



NORFOLK AND SUFFOLK

LOCAL FLOOD DEFENCE COMMITTEE

ANNUAL REPORT 1997/98

**FINAL EDITION WILL INCLUDE
COLOUR PHOTOGRAPHS**

NORFOLK AND SUFFOLK LOCAL FLOOD DEFENCE COMMITTEE

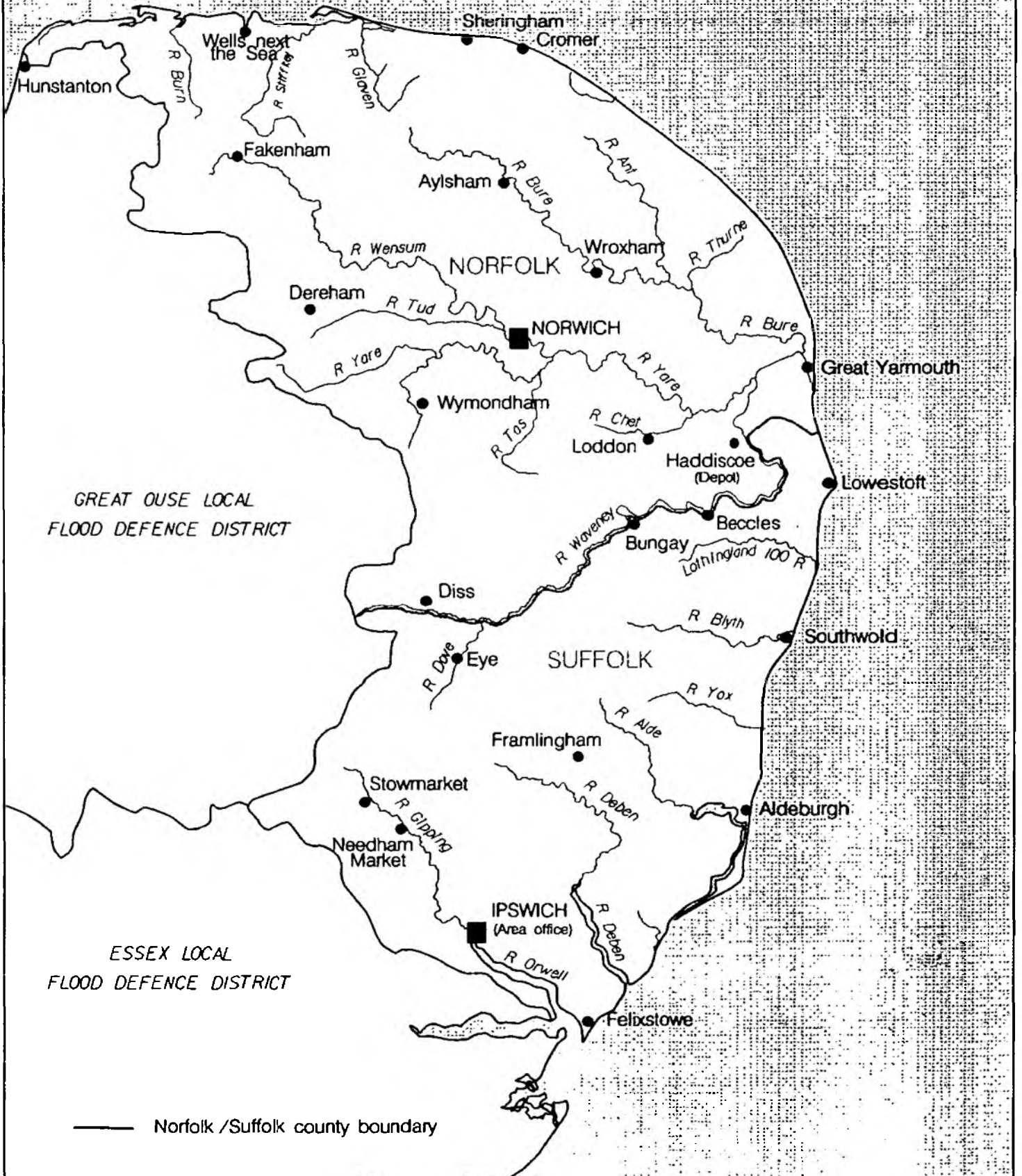
ANNUAL REPORT 1997/98

In accordance with Section 17 of the Environment Act 1995, the report on flood defence works carried out during the year 1997/98 in the Norfolk and Suffolk Local Flood Defence District is presented herewith, together with a summary of the accounts for that year.

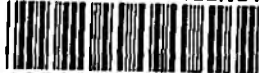
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NORFOLK AND SUFFOLK LOCAL FLOOD DEFENCE DISTRICT



ENVIRONMENT AGENCY



135960

The aim of the Flood Defence function is to provide effective defence for people and property against flooding from rivers and the sea, and to provide timely warning systems such that effective actions can be taken to minimise the impact of flooding. This will be achieved by undertaking works that are technically sound, economically justifiable and environmentally acceptable.

