NORTH WEST NORFOLK
CATCHMENT MANAGEMENT PLAN

FIRST ANNUAL REVIEW
November 1995 - November 1996

ENVIRONMENT AGENCY - ANGLIAN REGION
PLANNING AND CUSTOMER SERVICES (CENTRAL AREA)
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Other publications available in this series:

The North West Norfolk CMP Consultation Report (March 1995).
The North West Norfolk CMP Action Plan (November 1995).

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DRAFT MISSION STATEMENT

We believe in an integrated approach to environmental management and the principles of sustainable development.

We will act as the Guardian of the Environment protecting and improving it for future generations by regulation and direct action.

We will operate openly and balance the interests of all who benefit from and use the environment and its resources by consulting widely before we take action.

(after 8/96)

VISION FOR THE CATCHMENT (as first published 11/95)

The Environment Agency's vision for the catchment is to promote its sustainable development by:

- maintaining and increasing the abundance and diversity of water-related life in the catchment;
- continual improvements to existing discharges by meeting the most stringent appropriate standards;
- maintaining groundwater supplies that do not damage rivers and wetlands;
- reducing the risk of diffuse pollution from the use of agricultural land and so allowing the habitats of rivers and wetlands to support appropriate species and quantities of wildlife;
- enabling people's enjoyment and appreciation of the river system and catchment to continue to grow;
- enabling commercial and pleasure navigation to develop in an environmentally acceptable way; and
- minimising the risk to people and property from flooding.

1.0 INTRODUCTION

1.1 The Role of the Environment Agency

The Environment Agency is a non-departmental public body established by the Environment Act 1995. The Agency incorporates the functions and responsibilities of its predecessors, the National Rivers Authority, Waste Regulation Authority, Her Majesty's Inspectorate of Pollution and several smaller units from the Department of the Environment. The Agency's functions, therefore, cover integrated pollution control, the management of water quality, water resources, flood defence, freshwater fisheries and conservation along with waste regulation including the regulation of radioactive waste. The Agency is also a statutory consultee to County and Local Planning Authorities. The principal role of the Agency is to provide an integrated approach to the protection and enhancement of the environment as a whole, in order to contribute to the objective of sustainable development.

1.2 Catchment Management Planning

Catchment Management Plans were produced by the National Rivers Authority and more latterly by the Environment Agency to enable informed decision making as part of the planning of river catchments. These plans are particularly important as activities in one part of a catchment may impact on others elsewhere in the catchment. The process of Catchment Management Planning involves as wide a range of public and private bodies as possible with the aim of realising the environmental potential of a catchment in terms of water quality and quantity and physical features. The first stage is the production of a Consultation Report. This outlines the Issues within a catchment and Options for their solution. Following a period of consultation, an Action Plan is produced. This includes an Activity Plan for improvements to the water environment. It also outlines areas of work and investment proposed by the Agency and others.

Developing the Plan

The production of the North West Norfolk Catchment Management Plan involved a number of stages over a 18 month period:

July 1994

Work Commences on Plan production

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13 October 1994

Pre-Consultation Meeting with interested external parties

March 1995

Public Consultation Commences on the Consultation report

June 1995

Public Consultation Period closes

August 1995

Review of responses undertaken towards formulating Action Plan

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December 1995

Action Plan Published

January 1996

Review of the Activity Plan Issues commenced

1.3 The Development of LEAPS

It is the aim of the Environment Agency to adopt an integrated approach to the protection and enhancement of the environment. Statutory guidance from the Department of the Environment, under section 4 of the Environment Act 1995, concludes that the Agency should achieve this by using integrated Catchment Management Plans and developing close and responsive relationships and partnerships with the public, local authorities and representatives of local communities, regulated organisations and public bodies.

Of course extensive consultations are already an important part of Catchment Management Planning. However to further develop partnerships and the integration of the functions of the Agency, Catchment Management Plans will be updated through the development of Local Environment Agency Plans (LEAPs). As the name suggests LEAPs focus on environmental improvements at the local level.

It is the role of LEAPs to aid the efficient and effective delivery of Environment Agency services through integrated activity and priority business planning to:

- promote openness and accountability;
- provide a focus for liaison and partnerships with other key stakeholders, especially Local Authorities; and
- educate and inform the local public on environment management issues.

1.4 Monitoring the Plan

The preparation and publishing of the North West Norfolk Catchment Management Plan - Action Plan in November 1995 was not the end of the planning process. It is only one stage in a cyclic process of plan preparation, implementation, monitoring and

review. The implementation of the plan is monitored and reviewed annually. This annual review summarises the progress made since the Action Plan was published, for this reason it is recommended that this report is read in conjunction with the Action Plan.

1.5 Purpose of the Annual Review

The purpose of this Annual Review is to:

- report on achievements and progress in undertaking the agreed Action Plan activities;
- encourage a continued dialogue between parties responsible for action and ensure the continued delivery of results;
- report on changes in the activity programme; and,
- consider the future review of the Management Plan

This should ensure that the plan continues to address relevant and significant issues in the catchment. This report will primarily focus on the water environment and the progress of the existing CMP. The surface water catchment area covered is shown on Map 1. Waste and Integrated Pollution Control (IPC) responsibilities and issues within the plan area, which have not previously been considered within this process, are briefly described in Sections 5.0 and 6.0.

2.0 CATCHMENT OVERVIEW

The North West Norfolk Catchment covers an area of 1007km^2 which is almost entirely within Norfolk. It has a population of approximately 109 000 which is predicted to increase to approximately 127 000 by the year 2006. Forty percent of the population is located in the three main towns of King's Lynn (35,135), Downham Market (5,965) and Hunstanton (2,440). Kings Lynn is the major urban centre within the catchment. It is the nodal point for the trunk and primary road network in the catchment which provides links with Swaffham, Downham Market and Hunstanton. There is also a main railway line from King's Lynn to London.

The catchment is bounded to the east by the Stiffkey, Burn and Glaven catchment and the Yare Wensum catchment. To the south is the Ely Ouse catchment linked to the North West Norfolk catchment at Denver. The Old Bedford catchment is to the south west and the Lower Nene catchment to the west. The surface water link between the Old Bedford catchment and the North West Norfolk catchment are the Old and New Bedford Rivers. The lower Nene catchment is indirectly linked to this catchment as the rivers Nene and Great Ouse both discharge into the Wash.

The solid geology of the catchment consists of a series of rock strata of Jurassic and Cretaceous age which dip gently to the east. Over much of the catchment the solid geology is obscured beneath thicknesses of younger superficial deposits. The western area of the catchment is dominated by Kimmeridge and Ampthill Clays overlain by alluvial and estuarine deposits. The central area of the catchment is dominated by Lower Greensand overlain by fen and river deposits and the east of the catchment consists of Chalk overlain in areas by Boulder Clay. This geology has resulted in the catchment consisting of two distinctly different areas. The west of the catchment is low lying, the lowest point being 2m below Ordnance Datum. This area is dominated by the tidal influences of the Wash and Great Ouse estuary. Most of the coastline is also low lying. Except at Hunstanton, the coastline is protected by a series of defences comprised of earth embankments, shingle ridges and concrete walls. The eastern portion of the catchment consists of a "highland" area of chalk outcrop with a maximum elevation of 93m Above Ordnance Datum Newlyn at Brink Hill near Gayton.

The catchment includes the River Great Ouse north of the Denver sluice to the Wash. This river is tidal over this length and is often referred to as the Tidal River. Freshwater in the Great Ouse/Tidal River has three sources. These are from the Ely Ouse via the Denver sluice, from the Counter Drain/Old Bedford Ouse via the Old Bedford sluice and thirdly from the River Delph/Old Bedford via Welmore Lake sluice. The Great Ouse/Tidal River is embanked along its entire length within the catchment to provide flood protection to the adjacent low lying land. A linear flood storage reservoir, the Relief Channel, is adjacent and parallel to the Tidal River. The catchment contains approximately 138.5km of designated main river with 26km of navigable river under Agency control. There are also approximately 87km of sea/tidal defences.

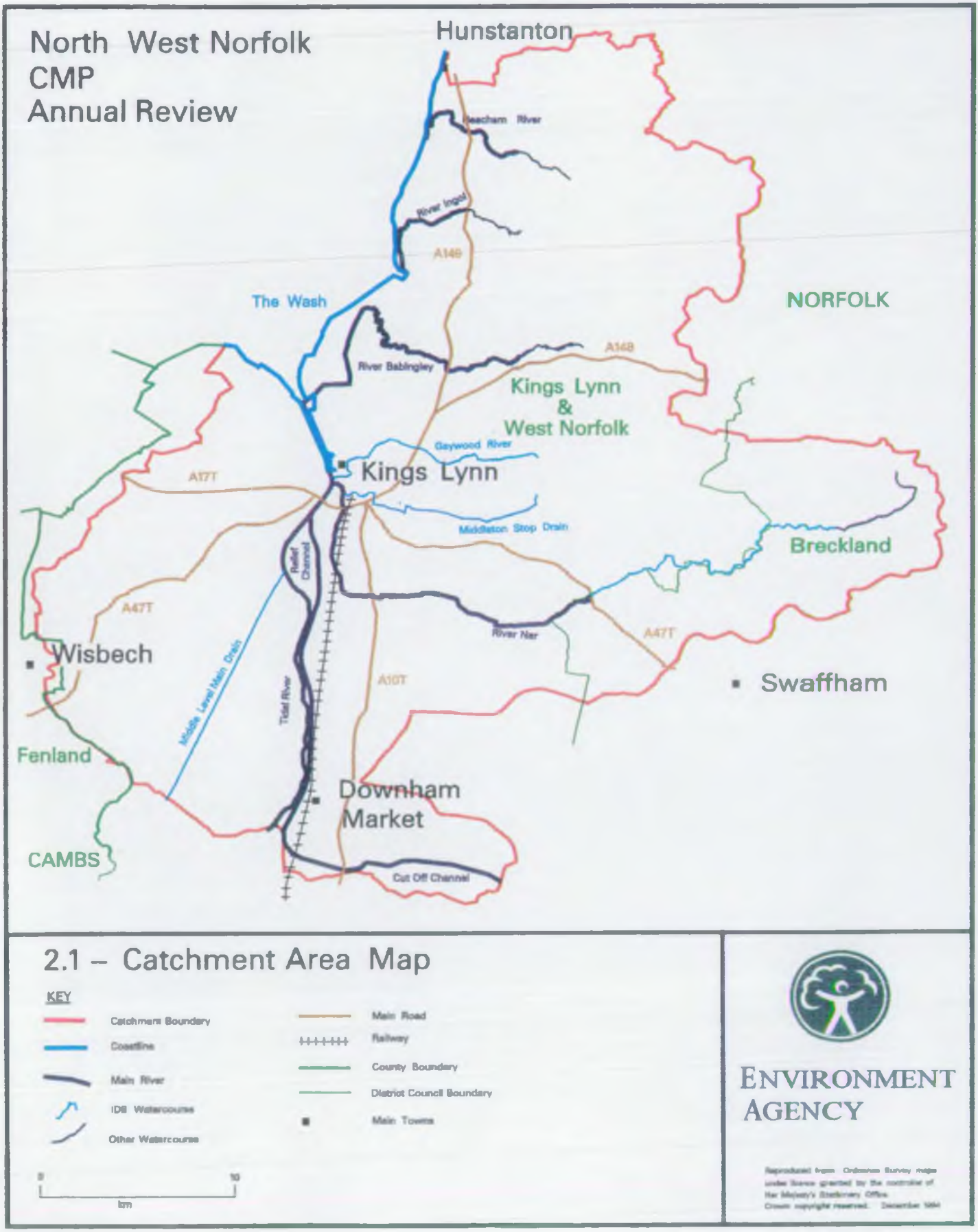
The rivers Nar, Babingley, Ingol and Heacham originate from springs in the eastern chalk upland areas and flow in a westerly direction across low lying land into the Tidal River or directly into the Wash. These rivers are embanked in their lower

reaches which along with the Tidal River result in approximately 57km of embanked river within the catchment.

