EA - Anglian - FRCN

FISHERIES, RECREATION CONSERVATION AND NAVIGATION

ANGLIAN REGION

ANNUAL REPORT 1996/97

FRCN ANNUAL REPORT 1996/97

CONTENTS

LIST OF PHOTOGRAPHS INCLUDED IN THE FRCN ANNUAL REPORT (1996-97)

GLOSSARY OF TERMS USED IN THE FRCN ANNUAL REPORT (1996-97)

AA	Angling Association
AC	Angling Club
AWS	Anglian Water Services
BFAS	Broadland Flood Alleviation Scheme
BSS	Boat Safety Scheme
CMP	Catchment Management Plan
CWS	County Wildlife Site
DETR	Department of the Environment, Transport and the Regions (formerly Department of the Environment)
DoE	Department of the Environment (now DETR)
ea	Environmental Appraisal or Informal Environmental Assessment
EA	Environmental Assessment
EO	Environmental Options
ESA	Environmentally Sensitive Area
ESMP	Estuarine Shoreline Management Plan
FRCN	Fisheries, Recreation, Conservation and Navigation
GAPS	Gipping Angling Preservation Society
GIA	Grant-in-Aid
GOBA	Great Ouse Boating Association
GOBOA	Great Ouse Boatbuilders and Operators Association
IFE	Institute of Freshwater Ecology
LBAP	Local Biodiversity Action Plan
LEA	Local Environmental Assessment
LEAP	Local Environment Agency Plan
LIFE	Financial Instrument for the Environment
MAFF	Ministry of Agriculture, Fisheries and Food
MES	Minimum Environmental Standard
MTR	Mean Trophic Ranking
NRA	National Rivers Authority (now Environment Agency)
PHABSIM	Physical Habitat Simulation Model
PSNCI	Potential Site of Nature Conservtion Interest
RAMSAR	Internationally Important Wetland (designated at the Ramsar Convention 1971)
RCS	River Corridor Survey
REDS	Rivers Environmental Database (System)
RHS	River Habitat Survey
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SMP	Shoreline Management Plan
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
WWF	World Wide Fund for Nature

1.0 INTRODUCTION

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This is the second combined Fisheries, Recreation, Conservation and Navigation (FRCN) annual report to be produced since the creation of the Environment Agency. It covers the period from April 1996 to March 1997 inclusive, and details the work carried out by FRCN staff in liaison and collaboration with other Environment Agency functions and external bodies.

The first combined FRCN annual report was published last year when the inclusion of all four functions' work in one report was considered to be more informative and of wider interest than reports of each function's work separately. This is also a reflection of a more integrated approach to environmental management by the Agency.

The breadth of detail covered by capital and revenue projects, surveys, policy implementation and environmental assessment illustrates the scope and volume of work undertaken by FRCN staff in Region and Areas, and further shows how integrated management of the environment benefits all involved.

2.0 PROJECTS IN CAPITAL AND REVENUE PROGRAMMES

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2.1 FISHERIES

2.1.1 Central Area

Habitat Enhancement in the Rivers Little Ouse and Thet

The Ely Ouse Catchment Management Plan (Action Plan, January 1994 - Issue 40) identified the River Little Ouse below Knettishall and the River Thet below East Harling as stretches failing to reach their respective potential fish biomass targets. It was suggested that habitat enhancement programmes would increase the rivers' fish biomass, thereby reducing the need for restocking.

On the Little Ouse, a detailed inspection of the river between Thetford and Brandon was undertaken in order to highlight any specific areas for improvement. This survey identified the river at St Helen's Picnic Area, Santon Downham, as being particularly devoid of fish owing to historical river maintenance that had resulted in an overwidened, shallow and featureless stretch. A special fisheries survey found a limited fish population, with a class C biomass.

Photo 1 Croys on the Little Ouse at Santon Downham

Artificial constriction of the river at intervals was proposed to produce a modified flow, creating deeper pools and exposing areas of gravel in the river bed. The aim was to encourage fish species such as chub and dace to inhabit these areas where there are improved spawning and feeding opportunities.

Four pairs of timber croys were installed 100m apart. A line of chestnut stakes was driven into the river bed, extending about 8m from each bank and pointing at an angle of 45° downstream. They were designed to leave a suitable gap in the centre of the river to allow passage for weed-cutting boats and canoes. The croys are also at such a height that during high winter flows they are over-topped by water so there is no significant impact on the river's flooding potential.

On the River Thet the most suitable area for habitat enhancement work was around Thorpe Woodlands Caravan Park where the banks are fished by Saffron Walden AC. Here the river is deep with limited marginal and instream vegetation; it also suffers from rapid water level changes due to the operation of a downstream sluice by a local land owner. A special fisheries survey revealed a biomass classification of C, primarily the result of capturing two noteworthy pike.

The project aimed to restore a back channel which was heavily silted, had a number of fallen trees along its length, and was only joined to the main river at its lower end via a dense reed bed. A new channel was dug to connect the upper end, and the remainder of the channel was dredged and reprofiled. All the timber lying in water was removed, and tree management was undertaken in close collaboration with Forest Enterprise, the riparian land owners, in order to reduce shading and leaf litter.

The newly created back water will provide a winter refuge for small fish during high flows. It should also be utilised by coarse fish as a spawning area and the increased productivity will offer improved feeding opportunities for these fish. An indirect benefit from rejoining this channel is the isolation of an island. Planting of species such as wild bramble is planned in the Autumn to create a wildlife haven and encourage its use by animals such as otters, which are known to live in the vicinity. To compensate for the loss of still water habitat from the backchannel work, a nearby ditch was dredged in order to retain an area of standing water suitable for amphibian and insect life.

Limited restocking will be carried out later this year on both the Little Ouse and the Thet to boost existing local fish stocks. It is anticipated that these habitat enhancements will promote increased fish populations in the long term, and the fish biomass will continue to be monitored to assess this.

Fish Refuges in the Relief Channel

Poor fisheries habitat in the Relief Channel was raised as an issue in the North West Norfolk Catchment Management Plan (Action Plan, November 1995 - Issue 23a). The channel was excavated in the early 1960's to provide assistance in relieving flood water from the Great Ouse catchment. It is suspected that changed flow regimes during the last 20 years have led to a decline in the fishery. High flows may cause the

displacement of fish and could affect the recruitment of fry into the existing population.

In 1996 the Agency commissioned a £60k pioneering project to design and install 15 artificial reefs in the channel. These structures provide an area of slack water to shelter fish populations in times of high flow and should also improve the substrate for aquatic plants and invertebrate life, resulting in a more productive feeding environment.

To complement this habitat improvement, 40 brush willow croys were installed at two sites near the bridges at Downham Market and Stowbridge. These sites were selected because of the ease of access and the frequent use by anglers. The croys resemble "submerged fences" and protrude 5m out into the channel, at right angles from the bank.

The croys should provide valuable areas for fish to shelter during times of peak flow and also increase the spawning and feeding areas in these localities. The work was undertaken in consultation with the resident club, King's Lynn AA who will be the beneficiaries of the work. The effectiveness of the structures will be monitored through routine fisheries surveys and angler reports and it is hoped to repeat a hydroacoustic survey of the channel in 1997.

Photo 2 The willow croys installed on the Relief Channel - Jan 97

2.1.2 Northern Area

River Witham Tree Planting - Long Bennington and Thurlby Washland

A programme of tree planting was undertaken on the River Witham to establish areas of shade and cover along the river's edge.

Photo 3 River Witham Tree Planting, Long Bennington

This planting not only encourages invertebrates, which provide additional food sources for the fish below, but also aids in minimising algal growth in the river section. Thirty willow stakes and several alder trees were planted at Long Bennington over a 3 km stretch of river. At Thurlby, following the completion of the washland area, 30 willow stakes, alder and black poplar trees were planted.

Louth Canal Fish Refuge And Habitat Improvements

Past land drainage works on the Louth Canal have resulted in the river channel and bank side being degraded in terms of ecological diversity, as identified in the Louth Catchment Management Plan (Issue 23).

To remedy this, a deep water fish refuge with tree cover has been created near Tetney. The refuge will provide an over-wintering site for common coarse fish species, improving the lowland coarse fishery on an area of Agency owned land. To construct the refuge area approximately 8500 cubic metres of soil have been excavated and used to reinforce existing flood banks around the flood storage area.

Photo 4 Work beginning on the Louth Canal fish refuge.

Photo 5 The completed fish refuge

In addition to the refuge site the project has also provided shallow marginal areas of value to both spawning adults and juvenile coarse fish. Aquatic plant species diversity will improve through the establishment of aquatic marginal habitat and wetted grass areas.

The success of the project will be monitored through a continuation of routine fisheries surveys and other special surveys aimed at evaluating the use of the site by fish during winter months.

Harpers Brook Improvements

A major piece of habitat restoration was undertaken on Harpers Brook at Lowick during 1997. The Harpers Brook supports a good coarse fish and trout biomass of approximately $25gm^{-2}$ downstream of a 2m weir at Lowick, compared to a biomass of $2gm^{-2}$ upstream of the weir. This much lower biomass figure is mainly due to the weir acting as a barrier to migrating fish.

Photo 6 Harpers Brook before the habitat restoration project had begun

Over 400 tonnes of local limestone in 20 to 30 pieces were tipped into the brook to form a large riffle which completely covered the weir and created an incline of approximately 1:8. This incline is acceptable to species such as chub and dace and will allow them to migrate over the former weir site. The riffle was finished off by covering the large pieces of limestone with a layer of smaller 4-10 cm stones, again

from a local quarry. The new riffle will allow fish access to both sides of the weir and regular monitoring will be carried out to assess any changes in fish populations that occur.

Photo 7 The new riffle created on the Harpers Brook.

Elver Passes On The River Nene

Following the construction of the combined fish pass at the Dog In A Doublet sluice downstream of Peterborough, additional elver passes were installed at the Stanground, Orton, and Alwalton Sluices. These passes will allow elvers migrating through the tidal sluice at the Dog In A Doublet to gain access to the river upstream of Peterborough.

The elver pass design is quite simple and consists of a crawling tube, a chamber (incorporating a trap) and a gravity fed supply from the river upstream of the weir. Monitoring is taking place on a daily basis. Initial results are encouraging, with elvers being picked up at Alwalton.

2.1.3 Eastern Area

River Waveney Feasibility Study

Several angling organisations along the Upper Waveney have formed the Waveney Regeneration Project to promote various riverine enhancements. The clubs suggested

several schemes to the Agency and are putting together a bid to apply for lottery funding. The Agency employed a consultancy to carry out a river restoration feasibility study to assess the feasibility of the projects put forward by these clubs, and to identify new proposals. Funds have been obtained from a national "make a difference" multifunctional budget to implement the proposals in 1997/98.

Pool Creation - Binham Tributary

The Binham Tributary is a tributary of the River Stiffkey and suffers from low flows in Summer with the lower reaches drying up occasionally. Brown trout have been found to survive in the deeper pools upstream, and the purpose of this scheme was to increase the number and depth of these pools so as to increase the holding capacity for the brown trout population. Gravel riffles were created to raise the levels of the pools directly upstream and some of the existing pools on the bends were deepened. This scheme was undertaken in collaboration with the Kings Lynn Consortium of Internal Drainage Boards.

Photo 8 Created riffle on the Binham Tributary

Hickling Fishery Monitoring and Catfield Environmental Assessment

Hickling Broad in Norfolk has a history of fish mortalities attributed to blooms of the toxin-producing algae *Prymnesium parvum.* A freshwater refuge is in place (Catfield Dyke) but the effectiveness of the refuge had never been quantified. A consultancy (APEM) was taken on to identify the distribution and seasonal movements of fish within the Broad and to identify the response of fish to the refuge during a *Prymnesium* event.

Land and Water Resource Consultants were employed to prepare part of the Environmental Assessment on the impacts of the Catfield borehole on Catfield fen. It is proposed that in the event of a *Prymnesium* outbreak, water from the borehole will be pumped into Catfield Dyke to provide a freshwater refuge for fish. Subject to the outcome of the Environmental Assessment, the Environment Agency will apply for a consent to use the Catfield borehole. This work is being carried out in conjunction with the work of APEM on Catfield Dyke.

Bank Reprofiling - Hoe Rough

Hoe Rough is a Nature Reserve owned and managed by Norfolk Wildlife Trust. This scheme involved the reprofiling of the river banks of the Whitewater River to reduce their steepness which will encourage the colonisation of marsh and marginal plants. The benefit to the fishery includes increased marginal cover and a greater diversity and density of invertebrates available as food for the brown trout population. This scheme was completed in agreement with Norfolk Wildlife Trust and English Nature.

Photo 9 Work begins to reprofile the bank of the Whitewater River at Hoe Rough.

Photo 10 The completed bank reprofiling at Hoe Rough.

Habitat Improvements - Bintree Mill

The purpose of this scheme was to prevent stock, primarily sheep, from grazing an area directly adjacent to the River Wensum, and therefore reduce the poaching of the riverbank. Stock-proof fencing was erected with stiles and gates to allow access for anglers. The gates also allow for controlled grazing of the bank in the future.

Waveney Fish Refuge

This scheme involved the deepening of a series of marsh dykes adjacent to the River Waveney. It is hoped that these refuges will provide an over-wintering sanctuary for fish fry to shelter from strong winter flows.

Whole Stone Deflectors - River Stiffkey

The aim of this scheme was to improve the overall habitat of an over widened stretch of the River Stiffkey through the installation of whole stone deflectors and an island. It is hoped that these habitat improvements will increase the diversity of flow in the river which will be of benefit in particular for the native brown trout population.

Bullhead Research

The bullhead (*Cottus gobio*) is listed under Annex II of the EC Habitats Directive. ECON were employed to carry out a survey of the Rivers Glaven, Stiffkey, the Upper Wensum and one of its tributaries (Whitewater Stream) to determine the habitat preferences of this key species. The study found that the presence of a well structured riparian zone of deciduous woodland (to provide an input of woody debris) and good channel form with natural sediment and flow regimes providing riffle/pool structure (with bed gravels exposed on riffles and woody material and silt deposited in pools) are essential to promote good populations of bullhead. It is hoped that these findings can be used to maintain existing, and create new, bullhead habitat.

Fishing Platforms

A scheme in collaboration with the Dedham Vale and Stour Valley Project has been set up to provide a canoe launch area, disabled angling facilities and fishing platforms at a picnic site at Cattawade on the River Stour. Discussions with Flood Defence, the British Canoe Union and Suffolk County Council have already taken place and it is hoped that the work will be completed by the Agency in 1997.