PRINCIPAL STATISTICS

Total Length of Main River	1332 km
Total Length of Tidal Main River Defences	217 km
Total Length of Estuary Defences	107 km
Total Length of First Line Sea Defences (Environment Agency responsibility)	102 km
Total Length of Fluvial Main River (to MAFF demarcation point)	1097 km
Area of Local Flood Defence District	5329 km ²
Number of Internal Drainage Boards	36
Total Area of Internal Drainage Districts	584 km ²
Number in Workforce:	
Approved Emergency Workforce "core" number	62
Actual number during year	59

NORFOLK & SUFFOLK LOCAL FLOOD DEFENCE COMMITTEE MEMBERSHIP

CHAIRMAN

Sir Edward Greenwell Bt, DL
Estate Office
Gedgrave Hall
Woodbridge IP12 2BX

APPOINTED BY THE REGIONAL FLOOD DEFENCE COMMITTEE

Mr. D.C. Adams
Deben View
Falkenham
Ipswich IP10 0RA

Mr. H.G. Cator
Broad Farm
Salhouse
Norwich NR13 6HE

Mr. N.J.E. Crane (until July 1997)
Cedars Farm
Church Road
Upton, Norwich NR13 6AW

Professor T. O'Riordan
University of East Anglia
Norwich NR4 7TJ

Mr. P.D. Papworth (from January 1998)
Tuttington Hall, Tuttington
Aylsham
Norwich NR11 6TL

Mr. D.L. Ritchie (until July 1997)
Crossways
Norwich Road
Ludham NR29 5PB

Mr. J. Sharpe
8 Havelock Road
Norwich NR2 3HG

Mr. B. Steward (from July 1997)
Brook House, Chapel Road
Longham
Dereham NR3 1HB

APPOINTED BY THE CONSTITUENT COUNCILS

Norfolk County Council:

Mr. P. Baldwin
21 Alexandra Road
Sheringham NR26 8HU

Mr. M.V. Castle
27 Beaconsfield Road
Great Yarmouth NR30 4JN

Mr. N.G. Chapman
Lime Tree Farm Bungalow
Fornsett St. Peter
Norwich NR16 1HT

Mr. D.C. Holland (until May 1997)
Newling Farm
Tittleshall Road
Litcham PE32 2PB

Mr. R.C. Rockcliffe
34 Thieves Bridge Road
Watlington, King's Lynn PE33 0HL

Mr. J.W.P. Smithson (from June 1997)
Acom Cottage, Marsh Road
Pilson Green, South Walsham NR13 6EG

Suffolk County Council:

Mr. T.C. Chipperfield (until May 1997)
50 Elmhurst Avenue
Oulton Broad
Lowestoft NR32 3AS

Mr. G. Gouldby (from June 1997)
36 Cotmer Road
Oulton Broad
Lowestoft NR33 9PW

Ms J. Hore (until May 1997)
16 Victoria Road
Oulton Broad
Lowestoft NR33 9LH

Mr. P.D. Monk
The Old Star Inn, The Street
Bawdsey
Woodbridge IP12 3AJ

Mr. J.J. Stansfield, OBE (from June 1997)
22 Badgers Bank
Ipswich IP2 9EN

OBSERVER

Mrs. S.V. Ashford (Norfolk & Suffolk Area Environment
Holly Lodge Group)
Strumpshaw
Norwich NR13 4NS

AREA MANAGER'S REPORT

The Eastern Area of the Environment Agency Anglian Region comprises Norfolk, Suffolk and Essex. The Area is an operational unit, headed by the Area Manager, who is a member of the Regional Management Team. Its structure is based on integrated catchment management to enhance the effectiveness of the efficient delivery of services across all Agency functions at Area level. Flood Defence personnel are split into client and contractor groups in recognition of the need to apply market testing to Agency operations in order to demonstrate its ability to provide value for money. The client group is headed by the Area Flood Defence Manager supported in Norfolk and Suffolk by a Catchment Engineer. The Emergency Workforce and supervisory staff are headed by the Direct Services Manager.

The Ministry of Agriculture, Fisheries and Food for the seventh year in succession granted the Norfolk and Suffolk Local Flood Defence Committee an enhanced rate of grant in recognition of the continuing urgent need to upgrade flood defence standards in Norfolk and Suffolk. Following increases of 10% and 15% in the flood defence levy for the previous two years, the Norfolk and Suffolk County Councils recognised the necessity to continue a high level of funding and approved a 10% increase in the levy for 1998/99. The Ministry again responded to this signal of local commitment by maintaining a high grant earning ceiling for 1998/9. The high level of funding which resulted from the Ministry's response to local commitment has allowed Stage 2 of the Happisburgh to Winterton Sea Defences to proceed rapidly. This major scheme to combat the severe erosion problems on a vulnerable coastline was completed in July 1997, several months ahead of programme, and accounted for over half of the Committee's grant aided capital expenditure during 1997/98.

I am very pleased to report that in January 1998, some four years after its submission, the Ministry of Agriculture, Fisheries and Food gave their agreement to the £63 million Broadland Flood Alleviation Strategy. The Strategy is currently being considered as to its suitability for the Public/Private Partnerships Programme, and the agreement to proceed with the Strategy was conditional upon this examination being carried out. If successful, PPPP will enable the Committee to enter into a long term arrangement with a private sector consortium to undertake these important works. This is the first time that there has been government agreement for a comprehensive strategy for the alleviation of flooding in Broadland, and will enable the Agency to embrace the environmental dimension involving conservation, recreation and agricultural interests within the area. The agreement also allows the Committee to proceed with the most urgent works within Broadland, and, with the funding now available, these works are being put in hand on a priority basis.

The implications of the European Habitats Directive became apparent when the Committee wished to proceed with its preferred option of controlled realignment to manage the sea defences at Brancaster. Under the Habitats Directive there is a requirement to maintain a position of "no net loss of habitat", from which it follows that, if habitats are lost either as a result of natural coastal processes or man's intervention through managed retreat, then they should be re-created. DETR have been asked for guidance on their interpretation of the legislation and in particular how they would wish to fund the re-creation of lost habitats. The likely cost to the nation for lost habitats over the next 50 years (England and Wales) is in the order of £60 million, and Brancaster is seen to be a test case which will set a precedent for the future.

There have been some changes in the membership of the Local Flood Defence Committee during 1997/98. Mr. N.J.E. Crane (Vice-Chairman), Mr. T.C. Chipperfield, Ms J. Hore, Mr. D.C. Holland, and Mr. D.L. Ritchie have left the Committee. Mr. G. Gouldby, Mr. P.D. Papworth, Mr. J.J. Stansfield and Mr. B. Steward have been appointed to the resulting vacancies. Mr. Paul Foster, Eastern Area Manager, retired in February 1998.

