantly increased. Northamptonshire County Council have designated much of the landscape north of Thrapston and that to the west and north of Northampton as SLAs.

There are 110 Scheduled Ancient Monuments in 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.
- To maintain the water table at a high level in wetland/marshland areas.





# NWC Classes

Map No.22  
Dec 1993

## Key

- Catchment boundary
- NRA regional boundary

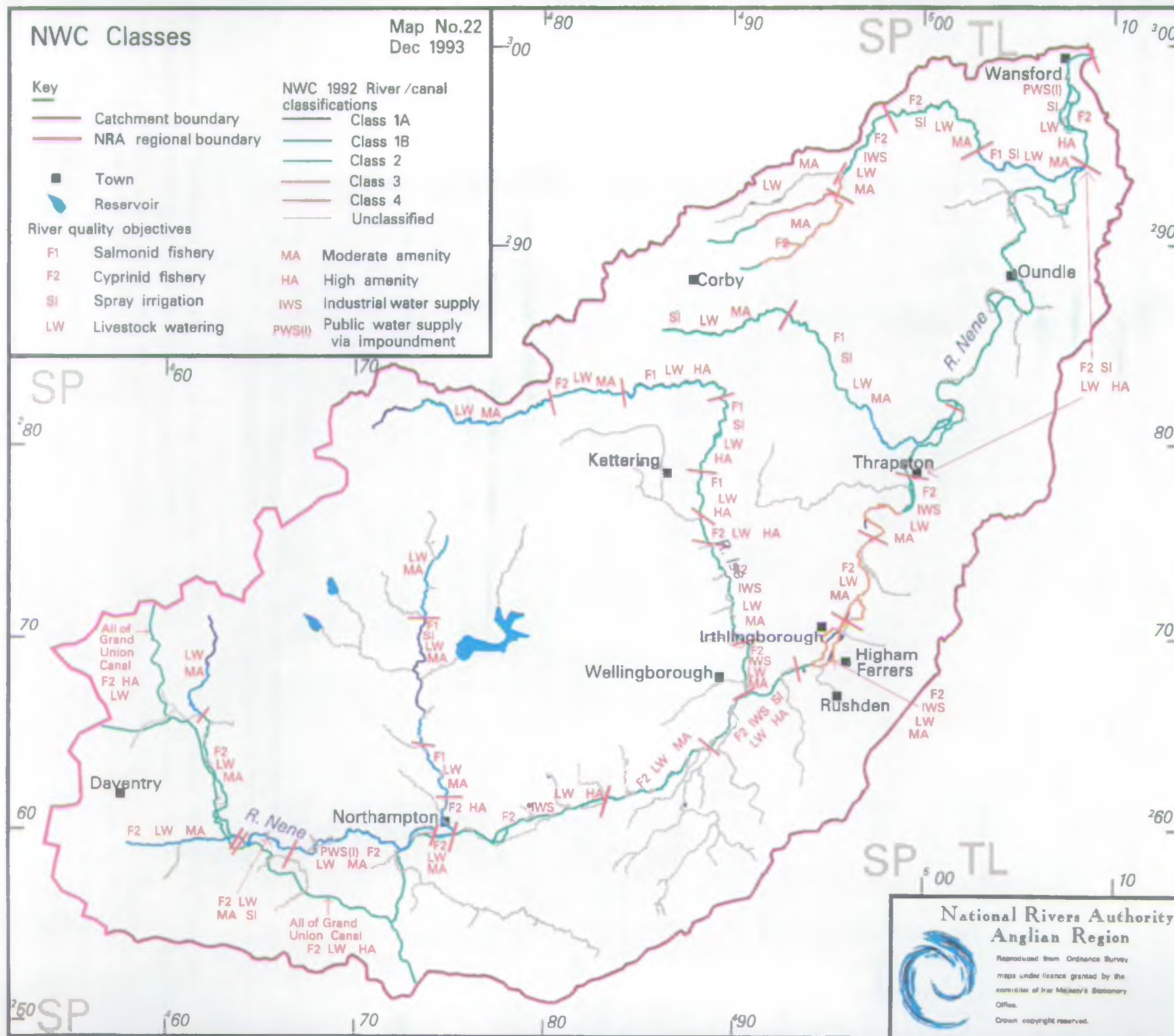
- Town
- Reservoir

## River quality objectives

- F1 Salmonid fishery
- F2 Cyprinid fishery
- SI Spray irrigation
- LW Livestock watering

## NWC 1992 River /canal classifications

- Class 1A
- Class 1B
- Class 2
- Class 3
- Class 4
- Unclassified
- MA Moderate amenity
- HA High amenity
- IWS Industrial water supply
- PWS(I) Public water supply via impoundment



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4. CATCHMENT-CURRENT STATUS

4.1 WATER QUALITY

General

Water quality throughout the catchment is variable. Map 22 shows the NWC classes for 1992 and River Quality Objectives. Map 28 (Baseline map based on 1990-1992 data) represents current quality in terms of Fishery Ecosystem Classes, and Map 30 (shortfalls against current targets) shows stretches that are currently failing to meet current targets (both Fishery Ecosystem and RQO/NWC). Only those rivers which appear in the National Water Council survey have been included at present.

The headwaters of Willow Brook at Corby are currently particularly notable for their poor quality, and the Brampton Branch between Brixworth and Hanging Houghton is of good quality.

Local Perspective

a) Eutrophication in the River Nene

The greatest influences on water quality are those made by the discharges from Whilton STW serving Daventry, Great Billing STW serving Northampton, Broadholme STW serving Wellingborough and Kettering and Corby STW serving Corby. Some of these discharges cause dissolved oxygen sags downstream of the outfalls, siltation, scouring and nutrients discharged contribute to Eutrophication.

Eutrophication of the river system can result in the development of algal blooms such as those observed in the Blue Lagoon/Rushmere Lake on the outskirts of Northampton and at Pitsford reservoir.

Major Sewage Treatment Work improvements are planned, and some have recently been completed, consequently it is anticipated that river quality will improve.

The N.R.A. has recommended that the River Nene, as far as the tidal limit at Dog in a Doublet sluice, be designated 'sensitive' under the Urban Waste Water Treatment Directive. Confirmation is awaited from the D.O.E. on site designation.

b) Pollution Prevention

To reduce the number of pollution incidents within the catchment a campaign of pollution prevention inspections is required. Inspectors will provide advice to those responsible for sites and developments with a potential for pollution. This includes farms, industrial premises and quarries.

- c) **Maintain Water Quality for Public Water Supply Upstream of Abstraction Points**

Abstraction for Public Water Supply is an important use of water in the catchment and water quality needs to be protected so it remains suitable for this use. There are 3 major reservoirs within the catchment, Pitsford, Hollowell and Ravensthorpe. Water is abstracted from the River Nene at Duston and pumped to Pitsford, Hollowell and Ravensthorpe fill naturally. Rutland water although not within the catchment itself, receives water abstracted from the Nene at Wansford.

- d) **NWC Class 3 and 4 stretches**

Willow Brook (Northern Stream) (class 4) is of poor quality due to drainage from the Pen Green surface water sewer, other class 3 stretches include the Willow Brook (Southern Stream) and the Nene between Ditchford and Denford.

- e) **Surface Water run off from Developed areas**

Surface water drainage adversely affects water quality in some watercourses within the catchment, for example, Gretton Brook receives surface water drainage from the Earlstree Industrial Estate and Pen Green surface water sewer has an adverse affect on the Willow Brook Northern stream. Development control and the incorporation of pollution prevention measures at the development stage are particularly important with the high growth rate in the catchment.

- f) **Village sewers / Sewerage facilities**

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 great. Kettering Borough Council has included the problem of village sewers in their local plan.

A number of intermittent discharges from surface water sewers serving industrial areas and storm sewage overflows occur which from time to time cause pollution, for example, a storm overflow from a pumping station in Great Oakley is having a detrimental affect on the Harpers Brook.

- g) **Compliance failure of EC directive**

The effluent discharge from British Steel at Corby causes the Willow Brook to fail to comply with the Zinc standard in the EC Dangerous Substances Directive. Substantial improvements have already been made and further improvements may be required following a period of evaluation.



## CURRENT STATUS

### h) Compliance failure of River Quality Objectives - Raunds Hog Dyke

The Raunds Hog Dyke is currently failing to comply with Spray Irrigation and F2 Fisheries objectives. Possible causes for these failures could be Sewage Treatment Works and a Tannery.

### Landfill:

#### General

There are some 88 landfill sites within the catchment that accept category C to F material, all of which have a potential to pollute, (See Map no. 4). There are many more that take inert material only.

#### i) Rushton Landfill site

Rushton landfill site is having an unacceptable impact on the River Ise, and possibly also on the nearby Site of Special Scientific Interest (SSSI). Drainage from the site needs to be controlled.

#### j) Corby

A discharge of contaminated groundwater (high ammonia concentration), is thought to emanate from the former Deene Coke Oven area.

#### k) Development of landfill sites in the floodplain

A number of landfill sites have been developed in the floodplain, that have a potential for pollution. Of particular concern is the development potential of former mineral extraction workings as landfill sites.

#### l) There are several other landfill sites within the catchment which affect water quality, some of which are listed below.

<i>Site Name</i>	<i>NGR</i>	<i>WRA Lic. Ref.</i>
<i>Carol Spring Farm, Sidegate Lane</i>	<i>SP917701</i>	<i>W4</i>
<i>Milton Malsor Road, Gayton</i>	<i>SP714552</i>	<i>No Licence</i>
<i>Cottingham Stone Quarry</i>	<i>SP855895</i>	<i>C5</i>



# Water Resources – State of the Catchment

## Key

- Main river
- Catchment boundary
- NRA regional boundary
- Subcatchment boundary
- Grand Union Canal
- Town
- Reservoir

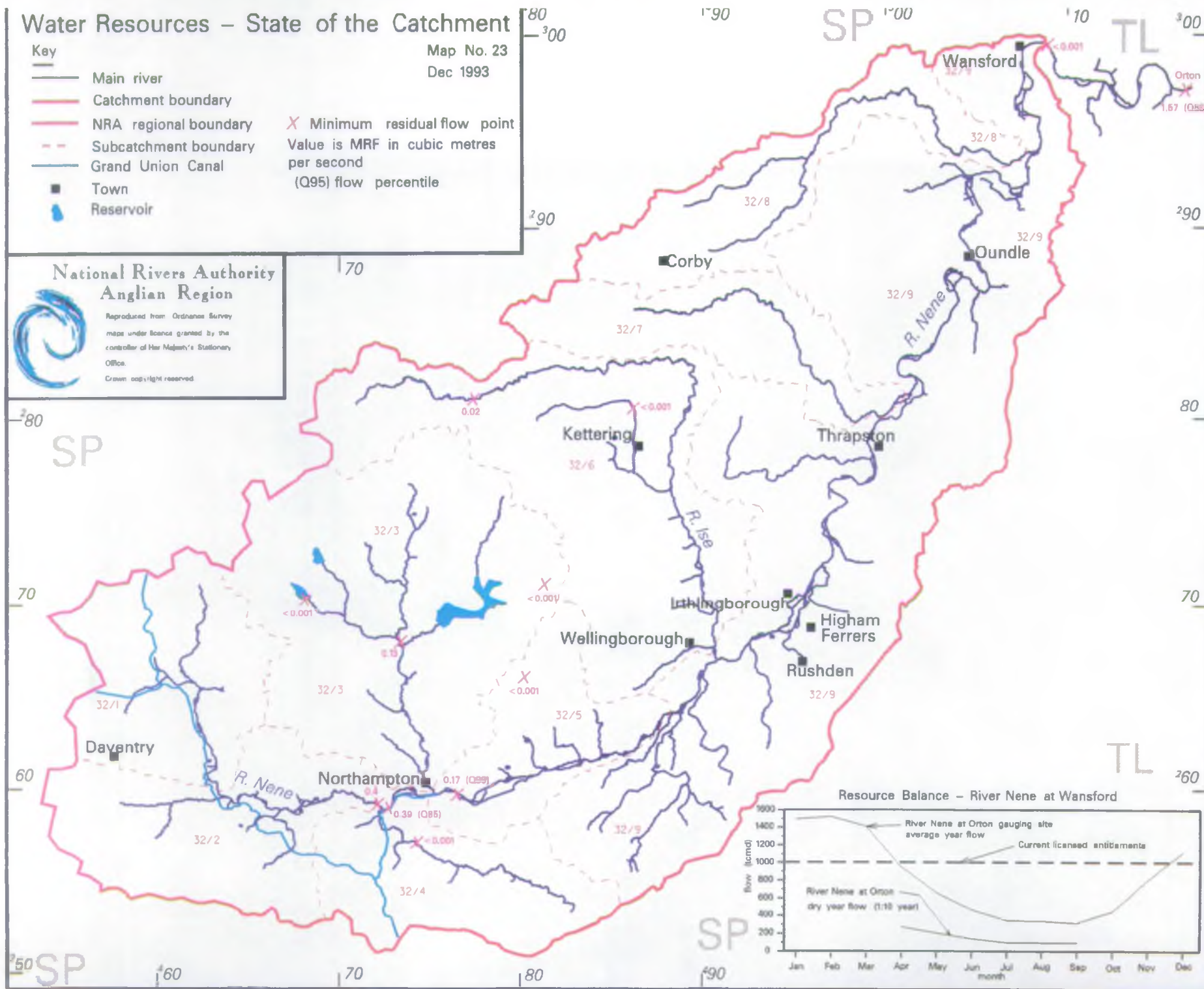
Map No. 23  
Dec 1993

X Minimum residual flow point  
Value is MRF in cubic metres  
per second  
(Q95) flow percentile