Repairs to angling platforms were made on the River Gipping in the centre of Ipswich. The platforms had become worn and their position on a riverside footpath meant they were a safety hazard. This work was carried out in collaboration with GAPS (Gipping Angling Preservation Society). Several new fishing platforms and disabled and ladies toilet facilities were installed at a fishing lake adjacent to the River Gipping at Needham Market. This work was also carried out in collaboration with GAPS.

2.2 RECREATION

2.2.1 Central Area

Extension of the Fen Rivers Way

Since 1995 the NRA, and now the Agency, have supported Cambridgeshire County Council's initiative of a footpath link between Cambridge and Ely. The 17 mile walk known as the Fen Rivers Way closely follows the course of the Rivers Cam and Ely Ouse. Our collaboration continued this year with the production of seven interpretative boards at intervals along the path and a route map in the form of an information pack.

The project aims to improve the public access along two of our Region's most famous rivers. In addition to encouraging people to utilise all, or part, of the footpath, the information boards seek to raise interest in the river and water environment.

Restoration of Little Cressingham Windmill

The Agency has completed its input to a project aimed at restoring a unique Norfolk mill. The Agency recreated the mill pool and restored a dam allowing water from the

nearby brook to be diverted to fill the pool. The work has been carried out with the collaboration and financial support of Norfolk County Council and the Windmill Trust. What makes this historic building so special is that the mill's original activities could be powered by both water and wind. Very few of these mills were ever built and effectively operated, and even fewer exist today to be enjoyed as a recreational facility for a new generation of water users.

Photo 11 Little Cressingham Windmill

Kissing Gates on the Relief Channel

The North West Norfolk Catchment Management Plan's Action Plan, produced in November 1995, identified as issue 23b the need to improve the recreational access to the channel. Three kissing gates were installed for the car park at Stowbridge on the Relief Channel. King's Lynn Angling Association, who lease the water from the Agency, highlighted the popularity of this section of bank with their anglers. The kissing gates will improve the access for fishermen between the car park and the bank, and will be of particular benefit to less mobile persons.

Hedge planting at Mepal Car Park

A native hedgerow was planted around the recently constructed car park at Mepal. The car park is used by members of Cambridge Fish Preservation Society who lease the fishing at the nearby stillwater, Pingles Pit, and also banks of the Old Bedford/River Delph. The hedgerow once mature will enhance the visual aspect of this recreational development.

2.2.2 Northern Area

Boston Angling Pegs and Improvements

Concern had been raised from members of the local angling association who had experienced problems securing good access to the Maud Foster Drain river bank for angling purposes. At some locations the bankside had deteriorated through the action of heavy angling use to the point where erosion was accelerated and angling activity was made difficult. In places, the steep incline of the bankside batter also contributed to the inaccessibility to anglers. To improve the situation, 10 purpose built fishing stages were constructed at the Windsor Crescent section, in the heart of Boston. These will now provide improved facilities for local and visiting anglers who can now gain safe and convenient access to the waterside.

Photo 12 Angling pegs at Boston

Following completion of this work, the Boston Angling Association who had been closely involved with the scheme, committed some of their own funds to provide an additional 20 angling pegs on the Horncastle Road section of the Maud Foster Drain.

Another project on the River Witham involved the installation of a series of wooden steps and a sturdy handrail at a popular access point for walkers and local anglers. An angling facility also on the Witham had become severely undercut because of bankside erosion and repairs to this potentially dangerous defect involved casting a new concrete slab to support the structure. An additional benefit of this has been the use of the site for a setting-off area by the members of the local rowing club. Together the initiatives will improve the angling value of the fishery.

Humber Bank Access Improvements

The Humber Catchment Management Plan has identified that the recreational potential of the estuary is not fully developed. In particular, access to some embankments were restrictive to disabled people. This project has provided safe and convenient access onto a scenic area of the Humber Bank, at Barton Outdoor Pursuits Centre. The access ramp, constructed using spoil from reed beds at Far Ings Nature Reserve, has provided an access point for wheelchair users and people with walking difficulties. The yellow handrail provides assistance to partially sighted people who may wish to use the facility. This project is part of an ongoing development to improve recreational access in this area; similar improvements are envisaged that will build on the work already done.

Photo 13 Humber embankment before ramp constructed

Photo 14 Humber embankment with access ramp

River Nene Canoe Access Points

Following consultation with local canoe clubs attempts have been made to ease entry and exit at locks for canoeists using the River Nene. Where possible a "low tech" approach has been adopted. Bank sides have been lowered at locks, with rollers incorporated to assist with lowering canoes down to existing pontoons, or a small landing stage has ben provided. It is intended to provide "portage" points at all locks over time.

Photo 15 Canoe launch site at Welllingborough embankment

Toft Newton Reservoir Improvements

Following a major water resources project to enhance and maintain the Trent Witham Ancholme Transfer Scheme, work was carried out at the reservoir site which made possible improvements to the current facilities for anglers and the visiting public. The original fishing lodge has been removed and simple modifications to an existing brick building have been completed to create an improved fishing lodge which includes access for wheelchair users via a shallow ramp and toilet facilities for disabled persons. These improvements compliment the existing "Wheely Boat" which is available to disabled anglers and bird watchers who wish to benefit from the recreational resource.

2.2.3 Eastern Area

Mill River Boardwalk

The second phase of this scheme was completed in partnership with the Greenways Countryside Project. Additional boardwalk (160m) was installed in phase 2 of this project to improve access to the Mill River at Foxhall. This site is designated as a County Wildlife Site and has been proposed for SSSI designation.

Photo 16 Boardwalks through marshy area adjacent to Mill River

Photo 17 Bridge and wood chippings used to improve footpath

Stour Valley Trusts Navigation Award Scheme

The Agency sponsored the 1996 Navigation award. The Stour Valley Trust presents awards for the most meritorious journeys down the freshwater River Stour, a 25 mile statutory navigation from Brundon Mill (near Sudbury) to Brantham Bridge, in that year. Many of the trips, in a variety of craft, are a testimony to endurance, determination and skill along a course of considerable diversity.

Walking in Constable Country

The Environment Agency sponsored the "Walking in Constable Country - A visitors guide to the footpaths in the Dedham Vale" leaflet. The leaflet promotes the 12 mile network of footpaths within the River Stour valley. This area is a very popular destination for tourists and the leaflet aims to inform and educate visitors.

Belstead Brook Park Information Board

Belstead Brook Park is a strip of countryside adjacent to Belstead Brook in Ipswich. The park is managed by Ipswich Borough Council Park Rangers with the aim of improving landscape, conserving wildlife and involving local people in conservation work. The Agency contributed to the production and installation of four interpretation boards introducing the park, its conservation importance and future works.

Pond Work

A project was completed in collaboration with the River Colne Countryside Project and Stanway Fiveways County Primary School. An educational pond was constructed in the grounds of the school for use by the pupils and local community. In collaboration with Colchester Borough Council and Gosbeck Primary School, enhancement work was carried out on their school pond. This work will improve the conservation and educational value of this school resource. Pond excavation works were carried out at Fordham Parish pond to improve the habitat diversity of this village pond. This work was completed in collaboration with the River Colne Countryside Project.

Photo 18 Pond at Stanways showing damp, marshy margins

Gipping Valley Riverside Walk

The Gipping Valley riverside walk is a through footpath which runs between Ipswich and Stowmarket alongside the River Gipping. Sections of this walk at Baylham had become overgrown and dangerous to the public. In collaboration with the Gipping Valley Countryside Project the trees were managed to keep the path open and the path resurfaced to allow wheelchair and pushchair access.

Sponsorship of Suffolk Coast and Heaths Magazine

The Suffolk Coast and Heaths Area of Outstanding Natural Beauty is an important area within the region. The area has candidate SAC, SPA/Ramsar site, SSSI and Heritage Coast designations and therefore has many Flood Defence and Conservation implications The Suffolk Coast and Heaths Project produces a free information newspaper aimed at people visiting the area. The Agency contributed towards the publication costs of the 1997 issue which contains a major feature written by the FRCN Department, explaining Shoreline Management Plans.

Norwich Fringe Regeneration Project

The Agency contributed towards a study into the feasibility of the East Norwich Single Regeneration Budget Challenge Fund Bid. The project aims to revitalise an area of Norwich adjacent to the River Wensum through regeneration and enhancement schemes. This project was carried out in collaboration with 40 interested parties.

The Pennings Nature Reserve

The Pennings, on the River Dove near Eye in Suffolk, was designated as a Local Nature Reserve this year. Flood Defence maintenance work on the Dove enabled conservation enhancements to be made by opening up the area to sunlight. The opening of the Reserve coincided with an educational day for local school children.

Photo 19
'Identify that bug' day for children at the Pennings

Broadfields Pond Dipping Platforms

A contribution was made towards the construction of pond dipping platforms at one of the Broadfields ponds in the Mar Dyke catchment. This project was in collaboration with Thames Chase who have a Forest Centre at this site which receives visitors from the local community. The pond provides a valuable educational resource to the centre.

Alderman Canal

The Alderman Canal is in the centre of Ipswich and has recently been declared a Local Nature Reserve. The Agency contributed to the installation of a ramp to allow disabled access to the footpath and disabled fishing platforms already present. Money was also given towards the production of two interpretation boards which carry information on the site and its management. This site is in the centre of Ipswich and provides a valuable recreational facility for the inhabitants of the town.

Photo 20 Alderman Canal with access ramp

Photo 21
Alderman Canal

2.3 CONSERVATION

2.3.1 Central Area

Conservation Input to Maintenance Dredging

Fifty nine lengths (39km) of main river were included in the maintenance dredging programme in Central Area.

A typical example of the attention given to the assessment of the environmental impact of our operations is the dredging of the Ely Ouse river in Cambridgeshire. The fenland area associated with this catchment has a 1 in 100 year standard of protection because of the large area of low lying land and hence the very serious consequences of flooding. The dredging of this length of the Ely Ouse marks the penultimate phase of

a rolling programme which commenced at Bottisham Lock in 1989. The initial project was identified to improve the discharge capacity through the rivers Cam and Ely Ouse.

Photo 22 Dredging Works on the Ely Ouse using a dragline with a 70ft reach. Ely Cathedral, widely known as the 'ship of the Fens', is in the background.

The entire length (14.7km) of the Ely Ouse main river is embanked. The river and its washlands enclosed by its flood banks not only form a green corridor through an intensively farmed landscape but make an important contribution to the extent and variety of washland in eastern England. These washlands are important for breeding and wintering wildfowl, waders and raptors, and also contain habitats that are uncommon to the area. The washland on the right bank has been designated as a Potential Site of Nature Conservation Interest (PSNCI) by the Cambridgeshire Wildlife Trust because of the range of plants and animals it supports.

The washlands are not only of conservation importance, but the close proximity to Ely also imparts a high landscape and amenity value to those living and holidaying in the

locality. As a result, a specific survey of the river corridor was undertaken in order to determine the appropriate location for depositing the silt that had to be taken from the river.

A popular and regularly used footpath runs along the left bank adjacent to the river. The footpath, which forms part of a circular walk through the Agency owned Roswell Pits nature reserve before returning to Ely had to be closed for the duration of the works. Some of the dredged silt will be used by the Agency to reinstate and further improve the footpath to a standard which will allow for wheelchair access. Pollarding of selected willows on the right bank which if not managed will die will be carried out by the Agency in the winter.

Photo 23 Ely Ouse just downstream of Ely January 1997, prior to the commencement of the maintenance dredging works. The footpath can be seen on the left and the potential site of nature conservation interest on the right

Great care was taken to minimise the impact of the dredging works and to ensure that the diversity of interests in this area were not compromised. A successful outcome was achieved through a wide consultation process and continued dialogue between Flood Defence and Conservation, with the landowners, the District Council, the Wildlife Trust and English Nature, both before and during the operation.

The Brecks River Restoration Project -Phase II

Past management practices have straightened and over-deepened watercourses which have resulted in ecologically degraded rivers within the Brecklands. This has resulted in the loss of in-river habitat diversity eg. river margins and spawning areas for fish, and caused floodplain wetlands to dry out. The need to restore the ecological value of the rivers in this area was identified in the Ely Ouse Catchment Management Plan.

Phase II marks the final phase of a four year programme of river restoration works in the Brecks. The project commenced in 1994 with a series of project specifications following detailed appraisals of existing river corridor survey data and site appraisal. The preceding years have seen restoration works carried out on the River Little Ouse through the British Trust for Ornithology land in Norfolk (1994), the Little Ouse at Knettishall Country Park (1994), the River Sapiston at Sapiston and the Culford stream at Culford School in Suffolk (1995).

The project involves the restoration of meanders cut off in the 1960's to the straightened channel on the upper reaches of the Little Ouse at Garboldisham. In consultation and collaboration with the Suffolk Wildlife Trust and the landowner the aim of the project is to restore and enhance both the instream and wider river corridor habitats and raise the water retention levels. The straightening and deepening of the river has caused the fen soil to dry out and lose its structure thereby decreasing the quality of land for grazing. A modular approach over a two year period has been taken, with year 1 (1996/97) including the feasibility and design and initial meander construction, and year 2 (1997/98) covering meander design, construction and installation, and the introduction of water flows from the straightened channel into the newly constructed meanders.

Photo 24 The deep trapezoidal channel of the Little Ouse. Meander restoration carried out on the right hand bank.

Photo 25 Environment Agency contract staff with the hydraulic excavator used to restore the meandering channel. Arrows show direction of flow.

Management of Willows on the River Great Ouse

The practice of pollarding willows has been largely abandoned by landowners in recent years, resulting in mature and unmanaged trees vulnerable to wind and ice damage. This project aims to manage trees in support of the Ouse Valley Willows Strategy (supported by Huntingdonshire District Council, the local Wildlife Trust, and as part of the Ouse Valley Countryside Partnership). The pollarded willows will greatly benefit wildlife as well as obviating tree collapse risks to the Flood Defence and Navigation functions.

The first year of this 4 year project involved surveying tree health and management need in the Godmanchester and Huntingdon area. Forty nine willows were identified for urgent management and selected for pollarding. A variety of pollarding methods (high pollarding, pollarding at original cut and removal of dead wood) were used on the chosen trees depending on health, age and past management. To limit any adverse effects of this work on wildlife associated with the trees, a maximum of one third of the trees at each site were pollarded.