ROBERT RUNCIE
Acting Area Manager (Eastern)

OPERATIONS REPORT - 1997/98

CAPITAL WORKS 1997/98

The Norfolk and Suffolk Local Flood Defence Committee's allocation from Anglian Region's Grant Earning Ceiling for 1997/98 was £7.1 million.

The basic rate of grant from the Ministry of Agriculture, Fisheries and Food was 55%, with a 20% supplement for tidal and sea defence works. The final out-turn figures for capital expenditure were:-

	1997/98 £K
Grant eligible work	7,112
Non grant eligible work	238
Salaries and consultants' fees	1,150
Total	8,500

A schedule showing this expenditure split down scheme-by-scheme is included in the financial summary at the end of this report.

The programme was again dominated by high priority sea and tidal defence schemes, the most significant of which are briefly described below:-

1. FRONTAL SEA DEFENCES

Happisburgh to Winterton Sea Defences - Stage 2

Scheme No. MTB41308

Expenditure 1997/98 - £3,971,000

The second phase of the works to be carried out under the Happisburgh to Winterton sea defence strategy comprised the construction of five offshore rock reefs together with beach replenishment along the frontage covered by all nine completed reefs.

A contract had been awarded to Van Oord ACZ Ltd in late August 1996. The contractor maintained the good progress achieved during the previous winter and the works were completed in July 1997, some 5½ months ahead of programme.

Some 215,000 tonnes of rock were transported from Norway and placed in the works along with 1.25 million cubic metres of sand recharge at a total cost of £18.4 million. A post-award Partnering Charter between the Agency, Contractor, Sub-Contractors and Design Engineers contributed to the successful completion of the works within budget.

2. TIDAL RIVER DEFENCES

Broadland Flood Alleviation Strategy

The preparation of detailed scheme proposals continued for Compartments 11, 22 and 36 and the development of a Local Environmental Assessment and scheme proposals for Compartment 35 also got under way. Ongoing consultation with the Ministry of Agriculture, Fisheries and Food, statutory consultees and landowners continued to add a valuable contribution to the progression of the project.

Agreement to the Strategy has now been obtained, subject to the outcome of the Private Finance Initiative investigations which have been actively progressing. Agreement has also been given to the progression of "Urgent Works" in advance of these investigations being completed. Development of detailed proposals for the urgent works has therefore proceeded with a view to construction commencing in 1998/9.

The Strategic Environmental Assessment identified the need for a programme to monitor the environmental effects of works carried out in Broadland. To acknowledge this requirement, consultants have been appointed to collect and collate data and to initiate a suitable programme in advance of the urgent works.

Broadland Compartment 11 - Halvergate Phase 9

Berney Arms Reach

Scheme No. MTB40409

Expenditure 1997/8 - £1,306,000

A contract to replace 575 metres of steel sheet piling on the north western bank of the River Yare, near Berney Arms Mill, was awarded to Tilbury Douglas Construction Ltd. The tender value was £1,890,000 and work commenced in October 1997.

South Oulton Broad

Scheme No. MTB40375

Expenditure 1997/8 - £411,000

A contract to carry out flood defence improvement works at South Oulton Broad was awarded to J Breheny Contractors Ltd. with a tender value of £436,000. Work commenced in November 1997 and has now been successfully completed except for a few minor outstanding items.

Broadland Compartment 35 - Raven Hall Emergency Work

Scheme No. MTB43351

Expenditure 1997/8 - £425,000

A section of existing timber piling along the south eastern bank of the River Yare, near Raven Hall, failed. This made it necessary to instigate emergency re-piling works, without delay, to reduce the risk of failure of the flood defences in Compartment 35. The 130 metre length was successfully completed by Tilbury Douglas Construction Ltd. who were also working on the Compartment 11 Berney Arms Reach scheme.

Great Yarmouth Flood Defences - ABC Wharf

Scheme No. MTB41410

Expenditure 1997/98 - £150,000

To secure the integrity of the flood defences along this important frontage on the east bank of the River Yare, it has been necessary to reconstruct the quay wall using heavy steel sheet piling and ground anchors. The works were completed by contractors, May Gurney & Co. Ltd., early in the year and the expenditure shown represents the balance of the Local Flood Defence Committee's contribution to the cost of the work.

3. SHORELINE MANAGEMENT PLANS

The aim of a Shoreline Management Plan is to provide the basis for sustainable coastal defence policies within a sediment cell and to set objectives for the future management of the shoreline.

Norfolk and Suffolk Shoreline Strategy

Shoreline Management Plans have been prepared covering the Norfolk coastline from Snettisham to Sheringham (Subcell 3A) and Sheringham to Lowestoft (Subcell 3B) and the Suffolk coastline from Lowestoft to Harwich (Subcell 3C). This work was undertaken in co-operation with the relevant maritime district councils. The Norfolk and Suffolk Local Flood Defence Committee has now adopted all three Plans.

Suffolk Estuary Strategy

In addition a Shoreline Management Plan will be produced for the Suffolk Estuaries.

MAINTENANCE AND EMERGENCY WORKS 1997/98

Introduction

The Catchment Engineer manages the tidal and fluvial resources in the two counties with a staff of 12, based at Norwich and Ipswich. A pivotal role of the Catchment Team continues to be the ongoing liaison and consultation with riparian landowners and frontagers, public authorities and private organisations, and increasingly developing relationships with statutory environmental bodies and conservation organisations. An increasing interest in flood defence issues is shared by the media, the public and education centres, and Catchment staff continue their involvement in this ongoing liaison, particularly during an emergency event. Flood defence matters are routinely dealt with by telephone and in writing and by attending site meetings. Requests to attend public meetings with locally elected representatives, district and county councils reflect a growing public requirement for accountability. Catchment staff again manned the Environment Agency stand at both the Norfolk and Suffolk Shows in 1997. Opportunities for increased liaison and co-operation with other functions in the Agency is an ongoing commitment. Liaison meetings continue with the Norfolk and Suffolk Constabularies and other emergency services to discuss emergency procedures, liaison and co-ordination during tidal and fluvial events. The role of the Environment Agency in issuing flood warnings is currently confined to Suffolk, with the Norfolk Constabulary still retaining their former responsibilities in the lead role for issuing warnings.