The predominant land use in the catchment is agriculture, the urbanised areas and other areas in non-agricultural uses are comparatively small. The geology and geomorphology dictate the quality of the agricultural land. Although the catchment contains MAFF grade I, II, III and IV agricultural land. The west of the catchment is dominated by MAFF grade I and II land, while the east of the catchment is dominated by grade III land with small pockets of grade II and larger areas of grade IV land.

The catchment contains 17 Sites of Special Scientific Interest (SSSIs) of which eight are water dependent. The River Nar is one of these SSSIs as it is an outstanding river of its type, combining the characteristics of a southern chalk stream with that of an East Anglian fen river. The Wash is designated as a Ramsar site and a Special Protection Area (SPA), Roydon Common is designated as a SPA. The Brecklands are a potential SPA. There are also three candidate Special Areas of Conservation (cSACs) under the Habitats Directive. These are The Wash, Roydon Common and Dersingham Bog, and East Walton Adcock's Common.

The 1993 approved Norfolk Structure Plan proposes development at selected development locations along identified strategic routes. The Structure Plan identifies King's Lynn as a main location for employment growth and along with Downham Market it is identified as a location for the major provision of housing development.



2.1 – Catchment Area Map

KEY

- Catchment Boundary
- Coastline
- Main River
- IDB Watercourse
- Other Watercourse
- Main Road
- Railway
- County Boundary
- District Council Boundary
- Main Towns

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km

ENVIRONMENT AGENCY

3.0 DEVELOPMENT AND PLANNING

3.1 Development Plans

Current Status of Development Plans in the North West Norfolk Catchment

COUNTY COUNCIL	STRUCTURE PLAN	MINERALS PLAN	WASTE PLAN
Norfolk	Approved March 1993. Review to 2011 has been completed and a draft plan was published on 28 January 1997.	Plan adopted December 1996. Expected to be published July 1997.	Consultation Draft produced November 1996.
Cambridgeshire	Adopted December 1995. Monitoring Reports published 1996 and 1997.	Adopted August 1991. The plan will be reviewed after the next National Minerals Survey in 1997.	Issues Report expected July/ August 1997.

LOCAL PLANNING AUTHORITY	CURRENT STATUS
Breckland	Deposit Draft published 19 August 1996 and suggested changes made in May 1997. Public Inquiry intended for October/November 1997.
Kings Lynn & West Norfolk	Inspector's Report received in mid January 1997.
Fenland	Adopted December 1995. Review currently under way to produce an issues report in the spring of 1997.

3.2 Environmental Planning

Cambridgeshire County Council produced its first Environmental Action Plan in 1990. This Plan set out the role of the Council, in partnership with other organisations, in protecting and enhancing the environment of Cambridgeshire. This original Plan was reviewed in 1994 to set targets up to the year 1997.

In 1994 Cambridgeshire County Council also began a series of annual Environment Reports to set out the state of the environment measured through the use of key indicators. In January 1997 Norfolk County Council produced a State of the Environment Report as a background paper to their review of the County Structure Plan. The Agency had a large input into these reports, supplying information on a

number of these key indicators including water quality and consumption, flood and pollution incidents.

Governments attending the Rio Earth Summit in 1992 were signatories to Agenda 21, which is a global environmental action plan for the 21st century. Cambridgeshire County Council have begun work on a Local Agenda 21 (LA21) initiative. LA21 acknowledges the key contribution that local government can make, in partnership with all sectors of the community, to achieving environmental improvements. As part of this Cambridgeshire County Council have produced a list of contacts for LA21 within the County with the aim of creating a network of contacts who are working to achieve sustainable development.

LA21 within Norfolk is developing through Norfolk 21 which is a LA21 partnership of the District Councils and the County Council. The Norfolk 21 partnership is to set up a working group to produce a draft LA21 Plan for the County. The County Council has appointed a LA21 Officer to coordinate the County's LA21 efforts.

3.3 Housing and Economic Development

All the plans of the County and Local Councils with planning and development control responsibilities for land within the catchment were consulted to identify any major development proposals within the catchment.

Breckland District Council

The District Council has selected a number of large sites considered to be appropriate to meet the needs of the Structure Plan. None of these sites are in the North west Norfolk Catchment. Only individual dwellings or small groups of houses may be permitted in accordance with Policy HOU.4 of the Local Plan at villages within the catchment.

The District Council has allocated 114.44ha of land for economic development. Of this 73.42ha already benefits from planning permission and 41.02ha are proposed, none of this allocation is within the North West Norfolk Catchment. Only small scale new economic development may be permitted within the catchment provided it satisfies policies ECO.4 and ECO.5 of the Local Plan.

King's Lynn and West Norfolk Borough Council

The Borough Council strategy involves concentrating major housing development at King's Lynn (104ha) and Downham Market (48ha) and encouraging development at Hunstanton (4ha) and Emneth (6ha). This allocation along with existing permissions is likely to supply 9,760 dwellings between 1993 and 2006.

General employment land distribution is also concentrated in King's Lynn (111ha) and Downham Market (17ha), the major areas being White House Farm, Hardwick Estate and Riverside Estate. This allocation along with existing permissions would yield 213ha by 2006. Additional sites in rural areas may add further to this total.

Fenland District Council

Only a small portion (1.25km^2) of the catchment is within Fenland District. Within this area only 13ha of residential development is allocated with the potential for 325 dwellings.

3.4 Roads

Although no major new roads are proposed for the catchment in the foreseeable future there are currently a number of road improvement schemes in progress; such as the A47 Walpole Highway to Tilney High End. The Highway Agency Priority 2 schemes include the A47 Tilney to King's Lynn improvements and the Middleton and East Winch Bypass. Long term proposals include the A17 improvement between Sutton Bridge and King's Lynn and the Setchey - West Winch Bypass on the A10.

3.5 Other Proposed Developments

There is currently a proposal to expand King's Lynn Power Station.

The Environment Agency is a statutory consultee under planning legislation and advises county and local authorities on those development proposals which may have an impact on matters within the jurisdiction of the Agency.

4.0 SUMMARY OF PROGRESS

4.1 Notable Occurrences and Achievements

- ***On 1 April 1996 the National Rivers Authority joined forces with Her Majesty's Inspectorate of Pollution, the Waste Regulation Authorities and parts of the Department of the Environment to become the Environment Agency. It is our aim to identify objectives for environmental protection and improve the land, air and water environments for the benefit of all.***

- A fisheries habitat enhancement project was completed on the River Great Ouse Relief Channel to introduce a series of artificial reefs and willow croy fish shelters.

- A fisheries survey on the River Nar was completed in March 1996. Results indicate a great improvement with an increase since 1993 of over 500% in the numbers of trout recorded. The possibility of future habitat enhancements are being considered. Preliminary results also indicate an increase in the brown trout population in the upper reaches of the River Babingley.

- No failures at the EC identified Bathing Waters occurred in 1996.

4.2 Notable Disappointments

- There has been slow progress on methods for assessing in river needs and therefore delay in any application to rivers in this catchment. Also the review of the availability of water resources in the catchment has been delayed.

5.0 WASTE ISSUES

Responsibility for the regulation of the treatment, storage and disposal of controlled waste lies with the Environment Agency. Controlled wastes consist of domestic, commercial and industrial wastes. Mine and quarry wastes, agricultural and radioactive substances are excluded. Special waste is any controlled waste consisting of, or contaminated with, substances which make it hazardous to life or the environment and is defined in the Special Waste Regulation 1996. The legislative framework for this regulation by the Agency is contained within the Environmental Protection Act 1990 (EPA90) and the Environment Act 1995.

The main functions and activities with regard to waste management are:

- The licensing of waste management activities with the imposition of appropriate conditions and their subsequent supervision;
- The registration of waste management activities which are exempted from waste licensing requirements due to nature and scale of operations,
- Operation of enforcement procedures;
- Administration to regulate and monitor the movement of special wastes and transfrontier shipments of wastes;
- Registration of waste carriers and brokers;
- Collection of information about waste arisings and maintenance of a national waste database and preparation of a waste management strategy;
- Promotion of waste reduction, minimisation and recycling;
- Administration and enforcement of the Producer Responsibility (Packaging) Regulations 1997;
- Responding to planning consultations;
- Maintenance of a public register;
- Promotion of the Duty of Care; and,
- Provision of waste management information & advice.

The Agency issues waste management licences in accordance with the Waste Management Licensing Regulations 1994 under the EPA90. These are used to control the operations on a waste site and also the monitoring and aftercare of closed waste sites. Licences cannot be surrendered until the Agency is satisfied that the site does not represent a risk to the environment. Licensed sites are visited regularly by Agency Inspectors to ensure compliance with licence conditions and monitoring of sites is carried out on a regular basis by the Agency and the licence holders. A wide range of operations require a licence, eg, transfer stations, waste storage facilities and scrap

yards (all of which have the potential to pollute).

Prior to 1972, waste disposal sites were controlled only by planning permission and could take virtually any waste. Records of the location and type of wastes deposited in old fashioned landfill sites are poor or non-existent. However, now the Agency's responsibilities are exercised in conjunction with other statutory bodies, in particular County Councils which, as Minerals and Waste Planning Authorities, are responsible for the formulation and adoption of related land use planning policy and the determination of site specific planning applications. In the absence of planning permission, waste regulation site licenses can not be issued. In the establishment of Waste Management Facilities, there will be Agency involvement at three levels:

i) On the **Waste Local Plan** which each County Council is required to produce under the Town and Country Planning Act 1990 and Schedule 4, Part I of the Planning and Compensation Act 1991. These Waste Local Plans address planning policy issues and general suitability of locations for the disposal, recycling, storage and processing of waste;

ii) On the **Planning Application** for an individual site which allows detailed consideration of the suitability of waste management activity at a particular location; and,

iii) On the **Site Licence**, which if granted determines the nature of waste management activity appropriate at any particular location and imposes conditions to control pollution, site operations and aftercare procedures, etc.