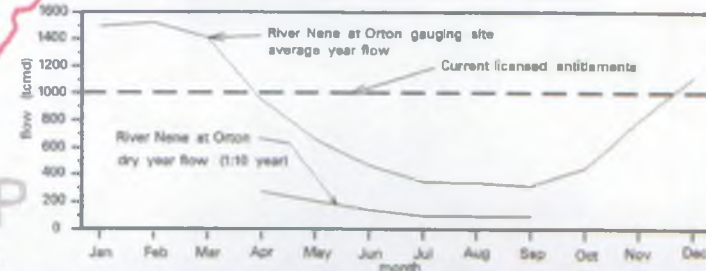
## National Rivers Authority Anglian Region



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Resource Balance – River Nene at Wansford



## 4.2 WATER QUANTITY

### General

This section summarises the total licensed and actual abstraction within the catchment as compared with the available resource. The purpose of this comparison is to illustrate the scale of water resource development within the catchment. In addition the position regarding low river flows and minimum residual flow (MRF) conditions related to abstraction are, where relevant, considered.

For water resource management purposes the Upper Nene catchment must be considered with the Lower Nene catchment, the management plan for which has been published (for consultation). There is a resource deficiency at times in the Lower Nene catchment which results in a number of issues which are directly related to the resource position in the Upper Nene catchment.

A key characteristic of the Upper Nene catchment, in water quantity terms, is the commitment of available water resources to meet licensed abstraction for public water supply from surface water sources. In particular, the abstraction at Wansford is of principal significance.

### Local Perspective

#### Surface Water

The water resources of the River Nene and its tributaries are principally committed to Public Water Supply (PWS) by virtue of the licensed abstractions relating to the Ravensthorpe, Hollowell and Pitsford reservoirs and the abstraction at Wansford, all operated by Anglian Water Services. The Wansford licence is particularly significant in that the licence has no effective total quantity but abstraction is limited by pumped capacity to 764 tcmd (278809 tcma) and an MRF of 136 tcmd at Orton (situated in the Lower Nene catchment). The abstraction and licence at Wansford is geared to meeting the design yield of Rutland reservoir.

In average years the flow in the River Nene at Wansford during the April to September period does not exceed the entitlement to Anglian Water Services (effectively 900 tcmd, equal to the pumping capacity plus the MRF). However, the river flow does exceed 900 tcmd for around 30% of the time during the winter months. In below average winter rainfall periods the percentage of the time that this flow is exceeded significantly reduces. In view of the above, the existing water resources of the Upper Nene catchment are effectively committed to meeting the licensed PWS entitlement and MRF. Some unallocated resource is available but only in some average and above average winter rainfall periods and as such this resource is not reliably available.

In years of below average resource availability the flow in the River Nene at Wansford/Orton can, at a frequency of around one year in five (see Lower Nene CMP) fall below the existing MRF related to Wansford abstraction. This has implications for abstraction at Wansford but more importantly for demand deficiencies in the Lower Nene catchment (see Lower Nene CMP). However, despite this restriction on abstraction, Anglian Water Services have sufficient resources to meet forecast water demands to the current planning horizon (2015). Current abstraction from all the PWS surface sources in the catchment is 96515 tcma, and from Wansford alone is 73186 tcma (1992 figures). These abstractions are 28% and 26% of their licensed entitlements respectively.

Some improvement in summer flows in the River Nene will accrue in relation to the increase in returning effluents from the principal developments around Northampton (currently around 50 tcmd), Wellingborough (46 tcmd) and Corby (11 tcmd). However, these will not materially affect the above resource commitment.

Industrial and agricultural abstractions within the catchment take only 4-5% of licensed entitlement and several large entitlements are unused. Some abstraction is unreliable due to natural low flows and imposed flow controls. For new demands the commitment to existing uses and users is a constraint on development. However, given the modest current actual water abstraction in the catchment (compared with licensed and available resource) then some new abstractions can be permitted. Such new abstractions are strictly controlled by time limitations (10 yrs) and minimum residual flow conditions to protect existing uses and users of water. The reliability of these abstractions will be less than the target level of service and may not be renewed in the medium term as the actual demand from existing entitlements increases.

#### Minimum Residual Flows and Environmental Flows

Minimum residual flows have been applied to licences downstream of public supply reservoirs and to the River Nene downstream of the Northampton (Duston Mill) and Wansford public supply abstractions. In addition recent spray irrigation and non-consumptive industrial licensed abstractions have MRF's imposed.

Residual flows downstream of impounding reservoirs (Ravensthorpe, Hollowell, Pitsford) were set to protect downstream interests and there are no environmental problems related to these.

Minimum Residual Flows on other licences are related to protection of downstream users, principally AWS.

There are a number of issues relating to the MRF associated with Wansford but these are associated with the Lower Nene catchment and are considered in the Lower Nene CMP.

## CURRENT STATUS

There are considered to be no instances in the catchment of riverflows declining to unacceptable levels as a consequence of historic abstraction. Such cases are often related to groundwater abstraction which is limited in this catchment.

The location and flow of existing MRF's are shown on Map No. 23.

### Downstream Catchment

The degree of commitment of water resources to meet licenced demands in the Upper Nene Catchment (principally PWS) impacts on water resource deficiencies in the Lower Nene Catchment. There is a deficiency in resources in the downstream catchment to meet abstraction for agricultural and conservation purposes and to sustain river levels for water quality and navigation purposes. As abstraction for PWS purposes increases in the upper catchment, the frequency and duration of resource deficiencies in the downstream catchment will increase. Current deficiencies can be expected 1 year in 5.

### Groundwater

The available resources of the catchment are limited by the relatively small, thin and disperse areas of aquifer and the network of draining springs and surface watercourses.

The total available resource has not been quantified but is substantially committed to meeting environmental needs on the very large number of springfed watercourses and the existing small local potable supplies.

In periods of below average resource availability there are local supply deficiencies to local springs or wells.

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.

### Summary

The water resources of the catchment are largely committed to existing water entitlements. There are no significant deficiencies in the catchment and none are forecast within the next 10 years. All categories of licensed abstraction considerably underabstract on their entitlements (actual abstraction is 28% of licensed entitlement) and there is currently flexibility to meet some additional water demands but only on a time limited and flow controlled basis to a reliability less than the Authority's target.





# Physical Features – Riffle and Pool Sequences

Map No. 24  
Dec 1993

## Key

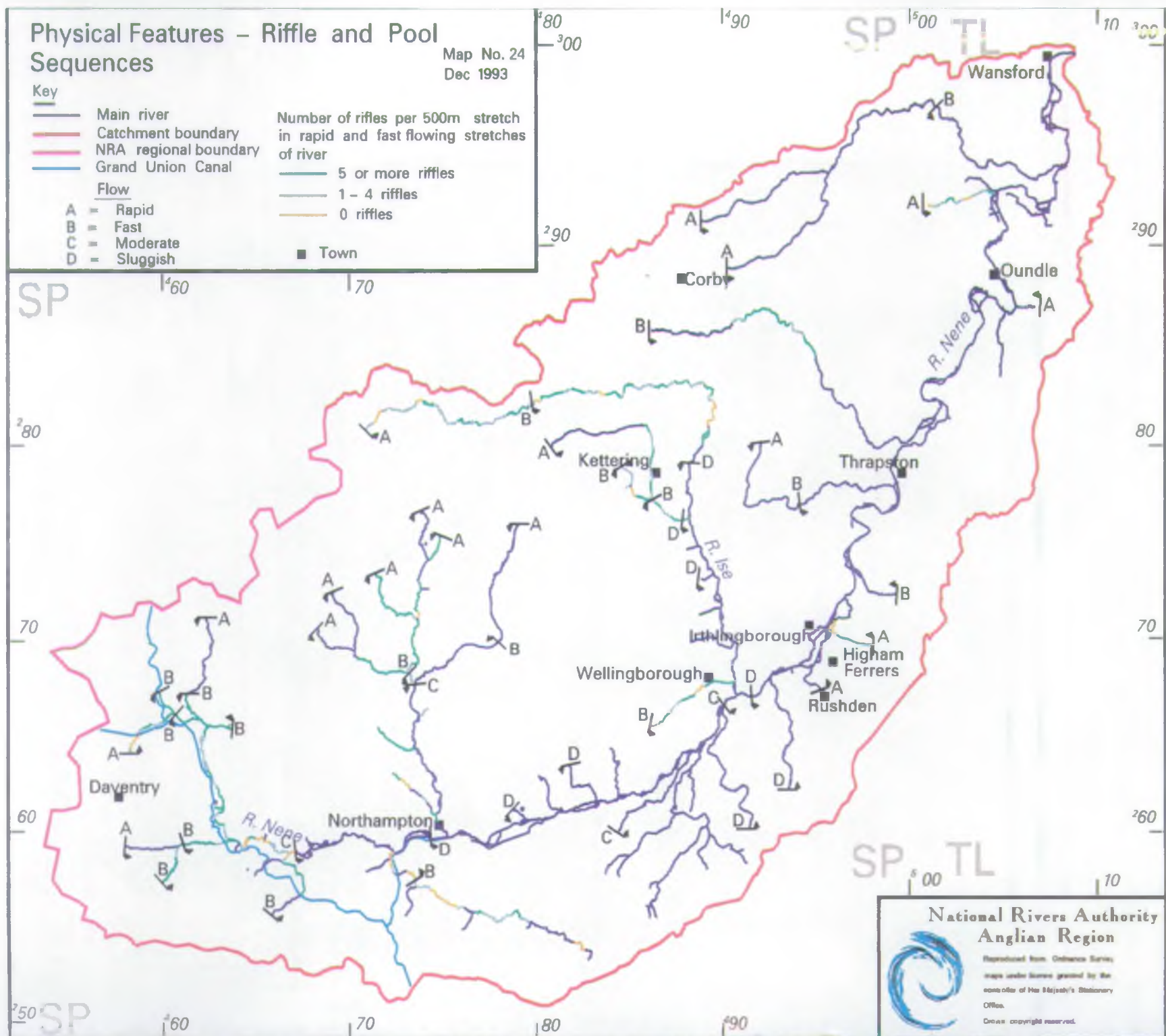
- Main river
- Catchment boundary
- NRA regional boundary
- Grand Union Canal

- Flow
- A = Rapid
  - B = Fast
  - C = Moderate
  - D = Sluggish

Number of riffles per 500m stretch in rapid and fast flowing stretches of river

- 5 or more riffles
- 1 – 4 riffles
- 0 riffles

■ Town



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# Physical Features – Aquatic Plant Diversity

Key

- Main river
- Catchment boundary
- NRA regional boundary
- Grand Union Canal
- Town