Photo 26 Willows in need of management

Photo 27 After pollarding

2.3.2 Northern Area

Aquatic Planting - River Welland, Spalding

2000 reeds were planted along the banks of the River Welland to increase species diversity following completion of bank protection stoning works. The reeds used were taken from local borrow pits.

Northampton Biodiversity Action Plan

The Agency contributed to the cost of producing the Northamptonshire Biodiversity Action Plan. It was produced in association with the Northamptonshire Nature Conservation and Landscape Forum.

River Glen Reed Bed Management

This work was carried out by Flood Defence who dredged the existing Agency-owned borrow pits. The material gained by dredging has been placed at the toe of the Glen embankment to dry. This material will be available in the future for bank repairs. Following liaison with the Lincolnshire Wildlife Trust the dredging has been designed to give maximum habitat enhancement. The existing borrow pits had been completely covered with common reed, and dredging has provided open water and additional habitat, retaining undisturbed areas. The water levels were raised by diverting flow from an adjacent ditch.

Maud Foster Tree and Shrub Management

Following a survey of non-native locust trees on the banks of the Maud Foster Drain owned by the Agency, it became obvious that to meet safety obligations some removal was necessary. Some of the trees were pruned, others had branches lopped and twenty four of the worst trees were felled. Thirty small leafed limes have been planted to replace the felled trees. As the remaining locust trees deteriorate they will also be replaced with native species over the coming years.

Difficulties experienced in gaining access to dredged material passed to the bank toe by a pontoon sites hydraulic machine were remedied by creating gaps in a wide hedge. This hedge consisted mainly of hawthorn, with some elder, ash and sycamore. Re-instatement of the bank following the completion of the dredging involved the planting of 500 trees and shrubs including a greater variety of native species, including blackthorn, hazel, dogwood, dog rose and wild privet. Grass mixture of birdsfoot trefoil, filed scabious, red campion and yellow rattle was also sown. This replanting will help to add diversity for the birds and insects that frequent the bank and enjoyment for the many walkers who use the area.

Protection Of Badger Setts

Loss of natural habitat has led to badgers looking for new sites to develop their colonies. The relative solitude of our watercourses and the badger's preference for using banks to ease sett construction has led to them adopting several of our embankments for colonisation. In some cases this has caused the entire width of the embankments to be breached and seriously compromised the standards of flood defence. Working with MAFF and complying with the requirements of the Badger Act, the Agency has been successful in restoring the flood capacity of watercourses by piling around setts with minimal disturbance to their occupants. All the colonies remain active but are now protected from rising water levels, as is the adjacent farmland.

Barn Owl Survey

Since 1989, the Agency and its predecessors, in conjunction with the Hawk and Owl Trust, have continued a project to build and erect Barn Owl boxes along some Lincolnshire river banks. In total 24 sites have had boxes erected, with two boxes at each site. 1997 has proved to be the most successful year with 10 breeding pairs of Barn Owls and one Tawny Owl using the boxes.

Kettleby Beck Improvements

Topographical surveys confirmed the need to raise the right bank of the Kettleby Beck for approximately 100 metres of its length at its confluence with the River Ancholme. Aquatic plant diversity is relatively high for the area along this length. Whilst the bank was being re-profiled the opportunity was taken to construct a 2-3m wide wet berm in what was previously a trapezoidal channel. This will provide a niche for marginal plants to develop, increasing floral diversity and providing habitat for associated fauna.

Great/Long Eau Restoration Project

Following work to restore flood washland and such riverine features as riffles, a 2 year study was commissioned from the University of Birmingham to determine the impact of this work on the invertebrate population. During 1996, the second year of sampling, work was undertaken and a report compiled to demonstrate the impact.

Photo 28 A riffle site where invertebrate surveying was undertaken

2.3.3 Eastern Area

Cornard Mere

Cornard Mere is a Site of Special Scientific Interest designated for its value as a wet fen. Water levels at the site had been dropping significantly due to an adjacent public water supply borehole. To remedy this problem, the Agency, in collaboration with Suffolk Wildlife Trust (who manage the site) and Anglian Water Services, excavated a scrape to restore aquatic plants. This year a small pipeline was installed by the Agency which will provide a guaranteed water supply to this important wetland site. AWS have agreed to supply water free of charge.

Photo 29 Cornard Mere SSSI

Wensum SSSI Conservation Strategy

A Conservation Strategy has been written in line with the Agency's and English Nature's Memorandum of Understanding for SSSI rivers, through close liaison between English Nature and numerous functions of the Agency. The strategy outlines the priorities for management of the river to protect and enhance its wildlife value. The strategy will out for consultation in 1997/98.

Stow Fen

A pipe was installed to carry water from the River Waveney to the backwater within Stow Fen (common land). De-silting is proposed for this year to open up the backwater. This enhancement work will recreate the traditional wetland habitat present within the Broads Environmentally Sensitive Area (ESA). The work was carried out in collaboration with Flood Defence.

Cattawade Reedbed Restoration

The Environment Agency own two areas of land at Flatford on the River Stour, which lie within Cattawade Marshes SSSI, SPA and Ramsar site. This area is an important reedbed which over the years has become overgrown with invasive vegetation. In an attempt to improve the value of the reedbed, a scheme was set up in collaboration with Flood Defence and with the agreement of English Nature. The smaller plot of Agency owned land was cleared and the top soil removed to leave only the rhizomes of the reeds remaining. A penstock was then installed to allow freshwater to inundate the site. This spring the rhizomes of the reeds are beginning to grow which should lead to the re-creation of a healthy reedbed. English Nature are monitoring the progress of this scheme to assess suitability for projects elsewhere. It is hoped that the larger area of land owned by the Agency will be restored at later date if this scheme is a success.

Photo 30 Spoil being removed to create reedbed

Photo 31 Reeds beginning to establish

Freshwater Creeks for Waterfowl

Research investigating the importance of small freshwater creeks for waterfowl on estuaries has been carried out in collaboration with English Nature and undertaken by Suffolk Wildlife Trust. The research is looking into a case study on the Orwell Estuary (SSSI/SPA) and is designed to assist in the formulation of an abstraction policy for winter water from small freshwater streams issuing into estuaries designated as SPA's or candidate SAC's, to ensure their importance for waterfowl is maintained.

Stour - Orwell Estuaries Management Plan

The Stour and Orwell Estuaries Management Plan is an integrated approach to the management of these SSSI and SPA designated estuaries. The plan aims to promote the sustainable use of the estuaries through the management of human activity in a way which is compatible with the conservation of the estuarine ecosystem. The Agency contributed towards the draft and final plan production.

County Wildlife Site Identification

Norfolk, Suffolk and Essex Wildlife Trusts are participating in a collaborative project

to identify and designate riverine and seawall county wildlife sites (CWS). Using information held within the FRCN Department (survey data), the Trusts are identifying the most important 500m stretches of river and seawall in each county for inclusion in CWS directories. These directories will be updated annually as new survey data becomes available. This information will be used by FRCN to prioritise workloads and to ensure that the most important aspects of our rivers are protected.

Framlingham Mere Restoration

The Agency contributed towards an application for lottery money for the restoration and enhancement of Framlingham Mere in collaboration with Suffolk Wildlife Trust and Framlingham College. The mere is an important shallow lake at the foot of the ramparts of Framlingham castle. Surrounded by flower-rich meadows and fen, the mere is an important wildlife, landscape and archaeological feature. Over the years the mere has silted up and has become enriched from agricultural run-off. The scheme, if successful, will restore the mere and its landscape and will improve access and educational potential.

Photo 32 Framlingham Mere and Castle

Hickling Ochre

This experimental scheme using bark chips to remove ochre from Hickling Broad National Nature Reserve was undertaken in collaboration with Norfolk Wildlife Trust. If successful, this will be a useful and cost effective way of removing ochre which has become a huge problem in the Upper Thurne area.

Holme Water Control Structures

This project was undertaken in collaboration with Norfolk Wildlife Trust. A water control structure was placed at the end of Broad Water, a very important brackish lagoon within the North Norfolk Coast SSSI, cSAC, SPA and Ramsar site.

Darsham Marshes Habitat Improvements

Darsham Marshes is a County Wildlife Site owned and managed by Suffolk Wildlife Trust. The marshes are an important haven for many wetland plants and animals such as bog bean, marsh orchid and snipe. In collaboration with Flood Defence, a pond was created within the marsh. It is hoped that the pond will encourage the spread of wetland species and improve the overall habitat diversity of this important reserve.

Photo 33 New pond at Darsham Marshes

River Gipping Habitat Improvements

In collaboration with Flood Defence and the landowner, a riffle was created in the River Gipping at Baylham. This stretch of the River Gipping is designated as a County Wildlife Site for the wide diversity of habitats and species present. The riffle has created a greater flow diversity which has added to the habitat diversity of this important stretch. A riverside path runs the length of the valley which makes this stretch important for recreation as well.

Photo 34 New riffle on the River Gipping

Easton Valley

A water level management plan has been completed for Easton Valley (SPA). The project was entered into the Bittern project and has received European funding under the LIFE budget. Work to improve water level management has been planned and will be completed in 1997/98.

Brackish Lagoon Restoration

The first stage of this scheme to re-create brackish lagoons at Buss Creek, Southwold has been completed in collaboration with Flood Defence. A 150m stretch of watercourse was excavated to remove silt and reed, which restored open water in the channel. This has extended the area of brackish lagoon at Buss Creek significantly. In

Britain, brackish lagoons are extremely rare (the Suffolk brackish lagoons account for 8% of the National resource). In a European context, brackish lagoons are one of only three habitat types in the country that are identified in the EC Habitats Directive as being top priority for conservation in Europe.

Deben ALF

Proposals to alleviate low flows in the River Deben have been developed as a multifunctional project. The FRCN department is leading on proposals to enhance the river channel to ameliorate the impact of low flows. Various enhancements have been developed, by Leicester University under contract, to be completed in 1997/98.

Biomanipulation R&D

A study to identify the role and management of fish populations in biomanipulated Broads has been started under contract to the Institute of Freshwater Ecology (IFE). This desk and seminar based R&D will be completed by early 1998.

Minimum Environmental Standards

A set of minimum environmental standards has been drawn up in consultation with Flood Defence to ensure best practice for conservation work in rivers. Training was given to Area Flood Defence and Direct Services staff on these standards and future on-site training is planned for the summer.

River Stour Pollards

The results of a pollard survey produced for the Agency by the Dedham Vale and Stour Valley Project was used to identify willows adjacent to the river requiring work. In collaboration with Flood Defence, a number of willows were pollarded as part of a 10 year works programme. This work will prolong the life of the willows which are an important landscape feature.

2.4 NAVIGATION

2.4.1 Central Area

River Great Ouse Navigation

During 1996/97, the Central Area Team completed one of the largest ever winter programmes of navigation improvements on the River Great Ouse. Many of the work items from future years were able to be brought forward due to the late release of

additional funds. The capital budget allocation for 1996/97 was £305,000, more than double normal expenditure. All of the work was completed by Easter 1997, despite being delayed by the big freeze up and last minute changes to work specifications.

Brandon Lock

Work was completed on the construction of a 48 hour mooring at the head of the Agency's navigation on the River Little Ouse in Brandon. This mooring provides ease of access to Brandon Town for boats which have navigated the new lock at Brandon. Following extensive discussion with The Great Ouse Boating Association (GOBA), a new lock landing stage will be installed downstream of Brandon Lock. The original 48 hour mooring downstream of the lock will remain in use.

Photo 35 New landing stage in Brandon

Landing Stage Improvements

Following concerns raised by boaters and GOBA members, a variety of improvements to lock landing stages were carried out at the following locks: Roxton, Willington, Great Barford, Castle Mills and Cardington. Works included the installation of hand-rails, and new timbers. The downstream landing stage at Great Barford Lock and one of the Roxton stages have had to undergo major rebuilds due to deterioration in the timbers. A non-slip surface coating was applied to all of the landing stages.

Eaton Socon Lock Widening

The major project during 1996/97 was the widening of Eaton Socon Lock in St Neots. The construction of an extra bay inside the lock chamber allows more boats to pass through in each locking operation, thus easing congestion at the lock during peak periods. The design of the extra bay was modified following consultation with GOBA. Trialling of vertical tethers inside the lock pen was also carried out which should aid in securing boats during the locking process. Customer feedback has so far been most positive.

Photo 36 Lock widening of Eaton Socon lock

Photo 37 Boat using newly completed lock

Bottisham and Isleham Lock Controls

A project to rewire and refurbish the control panels on these locks to ensure that they operate reliably through the coming season has been completed.

Lock Fenders

Boaters have been experiencing difficulties entering Houghton Lock from the upstream side due to cross winds and a silt shoal. Wooden fenders have been installed to make entry to this lock easier. Vertical fenders have also been installed on the entrance to Salters Lode Lock on the Tidal River Ouse.

Refurbishment of Locks

Both Hemmingford and Cardington Lock vee doors have become increasingly difficult to operate over recent years. Hemmingford Lock was dammed off and works to re-set the cill and the pintle which holds the door were completed and repainting of doors was also carried out. Further safety improvements to the landing stage were completed, including the replacement of rotten timbers, repairing damaged concrete surfaces and repairing the steps up to the lock. Similar works to the vee doors at Cardington were also completed. The brickwork facing of Offord Lock was also repaired.

Hermitage Lock

Major refurbishment works were completed at Hermitage Lock on the Old West River. The Lock was drained and inspected with both doors being repainted. The hydraulics were inspected, new pipelines installed and the wall joint seals replaced. The Agency is also experimenting with the fitting of vertical boat tethers at this lock.

Old Bedford Sluice

The operation of the Old Bedford Sluice which links the Old Bedford/Counter Drain with the Tidal River and thence the Middle Level and Great Ouse has experienced difficulties in recent years. The Agency has discussed the issue with GOBA and the local branches of the Inland Waterways Association to find a way forward. The Agency undertook dredging both in the Old Bedford/Counter Drain and around the sluice doors in an effort to clear the navigation. The silt poses a further problem in that water levels in the Tidal River now frequently fail to fall to a level which enables the sluice doors to be opened - the sluice doors can only be opened at level water. Further difficulties have been experienced in the operation of the doors. The tidal doors were therefore dammed off and inspected during February and March. Despite all the efforts of the Agency, the silt in The Tidal River now means that no navigation is currently possible between The Tidal River and The Old Bedford/Counter Drain.

Lock Security

In response to a recent upsurge in damage to lock control panels, security boxes have been installed at several locks. The security box encloses the lock control panel and can be operated with a standard lock handle. It is hoped that this will deter the "casual" vandal. Boxes have been installed at Cardington, St Neots, Houghton, Eaton Socon, Brampton and St Ives Locks. The Agency is experimenting with a variety of simple and cost effective methods for ensuring that the boxes are self closing, whilst also being accessible only to those people in possession of a lock handle.