In recent years there has been a major change in the philosophy of landfilling waste. Previously a policy of 'dilute and disperse' was applied. This assumed that any leachate generated could be accepted in an aquifer provided that no local use was threatened. Recently, all new sites taking any potentially polluting water must be designed on a containment basis in order to protect all groundwaters, as required by the EC Directive (80/68/EEC) on the protection of groundwater quality. This also has sympathy with the aspirations of the Agency's Groundwater Protection Policy.

In accordance with the National Strategy set out in the White Paper "Making Waste Work - A strategy for sustainable waste management in England and Wales" (December 1995), the Environment Agency will encourage the development of waste management practices higher up the waste management hierarchy such that the amount of waste requiring disposal is minimised. This will be undertaken by such means as a programme of visits to waste producers seeking changes in philosophy, where necessary, and assisting in moves, where possible, towards waste avoidance, re-use or recycling. The Agency will ensure that all waste management activities are regulated to the highest standards and will combine resources to seek a solution to any local problems, so as to protect and enhance the environment and to make a contribution towards achieving sustainable development.

There are relatively few waste disposal sites in the catchment. There is a total of 9 operational and closed landfill sites in the catchment, currently there are three major operational landfill sites for domestic, industrial and commercial wastes at Docking and Blackborough End (two sites), details of these sites are given below.

5.1 Operational Landfill Sites

The Docking landfill site (grid reference TF 790358) is located some 2km south east of the village. It is operated by Norfolk Environmental Waste Services Ltd. The site comprises two landfills, (Docking Common and Jacobs Pit) both of which are former sand and gravel extraction sites. Waste disposal at the Docking Common site was completed prior to the implementation of waste disposal legislation and was therefore never licensed. The Jacob's Pit site was first used for waste disposal in the 1950s and is still in use although the remaining capacity of the site is limited. It is expected that waste disposal at this site will be completed in the very near future. The present waste management licence which covers this site permits the disposal of household, commercial and industrial wastes. Historically the site has accepted liquid wastes.

The Blackborough End site (grid reference TF675149) is a large sand and gravel/carstone quarry, areas of which are presently used for mineral extraction and waste disposal. These activities are undertaken by several different operators at different locations within the quarry. There are currently two main landfill operations accepting biodegradable waste and one operation accepting inert waste under way at the site, these are:

- a site accepting household, commercial and industrial wastes operated by Anti Waste Ltd. This site has been developed on an engineered containment basis to minimise the risk of pollution;

- a site operated by Mr George which, although predominantly licensed to accept inert waste, also has a small area which is able to accept biodegradable wastes, but not wastes that are highly putrescible such as household wastes. The Agency is currently in discussion with the licence holder regarding the future development of this site; and,

- a site accepting inert wastes such as soil, clay and sand operated by Middleton Aggregates Ltd. The wastes being disposed of at this site are considered to have little or no pollution potential, as a result the site is operated on an unlined basis and will continue to do so until completed.

Other sites currently operating in the catchment are at Snettisham and Anzac Pit, Wereham. Both these sites are licensed to accept inert wastes only. The Snettisham site (grid reference TF696339) is operated by Frimestones Ltd. The site is operated on an uncontained basis and has an estimated remaining life of four years. The total capacity of the site is 60,000m^3. The Anzac Pit, Wereham site is operated by Wereham Gravel Company Ltd and is licensed to accepted soil from the Wissington sugar factory. The site is operated on an uncontained basis. Other areas of the pit have been infilled by British Sugar (waste soils), Norfolk County Council and Kings Lynn and West Norfolk District Council (household, commercial and industrial wastes). The licences for these areas have been surrendered under the Control of Pollution Act 1974.

5.2 Undeveloped Landfill Sites

In addition to the existing operational sites at Blackborough End, Anti Waste Ltd are also licensed to dispose of household, commercial and industrial wastes on a containment basis in new areas of the quarry. Wereham Gravel Company Ltd is also licensed for the disposal of waste from the Wissington Sugar factory at a site at Crimplesham (grid reference TF663037). This site is to be operated on an uncontained basis.

5.3 Landfill Sites where Operations have Ceased

Part of the Blackborough End site has been filled with household waste by Norfolk County Council as the Waste Disposal Authority on an uncontained basis and was then transferred to Environmental Waste Services Ltd. The uncontained areas have been capped with a clay enriched sand.

5.4 Closed Landfill Sites

As previously mentioned two areas of Anzac Pit at Wereham have been filled and the licenses relating to these operations were surrendered under the terms of the Control of Pollution Act 1974. Waste disposal at the site operated by Norfolk County Council and Kings Lynn and West Norfolk District Council ceased in 1990. This site was not lined.

The former Wisbech Canal (grid reference TF468085 and TF813037) was infilled with household, commercial and industrial waste between 1962 and 1978. The site is currently monitored by Norfolk County Council.

Sites at Heacham and Dersingham are also known to have been filled, the Agency, however, does not hold details of these sites.

5.5 Licensed/Exempt Scrap Yards

There is one licensed scrap yard in the catchment, this is located at Wereham. Applications from five scrap yards are currently being determined. In addition two scrap yards have been issued with exemptions under the Waste Management Licensing regulations 1994, these sites are at West Lynn and Tilney St Lawrence.

5.6 Licensed Transfer Stations

Excluding civic amenity sites, which are provided for members of the public to dispose of bulky items of household waste, there are six licensed transfer stations in the catchment area.

6.0 INTEGRATED POLLUTION CONTROL

The EPA90 reassigned responsibility for regulation and control of releases to the environment, and introduced a regulatory approach to Integrated Pollution Control (IPC). Responsibility for regulating emissions from the 2500 (nationally) most significant polluting processes sites, either in terms of technical complexity in the volume or the nature of the substances handled, was assigned to the Agency (these are known as Part A prescribed processes). The Agency is required to establish that such processes meet the objective of ensuring that the best available techniques not entailing excessive cost (BATNEEC) are used to prevent pollution occurring. Alternatively, where this is not possible, there is a requirement to minimise the pollution which may be caused by releases to the environment having regard to the best practicable environmental option (BPEO) available in respect of those substances which may be released. In this context, consideration of BATNEEC and BPEO are, primarily, site specific.

The Agency is required to ensure that statutory Environmental Quality Standards (EQSs) are not exceeded. Although standards have been established for releases to air and water, there are no standards for depositions to land. EQS for air are set for four substances, Nitrogen Dioxide, Sulphur Dioxide, Suspended Particles, and Lead. Further EQS will shortly be established for Benzene, 1,3 Butadiene, Carbon Monoxide, Ozone, and Polycyclic Aromatic Hydrocarbons (PAH). EQS for water are set for fifteen substances or groups of substances, mainly persistent pesticides and similar chlorinated hydrocarbons, but also including the metals cadmium and mercury.

Releases to controlled waters are evaluated to ensure that the quality of the receiving waters, which extend beyond the site specifics, are given full recognition. No release to water may be authorised which would cause a breach of a statutory EQS. Hence the impact of all discharges to the receiving water are given due regard in the determination of an individual authorization.

There are currently 8 organisations within the catchment area, operating 12 processes authorised by the Environment Agency as IPC processes under Statutory Instrument 1991:472 as amended.

The major processes are listed in the table below:

NAME	LOCATION	TYPE OF PROCESS	NUMBER OF AUTHORISATIONS	POCs	ACID GASES	VOCs	AMMONIA	Ptcs
Porvair Ceramics Ltd.	North Lynn	Organic Chemicals	1			✓		
Porvair International Ltd.	North Lynn	Petrochemical	1			✓		
Dow Chemicals Co. Ltd.	North Lynn	one Pesticide and two Organic Chemicals	3		✓	✓		
Omex Agriculture Ltd.	North Lynn	Fertilizer manufacture	1				✓	
Warner Jenkinson	Hardwick	Chemical manufacture	3		✓	✓		✓
Anglian Power Generators Ltd.	Saddlebow	Combustion	1	✓				
Energy Supply Ltd.	Saddlebow	Combustion	1	✓				
BG plc	West Winch	Combustion	1	✓				

Key

POC's Products of Combustion
VOC's Volatile Organic Compounds
Ptcs Particulates

6.1 Air Quality

Air Quality has been improving in recent years and these improvements are set to continue. The new systems for dealing with industrial pollution introduced by the EPA90, new vehicle emission standards and other measures aimed at mitigating the effects of traffic are contributing to a reduction of emissions. The UK confidently expects to meet its existing international commitments for reduction in emissions of Nitrogen Dioxide, Sulphur Dioxide and volatile organic compounds.

6.2 National Air Quality Strategy

Interactions between weather conditions and emissions to the atmosphere from chemical processes are complex. This complexity is exacerbated by the distance air pollution can travel and the diversity of possible sources. This makes the understanding of causes and effects and the attributing of responsibility difficult in cases of air pollution. Prevention of pollution, therefore, depends on the establishment of local air quality targets. The Environment Act 1995 extended responsibilities of Local Authorities to establish action target standards for air pollutants so as to improve the environment. The Government published its National Air Quality Strategy in late March 1997 for which the Agency is a statutory consultee.

The system is based on clear and measurable targets bound, as far as possible, on the understanding of the health effects of the pollutants concerned. Eight pollutants have been identified:

Benzene	Nitrogen Dioxide	Carbon Monoxide
Lead	1,3 Butadiene	Ozone
Sulphur Dioxide	Particles smaller than 10 microns in diameter (PM_{10})	

Eventually, it is intended that a two level target will be set. One will be a guideline figure to represent the level at which the pollution has been rendered harmless to health or the environment, or at which it is unlikely that further benefit could be obtained from spending more on abatement. The other, a higher level than the guideline figure, will be a trigger which distinguishes when air quality is so poor that an immediate response would be justified to prevent serious damage.

All the objectives are to be achieved by the year 2005. A duty is placed on Local Authorities to carry out a review of air quality in their area and assess whether the standards and objectives are likely to be met. If the objectives are not likely to be met, then they are required to set up an Air Quality Management Area. Using various powers available to Local Authorities such as land use planning, Local Authority Air Pollution Control, smoke control, transport planning, traffic management, and urban environmental management, the Local Authorities are required to set up an action plan with the objective of meeting the targets. Regulations are to be made to give Local Authorities further specific powers governing the development of these plans.

The role of the Environment Agency is to act as a consultee on the National Air Quality Strategy and be consulted on regulations to give effect to action plans. The Strategy is likely to require the exchange of information from the Environment Agency, the Local Authorities, and a protocol is being developed for this.

The strategy acknowledges the role of the Agency (and its predecessors) has had in reducing industrial emissions (especially oxides of sulphur) in the past.

6.3 Status

The area covered by this plan is essentially rural with King's Lynn as the major urban centre. Generally air quality has not given rise for concern and for this reason little information is available from monitoring of air quality for the majority of the area. However, in King's Lynn some measurements have been undertaken. The results obtained for nitrogen dioxide have on occasions given some cause for concern in some curbside locations (London Road) under certain meterological conditions. The overall results are typical for this type of town.

Development of the electricity supply industry within the area (proposal for expansion of King's Lynn Power Station) and just beyond the area at Sutton Bridge and Spalding will have an impact on local air quality. These matters are taken into consideration when the Agency determines the IPC applications for authorisation so as to ensure the requirements of the EPA 1990 are met.