Map No. 25

Dec 1993

River Channel – Aquatic Plant Diversity

- 20 + species
- 10 – 19 species
- 9 and below species



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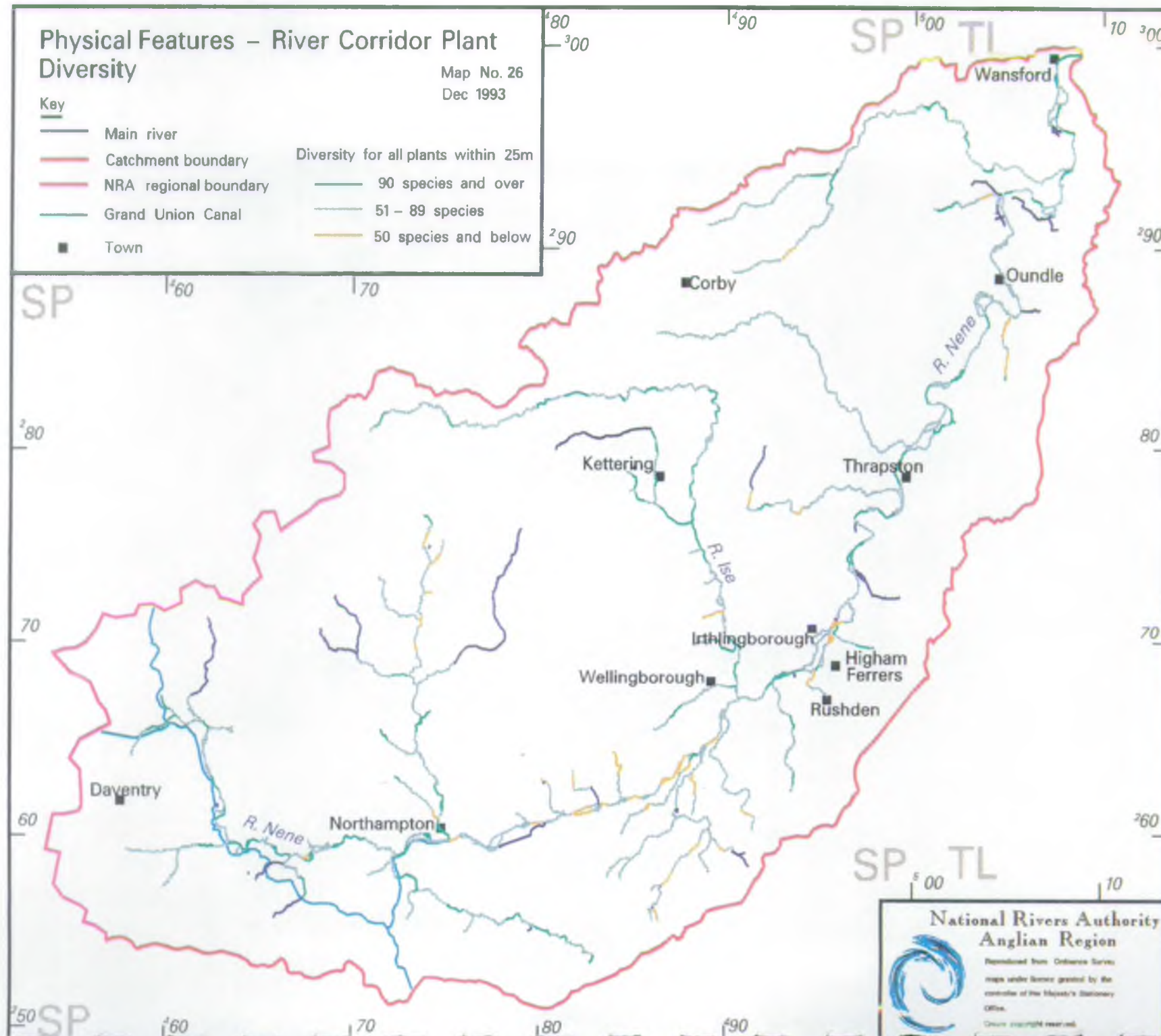


# Physical Features – River Corridor Plant Diversity

Map No. 26  
Dec 1993

## Key

- |                         |                                     |
|-------------------------|-------------------------------------|
| — Main river            | Diversity for all plants within 25m |
| — Catchment boundary    | — 90 species and over               |
| — NRA regional boundary | — 51 – 89 species                   |
| — Grand Union Canal     | — 50 species and below              |
| ■ Town                  |                                     |





### 4.3 PHYSICAL FEATURES

#### Introduction

The 'natural state' and diversity of a river's geomorphological features has an overriding effect on its ecological value. Aquatic plants, marshy grasslands, bankside trees and hedgerows and their dependant fauna are reliant on the maintenance of gravel beds, pool/riffle sequences, meanders, berms and floodplains.

The development of large urban areas and agricultural improvements over this century, and subsequent manipulation of river regimes through drainage, canalization and dredging, has had a significant impact on the physical structure of the catchment's rivers.

#### Status

In general the Upper Nene Catchment can be divided into three geomorphological stages.

The headwaters are a compilation of small sometimes rapid flowing semi-natural streams and much modified drainage channels which have increased the rate of surface water run off. In the flatter regions arable farming predominates and cover is poor, in steeper regions the farming practice supports a greater tree cover and physical diversity along the watercourse. In urban areas many small watercourses have been culverted leading to loss of habitat and in some instances flooding as a consequence of culvert blockages and/or inadequate size.

The Middle reach tributary rivers contain long stretches of Whilton rapid and fast flows over gravel beds creating pool and riffle sequences, such as on the Whilton and Brampton branches and upper reaches of the Ise where 10-20 or more may be found in each kilometre of river. The number of riffles per stretch has been used to indicate instream habitat diversity in the steeper stretches of streams (map 24).

In some areas but predominately in lower sections, moderate to sluggish flows run over silt beds, these areas with shallow gradients and small floodplains have often been subject to agricultural improvements and channel modifications, to the detriment of riverine habitats. All these tributaries are subject to spate flows.

The Nene and its many side channels forms the final stage of the catchment drainage. These meander over a wide floodplain with sluggish or moderate flow. In places wide margins of aquatic plants line the channel, the banksides and profiles are dependant on adjacent land use or manmade structures such as locks. From Thrapston much of the river has a woodland margin on one or both sides.

The river corridors of this catchment exhibit a wide plant species diversity and this is regarded by the NRA as indicative of its conservation value. Unfortunately despite the apparent diversity of the catchment there are reaches of watercourse which have adversely changed to the detriment of wildlife, as typified by the small numbers of otter to be found in the catchment where once they were prolific. A more obvious constraint upon wildlife diversity is the existence of river control structures along the Nene which hinder the passage of migratory fish through the river system.

## **FLOOD DEFENCE**

### **Maintenance**

Flood defence maintenance work within the catchment is targetted at ensuring that existing works function as required.

The principal maintenance activities undertaken include weed control, dredging, obstruction clearance and structure maintenance, the aim being to maintain the discharge capacity of the various watercourses and their associated structures. The maintenance programmes and practices themselves have evolved over many years and are now under review as part of a national initiative to standardise levels of service.

Water levels in the River Nene are artificially retained by various combinations of locks, weirs and sluices, (130 No.). The great majority of structures are at least 50 years old with many being much older; a rolling programme of replacement/refurbishment exists in order to maintain these assets.

### **Capital Schemes**

Many capital schemes have been carried out within the catchment mainly to alleviate flooding risks to property. These have resulted in standards of protection as shown on Map No. 27.

These standards may not meet current NRA policy targets however the level of protection they afford is the most that could be economically justified at the time the schemes were carried out. Recent events most notably the floods of September 1992 have highlighted problem areas, for example Weedon where future capital schemes may be carried out subject to cost benefit criteria being met.

### **Continuing Flood Risk**

The NRA exercises permissive powers to alleviate flood risk associated with designated main river only.

There are many locations within the catchment which suffer or are at risk of flooding from non-main river watercourses where the maintenance responsibility rests with either riparian owners, County or District/Borough Councils.

However, the NRA has a duty under S.105 of the Water Resources Act 1991 to undertake surveys to ascertain the flood defence needs of an area covered by a Regional Flood Defence Committee. Surveys are in hand and are due to be completed in 1995 which will identify all urban areas at risk or any area with a known history of flooding from non-main river watercourses.

The surveys will establish existing levels of protection and will assist development control by seeking to ensure that existing or potential flooding problems will not be exacerbated by future proposed development. They will also be available to the relevant authorities to assist in identifying and programming future flood alleviation schemes.



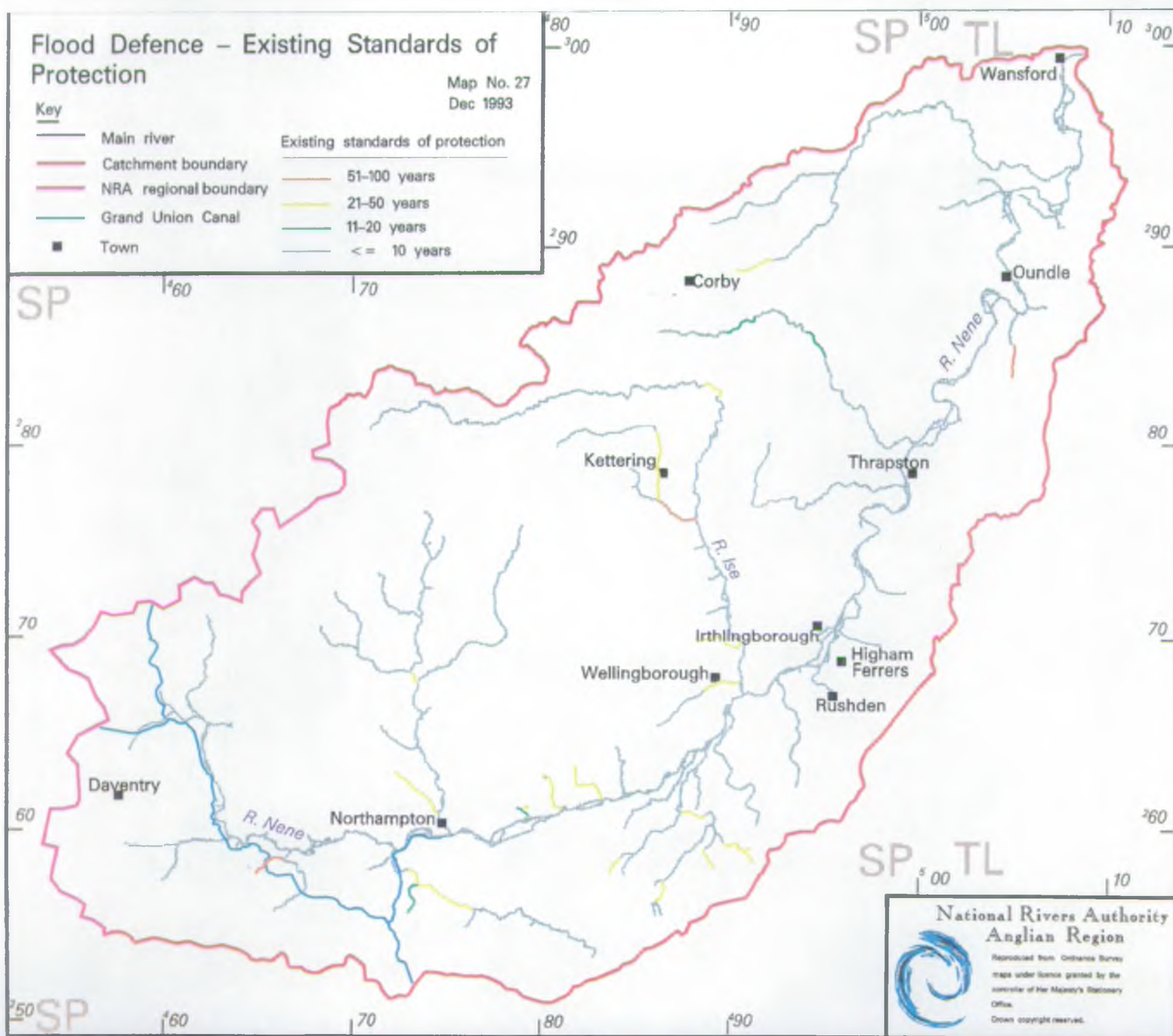


# Flood Defence – Existing Standards of Protection

Map No. 27  
Dec 1993

## Key

- |                         |                                  |
|-------------------------|----------------------------------|
| — Main river            | Existing standards of protection |
| — Catchment boundary    | 51-100 years                     |
| — NRA regional boundary | 21-50 years                      |
| — Grand Union Canal     | 11-20 years                      |
| ■ Town                  | <= 10 years                      |



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## CURRENT STATUS

The presence of flood alleviation schemes does not remove the risk of flooding which can still occur if the duration and intensity of rain exceeds the design standards. Regardless of the type of scheme, a greater risk will remain unless an adequate maintenance programme exists and is carried out. This is well illustrated by areas such as Dallington in Northampton where long lengths of urban watercourse are culverted, regular inspection and clearance of which are essential if their capacity is to be maintained and the overall system is to perform to design standard.