New Signage

All locks, navigation structures and facilities in the Central Area have now been re-signed as part of a national initiative. The new signs have greatly assisted boaters in their use of the rivers, as well as improving the general appearance of the navigation.

Brownshill Staunch Refurbishment

Many of the old water retention structures on the Great Ouse river system are ageing and in various stages of disrepair or even collapse. During 1996/97, the navigation function funded essential emergency works to Brownshill Staunch, adjacent to Brownshill Lock. Without such works having been completed, there is a risk that the structure would have collapsed and water levels retained for navigation lost.

2.4.2 Northern Area

River Nene Water Level Management Strategy

The River Nene is a particularly important navigation, as it links the Grand Union Canal at Northampton to Middle Level, the Great Ouse system and the Wash. Although the navigation was originally commercial it is now almost entirely used for recreation. The Environment Agency is the Navigation Authority on the Nene navigation, which extends from Northampton to Bevis Hall, Wisbech. The Nene navigation system is artificially controlled by a series of lock structures, mill structures, by-pass channels, weirs and sluices at 39 different sites over its 128km length. A number of these structures date back to the 17th and 18th century. Maintenance of the existing structures and navigation channel is an ongoing process. Opportunities to enhance recreational facilities are also pursued. Refurbishment of structures can range from minor repair works to complete replacement. Annual maintenance of the watercourse itself, for example grass cutting and weed control is undertaken, at a cost of approximately £830K.

A major construction survey is nearing completion for the 54 weir and 42 sluice structures on the Nene navigation, as many are nearing the end of their useful lives. The purpose of these structures is two fold, retaining water levels which are essential

for navigation and other recreational uses during the summer, whilst permitting the passage of flood flows in winter. The investment involved in securing the long term benefits of these structures is considerable, and is currently being investigated under Environment Agency's Nene Valley Water Level Management Strategy. This is a strategy of considerable magnitude, involving extensive consultations with all river user groups, such as county, district and parish councils, angling, wildlife, sports and recreational organisations, landowners, developers, mariners and boatyards.

River Nene Lock Refurbishment

The Nene navigation has 38 locks, the majority of which were reconstructed in the 1930's. The Agency and it's predecessors have a planned programme to refurbish three locks per year. Refurbishment is distinct from routine maintenance in that it involves the closure of the navigation and the complete de-watering of the lock, in order to allow repair work on the whole lock structure. This extends the life of the lock, minimises leakage and ensures that lock operation is acceptable. To minimise disruption to boat traffic, this refurbishment takes place during the autumn/winter period.

2.5 ENVIRONMENTAL ASSESSMENT (EA)

2.5.1 Basis Principles

There are two broad areas of environmental assessment work:-

- input to the Agency's operational role through the project appraisal process
- the promotion of a 'best practice' approach to environmental assessment through liaison with staff from all functions including those involved in the Agency's regulatory and advisory roles

2.5.2 Involvement in the Project Appraisal Process

The main role of EA staff centres on involvement in project appraisal as members of multi-functional teams planning Flood Defence and Water Resources Strategies and Projects. The level of input varies according to the nature, size and location of works and their likely environmental significance. For the most part, EA involvement is on project teams and for large projects such as the Lower Witham and the Broadland Flood Alleviation Strategy.

Guidance on environmental assessment requirements is provided in accordance with legislation and the 'best practice' approach promoted by the Agency. EA staff work closely with Flood Defence and Water Resources project managers to provide terms of reference for formal Environmental Assessment, Environmental Appraisals, Strategic Environmental Assessments, Shoreline Management Plans, baseline studies and monitoring contracts; draw up tender lists of appropriate consultants; assess tender documents and project manage the appointed consultants.

Environmental Assessment input has been provided to 63 flood defence and water resources projects, 6 flood defence strategies and 5 shoreline management plans. These are shown in table 2.5.1 and selected descriptive summaries of the work involved in a range of the schemes is also given.

ENVIRONMENTAL ASSESSMENT INPUT TO AGENCY FLOOD DEFENCE AND WATER RESOURCES CAPITAL PROGRAMMES

Table 1 Showing Agency Flood Defence and Water Resources Capital Projects and Strategies With Environmental Assessment Input

PROJECT NAME	PROJECT DESCRIPTION	AREA
DEBEN ALF	ECOLOGICAL MONITORING	E AREA
HAPPISBURGH TO WINTERTON	COASTAL EROSION	E AREA
LINCSHORE	BEACH RECHARGE	N AREA
BROADS MONITORING	ENVIRONMENTAL MONITORING	E AREA
BROADS C 36 LEA	LEA	E AREA
BROADS C 11 LEA	LEA	E AREA
BROADS C 22 LEA	LEA	E AREA
HUMBER URGENT WORKS	COASTAL DEFENCE WORK	N AREA
ELY OUSE UNIT 1 AND 2	ea - FLUVIAL WORK	C AREA
ELY OUSE UNIT 3 TO 9	ea - FLUVIAL WORK	C AREA
RIVER NAR	ES - FLUVIAL WORKS	C AREA
WALLASEA TIDAL DEFENCES	TIDAL DEFENCES	E AREA
BOSTON SEA LOCK	PRELIMINARY STUDY INTO FEASIBILITY	N AREA (COMPLETE)
ARTS 4	TELEMETRY SYSTEM	ALL AREAS
JAYWICK TO COLNE POINT	COASTAL DEFENCES	E AREA
TENDRING HOLLAND	TIDAL DEFENCES	E AREA (ON HOLD)
BATTLESBRIDGE/ HULLBRIDGE	FLUVIAL WORK	E AREA
SKEGNESS/GIBRALTAR PT STRATEGY	COASTAL WORK	N AREA (COMPLETE)
LAGOON WALK (SKEGNESS)	URGENT COASTAL WORKS	N AREA (COMPLETE)
WELMORE LAKE SLUICE	REPLACEMENT OF SLUICE	C AREA (COMPLETE)
EAST RUSTON COMMON ALF	ECOLOGICAL MONITORING	E AREA
IPSWICH FLOOD DEFENCES	COASTAL DEFENCES	E AREA (COMPLETE)
CLACTON SEA DEFENCES	COASTAL DEFENCES	E AREA
HUNSTANTON HEACHAM MON	MONITORING	C AREA
BAWDSEY E. LANE SEA DEFENCES	COASTAL WORK	E AREA (COMPLETE)
OULTON BROAD FLOOD DEFENCE	INLAND FD IMPROVEMENT	E AREA

PROJECT NAME	PROJECT DESCRIPTION	AREA
TEMPSFORD MILL, R. IVEL	SLUICE INVESTIGATION	C AREA
R. WAVENEY ULTRASONIC STAT.	ea - GAUGING STATIONS	E AREA (COMPLETE)
ALTHORNE TO N. FAMBRIDGE	TIDAL FD IMPROVEMENT	E AREA
SLAUGDEN FLOOD DEFENCES	COASTAL MANAGED RETREAT. EARLY FEASIBILITY	E AREA (ON HOLD)
LOWER WITHAM STRATEGY	FLOOD DEFENCE STRATEGY AND SEA	N AREA (COMPLETE)
HUMBER ESTUARY EBS	ENV BASELINE STUDY FOR SMP AND SEA	N AREA
STAMP END LOCK/FISKETON SLUICE	FEASIBILITY STUDY FOR 11KM OF FD IMPROVEMENTS	N AREA (COMPLETE)
WASHBANKS	COASTAL FD IMPROVEMENTS	N AREA
RIVER HIZ OUGHTON & PURWELL	ECOLOGICAL MONITORING	C AREA
HUNSTANTON/HEACHAM	REVIEW & STRATEGY & SEA FOR COASTAL WORKS	C AREA (COMPLETE)
BLACK DYKE PS	MONITORING PROGRAMME FOR WEED PROBLEM	C/E AREA
RIVER ANCHOLME	FEASIBILITY STUDIES & eas FOR INLAND FD WORKS	N AREA
R. WITHAM OUTFALL STONING	ea FOR INLAND FD WORK	N AREA
BOURNE EAU ENHANCEMENTS	ENHANCEMENTS	N AREA (COMPLETE)
BOSTON RIVER WALLS	ea FOR INLAND FD WORKS	N AREA (COMPLETE)
WASH R. OUTFALLS STRATEGY STUDY	ea FOR SEDIMENTATION PROBLEMS - GT OUSE	C AREA
WEEDON BEC	TO REVENUE PROJECT. CONSULTN WITH AREA STAFF UNDERWAY	N AREA
WELLAND & NENE RESERVOIRS	FEASIBILITY STUDY & ea	N AREA (COMPLETE)
N/HAMPTON FD & STRUCTURES	INLAND FD IMPROVEMENTS	N AREA
CHAS/ROSES	CHELMER RIVER AUGMENTATION - RE-USE OF SEWAGE	E AREA
LINCOLNSHIRE SMP	SMP	N AREA COMPLETE FOR NOW
HECAG SMP	SMP	N AREA
WASH SMP	SMP	ALL AREAS (N AREA LEAD)
NORTH NORFOLK SMP	SMP	E AREA
ESSEX SMP	SMP	E AREA
RIVER RASE	FLUVIAL FLOOD DEFENCE WORK	N AREA
HOLME TIDAL DEFENCES	COASTAL FLOOD DEFENCE WORK	E AREA
COASTAL WILDLIFE	DATABASE OF COASTAL WILDLIFE	REGIONAL

PROJECT NAME	PROJECT DESCRIPTION	AREA
HOLLESLEY PUMPING STATION	LAND DRAINAGE PUMPING STATION REFURBISHMENT	E AREA
RIVER NENE PHASE B 1 & 2	TIDAL FLOOD DEFENCE IMPROVEMENT WORKS	N AREA (COMPLETE)
STAMP END LOCK TO FISK SLUICE	900M OF URGENT WORKS	N AREA (COMPLETE)
RIVER GLEN STRATEGY REVIEW	STRATEGY FD REVIEW AND SEA	N AREA
ELY OUSE MONITORING	ENVIRONMENTAL MONITORING	C AREA
PARKESTON & BATHSIDE BAY	TIDAL DEFENCE WORK	E AREA
ARTS 3	TELEMETRY	ALL
LAGOON WALK	COASTAL WORK	N AREA
HUNSTANTON/HEACHAM UW	URGENT COASTAL DEFENCE WORK	C AREA (COMPLETE)
CORONATION CHANNEL PH 4	FLUVIAL FLOOD DEFENCE WORK AND EA	N AREA
CRADGE BANK PH 2 (WELLAND)	FLUVIAL FLOOD DEFENCE WORK AND EA	N AREA
NENE TIDAL LIMIT	SCOPING STUDY FOR CHANGING TIDAL LIMIT	N AREA (COMPLETE)
RIVER FRESHNEY	FEASIBILITY STUDY AND EA FOR INLAND FD WORKS	N AREA

2.5.3 Broadland Flood Alleviation Strategy (BFAS) - Environmental Monitoring

The Flood Alleviation Strategy for Broadland establishes and justifies the objective of sustaining the current standard of flood defence throughout the area. The Strategy proposes a ten year programme of bank strengthening and erosion protection works followed by a rolling programme of works at 15 year intervals to maintain the defences and counter settlement and sea level rise over the next 50 years. The first 10 year programme of works is estimated to cost £63 million.

Monitoring, as identified in the BFAS Strategic Environmental Assessment (SEA), provides baseline information to assess impacts and changes resulting from flood defence works. The estimated total cost of the 5 year monitoring proposal is £323k. This is contained within the overall Scheme costs for Broadland and the benefit/cost ratio is therefore not compromised.

Environmental Constraints In Broadland

Environmental constraints figure highly in the Broadland area. A large proportion of the Area is protected by national and international legislation. It is a noted area for conservation, recreation and navigation, with 17,000 craft using the waterways and over one million visitors each year and it is also a working agricultural area. Additionally, there are many properties which are undefended and subject to flooding at present. Their flood risk will increase without sympathetic implementation of the Strategy.

Strategic Environmental Assessment and Environmental Acceptability and Enhancement Criteria

A Strategic Environmental Assessment has been prepared which provides the fundamental code of practice for the area. This has completed an extensive consultation period and comments are now being reviewed and embodied in a revised final document. Environmental acceptability and enhancement criteria have been developed as part of the SEA through Consultation Forums. These provide the objectives within which works are planned and monitoring undertaken.

The Environmental Assessment process carried out as part of appraisal and design will ensure that all Schemes meet the criteria at the option selection and design phases, and that the site supervision will further ensure that the criteria are adhered to during the construction phase. The SEA identifies monitoring as an essential part of this process.

The Objectives of Monitoring

The objectives of monitoring are to:-

a) Determine if the BFAS has satisfied the environmental acceptability and enhancement criteria at a Broadland (Strategic), Flood Compartment (Local)

and Site Specific level;

b) Provide a baseline of information against which future flood defence engineering induced changes in the Broadland environment can be assessed;

c) Review the effectiveness of all environmental mitigation and enhancement work associated with flood defence schemes;

d) Ensure that the BFAS has not adversely affected any sites of international conservation importance;

e) Establish an annual consultation, feedback and review exercise that will ensure that all future environmental engineering work is designed and implemented on the basis of lessons learned from past schemes.

It is anticipated that the monitoring proposals set out in this report will receive grant aid from MAFF as part of the BFAS. To qualify for grant aid, the monitoring must be clearly shown to be the minimum needed to determine potential impacts of the flood defence scheme. The Agency cannot fund monitoring in excess of this from the flood defence budget.

Consultation

The monitoring proposal has been developed to make best use of existing Environment Agency data sources and monitoring initiatives. To this end, extensive consultation has been undertaken with Agency functions and outside organisations such as English Nature and the Broads Authority.