Overview

In 1997/98 the Norfolk and Suffolk Catchment prepared and completed a programme of maintenance works to the value of £2,261,000, approximately 10% of which was competitively tendered, the balance being awarded to the Environment Agency's Direct Services Group.

In addition to the planned and routine maintenance works carried out on the 1500km of Main River and 410km of sea and estuary defences in the Catchment, the following factors have influenced the programme of works and expenditure:

- The continuing need to prioritise maintenance works to protect people and property affected by previous flooding events.
- The increasing revenue expenditure necessary on the deteriorating tidal floodbanks in Broadland and the rural Suffolk estuaries, ahead of any approved capital expenditure.
- Drought conditions and low flows leading to increased deposition of silt and invasive vegetation growth in the freshwater river system.
- The balance needed to meet recommended maintenance standards and minimum flood return frequencies whilst meeting our statutory environmental objectives.
- The ongoing revenue maintenance commitments necessary on the sea defence frontages at Salthouse and Brancaster ahead of policy decisions on their future.

These factors have challenged the resources available to the Catchment in this financial year. The revenue expenditure for 1997/98 again included an additional 2.5% granted by the Local Flood Defence Committee to assist in meeting the increased revenue costs of maintaining our deteriorating assets. The budget target was met within 0.2% including emergency and contingency items.

The use of external contractors continues to complement the service provided by our in-house team, particularly where the supply of specialist equipment, plant and resources are required and where external contractors have been successful in winning competitive contracts.

Approximately 75% of the total maintenance budget was allocated to individually identified and planned revenue jobs, whilst the remaining 25% were expended on emergency events and tasks of an unplanned nature. The total maintenance expenditure during 1997/98 (with the previous year's figures for comparison purposes) was:-

	1996/97 £K	1997/98 £K
Maintenance of Sea and Tidal River Defences	1,525	1,408
Maintenance of Inland Waters	762	853
Total	2,287	2,261

Sea Defence, Tidal and Fluvial Maintenance Works

The following report describes some of the revenue works undertaken in the Catchment in the past year, and identifies the expenditure incurred on maintenance activities.

Sea Defence Works

General

The sea defence frontage for the Norfolk and Suffolk Local Flood Defence Committee extends from Old Hunstanton in West Norfolk, along the Suffolk frontage to Shotley near the Essex border. The 102km of defences range from hard steel and concrete floodwalls to softer frontages of shingle bank and sand dunes. These softer natural defences are particularly vulnerable to aggressive winter storm damage requiring ongoing and frequent maintenance to ensure the continuing integrity of these frontages. Shingle beaches are especially vulnerable to wave and tidal action and the shingle bank defences at Cley to Salthouse, Easton Broad, Walberswick to Dunwich and Sudbourne Beach, protecting property, agricultural land and areas of internationally important nature reserves, continue to require significant repairs following tidal damage.

Holme-next-the-Sea

The sand dune frontage of approximately 500 metres continues to erode at a rate between 5-10 metres per annum. In the spring of 1997 a 12 week trial using the Beach Management System (BMS) was completed. However, subsequent evaluation did not demonstrate a robust

justification for this method. Subsequent experimental works using traditional methods of brushwood faggots and chestnut fencing are proving successful in protecting the dune toe against further erosion.

Brancaster

The construction of a short ring bank to protect properties at risk has been successfully completed. So far as the protection of the West Marsh is concerned, the preferred option, which is also the cheapest, involves managed retreat by a designed breach. However, the outcome of the EC Habitats Directive consultation is still awaited and in the interim emergency works have been successful in maintaining the existing northern frontage.

Cley to Salthouse

A partial set-back has been selected as the preferred option for the protection of Salthouse village following a number of successful local public liaison meetings. A 4km clay embankment is proposed and a detailed appraisal and environmental statement is currently out for public consultation.

The annual management of the shingle ridge has been carried out using contractors' bulldozers, although the quantity of material available for re-profiling the defence continues to decrease.

Happisburgh to Winterton

The successful completion of the further five reefs and accompanying recharge with one million cubic metres of sand has protected the existing sea wall over the past year. There remains a significant beach which is proving an amenity asset. However, the existing groyne field continues to deteriorate and maintenance works are ongoing on their repair. Additional warning signs are being installed to warn the public of the hazards of the reefs and the groynes.

Shingle Defence Banks in Suffolk

Annual works to re-profile storm damaged soft defences in Suffolk are complete as part of our strategy for the longer term management of these frontages.

At Aldeburgh beach recharge works south of the town along the shingle defence bank involved the recycling of material from Orford Ness to reinforce the depleted updrift frontage.

Between Dunwich and Walberswick re-profiling of the shingle ridge was carried out and further works between Southwold and Benacre were necessary along this shingle defence.

Groyne Fields

Existing groynes at Old Hunstanton, Wells, Happisburgh to Winterton and at Felixstowe have all required repair and maintenance works, which are ongoing commitments.

Tidal Banks and Embankments

Broadland

The condition of the 240km of tidal floodbanks throughout Broadland continues to worsen. In Broadland annual settlement of up to 20mm, boat wash and impact damage, leaks and tidal scour all contribute to the need for essential maintenance. Ahead of the Broadland Flood Alleviation Strategy, ongoing maintenance and emergency works are proceeding and additional resources continue to be targeted into Broadland. This revenue work is intended to reduce the accelerated rate of defence deterioration by targeted works and pre-planned maintenance and repairs, to prevent as far as possible the risk of total failure of a tidal bank.