6.4 Other Influences on Air Quality

The concentration of an air pollutant in the atmosphere determines the severity of its effects on the people and environment within any area. Ground level concentrations of pollutants are determined by the degree of dispersion which is, in turn, largely a function of the prevailing meteorological conditions at a given time. These conditions can be categorised as wind direction and speed, atmospheric stability and mixing depth of the air.

It must be emphasised that the vast majority of air pollutants arise from diffuse sources including the natural environment.

7.0 RADIOACTIVE SUBSTANCES

The Radioactive Substances Act 1960 (RSA60) established controls over the holding, use and disposal of radioactive substances. The Agency is the body currently charged with regulating such uses under the subsequent extant Act, RSA93.

Various exemption orders made under the Acts permit the holding and disposal of radioactivity where the usage is widespread and the quantities involved are of such low magnitude as not to present any risk to the public or the environment. All usages and disposals above these levels are subject to regulation by the Agency.

In summary the usage/disposal of radioactivity is grouped by the Act into three categories:

- Section 7 covers the registration of premises where radioactive sources may be held and used. The Agency is concerned to ensure that the holding is justified, properly recorded and supervised, and that correct procedures are in place for ensuring the safe replacement/disposal at the end of the useful life of the sources.

- Section 10 covers the registration of mobile sources, where the Operator is permitted to take radioactive sources around in the course of his work. The Agency is concerned to ensure that the holding, transportation, and storage when not in use, is properly recorded and controlled, and that correct procedures are in place for ensuring the safe replacement/disposal at the end of the useful life of the sources.

- Section 13 covers the disposal of radioactive sources, whether to air, the aquatic environment, landfill, or specified depositories. The Agency is concerned to ensure that proper assessments of the impact on the environment are carried out and that the disposal is carried out in such a way as to prevent harm to humans or to the environment, and that the disposals conform to the approved methods.

In the context of radioactivity, consideration such as BATNEEC/BPEO and best technical means available (BTMA) are not appropriate. The guiding principle is "as low as reasonably achievable (ALARA)" and, because radioactivity can be measured accurately in very low concentrations, the standards to be achieved are high. All use of radioactive substances requiring either registration or authorization under RSA93 has to be justified and if required evidence is required that no alternative technique not involving radioactive substances is available.

7.1 Radiation Dose Rates to the Public

The majority of radiation a member of the public will be exposed to is due to natural radiation (87%). Of the remaining 13% artificial radiation, 11.5% is medical (e.g. radiotherapy and X-rays). Only 1.5% is attributable to other activities such as nuclear power etc.

There are no nuclear sites within the catchment area. There is only one authorisation under section 13 of the RSA93 involving releases into the environment. This authorisation relates to the use of radioactivity for diagnostic or therapeutic uses in human health care and was issued to Queen Elizabeth II Hospital at King's Lynn. There are however 22 registrations under section 7 or 10 of the RSA93. The majority of these sources are used for industrial measurement at premises throughout the catchment. Information on the processes and releases are available on the public register administered by the Agency.

8.0 ACTIVITY PLANS - MONITORING UPDATE

The following Activity Plan tables have been taken from the Action Plan and updated to show progress and any changes that have occurred since their publication. Since the Action Plan was published, work has begun on the LEAP for the Wash area which impinges directly on the North West Norfolk Catchment Management Plan area. The consultation report is due to be published in August 1998. Any changes since the Action Plan was completed will be shown in *italics* in the 'Progress/Notes' column. Shaded rows indicate issues that are now complete. All abbreviations used are explained on page 43. The issue numbers relate to those used in the Action Plan. Any site specific concerns are shown on the map at the end of this section.

8.1 Water Quality

Existing Issues

Issue	Activity	Lead Responsibility (other responsibility)	Total Cost£k	Timescale			Progress/Notes
				96 97	97 98	Future	
Issue 1a. R Nar Milcham to Litcham. Failure to meet Proposed RE3 Target	Examine relationship between Low DO and River Flow - review data	Agency *WQM*	R	*	*		Low oxygen levels appear to be linked to periods of low river flows - a "natural" phenomenon. *Water quality met RE5 in 1995 and RE4 in year ending December 1996. Failure to mee RE3 because of low dissolved oxygen. Data collection is continuing. Biological GQA grades could aid the identificatio of, or substantiate causes for, RE failure.*
	Maintain RE5 in short/medium term	Agency *WQM*	R	*	*		*This stretch complied with RE5 short term target in 1995.. RE3 target will be used for long term water quality planning.*
Issue 1b. R Nar Litcham to Lexham Hall. Failure to meet Proposed RE3 Target	Maintain RE4 in short/medium term	Agency *WQM*	R	*	*		Prevents deterioration in water quality. *Water quality target RE4 was met in 1995 and therefore complies with the short term target.*
	Review flow data for the river.	Agency *WQM*	R	*			*Current metering carried out in 1995/6 to give a better estimate of river flows.*
	Review consent limits if required	Agency *WQM*	R		*		Capital investment may be needed if tighter limits are to be imposed. This should be addressed in future Asset Management Plans. *More accurate river flow measurements will be used to determine whether Litcham STW consent will need to be reviewed.*

Issue	Activity	Lead Responsibility (other responsibility)	Total Cost£k	Timescale			Progress/Notes
				96 97	97 98	Future	
Issue 1c. River Nar, Lexham Hall to Castle Acre. Failure to Meet RE2 Target	Examine relationship between Low DO and River Flow - review data	Agency *WQM*	R	•	•		Low oxygen levels appear to be linked to periods of low river flows - a "natural" phenomenon.
	Maintain RE4 in short/medium term	Agency *WQM*	R	•	•		Prevents deterioration in water quality. Allows objective to be set on a statutory basis. *Compliant with RE2 target in 1995 and 1996.*
Issue 1d. Eutrophication in the River Nar	Review and collect further phosphorus data	Agency *WQM*	R	•	•		Will enable patterns and trends to be identified. *Data collection/monitoring ongoing.*
	Review water quality monitoring	Agency WQM	R				May be able to improve understanding of this issue by changing monitoring undertaken. *Additional sample points have been added.* Action complete.
	Improve flow monitoring upstream of Marham	Agency *WQM*		•			Will increase understanding of phosphate loads. *Current metering was carried out in 1995/6 to give a better estimate of river flows.*
	Investigate benefits of further controls to limit phosphate discharges	Agency *WQM*	R		•		Sources of phosphates in addition to sewage effluent may be significant.
Issue 2a. Gaywood River Failure to meet proposed RE3 Target	Review cause of elevated ammonia and depressed oxygen levels	Agency *WQM*	R	•	•		Cause may be diffuse or discrete discharges. Marginal failure to comply with RE3 target. *Marginal ammonia failures. Investigation progressing. Additional sampling to be carried out in 1997.*
	Maintain RE4 in short/medium term	Agency *WQM*	R	•	•		Prevents deterioration in water quality. *Complied with RE4 in 1995. RE3 target used for long term water quality planning.*
Issue 2b. Gaywood River Catchment. Roydon Common & Slurry disposal to land	Investigate sludge disposal practices and potential impact	Agency, AWS, *WQM*	N/K	•	•		There is concern that this wetland SSSI may be at risk from this activity. *Investigations have not yet started.*

Issue	Activity	Lead Responsibility (other responsibility)	Total Cost£k	Timescale			Progress/Notes
				96 97	97 98	Future	
Issue 3a. River Babingley Failure to meet proposed RE2 Target in the embanked lower reaches	Investigate cause of low DO - review water quality data	Agency *WQM*	R	•	•		*Met RE3 in 1995, failures for dissolved oxygen. Ongoing monitoring/data collection.*
	Maintain RE3 in short/medium term	Agency *WQM*	R	•	•		Prevents deterioration in water quality. *Complied with RE3 target in 1995. RE2 target now met and used for long term water quality planning.*
Issue 4a. Heacham River Failure to meet proposed RE3 Target	Investigate cause of low DO - review water quality data	Agency *WQM*	R	•	•		*Ongoing monitoring/data collection.*
	Maintain RE4 in short/medium term	Agency *WQM*	R	•	•		Prevents deterioration in water quality. *Compliant with RE3 target in 1995.*
Issue 5a. Middle Level Main Drain, Failure to meet proposed RE3 Target	Adopt RE4 in the short/medium term	Agency *WQM*	R	•	•		Prevents deterioration in water quality. *RE4 target adopted in the short term.*
Issue 6a. Oil Pollution Nuisance, Fisher Fleet King's Lynn	Promote better practices for storage and handling of oil by boat owners	Agency, Harbour Authority WQM	2	•	•		Leaflet and poster campaign and advice. The Agency will provide information on pollution prevention measures. *Memorandum of understanding is being established between the Agency and the Harbour Authority. A pollution prevention campaign will follow.*
	Assist harbour authority to prosecute offenders	Agency WQM	R	•	•		The Agency can assist by sampling and tracing sources. *Active dialogue and assistance with Harbour Authority is continuing.*
Issue 6b. Middleton Stop/Pierpoint Drain Failure to meet proposed RE3 Target	Investigate and confirm sources of pollution from industrial areas in King's Lynn	Agency WQM	R	•	•		Intermittent pollution can sometimes be traced back to source and eliminated. *Investigations have been carried out and sources identified.*
	Carry out pollution prevention inspections of industrial premises	Agency WQM	R	•	•		Pollution prevention is an important aspect of our work. *There have been 48 pollution prevention inspections carried out on Hardwick Industrial Estate to date (3/97).*
	Undertake remedial action	Polluter WQM	R	•	•		Costs could vary widely. *Inadequate pollution prevention measures persisting after an Agency inspection leading to a pollution incident has led to a prosecution.*
	Maintain RE5 in short term but move towards RE4 in medium term	Agency WQM	R	•	•		Prevents deterioration in water quality. *Water quality met RE4 in 1995 which complies with the medium term target. The RE3 long term target is used for water quality planning.*

Issue	Activity	Lead Responsibility (other responsibility)	Total Cost£k	Timescale			Progress/Notes
				96 97	97 98	Future	
Issue 7a. Estuary Eutrophication	Review current monitoring work	Agency WQM	R	*			To understand this problem better, the Agency may need to change monitoring procedures. *Specific eutrophication surveys carried out during 1996. Monitoring procedures have been reviewed.* Action complete
	Review and submit data for candidate Sensitive Area (Eutrophic) status under the UWWTD and polluted waters (eutrophic) under the Nitrate Directive.	DOE, Agency WQM	R				A national review of the Designation os Sensitive Areas (Eutrophic) and polluted waters will be carried out by DOE. *Data has been reviewed and submission for Sensitive Area (Eutraphic) Status will be assessed alongside other candidates on a national basis. Action complete.*
Issue 7b. Impact of King's Lynn STW on the estuary	Construct new STW facilities.	AWS WQM	12 mil	*			Better treatment is necessary to comply with the UWWTD. This work will improve water quality, oxygen levels in the estuary and reduce bacterial concentrations. *Construction of a new STW at Kings Lynn has commenced and scheduled for completion in 1997.*
	Monitor effluent quality for toxicity	Agency AWS WQM	R	*	*		The current effluent occasionally shows relatively high toxicity in tests on brown shrimps. It is hoped that improvements to levels of treatment will reduce this problem. *Toxicity tests are planned to take place before, during and after commissioning of the new STW to assess the toxicity of the effluent.*
	Review consent limits for King's Lynn STW	Agency WQM	R	*			*New consents will be issued to reflect improved treatment when the new STW has been commissioned*
Issue 8a. Heacham North Beach failed to meet the EC Bathing Water Directive for the 1995 Bathing Season	Investigate the cause of microbiological failures through carrying out surveys of the Heacham River system and the coast around Heacham and Hunstanton	Agency WQM	R	*	*		New issue since the Consultation Report. *Bathing water passed the EC Bathing Water Directive in 1996 bathing season. Intensive biological and bacteriological surveys carried out in summer 1996. Improvements have been made at Hunstanton STW (storm sewage retention) and Heacham STW (UV treatment).*

New Issues

None identified

8.2 Groundwater Quality

Existing Issues

Groundwater in the catchment is generally of high quality but vulnerable to pollution. The threat to groundwater quality is a major issue in this catchment. There are increasing levels of nitrate in some areas and to tackle this problem Nitrate Vulnerable Zones have been established by MAFF. The Agency is mapping Groundwater Protection Zones around major supply boreholes to aid the implementation of the Agency's Groundwater Protection policy. Groundwater vulnerability maps for the area have now been published. The three major issues relating to groundwater quality in this catchment are described below.