Management Framework

The monitoring proposal has been developed to ensure the Agency complies with, and can demonstrate compliance with, the environmental acceptability and enhancement criteria set out in SEA. It has been developed to be undertaken within the project management framework set out in the BFAS and the SEA. The framework is shown diagrammatically below:-

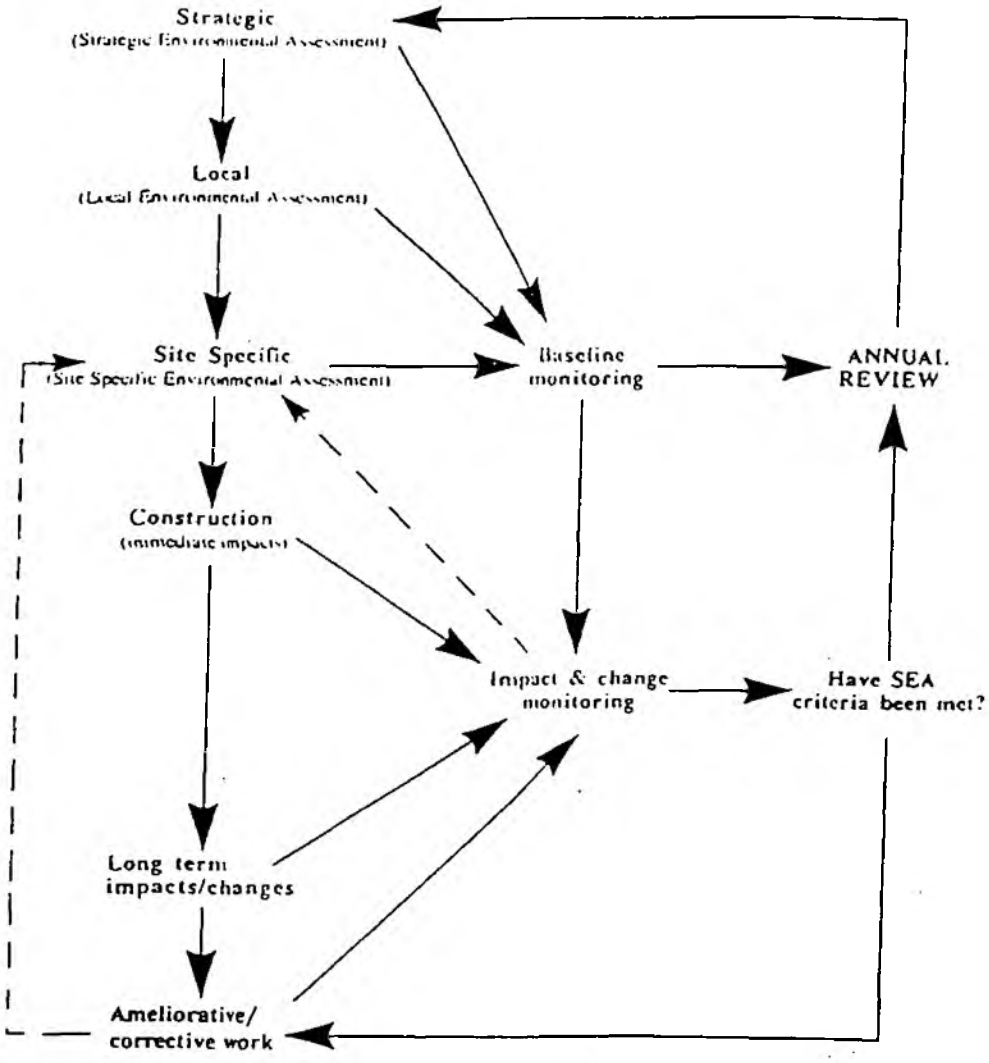


Figure 1 The Broadland Flood Alleviation Strategy Monitoring Framework (dashed arrow implies a learning process to be incorporated in the review and feedback exercise)

2.5.4 Broadland - Environmental Assessments completed Compartments 11,22 and 36

Background

The Anglian Region of the Environment Agency has embarked on a 10 year programme of works to improve the existing flood defences in Broadland. These works are part of an overall strategy (Broadland Flood Alleviation Strategy) to sustain the condition of the defences without raising the long-term standard of protection they provide, and are essential if the existing natural and man-made character of Broadland is to be maintained.

All of Broadland and parts of Gt Yarmouth lie below the highest river levels that can occur and are therefore susceptible to flooding and to combat this the rivers are contained behind flood embankments. The most damaging events occur when marine surges and tides combine to cause abnormally high sea levels.

A Strategic Environmental Assessment (SEA) of the Broadland Flood Alleviation Strategy (FAS) was undertaken in 1995. Much of the amenity value of Broadland lies in its expansive navigable waterways and a variety of other recreational pursuits including fishing, walking, sightseeing, bird watching, and simple enjoyment of the countryside. Today it is estimated that the rivers and Broads are seen by at least one million people every year.

As a result of the history and past management of the Norfolk Broads they have retained a considerable nature conservation interest such that large areas have been designated as nationally and internationally important.

Broadland is divided into 40 Compartments and in line with the management framework set out in the Strategic Environmental Assessment, Local Environmental Assessments (LEAs) will be prepared for proposed flood defence works in each Compartment in parallel with the engineering and economic appraisal of options. LEAs have been completed for Compartment 11, Compartment 22 and Compartment 36. The LEAs have ensured that the options promoted comply with the environmental objectives ("environmental enhancement and acceptability criteria" established by the SEA).

The works which will involve flood bank strengthening, raising, and re-alignment and erosion protection will facilitate considerable environmental enhancement opportunities, particularly where floodbank re-alignment is undertaken. This option facilitates the creation of new wetland habitat along the river margin and avoids the necessity to install expensive erosion protection measures. Further environmental assessment will be undertaken for individual works at the detailed design stage for contracts and sites within each Compartment resulting in the production of statutory Environmental Statements.

Photo 38 Typical aerial view of Broadland

2.5.5 Lower Witham Strategy Study

Background

The Lower Witham Flood Relief Strategic Study covers the flood defences on the River Witham system and its tributaries between Lincoln and Boston. The river system has 300 km of flood embankments protecting residential properties and highly productive farmland which has national economic significance. The current flood defences are of concern because breaches and overtopping of embankments have occurred, and erosion of berms is continuing. Future settlement of embankments and sea level rise will make conditions worse, and increase the possibility of failures. The sustained economy of the study area is dependent on effective flood defences. The strategic study has determined an overall strategy for flood defence of the whole area.

Strategic Environmental Assessment

A Strategic Environmental Assessment has been undertaken as part of the development of the strategy to ensure that options are environmentally acceptable as well as being technically and economically viable. The SEA involved establishing the environmental baseline for the study area, establishing environmental objectives, looking at the environmental acceptability of a range of options and identifying mitigation, enhancement and monitoring recommendations. Fundamental to the whole process has been an extensive consultation exercise which involved formulating a consultation document, requesting comments and having subsequent meetings with key interested

bodies and individuals. Ten environmental objectives for the strategy have been established including "maintain and enhance the river corridor" and "take full account of heritage and archaeology". The following strategic options have been evaluated against each of the objectives:

- Do Nothing
- Reactive Maintenance
- Sustain at existing standard
- Improvement options to various standards of protection (1 in 25 - 1 in 100)

  (a) Containment (1 in 25, 50 and 100 year standard of protection)
  (b) Flood Storage (1 in 25, 50 and 100 year standard of protection)

The Strategic Environmental Assessment concluded that carefully designed storage options gave the most environmentally acceptable solution and offered the most potential for environmental enhancement.

The Future

The strategy study has recommended that a phased improvement scheme be adopted, based on providing defences to a 1 in 25 year standard. This will be achieved by continued routine maintenance, phased improvement of embankments and re-establishment of berms over approximately 130 km and providing flood storage areas at key locations. Additional sources of funding are also being pursued which could enable a storage scheme with a 1 in 100 year protection to be undertaken which would be more environmentally beneficial. The SEA will provide a future framework for use in developing individual projects and in undertaking scheme specific environmental appraisals.

2.5.6 Rivers Hiz, Oughton and Purewell - Ecological Monitoring of Alleviation of low flows scheme

Background

The Rivers Hiz and Oughton have suffered low flows in recent years, which has been attributed to the abstraction of groundwater to meet the public water supply needs of a growing local population. The spring flows have been reduced in the upper Hiz resulting in the drying out of the stream, particularly during periods of drought. In addition, Oughtonhead Common, previously a spring-fed wetland of national importance, has dried out to such an extent that it lost its Site of Special Scientific Interest status in the 1970's.

The Environment Agency and the public water supply company, Three Valleys Water have worked together to find a solution to the low flow problem and as a result of detailed studies, various works have been implemented. This has included the reconstruction of a weir structure on Oughtonhead Common and the diversion of groundwater to the river systems during periods of drought by the modification of boreholes.

Ecological Monitoring

A three year ecological monitoring project has been instigated to establish the success of the alleviation of low flows scheme. Six survey sections have been chosen, two on the River Hiz, three on the River Oughton and one on the River Purwell. In addition, surveying of Oughtonhead Common is also being undertaken. For each of the stretches, the following monitoring has been carried out by Agency staff and consultants working for the Agency:

- Hydrological monitoring (eg current and water levels)
- Physical parameters (eg cross sectional profiles and substrate size and composition)
- Chemical water quality (eg biochemical oxygen demand and total organic nitrogen)
- River Habitat Surveys which look at physical characteristics and features of the bank and channel, land use and vegetation structure.
- River Corridor Surveys which look at channels and bank characteristics, land-use, vegetation, fauna, river management, amenity use, threats and potential enhancements.
- Vegetation surveys. This involves placing permanent quadrats at locations in channel, at the river margin and on the bank. In addition, vegetation surveys of Oughtonhead Common are being undertaken.
- Macroinvertebrate sampling.
- Fishery surveys
- Bird surveys

The Future

The first year of fieldwork has been completed and the programme will be continued for at least another two years.

2.5.7 Humber Estuary Tidal Defences - Procedure for Ensuring Consistency in the Delivery of Urgent Flood Defence Works

The three Regions, of the Environment Agency which have responsibility for the Humber Estuary (Anglian, Midland and North East) are collectively responsible for c. 250 kms of flood defences. To maintain these defences requires major expenditure in both the short term (estimated to be c. £20m over the next five years) and long term (estimated to be c. £120m over the next 20 years). In line with the Agency's environmental strategy there is a strong commitment from the Agency and other key interests that this work should be planned on an estuary-wide basis which reflects local needs, those of the Estuary overall and Local Authorities long term plans.

Short Term and Long Term Flood Defence Planning

The long term approach to the Estuary will involve the development of an Estuary based Shoreline Management Plan (ESMP). In the meantime it is essential that the Agency promotes works, referred to as 'Urgent Works', on the Estuary in advance of long term strategy development. It is essential to ensure that there is consistency across the three Regions in terms of how this work is identified, planned, prepared and delivered.

Procedures for Urgent Works

Procedures have been developed for the project management of the identification, appraisal and design of Urgent Tidal Defence Works on the Humber. These are not intended to replace existing requirements, rather they are intended to give added value through ensuring consistency and meeting the needs of the Estuary.

These procedures are documented in an Agency Manual 'Humber Estuary Tidal Defences: Procedure For Ensuring Consistency Of Approach'. By developing the procedures through an open consultative approach the Agency has ensured that all interested parties both within the Agency and externally are aware of the methodology and when they can influence decision making. This approach also ensures that consultants who will be undertaking most of the work on the Agency's behalf follow a consistent approach. Given the scope and size of the work around the estuary, it is essential that consultants are given as much guidance as possible on how to undertake the work they do on behalf of the Agency. Logically, the procedures therefore follow the route of first identifying flood defence needs; secondly, where justified, putting these forward for project appraisal and then determining detailed design and construction.

Consistency of Environmental Assessment

It is essential that if Urgent Works are being identified, planned, and delivered on a consistent basis then the accompanying Environmental Assessments (EAs) are as well. Consideration has been given to the EA procedures in use in each of the three Regions

and a "best practice" approach developed to ensure that the Agency takes into account the special requirements of the Humber given its environmental sensitivity, particularly for nature conservation.

2.5.8 Humber Estuary Environmental Baseline Study

Background

As part its role within the Humber Estuary Management Strategy, the Agency is seeking to develop a strategic approach to the management of the Humber Estuary. A large amount of environmental data on the Humber Estuary is held by numerous organisations and individuals at different locations.

Scope

A contract has been let to collate this data to provide essential information for the development of the Humber Estuary Shoreline Management Plan. Data will be collected on the existing state of the environment, predicted future trends and historical evolution. The type of data to be collected will include the following: a listing of key consultees, soils, climate, air quality, geology, water resources, hydrology, water quality, fisheries, land-use, archaeology, planning and policy and habitats. All the data will be collated into report format and also placed on a Geographical Information System.

Photo 39 Humber and Humber Bridge

2.5.9 Ely Ouse Flood Defences - Erosion Control and Environmental Monitoring

Background

The first phase of a 50 year flood defence strategy for the Ely Ouse system of rivers has been completed. The strategy is to provide an environmentally sensitive and sustainable approach to flood defence and erosion protection. "Soft" options and "bioengineering" techniques have been used in place of and associated with the traditional method of piling.

Erosion Control Techniques

The techniques adopted have been based on combinations of the following: low and high level piling, piling set into the bank, pre-planted fibre rolls, rock rolls, pre-planted pallets, post planted mattresses, stone revetment, use of individual plants, brushwood faggoting and cattle drinking accesses.

Photo 40 The installation of preplanted fibre rolls and pallets in conjunction with low level piling.

Environmental Monitoring

A contract is to be let to evaluate the various erosion control techniques used to date in terms of their technical effectiveness, landscape/ecological success and cost effectiveness. Twenty two sites have been selected for monitoring which will include looking at the integrity of each option, erosion rates, planting regimes (density, species, size etc), faunal activity and water levels. Knowledge gained from this exercise will be applied when deciding on suitable soft engineering options to be used in other flood defence projects.

2.5.10 Central Area Environmental Appraisal - River Cam

A project was initiated to review the condition of the River Cam between Jesus Green Lock and Baits Bite Lock after concerns were expressed of the potential lack of channel capacity for flood discharge. Consultants were employed to undertake a study in 2 parts. Part 1 to identify the existing flood defence standard of service by developing a suitable hydraulic model. Part 2 is for the process of identifying where improvements could be achieved and ascertaining any shortfalls in the standard of service. This process would require an environmental appraisal including full consultation with all interested parties.

Part 1 of the study has been completed which identifies various deficiencies in the standard of service. These will be reviewed under Part 2. Also completed is an ecological survey of land adjacent the river at Stourbridge Common. This included the National Vegetation Classification to assess the value of the area that may be subject to disturbance from heavy machinery and spoil disposal.

2.5.11 Development and Promotion of Environmental Assessment

Close liaison with other functions is maintained to promote and develop the environmental assessment process in the work of the Agency and to ensure that the "conservation" duties of the Agency are discharged through all its activities. Key areas of work completed this year are summarised below:

- Successful completion of the second phase of EA training with training provided to 75 staff from Catchment, Area and Regional offices from all functions.