General repairs to the steel and timber revetment piling is a continuing commitment due to boat wash and damage, tidal scour and structural deterioration. Emergency works to replace failed piling have been completed at Stracey Arms, Haddiscoe Cut and at River Chet mouth at Hardley Cross. Further emergency works at South Breydon were required ahead of the capital scheme.

The capital scheme at Berney Arms has been successfully completed and the failure of revetment on the opposite side of the River Yare at Raven Hall has received capital approval.

Suffolk

In Suffolk, repairs to existing rural tidal floodbanks continue, with 67km of estuary defences along the Alde, Deben and Orwell estuaries. These works do not match the worsening condition of the Suffolk estuaries floodbanks. A previous repair at Reydon Wall on the River Blyth has been strengthened using soft engineering techniques including geotextiles and brushwood faggots. The existing floodbanks protecting the Trimley and Shotley frontages on the Orwell estuary continue to give concern, and following an environmental, economic and hydrodynamic investigation at Shotley, a scheme to recharge the foreshore using dredged material from Harwich harbour has been successfully completed.

Repairs to the Falkenham Wall, River Deben, Aldeburgh Town Wall, Hazelwood Wall and the Sutton Hoo Wall are complete.

All the tidal defences are inspected annually as part of our ongoing monitoring programme and following a major tidal event. The resulting report and routine frontage inspections assist in the preparation of the Catchment's prioritised revenue and capital programme.

Structures

Throughout the Catchment there are more than 450 structures on fluvial and tidal rivers and floodbanks, and incorporated into sea defences, that require operating, maintaining, repair and eventual replacement. The ongoing commitment to meet the operating needs of these structures, whilst complying with current health and safety legislation, requires considerable revenue expenditure. Every significant structure has an operating and maintenance document, and all structures receive safety and maintenance inspections in addition to independent safety audits. Structures that are required to be operated during an emergency, such as floodgates, are regularly tested and receive enhanced levels of inspection and maintenance. Some significant works carried out in 1997/98 are:

- River Waveney - Wainford Sluice: A minor capital scheme to replace the old structure with an automated tilting gate and telemetry monitoring has been completed.
- Great Yarmouth: Repair and maintenance works to over 500 tidal outfall flaps and discharges into the River Yare have improved the integrity of the flood defences through the town.
- Lothingland 100 - Rushmere Arch: Construction of a tilting gate is continuing. The structure replaces antiquated and unsafe timber boards resulting in an improved flood defence structure and water level control.
- Structural repairs to Wells sliding gate, access floodgates along the Happisburgh to Winterton frontage, Buxhall Vale Sluice and the rebuilding of Minsmere Sluice headwall are continuing.

Fluvial Embankments

There are approximately 60km of flood embankments on freshwater sections of Main River in the Catchment, usually above milling heads, where the original function was to impound the river. Routine maintenance continues as required, with selected lengths requiring cutting, leakage repairs and reinstatement works to maintain flood defence standards. Private mill owners are encouraged to manage their water levels sensitively, to prevent either overtopping or drying out of the embankments. Drought conditions lead to lower retained water levels and drying banks, which increases maintenance costs. Following the designation of the River Wensum as an SSSI, an Interim Water Level Management Plan has been prepared which will recognise the significant length of embankment and water retained frontages.

The management and operation of retained water levels at both the Environment Agency and privately operated mills continues to be reviewed and refined in the interest of flood defence and the environment.

Pumping Stations

There are three major pumping stations in the Catchment, at Acle, Benacre and Hollesley. In addition, the Catchment administers an Internal Drainage Board pump at Reydon.

- Hollesley Pumping Station: A capital scheme to replace the existing dilapidated structure with an automated station has received MAFF approval and detailed design works are complete. The existing 16 inch pump continues to malfunction and significant maintenance and repair works have been required.
- Acle Pumping Station: No major operational problems were encountered during 1997/98, with improvements to the weedscreen and further health and safety works that were carried out. Higher winter flows have resulted in increased running costs.
- Benacre Pumping Station: The capital investment in new pumps and an automated weedscreen cleaner have been apparent during higher winter pumping conditions.
- Reydon Pump: This floating Administered Internal Drainage Board structure continues to require significant repair and maintenance involvement to secure its continuing operation.

Weed Control

The Direct Services Group were again successful in 1997 in winning the competitively tendered weedcutting contract for major river systems in Norfolk and Suffolk, against external contractors. Using a combination of weedboats, hydraulic machines with grasscutting buckets, flail and pedestrian mowers, and some essential hand cutting, the majority of major watercourses were cut, either once or twice, dependent on need and status of protected area.

Previous freshwater flooding events have highlighted the need to target weedcutting, especially on frontages where properties had flooded. On smaller watercourses, especially in Suffolk, this work is still carried out by hand because of difficulties with machine access and the need to preserve our environmental standards.

The timing and extent of weedcutting is discussed with our environmental and fisheries colleagues, particularly on sensitive sections of rivers where fish spawning areas exist. Increasingly, external environmental and fishing organisations influence the weedcutting regime and a balanced decision is required to maintain an effective flood channel whilst protecting conservation interests.

Low summer flows in 1997 increased the amount of aquatic weed growth and encouraged invasion of the watercourse by terrestrial species. The cutting programme is balanced to provide for sudden summer flooding, whilst retaining sufficient weed growth to hold up water levels in the channel. On the Rivers Deben and Waveney prolific summer growth led to deoxygenation of the water with some fish mortality. Urgent cutting works were put in hand, together with the use of pumping equipment to raise oxygen levels in the water.