Issue	Activity	Responsibility	Cost£k	Timescale			Progress/Notes
				96 97	97 98		
Issue 9a. Groundwater Source Protection	Define groundwater protection zones for remaining sources	Agency WQM	R	•	•		This is a significant piece of work. Some zones have been mapped but more work is needed. *Groundwater Protection Zones have been identified for all public water supplies in this area. Action complete.*
	Prepare a prioritised site inspection programme	Agency, WQM	R	•			Will help identify and prevent pollution. *Prioritisation programme established and completed with 35 site visits made to sites in zone 1 areas and 26 site visits made to sites in zone 2 areas. Action complete.*
	Offer advice and enforce pollution prevention measures	Agency WQM	R	•	•		Pollution of groundwater supplies prevented. *Advice given at pollution prevention site visits, enforced through farm waste regulations and prosecution following pollution.*
Issue 9b. Groundwater contamination from "Dilute and Disperse" waste sites	Monitor plume of contamination	Agency WQM	R	•	•		To establish risks to ground and surface water. *The County Council have produced reports on sites.*
	Carry out remedial work as required	Developer Site operator Agency, WQM	N/K	•	•		Prevent further pollution of ground and surface water.
Issue 9c. Rising Nitrate Levels in Groundwater	Establish and monitor Nitrate Sensitive Areas and Nitrate Vulnerable zones	MAFF, DoE Agency WQM	R		•		*Nitrate Vulnerable Zones(NVZs) have been designated to protect groundwater sources at Swaffham and Great Bircham. A Nitrate Sensitive Area (NSA)was designated in 1993 to protect the Sedgeford groundwater source. The Agency is likely to be the Enforcement Authority responsible for auditing farmers records.*

Issue	Activity	Responsibility	Cost£k	Timescale			Progress/Notes
				96 97	97 98		
Issue 9c. continued	Reduce fertilizer application rates throughout the area	MAFF NFU Landowners Fertilizer Industry WQM	N/K	*	*		General and long term reduction in pollution risk to aquifer. *For NVZs, farmers will be required to observe action programmes for nitrate reduction which should be in place by December 1996. For NSAs, compensation is paid to farmers to reduce nitrate applications to land.*

New Issues

None Identified

8.3 Water Resources

Existing Issues

The future use of groundwater for irrigation and water supply is an important issue affecting the catchment. In safeguarding water supplies for the future, the Agency will continue to balance the needs of abstractors with the needs of the environment.

Issue	Activity	Responsibility	Cost£k	Timescale			Progress/Notes
				96 97	97 98	Future	
Issue 10a. The availability of water resources in the catchment	Review the allocation of resources linked with the Chalk and Greensand aquifers	Agency WRM	R			*	Improve understanding of water resources and allows impact of abstraction to be estimated and better management of water resources. *The review of resource allocation has been delayed,the earliest the review will start is 1998/9 .*
	Develop a computer model to improve water balance calculations in the catchment.	Agency WRM	R			*	Modelling allows the impact of abstraction to be estimated and give better management. *The earliest start date is 1998/9 if the Agency is to carry out this modelling.*

Issue	Activity	Responsibility	Cost£k	Timescale			Progress/Notes
				96 97	97 98	Future	
Issue 10b. Balancing abstraction against in river needs	Undertake in-river needs study for the River Nar	Agency WRM	15			*	Allows the Agency to set future limits on abstraction. *Earliest start date for the in-river needs study is 1998/9. This is due to the experimental nature of the work, limited funding and overall priorities.*
	Undertake in-river needs study for the Gaywood River	Agency WRM	10			*	Allows the Agency to set future limits on abstraction. *Earliest start date for the in-river needs study is 1998/9. This is due to the experimental nature of the work and other rivers acquiring a higher priority.*
	Undertake in-river needs study for the Heacham and Ingol Rivers	Agency WRM	N/K			*	Allows the Agency to set future limits on abstraction. *Earliest start date for the in-river needs study is 1999. This is due to the experimental nature of the work and other rivers acquiring a higher priority.*
	Set up the hydrological monitoring of four wetland SSSIs	Agency WRM	32		*		To be used in future identification of protection zones for individual wetlands. *Monitoring installations were set up at East Walton Common in the 1995/6 financial year. Work on the remaining three sites at Dersingham Bog, Roydon Common and Leziate and Sugar Derby Fens will be completed in the 1997/8 financial year.*
Issue 10c. Hydrometric Monitoring	Review of hydrometric monitoring installations needed	Agency WRM	R	*		*	Ensure hydrometric data collection serves all functional requirements. *Strategy document produced in September 1996, no progress on this project is expected until 1998/9.*
	Carry out monitoring of the four wetland SSSIs	Agency WRM	20			*	*Monitoring started at East Walton Common. Monitoring of the other three sites is expected to begin in 1997/8 financial year.*

New Issues

Continued demand for water both from groundwater sources (particularly the Greensand aquifer) and winter storage reservoirs for spray irrigation adds urgency to the need to carry out the work identified in the above table.

8.4 Flood Defence

Flood defence works are now subject to Environment Agency Environmental Assessment Procedures.

Existing Issues

- There is a need to maintain the beach's effectiveness as a sea defence through understanding the system dynamics and recycling.
- Existing access ramps to the beach are becoming congested resulting in unlawful, and sometimes damaging, boat launches elsewhere.
- Despite the protection from flooding provided by existing tidal defences, King's Lynn is still under real threat from flooding.
- The Tidal River between Denver and King's Lynn has suffered increased siltation during the last 35 years, following the completion of the flood protection scheme, and is now affecting water movement and sluice operation. The training walls, which run on both sides of the Tidal River from King's Lynn to the Wash are meant to provide a "self-cleansing" channel in terms of sediment for Navigation and Flood Defence purposes. Salt Marsh has encroached on these walls reducing their effectiveness.
- There is a need to assess the amount of protection from flooding provided by the River Nar embankments and consider options to increase that level of protection to an agreed standard.
- The River Babingley's outfall is in an isolated location and the crude levels of control are achieved manually.
- The Kalajuga Sluice discharges water through the sea bank at Heacham which lacks back-up defences in event of a failure.
- The Heacham Pumping Station directly affects the river which means that it should be under the Agency's control.

Issue	Activity	Responsibility	Cost£k	Timescale			Progress Notes
				96 97	97 98	Future	
Issue 11a. Hunstanton to Snettisham beach recharge	Continue monitoring of effectiveness	Agency FDM	180 C	•	•	•	Review 95/96 & routine monitoring thereafter. *The Strategy Report has reviewed monitoring and the beach monitoring programme will continue on similar lines to the existing programme.*
	Continue recycling beach material from Snettisham Beach to Hunstanton	Agency FDM		•	•	•	*The Strategy Report indicates that recycling will continue but quantities may be reduced due to other works proposed in the Strategy.*
	Review Beach/Flood Defence Strategy for Hunstanton - Snettisham and take appropriate action	Agency *FDM*	£8 million C	•	•		*Strategy Report is almost complete - final draft February 1997. It will be presented to MAFF in June 1997 for approval to proceed with detailed design.*
Issue 11b. Hunstanton - Snettisham Beach Access	Investigate siting of access ramps	Agency/Local Authority *FDM*	N/K	•			Have to be written into Local Authority Byelaws. *Discussions held with Local Authority but safety concerns have ruled out a change to an alternative public access ramp.*
Issue 11c. Loss of beach material south of Hunstanton boat ramp	Agree suitable form of protection	Agency, Local Authority, Hunstanton Town Council *FDM*	£8 million C		•	•	Subject to outcome of review (11a). *The Strategy Report has identified the need to provide a hard defence down to current beach levels. Method subject to further consultations and cost considerations.*
Issue 11d. Sea Banks East, Wolferton - Snettisham	Investigate a source of material and re-profiling at specified locations	Agency *FDM*	400 R		•		Revenue project
Issue 11e. Coastal Zone Development - risks to human life	Restrict occupancy of holiday homes in high risk areas to the summer period	Planning Authority/Agency *FDM*	R	•	•	•	There is a high risk to life during winter storm tidal surges. Planning control & public advance notification issues. *Correspondence with the Planning Authority has continued. Warning signs have been agreed and are being produced.*
Issue 11f. Storm Tide Warning Service	Improve modelling ability in the Wash and set standard levels of service between Central and Eastern Areas of the Agency.	Storm tide Warning Service, Police, Agency, MAFF, Local Authority *FDM*	R	•	•		This will improve accuracy of warnings to Wash Coastline and make the service operated by the Agency consistent. *This situation has not changed.*
Issue 12a. King's Lynn tidal defences, Common Staithe Square to Purfleet Quays	Design and construct works to increase the level of protection to 1:100 year flood	Agency FDM	100 C	•			*These works are almost complete.*
Issue 12b. King's Lynn tidal defences, South Quay	Development over the years has meant that the South Quay area has a maze of redundant services, making the results of water movement unpredictable. Therefore, there is a need to update records and procedures as the whereabouts of pipework etc becomes known	Land owner, Utilities, Local Authority, Agency FDM	N/K	•	•	•	On going process. Many old services may never be traced. It is believed that there is potential for backflow via the old service pipework to breach flood defences. *There has been no change in this situation.*