- Completion of a Regional handbook *"Environmental Assessment Guidelines for Agency Projects in the Anglian Region"* has been completed and provided and promoted to functional heads and project managers from Water Resources and Flood Defence, Area FRCN staff and consultants.

- Production and promotion of a PR leaflet explaining in plain English the

availability of Agency EA guidance Anglian Region. This is included as Appendix 1 to the report.

- Collaborative development of a tenancy agreements procedure for the letting of Agency land to include liaison with functional representatives to ensure their concerns are addressed.

- Collaborative development of Guidance for Water Resources staff as an insert into the Licensing Manual on the use of the National EA Scoping Guidance for abstraction licensing.

- Collaborative development of Guidance for Planning Liaison staff on the use of the National EA Scoping Guidance for planning enquiries and applications.

- The development of Environmental Action Plans (EAP) as part of the EA input to the project management of flood defence projects. The plans will help to ensure that recommendations made in environmental assessment documentation are practicable and are carried through to detailed design and construction.

- Transfer of river corridor survey information for 6,000 km of river to CD ROM.

2.6 MULTIFUNCTIONAL

2.6.1 Flow Deflectors in the River Wissey

In recent years, a section of the river which supports an important trout fishery has declined from a fast flowing section with exposed gravel areas to a sandy, rather featureless section. Low flows have increased summer weed growth and sedimentation.

Following a consultation process involving Fisheries and Flood Defence staff together with the club's water bailiff, 11 wooden croys were installed. These are single croys extending at a downstream angle from the non-fished bank. They are up to 3m in length and constructed using a line of stakes hammered into the river bed. Fisheries funded 25% of the work whilst the remainder came from Flood Defence.

Flood defence will benefit from maintaining a weed free channel that assists in displacing silt from the section. In addition, by redirecting the flow the structures will improve the instream fisheries habitat and establish better trout lies. The success of the croys will be measured through our fisheries survey programme and feedback from the trout club.

2.6.2 Fishing Platforms at Godmanchester

Five fishing platforms were incorporated into a flood defence scheme to carry out bank repairs at the Godmanchester Weir Pool on the River Great Ouse. The platforms were designed and constructed to allow anglers safe access to a quality fishing area. The water is fished by Godmanchester Angling and Fish Preservation Society which make the fishery available to the wider angling public.

The site is to be further improved by the planting of marginal aquatic plants in coir mattresses and rolls and grass seeding of areas in order to disguise the bank protection works which have been undertaken.

2.6.3 Bridleway Gates on the Great Ouse Tidal River

Bank maintenance has been undertaken on the tidal river downstream of Denver for flood defence purposes. A number of new fences were erected, and where these faced onto roads they incorporated a bridleway gate suitable for horse riders. The gates are principally located at points where road bridges cross the river and there is an inherent danger from motor vehicles to bridleway users and members of the general public. The gates are of the "air-lock" design which should greatly improve the ease of progress for riders using the bridleway, in addition to prevent livestock escaping.

Photo 41 Example of a bridleway gate on the Tidal Ouse

2.6.4 Northern Rivers Group

Considerable knowledge and information exists concerning the water environment of the Broads. Furthermore, numerous organisations are involved in its management and have produced strategies, plans etc, setting out their objectives for the area. The Northern Rivers Group Project drew together the key statutory organisations involved in the water environment (Environment Agency, Broads Authority and English Nature) to form a consensus on the most important issues that need to be addressed, to agree objectives for the management of the water environment, and to produce a strategy outlining an agreed and integrated way forward.

The Group identified key issues and proposed preferred options for progress on the following aspects:

- hydrological monitoring on the Ant catchment
- development of a new wetland classification scheme based on hydrology
- development of a pilot nutrient model for the River Ant and Barton Broad
- research on the role of fish migration
- forward planning on human activity and climatic change
- economic evaluation of environmental restoration
- development of overall water recreational strategy for the Broads

Participation in the Group has enabled the Agency to influence key areas of Broads Strategy where our statutory responsibilities overlap with the other parties involved.

3.0 POLICY ISSUES

3.0 POLICY ISSUES

3.1 FISHERIES

3.1.1 Fishing Rod Licence Promotion and Enforcement

This year increased emphasis was placed on licence sales and fisheries promotion through the implementation of the first national fisheries marketing plan. The primary objective was to increase licence sales by 6% over 1995. Particular focus was made on licence enforcement blitzes at time of peak sales, media coverage to publicise enforcement, and advertising. The campaign has been highly successful, with licence numbers sold nationally increasing by some 17% to £1.2m, with a 9% increase in licence income (to £12.25m). In the Anglian Region, a total of 181,284 licences were sold with a value of £1.815m.

High profile licence enforcement checking, with blitzes linked to the two early sales peaks, together with associated publicity, has been a particularly significant factor in raising sales and awareness. Two nationally co-ordinated blitzes were carried out during the year, in May and July. A total of 25,449 anglers were checked at 2,594 locations. Overall 7.5% anglers were without a licence, but between the May and July enforcement efforts the evasion rate nationally dropped by one third. In the Anglian Region 4,271 anglers were checked at 470 waters, with an overall figure of 6% evasion. Between the May and July blitzes in Anglian the evasion rate was halved.

3.1.2 National and Regional Fisheries Byelaws

Prompted by the differences existing between inherited regional byelaws, the Agency through the National Byelaw Review Group, is examining the existing regional fisheries byelaws to identify those issues where nationally consistent byelaws may be appropriate from practical, biological and legal viewpoints. Regional differences exist for issues that are common to all regions and this, not only being perceived as being unfair, causes enforcement problems as rules may differ on crossing regional boundaries.

In 1996 the Agency undertook the first phase of the National Byelaw Review. In March 1997, new national byelaws were introduced covering the following issues

- Annual Close Season for Non Migratory Trout (Rod and Line)
- Use of the Gaff
- Number of Rods to be used when fishing
- Migratory Salmonid Catch Returns

3.1.3 Net Limitation Order

A Net Limitation Order in support of the phasing out of the Anglian Coastal migratory salmonid fishery came into force in January 1996 and limited the issue of net licences to those fishermen who held a licence the previous year. As existing licensees leave

the fishery, no new licences will be issued. After one year of operation the number of licensees has reduced from 65 to 59.

Enforcement of the Anglian sea trout fishery is now carried out on the Agency's behalf by officers of the Eastern Sea Fisheries Joint Committee under a service level agreement made during the year.

3.1.4 Honorary Fisheries Bailiffs

As part of a review of rod fishing licence enforcement procedures, the Agency has sought legal advice regarding its health and safety responsibilities towards honorary fishing bailiffs. This confirmed that the Agency has a Duty of Care towards Honorary Bailiffs in the same way as it has for full and part-time enforcement staff. The resource implications involved in bringing all the Honorary staff up to the same level of training, equipment and communications support as all other enforcement staff were examined, and the cost of fully meeting the Duty of Care responsibilities for existing Honorary Bailiffs was found to be excessive. The result of this scrutiny in the Anglian Region was that, whilst recognising the commitment and activity of Honorary Bailiffs, a smaller complement of these staff was necessary. Accordingly, the number of Honorary Bailiffs in Anglian was reduced from 47 to 10, selection of the retained staff being based primarily on the need to ensure balanced coverage between Areas.

3.2 CONSERVATION

3.2.1 Biodiversity

The Environment Agency has a commitment to conserving biodiversity since the UK Government signed up to the Biodiversity Convention at the Earth Summit at Rio in 1992. The Agency is also a key member of the UK's National Biodiversity Steering Group and has also stated that biodiversity is a key indicator of sustainability, which is the Agency's principal aim. This adds further weight to the Agency's duties to further, promote and have regard to conservation throughout its activities.

The UK Biodiversity Steering Group produced a series of 116 species, and 14 habitat action plans in early 1996. The UK Government endorsed this approach later in that year, which is paving the way for a new, objective-led approach to nature conservation in the UK. Prior to the UK Government endorsement, one of the first guides to biodiversity planning was produced for East Anglia. Entitled 'Action for Wildlife in East Anglia', it highlights the importance of biodiversity conservation in East Anglia, listing species and habitats of Regional concern, many of them being also national priorities.

Of the 116 species and habitats of UK importance, the Agency has particular responsibilities for 12 species and 1 habitat. These are listed below:

SPECIES FOR WHICH THE AGENCY IS LEAD PARTNER/CONTACT POINT	FOUND IN ANGLIAN REGION
Otter	Y
Water Vole	Y
White Clawed Crayfish	Y
Southern Damselfly	N
Depressed River Mussel	Y
Freshwater Pea Mussel	N
Ribbon Leaved Water Plantain	Y
River Jelly Lichen	N
Glutinous Snail	N
Shining Rams-Horn Snail	Y
Anisus vorticulatus (a snail)	Y
Vendace	N
HABITAT FOR WHICH THE AGENCY IS LEAD PARTNER/CONTACT POINT	
Chalk River	Y

At an Area level, conservation staff are contributing to the production of Local Biodiversity Action Plans (LBAPs). LBAPs are county based plans which aim to contribute to the delivery of national biodiversity targets at a local level. Northamptonshire produced one of the first county Local Biodiversity Action Plans in March. Further county based plans will follow in 1997/98.

3.2.2 Habitats Directive

The Habitats Directive and its subsequent implementation into UK law by Statutory Instrument 2716 has significant implications for the Agency. The Regulations are the most important piece of conservation legislation since the Wildlife & Countryside Act in 1981.

A series of seminars were held across the Region during 1997 to raise awareness about the Regulations, and their impact on the Agency. During 1997 the Agency is scoping the reviewing of consents, authorisations and projects, which is an obligation under the Regulations. This means that the Agency must review decisions taken on past consents, and new ones to determine if they have any impact upon the European

conservation interest of the site. As this impacts upon all Agency functions, the resource implications will be quantified for a Board paper in November 1997.

3.2.3 Drought Issues

During 1996/7 Anglian Region was in the midst of a severe drought, and with low winter rainfalls it was predicted that a hot, dry summer would lead to severe water shortages. In response to this, each Area's FRCN and Biological teams undertook environmental drought monitoring at sites identified as being possibly affected by drought (not over-abstraction). The monitoring took the form of bank walking, looking for visual features characteristic of drought, plus detailed species monitoring such as macroinvertebrate, macrophyte, and PHABSIM (in Northern Area). Further drought monitoring may continue in subsequent years should weather conditions not subside.

3.2.4 Flood Defence and Conservation Review of Flood Defence Maintenance

Many of the recommendations from Anglian Region's Review of Conservation and the Flood Defence Maintenance Programme were successfully implemented in 1996/97, the main ones being:

- Co-location of conservation staff at catchment office. Two Areas have staff at catchment offices for part of a week, the other Area has full time conservation staff at catchment offices.

- Training. Sessions were held in all 3 Areas between Flood Defence and Conservation staff to discuss conservation input into river maintenance programmes

- MES' (Minimum Environmental Standards) and EOs (Environmental Options). These are guidance and specification documents for bank and in-channel maintenance practices.

3.2.5 Wet Fens for the Future

Wet Fens for the Future is a group of organisations working towards a joint "Wet Fens for the Future" vision of the Fens. The vision is to:

- celebrate and take pride in the wetland heritage of the Fens and seek opportunities to maintain, enhance and create wetlands.

- take account of the benefits that wetlands can bring to the continued development of the Fens when devising policies, strategies and projects

- collaborate with others to work towards these common objectives

This year a Wet Fens for the Future conference was held at Spalding and attracted over 120 people. The conference was very successful and attracted much media attention. At the conference, a report: "Wet Fens for the Future - the Value of Wetlands for People and Wildlife in the Fens" was distributed, and there was also an opportunity to present an update on the project and to discuss the future role of Wet Fens for the Future.

In the coming year Wet Fens for the Future will be looking to widen the partnership, and to develop a series of core 'make it happen' projects. This approach will mean that organisations with a particular interest will be encouraged to develop ideas in a key area. The core projects when added together will deliver the Wet Fens for the Future vision.

3.3 NAVIGATION

3.3.1 National Boat Safety Scheme

The development of the National Boat Safety Scheme (BSS), initiated in 1993, was finalised in 1996 and implemented this year. The Agency was informed on 25 March 1997 that the byelaw amendments required to implement the Scheme had been confirmed by the DoE (now DETR).

The statutory consultative works carried out by the Agency included meetings with the Great Ouse Boating Association (GOBA) and Great Ouse Boatbuilders and Operators Association (GOBBOA) to discuss timing and implementation of the BSS. Similar meetings were held with trade and user representatives covering the rivers Welland, Glen, Ancholme and Nene. Literature publicising and promoting the BSS was produced for all registered users in the Anglian Region boating register. This included a newsletter (explaining the implications, timing and scope of the BSS), a BSS booklet and checklist, a "Tips for Boaters" leaflet and a data form requesting boat details.

Guidance notes were sent to all registered users falling within the scope of the BSS and visits to boat clubs were made by Area Enforcement staff to appraise owners of the more technical aspects of the Scheme.

3.3.2 Navigation Signage

The Agency inherited a host of river signs - many old, some confusing and at times inconsistent.

This was addressed in 1996/97 with a project to replace more than 1,500 signs in the Region. A key task was to rationalise the number/ type of signs provided and to ensure the environment was not cluttered with unnecessary signage. A new style for in-stream signs was also adopted to follow European standards. This decision was

made on the basis that European law will require these signs at some stage in the next 5/10 years. The best value for money option was to introduce the signs now rather than face further expenditure in the future. This decision was further influenced by the fact that the signs have been funded from Agency set up costs rather than from the Navigation budget.

3.3.3 Reciprocal arrangements

In 1996/97 an agreement was made between the Environment Agency and British Waterways to work towards adopting a common policy on registration and licensing.

The move followed a Government review of navigation roles, which concluded that the Agency and British Waterways should aim to work together to promote and develop waterways for boaters and other users.

A reciprocal arrangement pilot scheme was launched in January 1997, giving a licence holder with one authority 15 free days on the others' waterways. The ultimate aim is to achieve one-stop licensing, but currently differing schemes of administration and legislative aspects between the Agency and BW means that a common system is some years away.