A relative shortfall exists in flood warning capability within the catchment particularly in the area of Northampton. The present means of measuring and predicting river flows in the town is unsatisfactory and a project is under preparation to rectify this through the provision of new gauging stations. Further requirements for telemetry outstations to monitor levels at key points have also been identified.

### Development

The effect of development on flood defence needs within the catchment is considerable. Development gives rise to increased rates of run-off and consequently an increase in flood risk which may affect both the development area and existing uses downstream.

In addition, there is also pressure to develop within floodplains. Where such developments are proposed it is usual to infill the development site in order to raise it above flood level, thereby removing any flood risk. However, in so doing, floodplain storage volume is lost and unless compensated for elsewhere, then this reduction will have an adverse effect on existing uses.

Where flood defence works are necessary to allow developments to proceed, these are funded by the developer and may be provided by the NRA on a rechargeable basis or by the private sector.



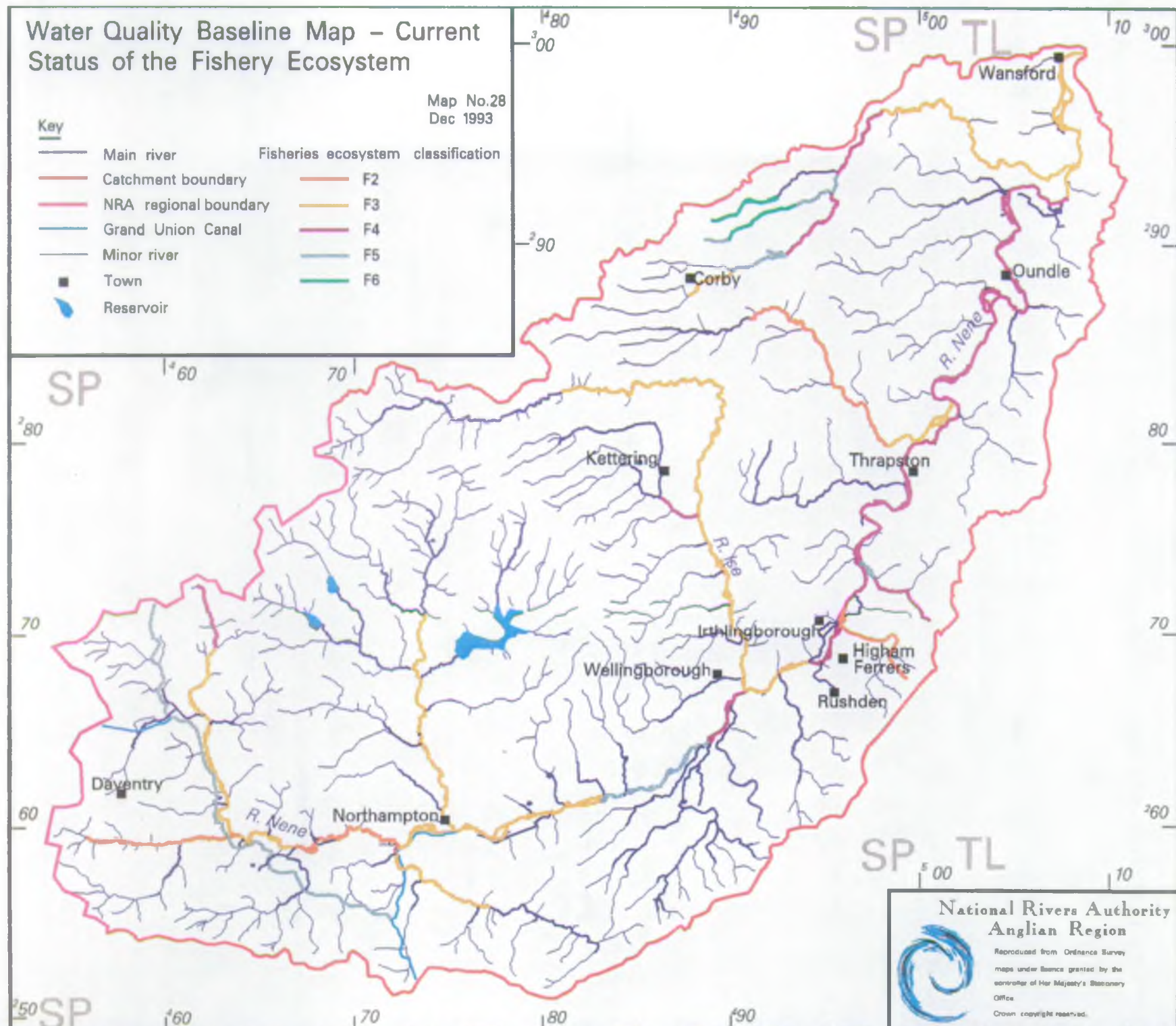


# Water Quality Baseline Map – Current Status of the Fishery Ecosystem

Map No.28  
Dec 1993

## Key

— Main river	Fisheries ecosystem classification
— Catchment boundary	F2
— NRA regional boundary	F3
— Grand Union Canal	F4
— Minor river	F5
■ Town	F6
● Reservoir	



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# Water Quality – Proposed Fisheries Ecosystem Targets

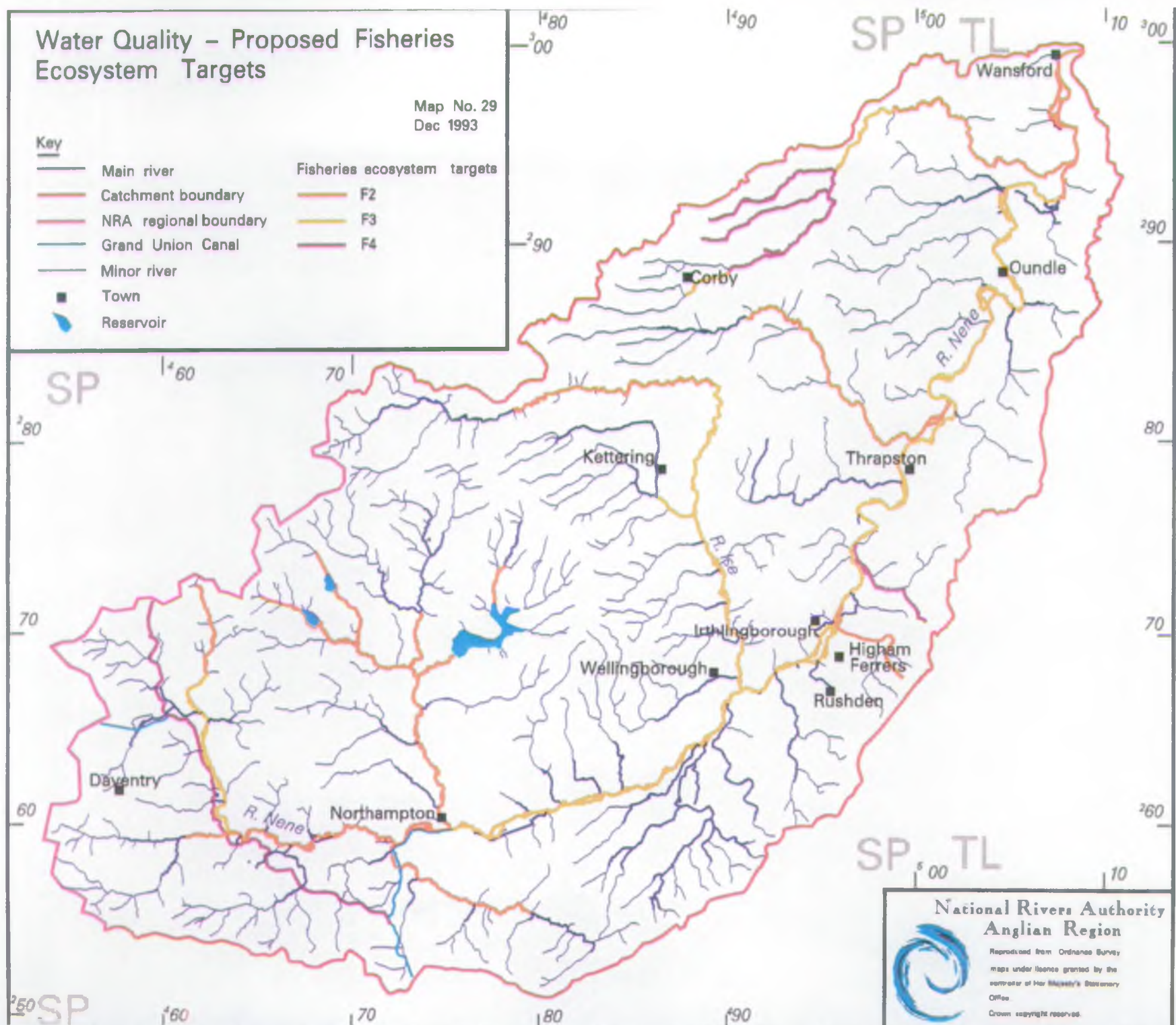
Map No. 29  
Dec 1993

## Key

- Main river
- Catchment boundary
- NRA regional boundary
- Grand Union Canal
- Minor river
- Town
- Reservoir

## Fisheries ecosystem targets

- F2
- F3
- F4



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5. CATCHMENT TARGETS

5.1 WATER QUALITY

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 approach will be more specifically related to water uses. The setting of SWQO's will involve local consultation

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

- a) Fisheries Ecosystem
  - Class 1: High Class salmonid/coarse fishery
  - Class 2: Sustainable salmonid/high class coarse fishery
  - Class 3: High Class coarse fishery
  - Class 4: Sustainable coarse fishery
  - Class 5: Fish present but not a sustainable fishery
  - Class 6: Fish unlikely to be present
- b) Abstraction for drinking water supply
- c) Industrial/agricultural abstraction
- d) Special ecosystem
- e) Water sport activity  
and relevant EC Directives

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

### Local Perspective

The NRA's proposals for Fisheries Ecosystem Classes in the Upper Nene Catchment are shown on the Proposed Fishery Ecosystem Targets Map (No 29), the timescale for improvements to reach these targets will be considered within a framework of regional priorities.

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.

### Groundwater

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

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

Anglian Region is currently developing a groundwater monitoring strategy which will improve our understanding of groundwater quality and identify areas where improvement is required.

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.



Water Quality Targets

a) Eutrophication

The designation of the freshwater Nene as sensitive under the Urban Waste Water Treatment Directive.

b) Pollution Prevention

To instigate a program of pollution prevention inspections targeting those sites in the catchment with the greatest pollution potential.

c) Maintain Water Quality for Public Water Supply Upstream of Abstraction Points.

To monitor water quality above the abstraction points so as to provide an early indication of failure to comply with the relevant water quality standards; and ensure through effective water quality planning that these standards are maintained.

d) NWC Class 3 and 4 stretches.

The effluent quality from Broadholme STW's needs to be improved in order to upgrade the Class 3 stretch of the River Nene to a Class 2. Discharges to the Willow Brook system must also be improved.

e) Surface water run off from developed areas.

To seek improvements in discharges of surface water into the headwaters of the Willow Brook.

f) Village Sewers.

Improved sewerage facilities are needed in rural areas, eg Fotheringhay and Little Oakley.

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.

g) Compliance failure of EC Directive.

To monitor the affects of improvements already achieved by British Steel and seek further zinc concentration reductions if necessary.

h) Raunds Hog Dyke.

To investigate the reasons for failing to comply with the Spray Irrigation and F2 Fisheries objectives.

i) Rushton.

To prevent drainage issues from Rushton landfill site affecting water quality in the River Ise.

j) Corby - Groundwater Contamination

To identify source of contamination, and determine the most cost effective solution to this problem.

k) Development of landfill sites in the floodplain.