Issue	Activity	Responsibility	Cost£k	Timescale			Progress Notes
				96 97	97 98	Future	
Issue 12b. continued	Continue to issue appropriate flood warnings	Agency, Police, Local Authority *FDM*	R	*	*	*	Ensures best possible preparation against flood risk
Issue 12c. King's Lynn tidal defences King's Staithe Square and the Purfleet	Incorporate permanent defences into any future development of the site	Agency, Developer, Local Authority *FDM*	R		*	*	We rely on the cooperation of the planning authority to include flood defences as development proceeds. *These may be included in Millennium Proposals.*
Issue 13a. Tidal River Bank Improvements and Erosion Control	Carry out annual inspections	Agency *FDM*	2 R	*	*	*	The bank improvements have increased the protection from erosion. Problems will be quickly and systematically identified
	Improve Tidal River Banks to 1 in 100 standard of protection	Agency *FDM*		*	*		*These works are almost complete.*
	Inspect banks after major storm surges	Agency *FDM*	R	*	*	*	As required
Issue 13b. Tidal River Siltation	Study and report on problem	Agency *FDM*	50 C	*			Siltation is a major influence on the effectiveness of Tidal River Flood Defences but definition of the problem requires a "state of the art" analysis of an extremely complex system. This study will give an initial indication of the problem. *The Strategy Report is almost complete. The detailed design is to be commenced in the 1997/8 financial year. With a further study to review the operation of Denver Sluice to increase its use for flushing silt.*
	Further "training" works alongside the river channel	Agency *FDM*	8 Mil C		*		May reduce siltation long term. *This is unlikely to be an option under current review due to the cost. However some works may be done to existing training walls, see 13c.*
	Silt Removal and siltation control works	Agency *FDM*	N/K		*		May provide immediate solution in specific locations but only effective for short term. Timing is indicative only - will depend on the outcome of the study. *Project set up to carry out a trial length of dredging to gauge effectiveness.*
Issue 13c. Tidal River Training Walls	Increase height of training walls	Agency *FDM*	500 C		*	*	Reduce volume of silt entering the Tidal River. *This option is likely under the current Strategy Report. Detailed design is to follow.*
	Complete Wash outfalls study	Agency *FDM*	20 C		*	*	Better understanding of sediment and saltmarsh dynamics. *The "Tidal River" siltation Strategy Report will feed into the Wash outfall study.*
Issue 13d. Tidal River Outfalls	Develop automated system	Agency *FDM*	10 C		*		Should stop saline intrusion and reduce flood risk. *The Ingol and Millfleet outfalls are now automated, the Nar and West Lynn outfall will be automated in 1997.*

Issue	Activity	Responsibility	Cost£k	Timescale			Progress Notes
				96 97	97 98	Future	
Issue 13d. continued	Clarify responsibility and agree working procedures	Agency IDB *FDM*	N/K	•	•	•	Responsibility will be more clearly defined. *This situation has not changed.*
Issue 13e. Relief Channel Bank Erosion	Continue Monitoring	Agency *FDM*	2	•	•	•	*Works have been carried out in priority locations. For example adjacent to bridges.*
Issue 13f. Tail Sluice Automation	Complete Tail Sluice automation	Agency *FDM*	50 C	•			Will improve long term monitoring and reduce costs. *This has been completed.*
	Monitor for performance and reliability in all conditions	Agency *FDM*	R	•	•	•	*Ongoing*
Issue 14a. River Nar bank instability	Complete study outlining options and issues and undertake any necessary improvement works	Agency *FDM*	1.8 mil C	•	•	•	Embankments on the river Nar protect large areas of agricultural land from flooding. *The feasibility report has been completed and a detailed design is to follow.*
Issue 14b. Non main river Flooding at West Winch	Re-excavate existing drains	Local Authority, Riparian Owner, *FDM*	N/K		•	•	The Agency regulates but cannot instigate works on ordinary watercourses. *This issue has not changed.*
	Promote alternative drainage scheme	Local Authority, Riparian Owner, *FDM*	N/K		•	•	Timing relates to discussions with responsible parties.
Issue 15a. River Babingley outfall	Investigate feasibility of providing power to the site and automation of outfall to relieve effects of water level fluctuations on habitat and flow regimes	Agency *FDM*	2 C		•		Will improve control of water levels. Ingression of sea water also impacts on water quality. (See also issue 13d). *An asset survey is currently under way.*
	Carry out works to relieve the effects of water level fluctuations on habitat	Agency *FDM*	40 C			•	As and when possible.
Issue 16a. Heacham river, Kalajuga Sluice Lacks a Secondary Flood Defence	Install a suitable penstock on upstream face of sluice structure	Agency *FDM*	10 C		•		*This is under consideration for the 1997/8 financial year.*
Issue 16b. Heacham river, Pumping Station	Hand over station from AWS to the Agency	Agency,AWS *FDM*	N/K			•	Progress to be decided. Overall control will rest with the Agency. *No progress has been made on this issue.*
Issue 16c. Heacham river Non Main river flooding at Fring	Prepare scheme to deal with uncontrolled spring water	Local authority, County Highways *FDM*	N/K		•	•	Will relieve flooding problems and reduce number of road closures. Timing relates to discussions with responsible parties. *There has been no progress on this issue. Heacham River dried up at Sedgeforth in 1996. The Agency has investigated this occurrence.*
Issue 17a. River Ingol Outfall	Refurbish outfall	Agency, IDB, Landowners *FDM*	70 C	•	•		Work in progress *and is now almost complete.*
Issue 17b. River Ingol Non main river flooding at Dersingham	Re-excavate ditches and replace undersized culverts	Riparian Owner, Local Authority *FDM*	N/K		•	•	Timing relates to discussions with responsible parties. *There has been no change on this issue.*

Issue	Activity	Responsibility	Cost£k	Timescale			Progress Notes
				96 97	97 98	Future	
Issue 18a. Water Level Management Plans	Complete plans or interim management statements for sites identified in the catchment. The Agency are charged with completing the River Nar SSSI (medium priority). Reviews of the plan will then follow.	Agency, IDBs, MAFF, EN *PM*	7	*	*	*	Will help to maintain and enhance wildlife value of recognised sites. *A memorandum of understanding has been made between the Agency and English Nature over a conservation strategy, objectives for management to be agreed. Started data collection and liaison with IDBs and English Nature.*
	Apply plans to flood defence maintenance operations	Agency, IDB *FDM*	N/K		*		Will help to maintain and enhance wildlife value of recognised sites. Costs will depend on outcome of plans.
Issue 18b. River maintenance standards	Complete standards of service review	Agency *FDM*	250	*	*	*	*Moved towards the Standards of Service review, development of the Flood Defence Management System (regionally) which will be applied to individual catchments 1998/99.*
	Apply criteria to flood defence maintenance	Agency *FDM*	N/K		*	*	Will help us to provide more appropriate and cost effective river and structure maintenance
Issue 18c. Non main river flooding	Clarify the roles and responsibilities of the various drainage Authorities	Local authority, Agency, IDBs *FDM*	R	*			A working protocol has been agreed with the local authorities in Norfolk. Resulted in reduced flood risk.
Issue 18d. Sea Level Rise and Climate change	Monitor information and design schemes to best forecast	Agency *FDM*	R	*	*	*	On-going. Subsequent projects are likely to involve major capital expenditure.

New Issues

Snettisham Beach Groynes
These groynes have become worn through age and damaged by recycling operations. Consideration is being given to the need for groynes and if appropriate the design of replacement groynes in the future under the Hunstanton - Snettisham Beach Strategy Report.

West Lynn Walkway - Millennium Bid Proposal
One of the proposals in the King's Lynn and West Norfolk Borough Council bid for Millennium funds is a walkway linking the Peter Scott Way at West Lynn Ferry Square to the public footpath at the West Lynn recreation ground. The proposal includes a board walk over the concrete capped piled tidal defence along Delmote frontage. The path would also cross the Agency's West Lynn Creek outfall structure which would require some improvement works for public safety. Further details of the Millennium fund bid are given in New Issues in Section 8.7.

West Lynn Tide Gauge
The structure which supports the current tide gauge is dilapidated and unsound and does not belong to the Agency. A second gauge has been set up at the Old Cut Bridge and will be monitored to identify variations between the two gauges at all states of the tide.

8.5 Navigation

The Tidal river from Denver to Stowbridge provides an important link between the Ely Ouse at Denver and the West of Ouse navigation in the Well Creek and the Old Bedford River. This short section of river is probably the busiest section of the tidal Great Ouse and is used by boat traffic on the Nene/Ouse Navigation link. Strong tidal currents and a large tidal range make navigation difficult here and a significant safety hazard.

Existing Issues

Issue	Activity	Responsibility	Cost£k	Timescale			Progress/Notes
				96 97	97 98	Future	
Issue 19a. Navigation of Salters Lode/Denver Tidal River Crossing	Review level of Navigation facilities	Agency *FRCNM*	R	•	•		Improved service and safety. To be completed 95/96, with implementation 96/97. *Meetings have been held with IWA, GOBA and the Middle Level Users Group. Wooden fenders have been installed at the entrance to Salters Lode lock. A strict procedure for the passage of boats between the two locks has been introduced, this is controlled by the lock keepers.*
	Produce navigation guidance sheet and information board	Agency *FRCNM*	5		•		Improve awareness of boat users. *An information Board is currently being produced.*

New Issues

Navigation in the Relief Channel has been raised by GOBA the feasibility of this is to be assessed.

8.6 Development Pressures

Population Growth in this catchment is expected to be around 1% per annum. Most development will be centred around existing towns and limited village development.
There are two main ways that the Agency can influence development:

- Through the **planning** system, the Agency can assist local planning authorities to allocate land for development by commenting on structure plans and local plans, identifying constraints and highlighting where the river environment can be enhanced by sympathetic development. The Agency will continue to advise on water environment issues in comments on structure and district-wide local plans;

- The Agency can advise on the **control** of development by offering formal and informal comments to planning authorities on planning applications and development briefs. The Agency can also control some developments using its own powers, for example, through issuing Land Drainage Consents.

The main objectives are to protect the water environment from the harmful effects of development and to minimize flood risk. With 30% of the catchment below the highest known tide level, controlling development to limit the risk of flooding is a priority.