3.3.4 Benchmark exercise

The Anglian, Thames and Southern regions of the Agency have significant inland navigation responsibilities. Each navigation is distinct in geography and hydrology, with differing usages and number and types of locks. Variances in regional expenditure and standards of service, based on levels inherited at the creation of the (previous) NRA, have been identified. To remedy this, a benchmarking project was completed during the year with the following aims:

- to establish a robust and equitable mechanism for the allocation of resources (GIA in particular) to those regions with navigation responsibilities
- to develop national standards of service
- to measure regional performance against standards and make recommendations for GIA allocations

The above objectives were achieved, with one significant result being the allocation of an additional £500k to Anglian navigations in 1996/97 with the provision of a further £400k in 1997/98.

4.0 MONITORING

4.0 MONITORING

4.1 FISHERIES SURVEYS AND INVESTIGATIONS

In accordance with the system of classification adopted in previous Fisheries Annual Reports, all fisheries in surveyed watercourses have been classified into the following biomass categories:-

Fish Biomass (including eels)	**Fisheries Class**	**Fishery Standard**
>20+2g/m^2	A	Excellent/Good
10+2 to 20+2g/m^2	B	Good/Moderate
5+1 to 10+2g/m^2	C	Moderate/Poor
0 to 5+1g/m^2	D	Poor

The data obtained for surveys during the year have been incorporated with the previous two years' survey data to form one complete 3 year survey cycle, and the resulting revised classifications are presented in Table 4.1.

In line with the approach described in the Regional Fisheries Strategy, a five year rolling programme of fisheries surveys has been adopted, and future data will be reported on a five year survey cycle.

A. FISHERIES WITH BREEDING POPULATIONS OF TROUT

Catchment	A (km)		B (km)		C (km)		D (km)		Total (km)	
Lincoln	0	*0*	17.0	*17.0*	25.0	*29.0*	11.0	*7.0*	53.0	*53.0*
Welland and Nene	39.0	*38.5*	62.0	*80.0*	63.0	*30.5*	25.0	*40.0*	189.0	*189.0*
Central	39.0	*18.0*	57.0	*75.0*	64.0	*6.0*	22.0	*44.0*	182.0	*143.0*
Norfolk and Suffolk	23.0	*18.0*	44.0	*61.0*	77.0	*64.0*	10.0	*10.0*	154.0	*153.0*
Essex	48.1	*38.1*	18.7	*18.7*	4.6	*4.6*	0	*0*	71.4	*61.4*
Total	**149.1**	*112.6*	**198.7**	*251.7*	**233.6**	*134.1*	**68.0**	*101.0*	**649.4**	*599.4*

B. FISHERIES WITH BREEDING POPULATIONS OF CYPRINIDS

Catchment	A (km)		B (km)		C (km)		D (km)		Total (km)	
Lincoln	464.5	*490.5*	105.0	*83.0*	33.5	*44.0*	76.0	*61.5*	679.0	*679.0*
Welland and Nene	164.0	*192.0*	138.0	*238.0*	253.5	*80.0*	25.0	*70.0*	580.5	*580.0*
Central	379.0	*379.0*	448.0	*455.0*	149.0	*158.0*	44.0	*39.0*	1020.0	*1031.0*
Norfolk and Suffolk	53.0	*47.0*	132.0	*203.0*	16.0	*45.0*	102.0	*26.5*	303.0	*321.5*
Essex	127.2	*165.2*	122.7	*80.3*	39.6	*43.6*	21.7	*29.5*	311.2	*318.6*
Total	**1187.7**	*1,273.7*	**945.7**	*1059.3*	**491.6**	*370.6*	**268.7**	*226.5*	**2893.7**	*2930.1*

C. TOTAL LENGTH OF RIVER CLASSIFIED ACCORDING TO FISH BIOMASS LEVEL

Catchment	A (km)		B (km)		C (km)		D (km)		Total (km)	
Lincoln	464.5	*490.5*	122.0	*100.0*	58.5	*73.0*	87.0	*68.5*	732.0	*732.0*
Welland and Nene	203.0	*230.5*	200.0	*318.0*	316.5	*110.5*	50.0	*110.0*	769.5	*769.0*
Central	418.0	*397.0*	505.0	*530.0*	213.0	*164.0*	66.0	*83.0*	1202.0	*1174.0*
Norfolk and Suffolk	76.0	*65.0*	176.0	*264.0*	93.0	*109.0*	112.0	*36.5*	457.0	*474.5*
Essex	175.3	*203.3*	141.4	*99.0*	44.2	*48.2*	21.7	*29.5*	382.6	*380.0*
Total	**1336.8**	*1386.3*	**1144.4**	*1311.0*	**725.2**	*504.7*	**336.7**	*327.5*	**3543.1**	*3529.5*

D. AREA OF BROADS CLASSIFIED ACCORDING TO BIOMASS

Catchment	A (ha)		B (ha)		C (ha)		D (ha)		Total (ha)	
Norfolk and Suffolk	47.6	*47.6*	108.8	*108.8*	0	*0*	246.6	*246.6*	402.6	*402.6*

TABLE 4.1: LENGTH OF RIVER (KM) CLASSIFIED ACCORDING TO FISH BIOMASS LEVEL 1994-1996 (1993-1995 CLASSIFICATION IN SMALL ITALICS)

4.1.1 Analysis of change

Central Area

Fish population surveys undertaken during 1996/97 include the River Nar, Minor Norfolk Rivers, Ely Ouse System and River Cam catchments.

The River Nar has remained a category A fishery with the brown trout population in the upper reaches increasing significantly in terms of biomass and density.

The Minor Norfolk Rivers are of only limited fishery value due to the nature of their small channel size. An increase in biomass in the River Heacham to 8 gm^{-2} makes this a category C fishery with improvements to both the brown trout and eel populations. The downstream River Babingley coarse fishery has remained very poor with the lowest densities of roach and dace ever recorded for this survey. Measures to improve this coarse fish population are to be investigated. In contrast, the upstream Babingley has shown an improvement, particularly in the trout population where habitat enhancement works have been carried out by the Agency. On the whole, the Babingley has shown an improvement to a category B/C fishery at 9.8 gm^{-2}.

The monitoring of the Ely Ouse system consisted of surveys of the Rivers Wissey, Lark and Little Ouse and also the Ely Ouse and Great Ouse Relief Channel.

The Ely Ouse river has shown an improvement in terms of biomass to a category B fishery, largely as a result of restocking and instream habitat improvements carried out by the Agency.

The routine fish population survey of the upstream River Wissey and tributaries showed very little change with regards to biomass classifications of these rivers. However, the survey undertaken during May 1996 was seriously hampered by low flows. It was not possible to undertake surveys on the Rivers Old Carr or Gadder, and only 2 sites could be monitored on the Watton Brook and 1 on the Stringside Stream. A further investigation was carried out on these rivers during February 1997 to assess the effects of low flows. The downstream section of the River Wissey remained a category B biomass fishery at 14.8 gm^{-2} with the highest fish density recorded so far.

The downstream River Lark has shown a biomass increase from 17 gm^{-2} to 23 gm^{-2} with particular improvement in the roach population.

The downstream Little Ouse survey revealed that the fishery has declined from a class A to a class B with a biomass of 18.8 gm^{-2}. The decline from a mean biomass of 29.9 gm^{-2} recorded during the 1993 survey is mostly attributable to a decline in roach and pike populations. Sampling difficulties due to excessive weed growth were encountered and therefore, this decline is likely to be less dramatic than it would appear.

A significant decline has been recorded in the Relief Channel fishery from a Class B

biomass fishery in 1993 to a Class D in 1996. Further investigation regarding flow regime and water quality in the Relief Channel has been undertaken. In addition results from a Fisheries trawling survey and acoustic survey will all be presented later in 1997.

The upstream River Cam has increased from 19 gm^{-2} to 37 gm^{-2} in terms of biomass and is now a category A fishery. Improvement is primarily attributable to increases in both roach and chub populations.

The Rivers Rhee and Granta Fisheries have remained similar to the previous surveys with regards to their biomass classification, with the Rhee remaining a Class A fishery. The Bourn Brook has shown improvement to a Class A fishery with increases in the chub population.

Downstream of Cambridge, the River Cam has an excellent biomass of 29.4 gm^{-2}. It therefore remains a category A fishery.

Northern Area

In the Lincolnshire catchment very little change has been observed during this survey period. Most of the lowland major rivers and drains sampled were found to contain the expected high fish biomass. The Class A status they previously held remained unchanged. These waters included the Ancholme, Stonebridge Drain, Upper Hobhole and West Fen Drain System.

The Lower Hobhole demonstrated a slight decline from Class A to B; this may reflect the recent elevated salinity levels in this System.

A section of the Upper Lymn declined in status from C to D, perhaps due to the impact of low river base flows as a result of the drought.

In the Welland and Nene catchment survey results have shown that there is a 30 km decrease in Class A cyprinid biomass fisheries, with a corresponding rise in Class B and C waters.

The effects of the on-going drought may have caused the slight change in salmonid biomass levels. However, there has been very few dramatic changes since the last survey.

Eastern Area

In the Norfolk and Suffolk catchments a number of changes were recorded. The River Tas system (including Hempnal and Flordon Becks) showed an improvement from class B to class A. Whilst this was predominantly due to an increase in the eel population, pleasing improvements in the stocks of both dace and brown trout were also noted. Barton Broad showed a substantial improvement from class D to class B.

Part of this can be explained by the chance capture of large and old bream, which were missing from catches in the preceding survey. The remainder of the increase was in the biomass of roach. An apparent increase in stocks in Starston Beck was attributed to biased site selection.

Declines to class D were recorded for the tidal reaches of the Rivers Waveney and Bure, which were previously classified in classes C and B respectively. These changes were attributed partly to seasonal effects, and partly to the absence of any large bream from the survey catches, despite their known occurrence in these large and open systems.

In the Essex District increased flows consequent upon the operation of the Ely Ouse to Essex Water Transfer Scheme may have facilitated an upstream extension of good fish stocks into the highest reaches of the River Pant. They may also account for a slow but steady increase in the small brown trout population, which is now present throughout the river.

Biomass class increases from C to B were found for the Roman River and for the Holland Brook catchment, whilst the upper reaches of the Brain improved from class D to class B. This change is of little significance for the Roman, where a relatively stable stock has fluctuated around the C / B class boundary for some years. Carp are now well established in Holland Brook and have bred successfully, accounting for the biomass increase observed. Changes in the River Brain may reflect improved compliance with water quality objectives.

Significant decreases in stocks were found in the headwaters of the River Colne, and throughout all but the lowest reaches of the Blackwater. These declines are particularly disappointing in that they return the affected reaches of these rivers to stock levels around their historic minima, following a number of years with much better results. Investigations into the possible causes are continuing.

4.1.2 Additional Surveys

The Ecology and Management of Smelt

A study was undertaken to investigate the ecology and status of smelt in the Great Ouse and North West Norfolk Catchment. This was as a result of issue 23f in the North West Norfolk Catchment Management Plan's Action Plan. From records and liaison through Agency colleagues information was collated relating to the distribution and historical population changes in the catchment. To further understanding of the species a wide range of external contacts, from English Nature to local eel fishermen were also consulted. Migration routes for the species were identified, as were obstructions preventing upstream movement to natural spawning grounds. A report was prepared for the Central Area Environment Group and recommendations for the future included ways of monitoring, conserving and enhancing the smelt.

Use of Angler Catches to derive Fisheries information

A report was produced using information provided by anglers fishing a stretch of the River Cam downstream of Cambridge in October 1996. Disposable cameras were provided by the Agency to supplement the weight data with information on species and sizes of fish caught along a considerable length of river. Although the quality of the data is not comparable with our routine fisheries surveys this technique provides a useful additional method of sampling, at a relatively low cost.

4.2 CONSERVATION SURVEYS

4.2.1 River Corridor Surveys (RCS)

Central Area

Tree Management Surveys

Oak, ash and willow trees along 121 km of main river in the Cam and Ivel catchments were surveyed and all trees above 1.5 m in height were recorded onto base maps. Details of the health and size of the trees were recorded, as well as the need for management. The details will be used to ensure both the survival of the trees and to pre-empt any collapse of the trees into the watercourse, thus preventing potential obstruction to flows. It is intended that when undertaking routine river maintenance any trees identified as requiring management can be incorporated.

Ornithological Assessment of REDS Bird Data

Data previously collected consists of lists of bird species, with no reference to habitat. This assessment relates bird species to habitats within the river corridor as well as discussing the susceptibility of some species to disturbance by particular river maintenance practices. The assessment will also examine which birds use the river corridor, at what times of year and their reliance on the river corridor for purposes such as breeding and feeding. Recommendations resulting from this study will be used for river maintenance operations.

Assessment of River Corridors

Phase I and II National Vegetation Classification surveys were undertaken on 149 km of main river (Ely Ouse, Old West River and Great Ouse catchments). The surveys were used to determine the conservation value of each river corridor section and will be used to assess the potential impact of any river maintenance works such as depositing of spoil. The data will also be used by the local Wildlife Trust to designate riverine County Wildlife Sites.

Otter Surveys

Surveys for otters were undertaken throughout Central Area (Bedfordshire, Buckinghamshire, Cambridgeshire, Norfolk and Suffolk) in collaboration with the Wildlife Trusts. There is a need to determine the distribution of otters throughout the Area, to relate their distribution to present habitat and the need for improved habitat along river corridors. River maintenance practices can adversely affect otter habitat if not undertaken in the appropriate manner, therefore it is important to be aware of the locations of these mammals in order to minimise impacts and to include, wherever possible, enhancements within the routine maintenance programme.

Eastern Area

Macrophyte Surveys

This year, Eastern Area adapted the standard RCS methodology to undertake specialist botanical surveys. Using maps from previous surveys, the exact locations of Nationally scarce, County rare or scarce and Biodiversity Action Plan species were recorded along with an estimation of abundance. These surveys were undertaken on the River Wensum, Bure, Waveney, Gipping, Stour, Colne and Ter Catchments (a total of 1020 km of main river). The surveys will provide additional, more detailed information to the existing River Corridor Survey data held by the Department.

River Corridor Surveys

A standard River Corridor survey was also undertaken on the Deben Catchment (98 km of main river).

Mean Trophic Ranking

Each 500m stretch was also surveyed for macrophytes as part of an Urban Waste Water Treatment Directive monitoring scheme in collaboration with Water Quality. Using these figures a computer program can then calculate the MTR of each section which indicates the level of eutrophication of each section. An assessment of the impact of eutrophication throughout the Area's rivers will be made once all rivers have been surveyed.

Crayfish Surveys

A survey to determine the extent and distribution of native and non-native crayfish in several Eastern Area rivers by means of field surveys. The contract was undertaken in collaboration with English Nature.