Landfill sites with the potential to form highly polluting leachate within the floodplain will be discouraged by the NRA.

l) To reduce the pollution potential of these landfill sites within the catchment having an adverse affect on water quality.

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 of watercourses, and to prevent any deterioration in water quality which could in any way affect special conservation area.

vi) Adoption of NRA Groundwater Protection Policy by all those whose activities may impact upon groundwaters.

## 5.2 WATER QUANTITY

### 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.

The Water Quantity targets for this catchment reflect the NRA statutory objectives.

- 1) 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 set minimum residual flows (MRF's) and minimum control levels (MCL'S) to protect riverflows for environmental protection and to afford protection to downstream abstractors.
  - to maintain flow regimes to protect conservation interests and low flows (reduction in flows below Q95 to be limited to areas where conservation impact is minimal).
  - to maintain levels for navigation purposes.
  - to protect water levels for wetlands.
  - to preserve flood flows for channel cleansing and wetland inundation.
- 2) To augment and/or redistribute water resources, where appropriate, to meet water demands to appropriate standards of reliability.
  - to meet existing water demands to defined standards of reliability.
  - to produce a water resource strategy to define how future demands will be met.
- 3) To ensure the proper use of water resources
  - to ensure existing protected rights to abstract water and established environmental needs are protected before allocating water for further abstraction.
  - to ensure all current and future licensed demands are properly justified.
- 4) To conserve water resources by encouraging efficient water use and leakage control.
  - to encourage the development of winter storage reservoirs to meet irrigation demand and to discourage summer surface water abstraction.

- to encourage efficient water uses, re-use of water where appropriate and effective leakage control.
- to seek to maximise use of effluents to increase surface water availability.
- to seek to revoke unused abstraction licences and to reduce licenced quantities for under-utilised licences.

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

Public water supply	<p>The NRA accepts the operational standards given by OFWAT for public water supply. These are:</p> <ul style="list-style-type: none"> <li>a) A hosepipe ban on average not more often than one every 10 years.</li> <li>b) The need for voluntary savings of water on average not more than once in 20 years.</li> <li>c) The risk of rota cuts or use of stand pipes on average not more than once in 100 years.</li> </ul>
Spray Irrigation	The region's target level of service is a risk of shortage not more than once in 12 years on average.
Other 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 OBJECTIVES

This section will consider the general requirements for the physical features of the river channel and its corridor.

#### Local Perspective

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 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.
- Promote initiatives through routine maintenance that will increase the conservation value of the river corridor.

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

- |                               |   |
|-------------------------------|---|
| <u>Fisheries</u>              | <ol style="list-style-type: none"> <li>1. For all watercourses to achieve Class A status for both fish biomass and species richness classification systems.</li> <li>2. To halt the decline of the grayling population in the River Ise and to protect the population's genetic integrity.</li> </ol>   |
| <u>Conservation</u>           | <ol style="list-style-type: none"> <li>1. To increase habitat diversity and plant diversity in areas identified as impoverished.</li> <li>2. To protect areas of high species diversity.</li> <li>3. To halt the decline of otters in the catchment and to re-establish a breeding population.</li> <li>4. To halt the decline of native crayfish in the catchment.</li> </ol>                          |
| <u>Navigation</u>             | <ol style="list-style-type: none"> <li>1. To improve the level of service along the navigation in terms of sanitary facilities, overnight moorings and rubbish disposal points.</li> <li>2. To make the navigation more user friendly:               <ul style="list-style-type: none"> <li>- ease of operating locks</li> <li>- minimising hazardous features of the structures</li> </ul> </li> </ol> |
| <u>Flood Defence</u>          | <ol style="list-style-type: none"> <li>1. To ensure that the river topography remains suitable for the efficient passage of high flows and that control structures are adequately operated and maintained.</li> </ol>   |
| <u>Recreation and Amenity</u> | <ol style="list-style-type: none"> <li>1. To promote the development of facilities for disabled users.</li> </ol>   |

## 5.4 FLOOD DEFENCE OBJECTIVES

### General

A system is under development by the NRA to assess new target levels of service for Flood Defences.

The system divides the river into reaches of between 4 and 7 km and assesses the land use behind each reach, to which it allocates a score by considering the agricultural, urban and commercial content within the floodplain. The score is measured in units called a House Equivalent and by the score achieved each river reach is placed into one of five Land Use Bands as identified below.

Each Land Use Band has with it a different target level of flood defence -

Band A	-	1 in 100 years
Band B	-	1 in 50 years
Band C	-	1 in 20 years
Band D	-	1 in 10 years
Band E	-	< 1 in 10 years

It is anticipated that this consistent approach will be used to identify target levels of defence and by comparing with existing levels of defence will enable the NRA to focus its resources on those defences where the shortfall is most pronounced.

Land Use Band	Description of Typical Land Use
A	A reach containing the urban elements of residential and non-residential property distributed over a significant proportion of its length, or densely populated areas over some of its length. Any agricultural influence is likely to be over-ridden by urban interests. Amenity uses such as parks and sports fields may be prominent in view of the floodplain's proximity to areas of population density. Band A = 50 or more house equivalents/km.
B	Reaches containing residential and/or non-residential property either distributed over the full length of the reach or concentrated in parts but characterised by lower densities than Band A. Band B = 25 to 49.99 house equivalents/km.
C	Limited numbers of isolated rural communities or urban fringe at risk from flooding, including both residential and commercial interests. Intensive agricultural use could also be included. Band C = 5 to 25.99 house equivalents/km.
D	Isolated, but limited number of residential and commercial properties at risk from flooding. Agricultural use will probably be the main customer interest with arable farming being a feature. If undeveloped pockets of largely urban use, amenity interests may be prominent. Band D = 1.25 to 4.99 house equivalents/km.
E	There are likely to be very few properties and major roads at risk from flooding in these reaches. Agricultural use will be the main customer interest with either extensive grassland or, where the flood plain extent is small, arable cropping being the most common land use. Amenity interests are likely to be limited to public footpaths along or across the river. Band E = 0.01 to 1.24 house equivalents/km.



## TARGETS

### Catchment Targets

#### Maintenance

To implement National Standards of Service when set and to carry out appropriate maintenance works in an efficient and environmentally friendly manner whilst ensuring optimum value for money.

#### Capital Works

To identify, justify and execute capital works to meet or exceed minimum target standards subject to appropriate cost/benefit criteria.













# Shortfalls Against Current Fisheries Ecosystem Targets

(Based on 1990-92 data)

Map No.30

Dec 1993

## Key

- |   |                       |   |                                       |
|---|-----------------------|---|---------------------------------------|
|  | Main river            |  | Consistent biological failures        |
|  | Catchment boundary    |  | Fishery ecosystem shortfalls (95%ile) |
|  | NRA regional boundary |  | Failures against other targets        |
|  | Grand Union Canal     |   |                                       |
|  | Minor river           |   |                                       |
|  | Town                  |   |                                       |
|  | Reservoir             |   |                                       |















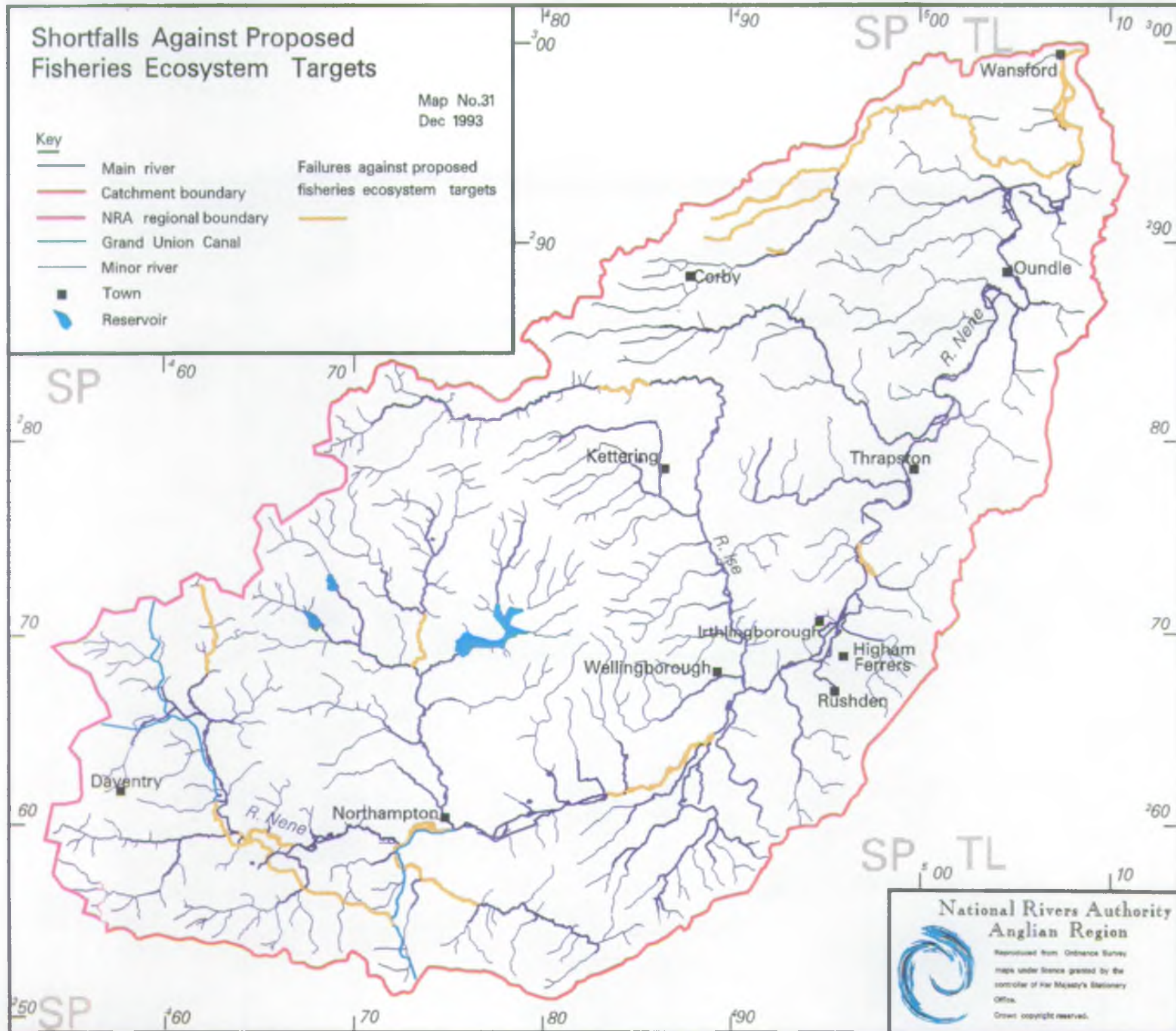


# Shortfalls Against Proposed Fisheries Ecosystem Targets

Map No.31  
Dec 1993

## Key

- |   |                       |   |   |
|---|-----------------------|---|---|
|  | Main river            |  | Failures against proposed fisheries ecosystem targets |
|  | Catchment boundary    |   |   |
|  | NRA regional boundary |   |   |
|  | Grand Union Canal     |   |   |
|  | Minor river           |   |   |
|  | Town                  |   |   |
|  | Reservoir             |   |   |



National Rivers Authority  
Anglian Region



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6. CURRENT SHORTFALLS AGAINST CATCHMENT TARGETS6.1 SHORTFALLSWATER 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. At this stage future fishery ecosystem based targets are draft proposals only.

The principal shortfalls are as follows :-

a) FISHERY ECOSYSTEM BASEDRiver Nene

Ecton Brook to Wollaston Lock - Fails to meet F3 Fishery targets for period 1990-1992. Great Billing Sewage Treatment Works is a primary factor in the poor water quality in this stretch of watercourse, causing a Dissolved Oxygen sag and nutrient input contributing towards Eutrophication.

Willow Brook

Northern Stream fails to meet F4 Fishery Targets - the discharge quality from Penn Green Surface Water Sewer needs to be improved.

Brampton Branch

Creaton Brook to Spratton Brook - Fails to meet F2 Fishery targets. Under investigation but thought to be a result of contaminated surface water discharges from Brixworth.