Existing Issues

Issues	Activity	Responsibility	Cost£k	Timescale			Progress/Notes
				96 97	97 98	Future	
Issue 20a. Development pressures - pollution risk from development in unsewered areas	Restrict development through the planning process	Agency, Planning Authority *PM*	R	*	*	*	Controls problem. *Ongoing.*
	Install "first-time" sewerage schemes	AWS, Councils, Householders, Agency *PM*	N/K	*	*	*	Reduce pollution. *Ongoing.*
	Install private sewage treatment plants	Householder *PM*	N/K	*	*	*	Reduce pollution. *Ongoing.*
Issue 20b. Development pressures - pollution risk from the redevelopment of Contaminated land	Identify type and scale of contamination	Agency, Planning Authority, Developer *PM*	R	*	*	*	Allows better design and control of redevelopment proposals. *Ongoing.*
	Agree measures to prevent pollution	Agency, Planning Authority, Developer *PM*	N/K	*	*	*	Protect rivers and groundwaters and eliminate some sources of pollution. *Ongoing.*

Issues	Activity	Responsibility	Cost£k	Timescale			Progress/Notes
				96 97	97 98	Future	
Issue 20c. Development Pressures - Structure and Local Plans	Promote Agency Guidance notes in Structure and Local Plans	Agency, Planning Authorities *PM*	R	•	•	•	Illustrates model policies to protect the water environment. *Ongoing, currently under review.*
Issue 20d. Development pressures - New Roads and Bypasses	Incorporate Flood protection measures into all proposals	Agency, Highway Authorities, IDBs *PM*	R	•	•	•	Avoids increased flood risk. *Ongoing.*
	Incorporate pollution prevention measures into all road proposals	Agency, Highway Authorities IDBs *PM*	R	•	•	•	Reduces pollution risks. *Ongoing.*
	Ensure wildlife is protected and enhanced with all road proposals	Agency, Highway Authorities *PM*	R	•	•	•	Occasionally the water environment is enhanced with road developments. Most often, the aim is to limit the damage they cause. *Ongoing.*
Issue 20e. Proposed development behind River Nar Flood Defences	Improve flood defences to the required standard to accommodate development allocated in the Local Plan, south east of King's Lynn	Developer *FDM*	N/K		•		Developer needs to provide additional flood defence protection to allow development to take place. Beyond the protection provided by activities discussed in issue 14a, above.
Issue 20f. Section 105 surveys	Improve our knowledge of flood risk areas through survey work and computer modelling	Agency *FDM*	1 mil	•	•	•	Able to fulfil the remit of controlling development in the flood plain - subject of a memorandum of understanding between the local authorities and the Agency.

New Issues

Proposal for the expansion of King's Lynn Power Station - see IPC Section.

8.7 Wildlife and Landscape Conservation

Many of the rivers in this catchment have been engineered to improve land drainage capability and control flooding. This work has restricted the wildlife value of these rivers. The Agency have assessed 138km of Statutory Main River to enable the preparation of plans to restore their wildlife value. Issue 18a, Water Level Management Plans, describes an important country-wide initiative which will aid the protection and future management of rivers and wetlands in this catchment. The "buffer zones" Research and Development project (21b) is an example of another national initiative. With appropriate financial backing, buffer zones could yield water quality and wildlife benefits throughout intensively farmed land in lowland Britain.
A category of the river quality objectives initiative had been proposed to protect ecosystems sensitive to potentially damaging changes in water quality.

Existing Issues

Issue	Activity	Responsibility	Cost£k	Timescale			Progress/Notes
				96 97	97 98	Future	
Issue 21a. Degraded Rivers	Identify sites most needing restoration	Agency, Land owners, angling clubs, conservation groups *FRCNM*	4		•	•	Draw up criteria for prioritization. All can share the responsibility to identify sites which most need restoring.
	Develop and implement restoration plans	Agency, Landowners, Conservation bodies,English Nature *FRCNM*	20		•		Concentrate on priority areas only and incorporate additional enhancements into routine flood defence works.
Issue 21b. River Corridor Buffer Zones	Complete R&D Project	Agency *FRCNM*	N/K	•			*The R & D project is now complete. An information note is now available.*
	Develop buffer zones	Agency, MAFF, English Nature, Countryside Commission *FRCNM*	R	•	•		Implement recommendations of R&D. MAFF initiative. Land owners and tenants also have a role in developing buffer strips. *A National Initiative is required between the Agency and MAFF to identify sites.*
Issue 21c. Habitat improvements to the Relief Channel	Review bank mowing policy (Do we mow or graze?)	Agency *FRCNM*	1	•			Banks are maintained to prevent scrub encroachment and reduce vermin damage. Grazing is encouraged wherever practicable. *Policy on grazing is currently being developed. Agency owned banks are mostly grazed.*

Issue	Activity	Responsibility	Cost£k	Timescale			Progress/Notes
				96 97	97 98	Future	
Issue 21c. continued	Target new management techniques using REDS and RCS	Agency *FRCNM*	R		*		Cost incurred by bank mowing programme. *Where mowing occurs it will be carried out once per year after the bird breeding season.*
	Identify appropriate grazing management	Agency *FRCNM*	R		*		Can only control grazing on NRA owned -banks. *Appropriate management will be developed through policy.*
Issue 22a. Special Ecosystems	Identify sites which may be included within the special ecosystem class of Water Quality Objectives if this is implemented.	Agency, MAFF, English Nature, County Wildlife Trusts *FRCNM/ WQM*	R		*	*	Enable implementation of new objectives when chemical criteria are finalised. *Sites on the Nar will be identified in the Nar Conservation Strategy. The Babingley also has a low nutrient concentration, therefore further investigation is required to identify sites.*
Issue 22b. River Nar Conservation Strategy	Partnership. A Memorandum of Understanding was produced in August 1995 between English Nature and the Agency. This provides mutual understanding and a common purpose between the two organisations regarding the management of river SSSIs. Agreed to produce a Conservation Strategy for each River including objectives and a 10 year plan for each river. water level management objectives otherwise covered in a WLMP	Agency, IDB, English Nature FRCNM	15			* (March 1998)	*A project team has been formed. The Conservation Strategy, which will include water level management objectives, is to be completed by March 1998 after which a consenting protocol between English Nature and the Agency will be agreed.*

New Issues

A partnership between King's Lynn and West Norfolk Borough Council, Earthkind Charity, English Nature, the Agency and Norfolk Museum Services has submitted a proposal to the Millennium Commission for funding for a Wash Interpretation Centre at King's Lynn. In addition to the Wash itself this Centre will also address issues relating to flood defence and the Fens. The Agency will make a financial commitment and provide expertise to this proposal. A detailed appraisal review of the application is currently under way and a decision is expected in the next few months.

8.8 Fisheries and Recreation

Existing Issues

Many of the rivers in this catchment are good coarse fisheries. In the 1970s, the Relief Channel was regarded as one of the top coarse fisheries in the UK. The enhancements outlined here will help to improve the habitat for fish. The upper reaches of the Rivers Nar and Babingley support breeding brown trout. The scale of the sea trout run in these rivers does not justify major works to improve access through river structures, although we will always consider fish access when river structures are being repaired or maintained. River and navigation works often affect the fishery. Targeting our river maintenance works more effectively - see Issue 18b - may also have beneficial effects on the fishery.

Issue	Activity	Responsibility	Cost£k	Timescale			Progress
				96 97	97 98	Future	
Issue 23a. Poor fisheries Habitat within the Relief Channel	Increase fish refuges using willow croys	Agency *FRCNM*	14	•			*There have been 40 Croys installed by January 1997 at Downham Market and Stowbridge.*
	Examine possible sites for artificial reefs.	Agency *FRCNM*	56	•			*Reef installation completed in April 1996 at five sites on the Relief Channel and four sites on the Ely Ouse. Monitoring will be carried out in 1996/7.*
Issue 23b. Recreational access to the Relief Channel	Establish the potential demand	Agency *FRCNM*	2	•			Survey of what Agency owns. *The Agency owns all the flood banks. A kissing gate has been installed at Stowbridge in the anglers car park and two additional gates have been installed on the river bank. Access is now good around the bridges which are the areas favoured by anglers. Access elsewhere is still limited as there are problems with access across privately owned land.*
	Increase public information and safety facilities	Agency *FRCNM*	8				*A meeting has been held with Norfolk County Council to discuss access, disabled angling and sustrans opportunities. Interpretation boards at Denver identifying walks may be erected in the future.*
	Provide more angling sites - particularly accessible to the disabled	Agency Angling Clubs *FRCNM*	10				*The steep, high banks do not lend themselves to a simple cost-effective solution of the problem of disabled angler access. The adjacent Cut-Off Channel may offer a more straight forward option. The use of the Cut Off Channel has similar problems except in the upper section between Stoke Ferry and Denver. The Agency are to liaise with Kings Lynn Angling Association to determine the number of disabled anglers and their needs.*

Issue	Activity	Responsibility	Cost£k	Timescale			Progress
				96 97	97 98	Future	
Issue 23c. Sea Trout access to the river Nar	Consider migrating fish access when sluice gates being renewed	Agency *FRCNM*	N/K				*As and when possible. The existing tidal flaps are fairly new and there is no need to replace them.*
Issue 23d. Coarse fishery on the lower reaches of the River Babingley	Operate sluice only when required	Agency *FDM*	R	*	*		Will help to stop loss of young fish. *Has been investigated but found not to be feasible.*
	Investigate use of habitat shelters	Agency *FRCNM*	3	*			*Will help reduce fish loss when sluice is open. This has been investigated but has proved not to be feasible due to the flood defence priorities.*
Issue 23e. Sea trout access to River Babingley	Allow for fish movement when repairing or renewing river structures	Agency *FRCNM*	R		*		As and when possible. *It is intended that this issue will be examined in the next year.*
Issue 23f. Smelt Population	Lack of knowledge of status of smelt population and factors determining population. A desk study will be completed in the first instance.	Agency *FRCNM*	5		*		Operational investigation bid. Considered a rare species. *This project was completed in April 1997.*

New Issues

None Identified

8.9 Summary of Issues

Figure 8.9.1 illustrates the location of the site specific issues that exist in this catchment which are also summarised below;

ISSUE 1 River Nar Water Quality problems
ISSUE 2 Gaywood River Catchment Water Quality Problems
ISSUE 3 River Babingley Water Quality Problems
ISSUE 4 Heacham River Water Quality Problems
ISSUE 5 Middle Level Drain Water Quality Problems
ISSUE 6 Water Quality Problems King's Lynn Area
ISSUE 7 Estuary Eutrophication
ISSUE 8 Bathing Water Quality
ISSUE 9 Pollution Risks to Ground Water Supplies
ISSUE 10 Managing Water Resources in the Catchment
ISSUE 11 Coastal Flood Defence Problems
ISSUE 12 King's Lynn Tidal Defences
ISSUE 13 Tidal River and Relief Channel Flood Defence Problems
ISSUE 14 River Nar Flood Defence Problems
ISSUE 15 River Babingley Flood Defence Problems
ISSUE 16 Heacham River Flood Defence Problems
ISSUE 17 River Ingol Flooding Problems
ISSUE 18 General Flood Defence Problems and initiatives
ISSUE 19 Navigation of Salter Lode/Denver Tidal Crossing
ISSUE 20 Development pressures
ISSUE 21 Degraded rivers
ISSUE 22 Special Ecosystems
ISSUE 23 Fisheries and Recreation Problems

NEW ISSUE 1 Continued demand for water from groundwater and winter storage reservoirs for irrigation (unsited)
NEW ISSUE 2 Need for groynes, groyne design and replacement at Snettisham Beach
NEW ISSUE 3 West Lynn Walkway Proposal - funding bid to Millennium Commission
NEW ISSUE 4 Monitoring of a second West Lynn Tide Gauge
NEW ISSUE 5 Assessment of the feasibility of navigation of the Relief Channel
NEW ISSUE 6 Expansion of the King's Lynn Power Station
NEW ISSUE 7 Wash Interpretation Centre - funding bid to Millennium Commission