Dredging and Desilting

The programme for fluvial river works has again been driven by previous flooding events, requests from landowners, frontagers and local authorities, and site inspections by staff. In Suffolk, where the watercourses tend to be more reactive and carry a higher silt load, remedial works have been focused on sections of Main River where urban areas have flooded and where maintenance standards in the past have been lower.

Prior to any work commencing, comprehensive liaison is undertaken with all interested parties and agreement sought from the Environment Agency's Fisheries Conservation and Recreation staff. The need to maintain channels to provide flood protection to people and property whilst meeting our statutory requirement to enhance the environment when carrying out these works is an ongoing challenge.

Clearance of Obstructions

There is a continuing need for sensible channel maintenance and the clearance of channel obstructions, weedcreens at pumping stations and sluices, and debris around bridges and structures. Following a major fluvial event, all main rivers in the Catchment are patrolled, obstructions removed and landowners advised about fallen trees. In addition, all sluices and structures are regularly visited to remove debris that can reduce the effectiveness of the controls and increase the flood risk.

The Operation of the automatic weedscreen at Benacre Pump continues to give lower

operating costs, although the initial capital investment was high. A similar installation is planned for Hollesley Pumping Station.

Incidents continue to be reported of shopping trolleys, cars and other debris in the urban river lengths, the problem being worse through dense urban areas such as Norwich and Ipswich. These require removal because of their flood risk.

The opportunity is always taken to remind landowners and local parish councils of our Freephone telephone number (0800 - 80 70 60). They are encouraged to advise Catchment staff of any river problems, as additional "eyes and ears" on the ground allow us to target our limited resources more effectively. Our staff continue to develop this local liaison and relationships which encourage the "partnership" approach to flood defence needs and promote the sense of local ownership of a problem.

Some Key Events in the Year

- April 1997 - Tidal River Bure - Stracey Arms: A 30 metre section of medium weight piling failed on the right bank of the river. As the piles represented both a danger to navigation and threatened the integrity of the floodbank, emergency reinstatement works were carried out by the Direct Services Organisation, using floating plant.
- July 1997 - Low river flows, high water temperatures and good weather increased the number of problems and complaints due to the extreme levels of weed growth in the rivers. The Rivers Deben and Waveney were particularly affected in water quality and flood defence terms and urgent weedcutting works commenced.
- September 1997 - Predicted high spring tides, the highest of 1997, affected the Norfolk and Suffolk coast. A combination of high pressure and light winds resulted in the manning of Wells, Cley and Woodbridge floodgates, although no flooding was reported. However, the highest recorded level over this period was 3.81 metres at Wells, equivalent to a 1 in 6 year return. The media erroneously described the predicted tide as the worst for 40 years, which resulted in some concern from the public.
- November 1997 - Tidal River Blyth: A 30 metre length of flood wall partially failed and emergency works were put into place to safeguard the adjacent sluice structure, the extensive freshwater marshes and the public footpath on the floodbank crest.
- November 1997 - A £63 million Broadland Flood Alleviation Strategy has been agreed in principle by MAFF, subject to the Agency pursuing a Public Private Partnerships Programme (PPPP) over 20 years. Major works at Berney Arms and Oulton Broad are under way and urgent works at Raven Hall, Reedham Ferry and South Breydon are proposed for 1998.

- January 1998 - Heavy rainfall on a saturated catchment in Norfolk and Suffolk, with up to 25mm recorded in North Norfolk, caused extensive flooding to farmland and some roads were blocked. Amber warnings were issued for the worst affected rivers, the Wensum and Tud. No major property flooding was reported. In Broadland tidal levels rose, flood gates were closed at Beccles and some overtopping and numerous leaks were reported along floodbanks. On 22 January risk level warnings were removed on all rivers.

- February 1998 - The 60th anniversary of the Horsey Floods in East Norfolk were commemorated by the Eastern Daily Press with extensive features over two weeks. Catchment staff were interviewed and the opportunity was taken to publicise the recent extensive capital investment along the Happisburgh/Winterton frontage.

- February/March 1998 - Spring equinoctial tides, combined with surge residuals, led to flood warnings being issued along the Norfolk and Suffolk coasts. Although flood defence structures were operated along urban frontages and the Operations Incident Room opened, no flooding incidents were reported.

- March 1998 - Preceding heavy rainfall in Suffolk resulted in all the county's main rivers being placed on a Yellow Warning status. Flood plains were inundated but no property damage was reported.

Summary of Revenue Maintenance Expenditure in 1997/98

The Norfolk and Suffolk Catchment, in carrying out its revenue expenditure approved by the Local Flood Defence Committee, continues to endeavour to provide value for money within the Authority's financial regulations, whilst achieving a quality level of service and emergency response. The competitive tendering of an increasing percentage of the workload, the requirement for the Direct Services Group to price all awarded work and the competitive tendering for all equipment and services helps to demonstrate our commitment to providing the best possible service for the most economic price.

The 1997/98 actual expenditure under the various task headings for the Catchment is given below.

-	Sea Defence Works: general maintenance and repairs to 102km of defences.	£	593,175
-	Tidal Banks and Embankments: grass cutting, clearance, damage repairs and revetment replacement to 224km of defences.	£	764,784
-	Structures: routine maintenance, repair and operation of approx. 450 major structures.	£	168,838

-	Fluvial Embankments: the routine maintenance and repair of 60km of non tidal defences.	£	153,364
-	Pumping Stations: the operation, maintenance and power supply to three stations.	£	34,160
-	Weed Control: the cutting and removal of aquatic growth within fluvial main rivers.	£	129,774
-	Dredging and Desilting: removal of silt and vegetation along identified lengths of fluvial main river.	£	95,725
-	Clearance of Obstructions: the removal of debris and obstruction along the whole of the main river system, particularly at bridges and control structures.	£	241,217
-	Emergency Works: the efficient, effective and prompt monitoring of the risk of flooding throughout the Catchment.	£	79,963
			<hr/>
		£	<u>2,261,000</u>

LOCAL ENVIRONMENT AGENCY PLANS

Local Environment Agency Plans (LEAPs) are fully integrated plans covering all areas of interest to the Environment Agency. They have evolved from the Catchment Management Plans instigated by the former National Rivers Authority in 1990, and contain the Agency's additional responsibilities for waste regulation and integrated pollution control. Within the Norfolk and Suffolk Local Flood Defence District there are three such plans - North Norfolk, the Yare and East Suffolk.