River Ise

Rushton to Barford Bridge - Fails to meet F2 Fishery targets. The source of contamination needs to be established and improved.

Raunds Hog Dyke

NGR SP 974 730 to River Nene - Fails to meet F4 (WQO's) Fishery targets. Improvements are necessary in effluent quality from Raunds STW's.

Grand Union Canal

Gayton to Brockhall - Fails to meet F4 Fishery targets. Result of Eutrophication and stagnant conditions.

b) FAILURES AGAINST OTHER TARGETSWillow Brook - Central Stream

Headwaters to Willow Brook (Southern stream) - Fails to comply with EC Dangerous Substances Directive for Zinc. Improvements in British Steel's effluent quality have been made, further improvements may be necessary following a period of evaluation.

Raunds Hog Dyke

Headwaters to River Nene - Fails River Quality Objectives for F2 Fishery and Spray Irrigation uses. The reasons for high chloride levels are unknown and need to be investigated.

Sewerage

Inadequate and/or total lack of sewerage facilities in parts of the catchment fail to comply with basic amenity standards.

## 6.2 WATER QUANTITY

Principal shortfalls against future targets relate to:

1. The deficiency in resource reliability in the catchment to meet direct water demands from the River Nene, for spray irrigation and industrial use, to the NRA's target standards of reliability.
2. The lack of effective regulatory control over water abstractions at Wansford.
3. Water Resource commitment in the catchment impacts on resource deficiencies to meet agricultural, conservation, navigation and water quality targets in the Lower Nene catchment.

## 6.3 PHYSICAL FEATURES

This section identifies areas where previously identified catchment targets are not being met.

- Navigation
1. No sewage pump out facilities exist in the catchment for non-boat club members. Only two Elsan disposal sites exist in the catchment.
  2. Only two rubbish disposal sites exist in the catchment.
  3. There are insufficient overnight moorings.
  4. The navigation is potentially hazardous.
  5. The operation of locks is physically demanding.

- Conservation
1. Areas of river channel and river corridor have low species diversity.
  2. Stretches of river have low habitat diversity.
  3. A sustainable otter population in the catchment does not exist.
  4. The native crayfish population in the catchment is in decline.

- Fisheries
1. Fish biomass levels are low in certain stretches of watercourse viz the Nene between Earls Barton and Thrapston, the Willow Brook, upper reaches of Harpers Brook.
  2. The Grayling population in the River Ise is in decline.

#### 6.4 FLOOD DEFENCE

Shortfalls have been identified as follows:-

1. The following list of locations indicates those areas within the catchment which have suffered flooding from main river and which the NRA have included in their Medium Term Plan as possibly justifying a Flood Defence Scheme.

Kislingbury  
Clipston  
Weedon  
Geddington  
Far Cotton - Northampton

2. Flood forecasting, telemetry systems are inadequate.

#### 6.5 DEVELOPMENT

As highlighted earlier within this Plan a significant feature of this catchment is the extent of development and change in land use that has taken place over the past 20 to 30 years and which looks set to continue.

Development of this scale has focused thoughts within the NRA on the need for a strategic approach towards development control through structure plans and the need for closer liaison between the relevant authorities.

Development in general and change of land use bring with them increased surface water run off which if not properly addressed may result in an increased risk of flooding (locally or elsewhere within the catchment) and an increased risk of pollution to controlled waters. Pressures to develop in the floodplain and pressures to culvert watercourses both have flood protection and environmental implications. The potential use of worked out gravel pits as landfill sites may have an impact upon water resources, it certainly brings a potential future risk to water quality.

With these thoughts in mind the following range of issues have been identified where the improved co-ordination and co-operation between authorities features in their solution.

- Changes in land use have an adverse impact on the water environment.
- Development in the catchment leading to increased run off poses a significant flood risk.
- Development in the catchment leading to loss of floodplain can increase the severity and frequency of flooding elsewhere in the catchment and is detrimental to the environment.
- Landfill sites within the floodplain accepting potentially polluting waste represent a significant threat to water quality if flooding occurs.
- The restoration of gravel extraction areas needs to be undertaken sensitively.

## 7. ISSUES AND OPTIONS

### ISSUE 1

LENGTHS OF THE RIVER NENE FAIL TO MEET THEIR WATER QUALITY OBJECTIVES AS A CONSEQUENCE OF NUTRIENT ENRICHMENT IE. EUTROPHICATION.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Designate relevant lengths of the River Nene as sensitive under the UWWT Directive.	NRA/DOE	Legislative support for requiring nutrient removal from discharges to the River Nene upstream of Wansford and Duston 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.
Discourage the use 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, for maintenance of residual flow.	NRA/Beneficiaries.	Reduces the potential for the conditions under which excessive algal growth develops.	Cost, partial solution.
Encourage changes in agricultural land use.	NRA/ Land owners.	Reduction in nutrient enhancement. Coordination with stewardship scheme.	Cost, restrictions in land use. Long term solution.

### ISSUE 2

STRETCHES OF WATERCOURSE ARE NWC CLASS 3 AND 4 (POOR QUALITY)

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Improve discharges to affected watercourses.	NRA/Dischargers	Improved water quality and enhanced amenity value.	Cost to dischargers and NRA in carrying out extensive investigation.

### ISSUE 3

THE RUSHMERE LAKE/BLEU LAGOON IN NORTHAMPTON IS ADVERSELY AFFECTED BY ALGAE, INCLUDING BLUE GREEN ALGAE.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Investigate reasons and produce an action plan for algal management, in particular for blue green algae.	NRA	Improved water quality and aesthetic appearance.	Cost. Partial solution.
Remove sediments and change physical characteristics of Blue Lagoon in line with the proposed extension of the Barnes Meadow Local Nature Reserve	NRA/District Council/Developers.	Improved water quality and aesthetic appearance.	Cost.
Increase flow through the Blue Lagoon.	NRA	Improved water quality.	Cost. Partial solution. The normal summer flow is inadequate.

### ISSUE 4

SEVERAL WATERCOURSES IN THE CATCHMENT FAIL TO COMPLY WITH PROPOSED FISHERY ECOSYSTEM OBJECTIVES.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Improve discharges to affected watercourses.	NRA/Dischargers	Improved water quality	Cost
Carry out cost benefit analysis to determine whether improvements required can be justified.	NRA	Better targeting of expenditure on environmental improvement.	Some improvements maybe discounted.

**ISSUE 5**

THE NUMBER OF POLLUTION INCIDENTS OCCURRING IN THE CATCHMENT IS INCREASING.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Carry out proactive pollution prevention inspections and identify potential sources of pollution and seek the co-operation and increased awareness of those responsible in reducing the pollution potential of their activity.	NRA/Dischargers/Developers.	Reduced frequency of pollution incidents. Improved water quality. Cost savings on pollution incident investigations.	Cost of implementing pollution prevention measures.
To persuade local authorities to include pollution prevention measures when granting planning permissions.	NRA/Local Authorities	Reduced frequency of pollution incidents. Improved water quality. Cost savings on pollution incident investigations.	Cost of implementing pollution prevention measures.
To seek additional regulatory powers to require pollution prevention works.	NRA/DOE	Reduced frequency of pollution incidents. Improved water quality. Cost savings on pollution incident investigations.	Cost of implementing pollution prevention measures.

**ISSUE 6**

SURFACE WATER RUN OFF FROM DEVELOPED AREAS CAUSES POLLUTION.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Investigate known sources of pollution and produce an action plan.	NRA	Identifies problem sites.	Does not prevent pollution.
Adopt pollution prevention to prevent surface water discharges becoming contaminated.	NRA/Planning Authorities/Developers.	Reduced frequency and risk of pollution occurring.	Cost
Increase awareness in those responsible for developing surface water systems.	NRA/Developers.	Improvements in initial design and installation of surface water systems.	Pollution may still occur.



## ISSUE 7

POLLUTION IS CAUSED BY INADEQUATE SEWERAGE FACILITIES/VILLAGE SEWERS AS A CONSEQUENCE OF EITHER HYDRAULICALLY OVERLOADED SYSTEMS OR INADEQUATE INDIVIDUAL FACILITIES IN RURAL AREAS

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Provision of improved sewerage/sewage treatment systems.	AWS/Individual householders/District Councils	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.	AWS/Individual householders	Reduce frequency of overflow.	Cost
Object to relevant planning permission in affected areas.	NRA/Planning Authority	Prevents additional pollution.	Partial solution. Restrictions on development.
Use of NRA's statutory powers to control pollution	NRA/Polluter	Improved Water Quality	Additional cost to polluter.

## ISSUE 8

WATER QUALITY IN WILLOW BROOK FAILS EC DANGEROUS SUBSTANCES DIRECTIVE FOR ZINC.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Further reduce the zinc concentration of discharges to the Willow Brook.	NRA/British Steel	Compliance with EC Dangerous Substances Directive.	Cost
Increase flow in Willow Brook.	NRA/British Steel	Dilution of zinc concentration in Willow Brook.	Doesn't eliminate the source of the zinc.
Do nothing.		May comply without further treatment being necessary.	May fail to comply with consent conditions.
Carry out further studies at Deene Lake to determine the degree of contamination of sediments.	NRA	Better understanding of influence which this site has had on water quality.	Cost

### ISSUE 9

RAUNDS HOG DYKE FAILS TO MEET WATER QUALITY F2 FISHERIES (RQO) AND SPRAY IRRIGATION OBJECTIVES.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Investigate source of contamination and the necessary remedial action to be taken.	NRA/Dischargers	Improved river water quality.	Cost

### ISSUE 10

THE RIVER ISE SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI) IS BEING ADVERSELY AFFECTED BY LEACHATE FROM RUSHTON LANDFILL SITE.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Implement an action plan to prevent site from causing further pollution.	Waste Regulatory Authority/ Operators.	Improved water quality.	Cost to site owner. Owner may surrender license and walk away from site.
Require County Council to change site licence conditions.	County Council	Improved water quality.	Cost to site owner. Owner may surrender licence and walk away from site.

### ISSUE 11

CORBY - CONTAMINATED GROUNDWATER DISCHARGE FROM AN UNKNOWN SOURCE CAUSES POLLUTION.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Investigate and trace source of pollution and carry out necessary remedial action.	NRA/Polluters	Improved water quality.	Cost

## ISSUE 12

POLLUTION OF GROUNDWATER AND/OR SURFACE WATER IS BEING CAUSED BY DISCHARGES FROM LANDFILL SITES.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Effluent quality may be improved by treatment of discharge.	Operators.	Reduction of Pollution and improved water quality.	Cost to operator.
County Council to amend site licence conditions to restrict the type of waste accepted.	Waste Regulatory Authority/Operator.	Reduction in potential polluting material.	Partial solution to problem, existing polluting material remains.
Remove polluting material from site.	Operator	Reduce pollution.	Cost to operator.
Line site with impermeable material.	Operator	Reduction in groundwater pollution. Retains leachate.	Cost to operator. Leachate still requires treatment prior to discharge.

# ISSUE 13

THE DEGREE OF COMMITMENT OF WATER RESOURCES TO MEET LICENCED DEMANDS IN THE UPPER NENE CATCHMENT (PRINCIPALLY PWS) IMPACTS ON WATER RESOURCE DEFICIENCIES IN THE LOWER NENE CATCHMENT

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
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 AWS and would require compensation. Partial solution.
Modify the pumping regime at Wansford.	NRA/AWS	Increases water availability. Reduces deficit in dry drought periods.	Cost of providing new water source. Variation to Wansford licence impacts on AWS and would require compensation. Partial solution.
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.
Utilise NRA water allocation from Rutland Water to meet demands from River Welland to reduce demand from River Nene.	NRA/AWS	Reduces deficit in dry/drought periods.	Cost to users. Partial solution. Potential unreliability of NRA allocation. Cost to NRA of utilising allocation.
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 to users. Partial solution. Potential unreliability of NRA allocation. Cost to NRA of utilising allocation.