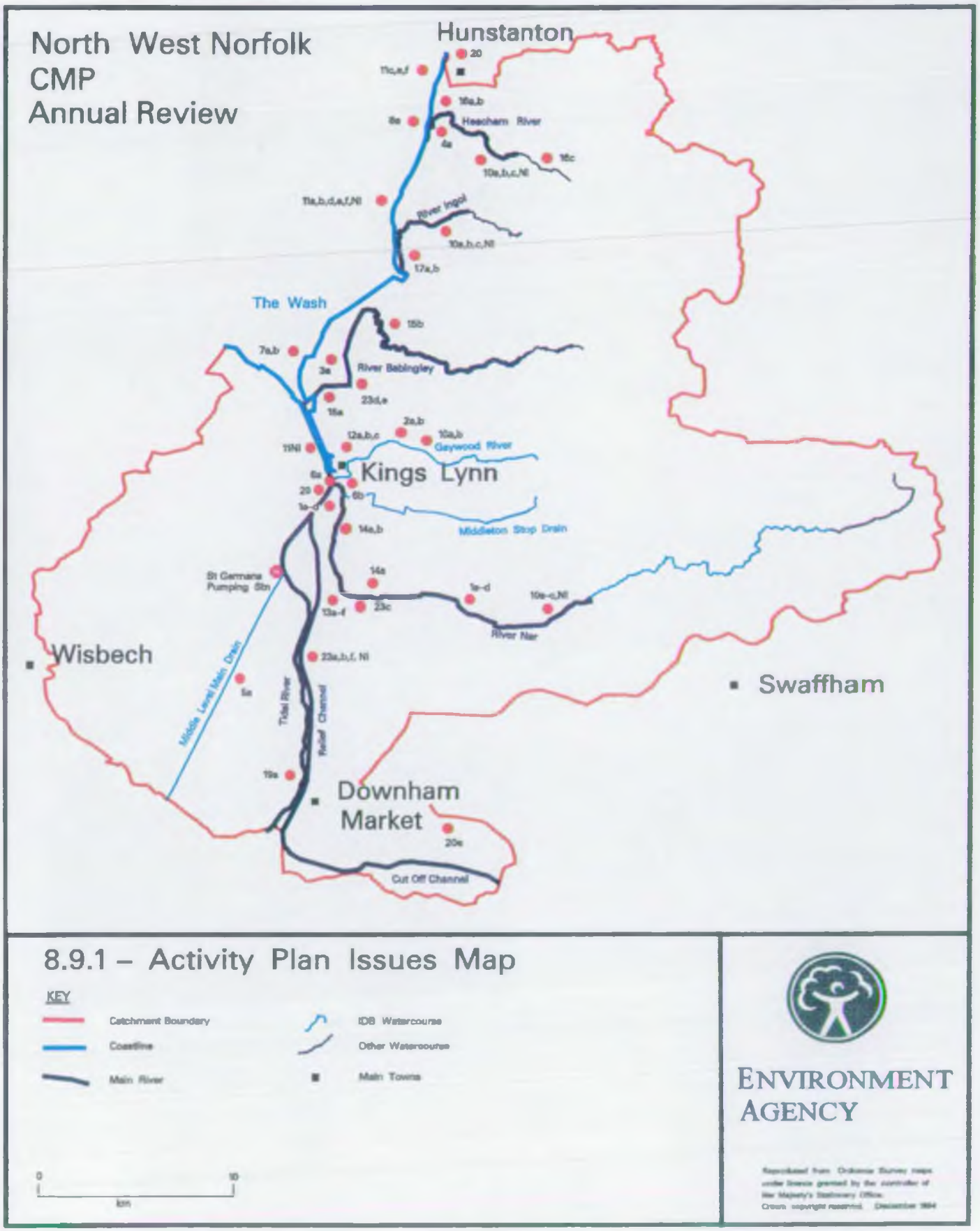
9.0 FUTURE REVIEWS

We will continue to monitor the issues within this Plan, but no further Annual Reviews will be published. A major revision of the "Consultation Report" will be carried out prior to the end of 1998 when a Local Environmental Agency Plan (LEAP) will be prepared to incorporate air, land and water environments; setting out a common vision for the management of the environment as a whole.

To improve future reviews, readers are asked to tell us of any noteworthy information or activities which would be of interest to others in the catchment. This will keep the Environment Agency informed and ensure that all the news on progress and activities is disseminated.

Thank you for your interest in the North West Norfolk Catchment. As this review shows, the Agency and others have made considerable progress addressing the activities stated in the Action Plan. The Agency hopes that this valuable work can continue in the future.

PLEASE LET US KNOW OF YOUR VIEWS AND ACTIVITIES



8.9.1 – Activity Plan Issues Map

KEY

- Catchment Boundary
- Coastline
- Main River
- IDB Watercourse
- Other Watercourse
- Main Towns

0 10 km

ENVIRONMENT AGENCY

APPENDICES
A: ABBREVIATIONS AND GLOSSARY

Abbreviations

ALARA	- As Low As Reasonably Achievable
AMP	- Area Management Plan
AWS	- Anglian Water Services Ltd
BATNEEC	- Best Available Techniques Not Entailing Excessive Cost
BPEO	- Best Practicable Environmental Option
BTMA	- Best Technical Means Available
C	- Capital budget expenditure (in the Activity Plans)
CMP	- Catchment Management Plan
cSAC	- candidate Special Area of Conservation
DO	- Dissolved Oxygen
EN	- English Nature
EPA90	- Environmental Protection Act 1990
EQS	- Environmental Quality Standards
FDM	- Area Flood Defence Manager
FRCNM	- Area Fisheries, Recreation, Conservation and Navigation Manager
GOBA	- Great Ouse Boating Association
GPZ	- Groundwater Protection Zone
ha	- hectare
IDB	- Internal Drainage Board
IPC	- Integrated Pollution Control
IWA	- Inland Waterways Association
km^2	- square kilometres
LA21	- Local Agenda 21
LEAPs	- Local Environment Agency Plans
m	- metre
MAFF	- Ministry of Agriculture, Fisheries and Food
NFU	- National Farmers Union
NSA	- Nitrate Sensitive Area
NVZ	- Nitrate Vulnerable Zone
PAH	- Poly Aromatic Hydrocarbons
PM	- Area Planning Manager
POCs	- Products of Combustion
Ptes	- Particulates
R&D	- Research and Development
RCS	- River Corridor Survey
REDS	- Rivers Environmental Database
RE#	- River Ecosystem Class target
RSA60	- Radioactive Substances Act 1960
RSA93	- Radioactive Substances Act 1993
SO_x	- Oxides of Sulphur
SPA	- Special Protection Area
SSSI	- Site of Special Scientific Interest
STW	- Sewage Treatment Works
UK	- United Kingdom
UWWTD	- Urban Waste Water Treatment Directive
VOCs	- Volatile Organic Compounds
WLMP	- Water Level Management Plan
WQM	- Area Water Quality Manager
WRM	- Area Water Resources Manager

Glossary

Alluvial	-	Relating to sedimentary deposits resulting from the action of rivers.
Ammonia	-	A chemical compound found in water often as a result of pollution by sewage effluents. It is widely used to determine water quality. Ammonia detrimentally affects fish.
Aquifer	-	A water bearing stratum situated below ground level. The water contained in aquifers is known as groundwater.
Buffer Zones	-	Strip of land 10 - 100m wide, alongside rivers which is removed from intensive agricultural use and managed to provide appropriate habitat types.
Catchment	-	The total area from which a single river system collects surface water run-off.
Culvert	-	Drain or covered channel carrying water across or under a road, canal etc.
Cut Off Channel	-	A water body that links the River Lark, Little Ouse and Wissey to Denver, taking storm water directly for discharge to tide and taking water from Denver for transfer to Essex for public water supply.
Estuarine	-	Pertaining to an estuary
Estuary	-	The mouth of a river.
Eutrophic	-	A description of water which is rich in nutrients. At worst, such waters are sometimes beset with unsightly growths of algae.
Eutrophication	-	The build up of nutrients within a waterbody which may lead to a reduction in the ability of the water course to support air breathing organisms
Extant	-	existing, usually used in the context of planning permission and legislation
Geology	-	The study of the earth and its composition.
Geomorphology	-	The study of the physical landforms of an area.
Groundwater	-	Water which saturates a porous soil or rock stratum (or aquifer). Water held in storage below ground level.
Groundwater Protection Zone	-	Agency designated area within which precautions should be taken to prevent derogation of groundwater quality.

Hydrology	-	The study of the properties and movement of the earth's water.
Hydrometric monitoring	-	Periodic recording of water levels and flows.
In river needs	-	The totality of requirements for the water environment and effluent dilution before abstraction is taken into account.
Integrated Pollution Control	-	Set out in the Environmental Protection Act 1990
Kimmeridge & Ampthill Clay	-	Low permeability grey clays.
Nitrate Sensitive Area	-	An area where nitrate concentrations in sources of public drinking water exceed, or are at risk of exceeding the limit of 50mg/l laid down in the 1980 EC Drinking Water Directive, and where voluntary, compensated agricultural measures were introduced in 1990 as a means of reducing those levels.
Nitrate Vulnerable Zones	-	An area where nitrate concentrations in sources of public drinking water exceed, or are at risk of exceeding the limit of 50mg/l laid down in the 1980 EC Drinking Water Directive, and where compulsory, un-compensated agricultural measures will be introduced from 1996 as a means of reducing those levels.
Ordnance Datum	-	Predetermined and agreed level against which ground levels are measured.
Outfall	-	The mouth of a river or drain where it empties into the sea.
Penstock	-	A sluice or a floodgate.
Permeability	-	The rate at which a liquid or gas is able to move through another medium.
Plume of contamination	-	The spreading out of pollutants within a water body, aquifer or in the atmosphere.
Radioactive substance	-	A substance within which there is spontaneous disintegration of atomic nuclei.
Re-profiling	-	Changing the shape, height or cross-section of a beach or river to prevent/correct erosion, to strengthen/enlarge or for conservation purposes.
River Ecosystem Class	-	Measure of Water Quality.
Smelt	-	Any green or silver fish of the genus *Osmerus* allied to Salmon and used as food.

Storm surge	-	Increase in water flow as a result of a storm event in the upper part of a catchment.
Sustainable Development	-	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Sustrans	-	An organisation attempting to establish a national cycle network.
Tail Sluice	-	Seven gate river control sluice at Kings Lynn on the Relief Channel where it enters the Great Ouse.
Toxicity	-	The extent to which a substance is poisonous.
Training works	-	Engineering of a channel to facilitate efficient entry and exit of water from a structure.
Wetlands	-	Habitats which are dependant on water. This may be either groundwater in contact with vegetation or flow of surface water across or through the site.
Willow croy	-	Bundles of Willow stakes used to alter water velocity, halt bank erosion and increase upstream habitat diversity.
1:100 year flood	-	A flood event with a statistical probability of occurring once in a one hundred year period (other periods may be specified in a similar way).

B: PROJECT TEAM MEMBERS

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Note: This is not a legally or scientific binding document. It is written for both wide public appreciation and information.