LEAPs provide a vision for each catchment, together with policies, objectives and actions to achieve overall improvements to the environment. Partnerships with other organisations are keenly sought. The Flood Defence function has an important role in these plans, alongside all the other functions within the remit of the Environment Agency.

CONSERVATION AND FLOOD DEFENCE

The Norfolk and Suffolk Local Flood Defence Committee has always recognised the effects that many of its works could have on the environment and has taken into account the need to conserve. Before any capital or revenue works are carried out there is full consultation with the conservation interests. Environmental surveys are undertaken and, in the case of major capital schemes, an Environmental Assessment. In addition, Section 7 of the Environment Act 1995 places a positive duty of conservation enhancement upon the Environment Agency: this policy is pursued whenever possible. Agency personnel involved in works are constantly alert to take advantage of unexpected opportunities that often present themselves when plant and workforce are in a particular area, assisted by close links with their conservation colleagues. Where works cannot be justifiably charged wholly to flood defence funds, conservation works using our specialist skills have been undertaken on a rechargeable basis.

The majority of the coast in Norfolk and Suffolk is covered by a range of statutory and non-statutory designations which recognise its national and international environmental importance. There are two statutory designations/directives that recognise the international conservation importance of natural habitats -

- Special Protection Areas (SPA) designated under the European Community Birds Directive for the value of wildfowl and waders.
- Special Areas of Conservation (SAC) designated under the Habitats Directive for the habitats and species value of the area.

Other designations include -

- Sites of Special Scientific Interest (SSSI)
- Areas of Outstanding Natural Beauty (AONB)
- National Nature Reserves (NNR)
- The Broads Authority Environmentally Sensitive Area (ESA)
- Local Nature Reserves (LNR)
- County Wildlife Sites

The need to ensure full liaison and agreement with all consultees prior to working within their designated areas involves a significant but necessary workload and satisfactory forward planning.

The Catchment staff continue to be involved in initiatives to enhance the environment whilst carrying out flood defence works. The following merit particular attention:-

- Alternative and experimental methods of softer engineering: Research into softer and cheaper methods of protecting tidal river banks is being continued by Catchment staff. Whilst some frontages still require the traditional protection offered by steel and timber revetment, appropriate frontages are being targeted with softer protection options. This approach is especially appropriate in Broadland and close liaison and cooperation continues with the Broads Authority on this issue. The use of geotextiles and recycled plastic piling continues, and the installation of locally grown reed

bundles stacked into eroded river banks is being trialled.

The Catchment continue their involvement in a National Research and Development Project into alternative methods of bank protection and Beta testing of the draft document is currently under way on identified sites in Broadland.

- Holme-next-the-Sea: Dune erosion protection works have been installed as an experimental soft engineering approach to protecting the unrevetted dune face from wave erosion. Bundles of hardwood faggots and chestnut pale fencing have been installed in a designed box formation to absorb wave energy and promote the accretion of wind blown sand. Apart from a delay due to the discovery of unexploded shells, these experimental and low cost works are proving successful. They are, however, sacrificial in a major storm event.
- Broadland, tidal River Yare at Bramerton: Experimental works using softer alternative engineering methods to protect the river bank from further erosion have recommenced. This is a collaborative project in partnership with the Broads Authority.
- Broadland, St. Benets Abbey, tidal River Bure: Discussions continue with English Heritage and the Broads Authority on an environmentally acceptable soft engineering solution to prevent further scour to the riverside medieval quay headings.
- Broadland - Haddiscoe Island borrow pit: A water level control structure has been constructed, during flood defence works, on an Agency owned borrow pit to provide environmental enhancement and manage water levels.
- River Bure, Ingworth: Old fishing groynes in poor condition have been removed and replaced with low level wholenstone groynes during desilting operations. This has improved the appearance of the river reach, retained environmental and habitat benefits of the old structures, and improved the flood flow capacity of the channel.
- Burnham Norton, North Norfolk Material to repair a damaged seawall has been excavated within the SSSI in collaboration with English Nature to provide additional open freshwater lagoons with landscaped margins.
- Aldeburgh Town Wall As part of the flood defence repairs an improved all weather footpath surface has been provided along the bank crest. This has generated local public acclaim.
- Rushmere Arch, Lothingland 100: The completion of the flood defence tilting gate will allow improved water level management on the freshwater grazing marshes.
- As part of the routine maintenance works on the River Gipping, a disabled fishing platform has been designed and constructed at Bramford.
- River Blyth, Southwold: A collaborative project with Suffolk Wildlife Trust was carried out to create a brackish lagoon within the old Buss Creek main river channel.
- Southwold Sea Defences: Rehabilitation works to the sand dunes are complete

including dune recreation, marram planting and pedestrian control measures. Suffolk Wildlife Trust provided volunteers to assist in marram planting on the reconstructed dunes. These last two schemes have featured in press articles in the Eastern Daily Press and East Anglian Daily Times.

WATER LEVEL MANAGEMENT PLANS

Water Level Management Plans (WLMPs) are a Ministry of Agriculture, Fisheries and Food (MAFF) initiative developed in 1994. The Plans provide a means whereby the water level requirements for a range of activities in a particular area, including agriculture, flood defence and conservation can be balanced and integrated. The "*Conservation Guidelines for Drainage Authorities*" (MAFF/DoE/Welsh Office, 1991) state that WLMPs should be prepared for areas where water levels are managed, the highest priority going to internationally important sites such as Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites.