#### ISSUE 14

CURRENT AND FUTURE DIRECT WATER DEMANDS FROM THE RIVER NENE FOR SPRAY IRRIGATION AND INDUSTRY CANNOT BE MET TO TARGET STANDARDS OF RELIABILITY.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Develop winter storage reservoirs to replace direct summer abstraction.	Farmers.	Agricultural solution. Abstraction charges much lower. Improved reliability to meet abstraction demands. Reduces summer water demand from River Nene.	Costs of construction of reservoirs.
Import water from the River Trent and/or canal system to augment the River Nene in critical periods.	NRA / Beneficiaries.	Increases water availability to improve reliability to abstraction demands. Potential strategic option to augment water resources.	Longer term option only. Cost. Some doubt over river water quality.
Utilise Eyebrook reservoir to augment the Willow Brook to enhance Nene river flows.	NRA / Reservoir owner / Beneficiaries.	Increases water availability to improve reliability to abstraction demands. Benefits to river water quality on Willow Brook.	Part Solution / Cost. Helps only a small section of the River Nene.
Develop a new winter storage reservoir for summer river regulation.	NRA / Beneficiaries.	Increases water availability to improve reliability to abstraction demands. Benefits to river water quality.	Cost.

#### ISSUE 15

NRA DOES NOT HAVE EFFECTIVE REGULATORY CONTROL OVER WATER ABSTRACTIONS FROM THE RIVER NENE. AWS'S 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 AWS.  Cost of compensation to AWS.

## ISSUE 16

THE EFFECTIVENESS OF FLOOD FORECASTING AND CONTROL, FOR FLOOD RISK AREAS IN THE CATCHMENT, ARE RESTRICTED BY A LACK OF MONITORING INFORMATION.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Improve gauging station network, develop forecasting models and extend the telemetry system.	NRA	Improved forecasting. More accurate measurement.	Cost.
Improve gauging station network.	NRA	Improved monitoring.	Partial solution. Cost.
Develop forecasting model.	NRA	Improved forecasting. Will identify floodplain.	Complexity. Cost. Only a partial solution.
Extend telemetry system.	NRA	Improved monitoring.	Cost. Partial solution.

## ISSUE 17

THE LEVEL OF PROTECTION TO PROPERTIES AGAINST FLOODING IS INADEQUATE IN CERTAIN LOCATIONS.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Improvements to watercourse and structures where possible.	NRA (main river) Local Authority (non main river)	Reduces flood risk. Improved land drainage.	Cost. Possible environmental damage. Possible adverse effect downstream.
Provide diversion relief channel where possible.	NRA (main river) Local Authority (non main river)	Reduced flood risk.	Cost. Land loss. Possible environmental damage.
Provide upstream attenuation.	NRA (main river) Local Authority (non main river)	Reduced flood risk. Opportunity for environmental enhancement.	Cost. Land loss. Possible environmental damage.
Floodproof individual properties.	NRA/ Local Authorities/ Individuals	Reduced flood risk. Relatively inexpensive. No environmental impact.	Piecemeal approach. Limited effectiveness.



## ISSUE 18

EFFECTIVE MANAGEMENT OF THE NAVIGATION IS LIMITED DUE TO INSUFFICIENT INFORMATION ON;

A. THE PRESENT USE OF THE NAVIGATION AND ITS CARRYING CAPACITY, BOTH IN TERMS OF BOAT TRAFFIC AND ENVIRONMENTAL IMPACT.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Undertake survey on use of Navigation and its environmental impact	NRA	Provides management information.	Only "one-off" survey
Install automatic systems to monitor boat movements	NRA	Provide information on the extent of the navigation use.	Cost Automatic device needs to be designed. Partial solution.

B. THE CUSTOMER

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Identify the range of customers and determine their needs	NRA	Provides management information. Improve customer liaison. Identification of conflicts between users.	Only "one-off" picture of Navigation. May raise false hopes.
Develop User Groups specific to Nene	NRA and Users	Improved customer liaison. Target improvements to Navigation Management.	

## ISSUE 19

AMENITY SERVICES ON THE NENE ARE LOW IN COMPARISON WITH OTHER NAVIGATIONS DISCOURAGING ITS USE AS A RECREATIONAL FACILITY

**A. INSUFFICIENT FACILITIES EXIST ON THE NAVIGATION IN TERMS OF SANITARY FACILITIES, RUBBISH DISPOSAL POINTS AND MOORING FACILITIES**

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
NRA to provide suitable range of amenity services.	NRA	Improved level of service. Reduced pollution risk.	Cost.
NRA to promote suitable range of services through joint ventures.	NRA/Others	Improved level of service. Reduced pollution risk.	Cost.
Encourage private developers to take on board.	NRA/Developers	No cost to NRA. Improved level of service. Reduced pollution risk.	
Develop facilities specifically for canoeing and rowing	NRA/District Council and Landowners	Improved level of services to users.	Cost.

**B. THE OPERATION OF NENE LOCKS IS PHYSICALLY DEMANDING AND SLOW**

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Power guillotine gates	NRA	Ease of operation. Improve speed of locking process. Safer operation.	Cost. Loss of traditional methods of operation. Increased maintenance requirement.
Power pointing doors	NRA	Operations by elderly or infirm users 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.

C. CERTAIN FEATURES OF THE NENE NAVIGATION ARE HAZARDOUS TO ITS USERS.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Identify hazardous features and effect a programme of repairs	NRA	Improved service to users.	Cost.
Advise users of dangers of the navigation by mailshots and/or erecting signs.	NRA	Users will be aware of the dangers.	Cost.

**ISSUE 20**

AREAS OF RIVER CHANNEL AND RIVER CORRIDOR HAVE BEEN IDENTIFIED AS HAVING LOW PLANT SPECIES DIVERSITY

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Restore and enhance during Routine Flood defence maintenance or Capital Works without loss of Channel capacity	NRA and landowners	Increased habitat diversity. Increased bio-diversity. Increased amenity value.	Cost.
Encourage landowners to restore wetland and riparian habitats (Countryside Stewardship, Set Aside schemes etc)	Landowners NRA Countryside Commission Wildlife Trust	Increased habitat diversity. Increased bio-diversity. Increased retention time of water in Catchment. Increased amenity value.	Cost.

**ISSUE 21**

AREAS OF RIVER BED IN RAPID AND FAST FLOWING STRETCHES HAVE BEEN IDENTIFIED AS HAVING LOW HABITAT DIVERSITY

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Restore and enhance during Routine Flood defence maintenance or Capital Works in liaison with Flood Defence.	NRA	Increased habitat diversity. Increased amenity value.	Cost.

**ISSUE 22****A SUSTAINABLE OTTER POPULATION NO LONGER OCCURS WITHIN THE CATCHMENT**

<b>OPTIONS</b>	<b>RESPONSIBILITY</b>	<b>ADVANTAGES</b>	<b>DISADVANTAGES</b>
Undertake additional otter surveys in the Catchment including identification of otter haven/holt sites	Northamptonshire Wildlife Trust NRA English Nature Northamptonshire County Council	Identify limiting factors and produce management plans.	
Target general habitat improvement to identified priority areas	Northamptonshire Wildlife Trust NRA English Nature Northamptonshire County Council	Improved conditions for otters.	Potential conflicts with other users.
Identify and construct otter haven/holt sites in identified priority areas	As above	Improved conditions for otters.	Potential conflicts with other users.

**ISSUE 23****THE NATIVE CRAYFISH IS UNDER THREAT OF EXTINCTION IN THIS CATCHMENT**

<b>OPTIONS</b>	<b>RESPONSIBILITY</b>	<b>ADVANTAGES</b>	<b>DISADVANTAGES</b>
Seek to prevent the establishment of exotic crayfish farms within the Catchment	MAFF NRA English Nature Northamptonshire Wildlife Trust	Reduces the potential of native crayfish being infected with plague and/or exotic escapees competing with native crayfish.	Restriction on crayfish farming industry.
Determine the crayfish status of the River Ise following the incidence of plague	NRA English Nature	Establish presence/absence of native and/or exotic crayfish.	
Enhance river stretches containing native crayfish during Routine Flood Defence Works or Capital Works	NRA	Improve habitat for crayfish.	
Designate the Fisheries Ecosystem Water Quality Target - F2 for the Brampton Branch.	NRA Industry	Ensure water quality is adequate for crayfish.	Potential cost to industry etc discharging into system.

**ISSUE 24**

FISH BIOMASS LEVELS ONLY ACHIEVE CLASS C/D BETWEEN EARLS BARTON AND THRAPSTON

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Investigate cause of low biomass levels.	NRA	Greater awareness of the issue.	Cost.
Improve water quality.	NRA	Improved fish stocks.	Cost to dischargers.
Create open connections between the Nene and neighbouring sand and gravel pits.	NRA Landowners	Provide shelter areas for fish during periods of high river flow.  Provide additional spawning and nursery areas.  Provide silt trap and thereby reduce downstream river maintenance.  Provides additional flood water storage.	Cost of structures.  The number of suitable sites is limited.

**ISSUE 25**

THE FREE PASSAGE OF FISH UPSTREAM AND DOWNSTREAM IS RESTRICTED BY PHYSICAL BARRIERS

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Install fish passes in appropriate locations	NRA	Permit fish to move throughout the river system.	Cost.
Ensure that any new structures include a fish pass	NRA	As above.	Cost.

**ISSUE 26**

THE GRAYLING POPULATION IN RIVER ISE SSSI IS IN DECLINE

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Undertake detailed investigation on Grayling population	NRA/English Nature	Assess extent of decline and identify reasons.	Cost. Working within the SSSI.
Restock with Grayling bred from adults in the Ise.	NRA/English Nature	Maintains genetic integrity of stock.	Potential damage to remaining population.
Conserve and enhance river environment for Grayling.	NRA/English Nature	Maintain genetic integrity of stock. Ensure future survival.	Surviving population may be too small for successful recruitment.

**ISSUE 27**

CHANGES IN LAND AND RIVER USE HAVE AN ADVERSE EFFECT ON 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	Ensures the protection and enhancement of the water environment is taken into account for changes in land use.	Implications on Local Authority control.  Partial solution.  Possible cost implications to landowners/developers.
Seek legislative change in land-use approval system	NRA/Government	Clear guidance for landowners/developers	Restrictions on land-use
Improve landowner/developer awareness of possible adverse impacts of land use changes	NRA/Local Authorities	Improved awareness and protection of the water environment	Partial solution.  Potential development restrictions.

**ISSUE 28**

THE RESTORATION OF GRAVEL EXTRACTION AREAS NEEDS TO BE UNDERTAKEN SENSITIVELY.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Restore applying zonal restrictions	Planning Authority/ NRA/Local Interests	Develop conservation and recreation areas with minimal conflict	
Restore on a piecemeal basis	NRA/ Local Interests/Planning Authority	Some environmental benefit will accrue	Haphazard approach to restoration



## ISSUE 29

LANDFILL SITES WITHIN THE FLOODPLAIN ACCEPTING POTENTIALLY POLLUTING WASTE REPRESENT A SIGNIFICANT THREAT TO WATER QUALITY IF FLOODING OCCURS.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Seek cooperation of planning authorities and developers to restrict development and minimise risk of pollution from landfill sites in floodplain.	NRA/Planning Authorities/ Developers.	Reduced risk of pollution occurring. Prevents loss of flood storage.	Restrictions on land use.

## ISSUE 30

DEVELOPMENT IN THE CATCHMENT LEADING TO INCREASED RUN-OFF POSES A SIGNIFICANT FLOOD RISK.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Seek to prevent development where there is a known flood risk	NRA through Planning Authority	No increase in flood risk	Adverse effect on local economy
Flow balancing	Planning Authority Developer (NRA)	No increase in flood risk. Opportunity for environmental enhancement	Cost. Future maintenance
Off-site improvements to watercourse	Planning Authority Developer (NRA)	No increase in flood risk	Cost. Possible adverse effect on others. Possible environmental damage.
Strategic scheme	Planning Authority Developer (NRA)	Provide long term integrated solution. Future development catered for. Opportunity for environmental enhancement.	Cost. Need for pre-funding.

**ISSUE 31**

DEVELOPMENT IN THE CATCHMENT LEADING TO LOSS OF FLOODPLAIN CAN INCREASE SEVERITY AND FREQUENCY OF FLOODING ELSEWHERE IN THE CATCHMENT AND IS DETRIMENTAL TO THE ENVIRONMENT.