The white clawed crayfish (*Austropotamobius pallipes*) is the UK's only native crayfish and its decline has been recognised in its listing under Schedule 5 of the Wildlife and Countryside Act, 1981, which makes it illegal to take it from the wild or to sell it in Britain. It is also included in Appendix III of the Bern Convention and Annexes II and V of the European Habitats Directive.

Prior to the contract, native crayfish were known to be present on the River Wensum SSSI although they were known to be compromised in the mid-reaches by signal crayfish (*Pacifastacus leniusculus*). The survey was extended to include the Bure and Gipping Catchments, the Rivers Stiffkey and Glaven and sections of the River Yare. These rivers were selected on the basis of historical records. The survey found that populations of signal crayfish on the Wensum were not as dense as was previously thought and that native crayfish populations were dense (by National standards).

A demonstration day for Agency and English Nature staff was included in the contract which gave training on the identification of crayfish, trapping and the identification of good crayfish habitat. The survey gave a good understanding of the current crayfish situation in the Area and pointed to future work that should be undertaken to conserve and enhance this species.

Otter, Water Vole and Mink Surveys

The project aimed to survey for otter, mink and watervole throughout the main river systems of Norfolk, Suffolk and Essex. The project was joint funded by the Agency, Anglian Water and the World Wide Fund for Nature (WWF). Otter are included in the European Habitats Directive, are on Schedule 5 of the Wildlife and Countryside Act (1981) and are a Biodiversity Action Plan Species. Water voles are a Biodiversity Action Plan Species and are proposed for inclusion in Schedule 5 of the Wildlife and Countryside Act, 1981.

The survey took the form of bridge surveys where all of the bridges over the main river system were visited twice and evidence of otters (spraints, tracks, etc) searched for underneath. At each site 600m of bank was walked and evidence of watervole (latrines, lawns, etc) and mink (footprints, scats, etc) were searched for.
Evidence of otters was found in almost every Catchment in Norfolk, in the Coastal areas of Suffolk and in North Essex. The distribution of watervoles was quite poor but it is thought that this was due in part to the survey methodology. Mink were found mainly on the River Waveney, which is probably due to the historic concentration of mink farms here.

The findings of the watervole survey have meant that this year a survey solely for the presence of watervole is being undertaken this year.

Northern Area

Over 570km of river corridor and river habitat surveys were undertaken during 1996/97. Surveys in Northern Area are updated in line with the LEAP timetable. This year the methodology was adapted, to provide contractors with previous surveys so that they could update the river maps and textual summaries more quickly. After the surveys are completed, the contractor analyses the data to produce a LEAP summary report, which is used as a basis for the conservation input into LEAPS.

4.2.2 River Habitat Surveys (RHS)

The final verification phase of the RHS dataset was completed in 1996/7. This involved the Region surveying 80 of its own sites to maintain RHS expertise and to add to the national database of information. In total 4600 sites have been surveyed nationally for RHS since 1994. Every Region now has at least three surveys per $10km^2$. The Regional RHS Co-Ordinator also trained up several Agency and external staff in RHS, who were then tested and passed as RHS Surveyors.

A CD-ROM containing RHS software and the national database has been circulated to all conservation staff. In future RHS will enable rivers to be typed according to their habitat characteristics. Subsequently, each river can then be classified with a habitat quality index to determine the level of modification away from *benchmark best* sites.

4.2.3 Rivers Environmental Database System (REDS)

Development of the REDS system continues to keep up with data and technological improvements. The latest development is a set of CD-ROMs containing all paper survey river corridor data ever collected by the NRA and the Agency. These enable data to be stored easily, accessed quickly and transferred to floppy discs or to a printer. One useful function enables the user to 'walk' a river, utilising the 37,000 colour photographs covering every 500m of Anglian rivers. This system can be used by engineers or conservation staff alike and can run on any PC with a CD drive, including lap-tops.

In the future, the system can be adapted to store other function's data. linked to the REDS 500m unit storage system. This could build into a historical record of all surveys and river maintenance activities undertaken on that river section.

4.3 NAVIGATION SURVEYS

In order to increase the Agency's understanding of customers and the market forces affecting the boating market, a major monitoring exercise was carried out, with particular emphasis on Anglian region navigations.

The study work was carried out in 4 phases:

- **Stated Preference** - a survey technique designed to provide information on customer choices, allowing the development of mathematical choice models which simulate customers' reactions to changing markets. Interviews were carried out on site.

- **User Survey** - to provide information on boat ownership patterns, including length of ownership, method of purchase and reasons for scrapping. The survey used a postal questionnaire.

- **MOSAIC Profiling** - this is a geodemographic profiling service provided by a company specialising in consumer research and marketing database services. Profile information about the population was gained, based on census data and lifestyle surveys. The classification was based on postcodes, enabling existing users to be compared with the background population. Used in conjunction with Geographical Information Systems plots, the MOSAIC provided a sample of target addressees for the Potential User survey.

- **Potential User** - Postal questionnaires were used to contact potential

boat owners most likely to acquire a boat on the basis of their income, lifestyle and geographic location.

The surveys provided much valuable information which will assist the Agency in the formulation of new policies and strategies for navigation.

APPENDIX 1

CONSERVATION IN THE ENVIRONMENT AGENCY

A quick guide to environmental assessment/appraisal guidance documents and other related manuals

ENVIRONMENT AGENCY

INTRODUCTION

The Conservation Function of the Environment Agency produce a wide range of guidance material on Environmental Assessment and Appraisal and Conservation best practice and policy. This leaflet is a quick reference guide to the internally produced documents that are available to Agency staff involved in environmental assessment/appraisal in Anglian Region. Its purpose is to steer would be users to the appropriate document in an efficient and hopefully painless manner.

WHAT IS ENVIRONMENTAL ASSESSMENT OR APPRAISAL?

Environmental assessment/appraisal is the process carried out to ensure that the environmental impacts of proposals are identified prior to commencement of work. This allows modifications or management changes to be made in such a way that adverse impacts can be avoided or minimised. The process for environmental assessment and appraisal is the same, but the difference is the higher level of detail and formality required with environmental assessment.

The Environment Act 1995 and other regulations require that the Environment Agency takes into account environmental considerations in carrying out all of its functions. This means that when the Agency acts as an operator regulator or in its advisory capacity, some form of environmental assessment or appraisal is required.

WHEN AND HOW DOES IT APPLY TO ME?

If you answer yes to any of the following questions, you will or should be involved in environmental assessment or appraisal ....

- AS AN ADVISOR - Do you comment on planning applications or do you give advice to developers? If yes, environmental assessment or appraisal may be required.
- AS AN OPERATOR - Do you promote flood defence, water resources and navigation schemes? If yes, some form of environmental assessment or appraisal must be carried out.
- AS A REGULATOR - Do you determine Agency licences, authorisations or consents? If yes, you undertake environmental appraisal during the course of your duties in processing applications. You may also request applicant: to undertake their own environmental appraisal.

WHICH DOCUMENT IS APPLICABLE TO YOU?

SCOPING GUIDANCE FOR THE ENVIRONMENTAL ASSESSMENT OF PROJECTS

FURTHER GUIDANCE ON THE ENVIRONMENTAL ASSESSMENT OF PROJECTS

WHAT IS SCOPING?

Scoping is the step of identifying, at an early stage, the key issues of concern to be addressed within the environmental assessment or appraisal process.

WHAT ARE THEY AND WHAT DO THEY CONTAIN?

- Two nationally produced documents published in 1995 dealing with issues related to the water environment. Both are large ring bound documents which provide scoping guidance for environmental assessment and appraisal
- They contain guidance on a comprehensive range of project types from Chemical Storage Units to Camping and Caravan Sites and from Reservoirs to Redevelopment of Contaminated Land and many more!
- The Scoping Guidance Document contains the guidance in checklist format whereas the Further Guidance Document contains detailed narrative guidance on Agency Licences, Major Potential Impacts, Baseline Surveys and Mitigation Measures for nearly all of the 63 project types.

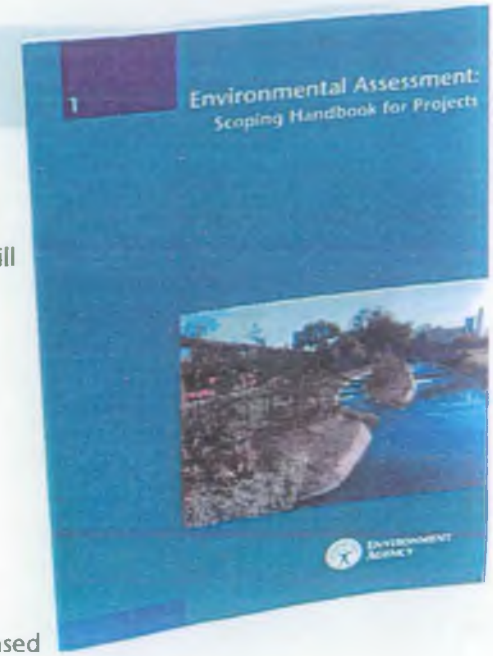
Also contained within the documents are:

- Internal environmental assessment procedures and contacts
- Legal requirements
- "Review Criteria"
- A standard letter that can be sent with the guidance notes

HOW DO YOU USE THEM?

- The complete documents are for internal use only but appropriate sections can be supplied free of charge by Agency staff to developers, their consultants and local planning authorities to aid in the environmental assessment or appraisal of externally promoted activities
- Appropriate guidance notes can be supplied by environmental assessment staff to engineers as part of briefs for consultants undertaking environmental assessment or appraisal for Agency promoted schemes
- Relevant guidance notes can be used by Agency staff as a tool in the appraisal of licence applications or supplied to applicants of Agency licences
- The "Review Criteria" can be used to assess the quality and content of Environmental Statements, Reports and environmental information submitted with planning applications and applications for Agency licences

ENVIRONMENTAL ASSESSMENT: SCOPING HANDBOOK FOR PROJECTS



WHAT IS IT AND WHAT DOES IT CONTAIN?

- This stand-alone booklet provides a summary of the guidance given in the two ring bound scoping and further guidance documents. Internal staff will find the handbook within their Scoping Guidance document
- It is of value to all Agency staff who wish to have an overview of environmental assessment or appraisal. External customers are also an important target audience for this handbook

HOW SHOULD IT BE USED?

- Agency staff should encourage developers and their consultants, local planning authorities and applicants of Agency licences to purchase the handbook. This will help to instigate early and effective consultation and liaison with the Agency for externally promoted activities. It can be purchased from the Stationary Office (was HMSO)

ENVIRONMENTAL ASSESSMENT GUIDELINES FOR AGENCY PROJECTS IN THE ANGLIAN REGION

WHAT IS IT AND WHAT DOES IT CONTAIN?

- This manual contains approved guidelines on the environmental assessment/appraisal procedures to be followed within Anglian Region for Agency promoted flood defence, water resources, FRCN, and water quality projects. It contains:
- Internal and external environmental assessment/appraisal roles and responsibilities
- Legal requirements
- Standard adverts for Land Drainage Improvement Works (SI 1217 Notices)
- Guidance notes for developers on the Food and Environment Protection Act Part II: The Licensing of Deposits in the Sea
- Standard Terms of Reference for Environmental Assessment, Environmental Appraisal and Strategic Environmental Assessment

HOW SHOULD IT BE USED?

- Agency staff should use this as a reference document and follow the approved guidelines
- Standard Terms of Reference can be supplied by Conservation and Environmental Assessment staff to Project Managers for inclusion within briefs for consultants
- The Environmental Statement Review Criteria can be used by staff to help assess the quality and content of Environmental Statements and Reports completed by consultants

For your copy of all of these documents or advice on how to use them, please contact the Regional Environmental Assessment Team at Peterborough. Advice on their application can also be obtained from Area FRCN staff.

CONSERVATION AND THE FLOOD DEFENCE MAINTENANCE PROGRAMME - REVIEW OF PRACTICES AND PROCEDURES AND FUTURE GUIDANCE

WHAT IS IT AND WHAT DOES IT CONTAIN?

An Anglian Region approved policy document containing:

- A review of legislation relevant to flood defence maintenance works, an assessment of current compliance with the legislation and a summary of action areas
- A review of current practice in each Area and an evaluation as to the level of consistency within the Region
- Revised Guidance based on the findings of the review including that for environmental assessment and appraisal
- An Action Plan detailing specific actions that need to be progressed. This includes an action for the development of a regionally consistent environmental appraisal procedure

HOW SHOULD IT BE USED?

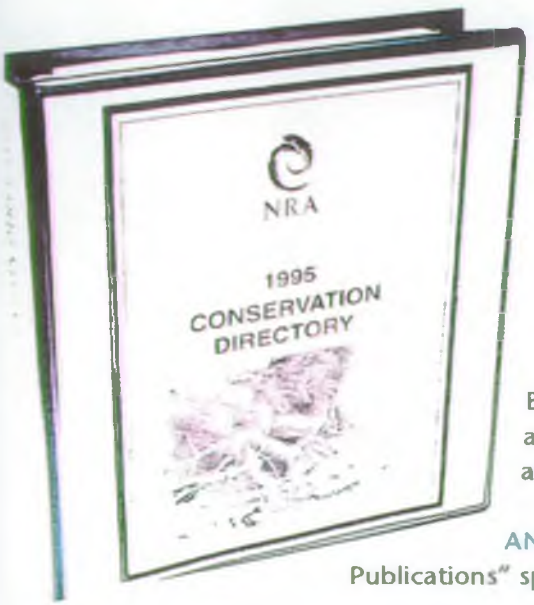
- Flood Defence and FRCN staff should use it as a reference document and follow the recommended procedures, some of which will be progressed and implemented during 1997 and 1998

Obtain your copy of this document or receive advice on usage from your Area Flood Defence or FRCN office, the Regional Flood Defence Manager or the Regional Environmental Assessment Team.

ALSO AVAILABLE .....

CONSERVATION POLICY MANUAL

- A quick reference guide to Anglian Region policies and procedures followed by the Conservation function for Agency promoted flood defence, water resources and navigation schemes, the flood defence maintenance programme, planning applications, consent to discharge and abstraction licence applications



CONSERVATION DIRECTORY

- A nationally produced document containing information on:
  - conservation input to Agency activities
  - conservation legislation and designations
  - conservation literature and R & D outputs
  - conservation organisations

Both of these documents are available from the Regional Conservation Officer at Peterborough. If you require advice on how to use the documents you can also contact your Area FRCN office.

AND FINALLY..... from time to time we issue other guidance so watch the "New Publications" space in Grassroots.