OPTIONS	RESPONSIBILITY	ADVANTAGES	DISADVANTAGES
Refuse development	NRA through the Planning Authority	Negate need for environmentally damaging flood defence works. No costs. No loss of existing flood storage	Possible adverse effect on local economies
Compensatory Works to maintain status quo	Planning Authority Developer NRA	Allows development to proceed. Potential for environmental enhancement.	Costs. Loss of wetlands - environmental damage
Restrict nature of development to water based activities	Planning Authority Developer NRA	Minimal works required to maintain status quo. Minimum cost. Potential for environmental enhancement.	Possible environmental damage

## **GLOSSARY OF TERMS AND ABBREVIATIONS**

**ABSTRACTION:** removing water from the ground or river usually by pumping

**AQUIFER:** water bearing stratum below ground level

**BACKWATERS:** bypass channel or secondary channel

**BASEFLOW:** proportion of river flow that is provided by groundwater discharge from an aquifer

**BERM:** narrow flat part of the riverbank normally just above water level

**BIO DIVERSITY:** the range of living organisms within a given area

**BIOMASS:** total number of living organisms in a given area

**BUNDING:** impermeable wall or mound around storage tanks to contain the maximum possible potential leakage of liquid

**CONTROLLED WATERS:** all rivers, canals, lakes, groundwaters, estuaries and coastal waters

**COST BENEFIT ANALYSIS:** a method of evaluating the financial costs against the financial benefit of any scheme

**DIFFUSE SOURCES:** pollutants from over a wide area rather than from a clearly defined single point

**ECOSYSTEMS:** systems involving the interactions between different life forms

**ELSAN:** portable toilet used on boats

**EMBANKED CHANNEL:** watercourse with banks raised above normal ground level

**EUTROPHIC:** water which is rich in nutrients

**EUTROPHICATION:** process by which water becomes saturated with nutrients so that algae grow rapidly and dilapidates the oxygen supply

**FLOODPLAIN:** flat area of land adjacent to the river which naturally floods when the river leaves the confines of its channel

**FLUVIAL:** relating to the river

**FREEBOARD:** the height above a given reference level, in this context the height above normal river level

**GEOMORPHOLOGICAL:** the structure, origin and development of the topographical features of the earth's crust

**GROUNDWATERS:** slow flowing water in the ground beneath the water table

**GUILLOTINE GATE:** vertically rising lock gate

**GULLETS:** old iron and limestone workings

**HEADWATERS:** the tributary streams of a river in the area where it rises

**INUNDATION:** to flood with water from the river

**LEACHATE:** polluted water from a refuse tip

**MINIMUM RESIDUAL FLOW:** minimum flow set by the NRA below which abstractors may not abstract

**PERMISSIVE POWERS:** powers to undertake work where there is no obligation to do such.

**POINTING DOORS:** a set of twin lock doors pointing upstream allowing access/egress to the lock

**POTABLE WATERS:** water suitable for drinking

**Q95:** level of flow which the NRA would expect to be exceeded 95% of the time.

**RIFFLES:** shallow gravelly areas in the river bed

**RIPARIAN:** owner of the river bank

**RIVER CATCHMENT:** the area of land that collects the precipitate water flowing into a given reach of river

**RUN OFF:** proportion of rainfall that runs into rivers as surface water

**SALMONOID FISH:** game fish eg trout and salmon

**SPATE FLOWS:** when the river is in flood conditions

**SURFACE WATERS:** water collecting on and running off the surface of the ground

**TRANSPIRATION:** to lose water vapour through the leaves

**WATER TABLE:** water infiltrating the upper layers of soil reaches a zone where the ground is saturated - the surface of this zone is known as the water table.

### **ABBREVIATIONS**

**NRA:** National Rivers Authority

**SSSI:** Site of Special Scientific Interest

**AOD:** Above Ordnance Datum

**PWS:** Public Water Supply

**MAFF:** Ministry of Agriculture Fisheries and Food

**NFU:** National Farmers Union

**Q95:** 95 Percentile

**SPA:** Special Protection Areas

**ESA:** Environmentally Sensitive Areas

**NNR:** National Nature Reserve

**SNCI:** Site of Nature Conservation Importance

**RDB:** Red Data Book

**SAMS:** Scheduled Ancient Monuments

**MRF:** Minimum Residual Flow

**RQO:** River Quality Objectives

**SWQO:** Statutory Water Quality Objectives

**NWC:** National Water Council

**OFWAT:** Office of the Water Regulator

**NGR:** National Grid Reference

**UWWT:** Urban Waste Water Treatment

**AWS:** Anglian Water Services

**TCMA:** Thousand Cubic Metres Per Annum

**TCMD:** Thousand Cubic Metres Per Day

**WRA:** Water Resources Act

**MCL:** Minimum Control Levels

**CMP:** Catchment Management Plan

**STW:** Sewage Treatment Works

**DOE:** Department of the Environment

## 9.0 APPENDICES

### 9.1 APPENDIX 1

#### LANDFILL SITES IN THE UPPER NENE CATCHMENT

	SITE NAME:	NGR:	WRA LIC REF:
1	Stamford	TL060990	no licence
2	Fair Oak Sale, King's Cliffe	TL042978	E1
3	Nassington Quarry	TL045973	E8
4	Nassington Quarry Extension	TL045973	E16
5	Morehay Lane, King's Cliffe	TL003968	no licence
6	Ashton Road, Oundle	TL048880	no licence
7	Titchmarsh	TL011802	no licence
8	Slipton	SP967783	no licence
9	Hillstone Farm, Stanwick	SP979705	E39
10	Mill Chrome/Van de Berghe	SP956699	E6
11	Station Road, Irthlingborough	SP956708	E7
12	Windmill Lane, Irthlingborough	SP938701	no licence
13	Carol Spring Farm, Sidegate La.	SP917701	W4
14	Sidegate Lane, Wellingborough	SP917706	no licence
15	Rushden	SP921700	no licence
16	Sidegate Lane, new area	SP915705	W41
17	Rushden UDC, Finedon	SP925699	WU/64/192
18	Wellingboro UDC, Gypsy Lane	SP906656	WR/53/109
19	Irchester Road, Wollaston	SP907643	no licence
20	Denton	SP843576	no licence
21	Courteenhall Grange Pit	SP760557	S12
22	Wootton Quarry, Collingtree	SP763555	S62
23	Blisworth	SP737530	S26
24	Gayton Part OS 96	SP714549	no licence
25	Milton Malsor Road, Gayton	SP714552	no licence
26	Dodford/Newnham Turn, A45	SP608601	no licence
27	Dodford Gravel Pit	SP605603	no licence
28	Penguin Hotel, Daventry	SP582611	no licence
29	Elderstubbs Farm, Daventry	SP552628	no licence
30	Daventry Sewage Works	SP576632	no licence
31	Ashby Road, Daventry	SP570640	no licence
32	Dodford	SP625608	D2
33	Dodmoor Farm	SP626612	no licence
34	Ashby St Ledgers	SP585678	no licence
35	Grove Farm, Kilsby	SP596695	D4/5
36	Clipston	SP701824	no licence
37	Old	SP785729	no licence
38	Brixworth - new area	SP755716	D67
39	Scaldwell Road, Brixworth	SP755716	no licence
40	Holcot Road, Brixworth	SP755711	no licence
41	Stone Quarry, Pitsford	SP762669	D3
42	Weedon Road - Sainsburys	SP727606	N18

Continued

SITE NAME:	NGR:	WRA LIC REF:
43 Weedon Road - east area	SP731606	N8
44 Weedon Road, Northampton	SP730603	N17
45 Harvey Reeves Road, Northampton	SP740602	N2
46 Abington Mills, Billing Road	SP780605	N7
47 Billing Park	SP803627	N1
48 Buccleugh Farm, Burton Latimer	SP909735	no licence
49 Wold Road, Burton Latimer	SP907749	K4
50 Cranford St John	SP935766	K58
51 Cranford St John	SP935763	no licence
52 Glebe Farm, Cranford St John	SP930769	K1
53 Glebe Farm, Cranford St John	SP930769	K13
54 Kettering Rugby Club	SP876778	no licence
55 Cransley Ironworks, Kettering	SP849774	K29
56 Foxhall, Loddington	SP801776	no licence
57 Loddington Lodge	SP798778	no licence
58 Thorpe Underwood	SP788808	KR/65/193
59 Thorpe Underwood, Rothwell	SP792808	no licence
60 Pipewell Road, Desborough	SP820846	no licence
61 Storefield Lodge Farm, Rushton	SP848836	K2
62 Geddington & Weekley	SP863820	KR/51/31
63 Cherry Hall	SP863815	no licence
64 Scott Road/Wood Lane, Weekley	SP875805	no licence
65 Field by Cottingham Quarry	SP842895	no licence
66 Cottingham Stone Quarry	SP855895	C5
67 Barn Close Quarry	SP905885	C1
68 Earlstree Quarry	SP889911	C4d
69 Barn Close Quarry	SP910882	C16
70 BSC North Brook Dry Tip	SP900908	C17
71 BSC North Brook Lagoons	SP900910	C18
72 CDC Deene Quarry	SP910915	C20
73 Cowthick Limestone Gullet	SP916884	C24
74 Cowthick Ironstone Gullet	SP925887	C25
75 BSC Works Dry Tip	SP910920	C2
76 BSC Central Ponds	SP919897	C3a
77 BSC Northern Ponds	SP900905	C3b
78 BSC Oil Separation Tanks	SP903912	C3c
79 BSC Candy Filter Sludge Ponds	SP905912	C3d
80 BSC Western Ponds	SP898911	C3e
81 BSC Southern Ponds/Tips	SP905888	C3/4
82 BSC Birchington Road	SP918906	C4a
83 BSC Sludge Tip/ East of Tarmac	SP915890	C4c
84 BSC Refractory Tip, Gretton Rd.	SP905917	C4e
85 Princewood Road, Corby	SP878909	no licence
86 Earlstree Quarry	SP889911	no licence
87 Brigstock Road, Stanion	SP922871	no licence
88 Gretton (Shanks & McE)	SP902924	CO/75/106



# LANDFILL SITES POSSIBLY WITHIN FLOODPLAIN

5	Morehay Lane, King's Cliffe	TL003968	no licence
6	Ashton Road, Oundle	TL048880	no licence
7	Titchmarsh	TL011802	no licence
10	Mill Chrome/Van de Berghe	SP956699	E6
11	Station Road, Irthlingborough	SP956708	E7
21	Courteenhall Grange Pit	SP760557	S12
22	Wootton Quarry, Collingtree	SP763555	S62
32	Dodford	SP625608	D2
33	Dodmoor Farm	SP626612	no licence
44	Weedon Road, Northampton	SP730603	N17
45	Harvey Reeves Road, Northampton	SP740602	N2
46	Abington Mills, Billing Road	SP780605	N7
55	Cransley Ironworks, Kettering	SP849774	K29
81	BSC Southern Ponds/Tips	SP905888	C3/4
83	BSC Sludge Tip/East of Tarmac	SP915890	C4c

MINERAL EXTRACTION

## MAP NO.5

KEYSand and Gravel Extraction**Sites with Planning Permission**

A		Kislingbury
B	*	Duston Mill
C		Wootton
D	*	Great Houghton
E	*	Cringle House Farm
F	*	Earls Barton
G	*	Doddington
H		Doddington
I	*	Ditchford
J	*	Nene Valley Farm
K	*	Stanwick
L		Titchmarsh
M	*	Tansar

**Proposed Sites**

1		Dodford
2		Newnham
3	*	Flore
4	*	Heyford
5		Bugbrooke
6	*	Rothersthorpe
7		Upton
8		Milton Malsor
9		Collingtree
10		Overstone
11	*	Great Houghton
12	*	Cogenhoe
13		Grendon
14	*	Bozeat
15	*	Wellingborough
16	*	Victoria Mills
17	*	Ditchford Lock
18		Stanwick
19		Titchmarsh
20	*	Maidwell

\* Sites located within the Floodplain

Continued

## Limestone Extraction Sites

### **Sites with Planning Permission**

1		Harlestone
2		Blisworth
3	#	Boughton
4	#	Pitsford
5		Pitsford
6		Harrington
7		Cottingham
8		Storefield Lodge
9	#	Cowthick
10		Kingscliffe
11		Oundle

### **# Ironstone Permissions**

### **Proposed Sites**

L	Cottingham
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### Ironstone Permissions

A	Boughton/Pitsford
B	Weekley
C	Geddington
D	Weldon
E	Gretton
F	Kirby Hall Gretton