Within the Norfolk and Suffolk Local Flood Defence District the Environment Agency is currently responsible for the preparation of 19 Water Level Management Plans. These include high profile sites such as Redgrave and Lopham Fens, Minsmere and the North Norfolk Coast. Because the Environment Agency controls the water levels at these sites, it is therefore responsible for preparing their WLMPs. These Plans have been endorsed by English Nature as written agreements. The Plans are treated as working documents and will be reviewed on a regular basis and updated or revised if the objectives are unable to be met or if circumstances change. They also seek to provide continuity and stability for these important sites and, by identifying opportunities, will allow the Flood Defence Committee, in undertaking its statutory duties, to further the conservation of wildlife and the enhancement of natural beauty.

SOFT ENGINEERING

Brancaster West Marsh

The flood defences to the west of the Royal West Norfolk Golf Club (RWNGC) access road comprise on the northern flank a natural sand dune which has been heavily revetted with stone filled gabions. Extensive and periodic winter storm damage has jeopardised the integrity of these defences and has resulted in increased maintenance costs to the extent that they are no longer economically viable to sustain from a flood defence point of view. The defences protect 41 hectares (ha) of mainly freshwater grazing marsh including 2.3ha of the golf club's practice ground and 0.7ha of urban development. The rough grazing marsh is considered by English Nature to have a high conservation value and is designated an SSSI and Special Protection Area (SPA) under the Birds/Habitats Directive. The adjacent marshes also are considered to have a high conservation value and are within the North Norfolk SAC (Special Area of Conservation). The RWNGC is considered to be an outstanding Links course with a high amenity and recreation value and is widely used. Additionally, a coastal footpath is routed along the line of the sea defences.

In view of the fragile condition of the sea defences, the 0.7ha of urban development, which includes 2 properties, has recently been protected by a ring bank under a separate stand-alone scheme. The remaining 40.3ha of rough grazing marsh is recommended for a managed realignment (managed retreat) option at a cost of £160K. The golf club's practice ground may be protected by a low earth embankment provided and maintained by the RWNGC. The main golf course, clubhouse and access road is outside the defended area and is not therefore affected by the realignment option. It is considered that the effect of realignment on the freshwater grazing marsh, which is designated as an SPA, will be a reversion to its original natural saltmarsh habitat.

The proposal, which fully accords with the recommendations of the North Norfolk Shoreline Management Plan for this part of the coast, has been approved by the Norfolk and Suffolk Local Flood Defence Committee. The Committee will fund the total cost since the proposal is not eligible for MAFF grant aid, falling outside PAGN guidelines.

The implications of the European Habitats Directive became apparent when the Committee wished to proceed with its preferred option of controlled realignment to manage the sea defences at Brancaster. Under the Habitats Directive there is a requirement to maintain a position of "no net loss of habitat", from which it follows that, if habitats are lost either as a result of natural coastal processes or man's intervention through managed retreat, then they should be re-created. DETR have been asked for guidance on their interpretation of the legislation and in particular how they would wish to fund the re-creation of lost habitats. The likely cost to the nation for lost habitats over the next 50 years (England and Wales) is in the order of £60 million, and Brancaster is seen to be a test case which will set a precedent for the future.

Shotley

Shotley sea wall is on the south bank of the Orwell estuary, 2.5km of revetted clay embankment protecting some 60 hectares of SSSI grazing pasture. Erosion has washed away the saltmarsh that once protected the sea wall and extensive concrete revetment repairs or improvements cannot be economically justified. The Agency, in close partnership with Harwich Haven Authority and Westminster Dredging Ltd., are experimenting with a solution that utilises harbour navigation dredgings that would otherwise be dumped at sea. A gravel bund has been placed at low water over a 500 metre length of foreshore, in total some 20,000 cubic metres. The material was delivered to site by the Westminster dredger "Sospa" and shaped by a low ground pressure bearing excavator. Into this bund was pumped 30,000 cubic metres of silt, again using the "Sospa" connected to a lightweight plastic pipeline. The eroded foreshore level was raised to protect the vulnerable sea wall from wave attack. The entire site and how the experiment behaves is being monitored by Cambridge University and University College, London.

The cost to the Local Flood Defence Committee is only £496, the charge for the "dump at sea" licence. All the construction and monitoring costs, in total some £110,000, are being met by Harwich Haven Authority.

A linked similar scheme is being conducted in Essex in the Walton Backwaters for the Essex Local Flood Defence Committee.

HYDROLOGICAL REPORT

Rainfall

The monthly rainfall totals are shown in the following table.

Month	1961-90 Long Term Average (mm)	1997/98	
		Actual (mm)	% Average
April 1997	47	16.8	35%
May 1997	44	44.4	101%
June 1997	49	121.5	248%
July 1997	53	28.4	54%
August 1997	54	32.8	61%
September 1997	54	12.8	23%
October 1997	56	43.0	76%
November 1997	65	52.0	80%
December 1997	58	84.5	146%
January 1998	55	59.2	108%
February 1998	40	8.0	20%
March 1998	46	52.8	115%
Total for year	615	556.2	86%

With few exceptions the monthly rainfall during 1997/98 was well below average, with May 1997 receiving an average amount and January 1998 slightly above average. For the majority of the year rainfall was spread evenly across the Catchment, with sporadic light events occurring between periods of dry weather. Only three months of the period under review experienced rainfall significantly above average, these being June, December and March.

Soil Moisture Deficit

The soil moisture deficit throughout the year was above average. It rose sharply through April and May 1997, levelling out in June, but then falling dramatically during the early part of July in response to June's rain which was 248% of average. The deficit abruptly rose again and remained high until the first half of October when it again fell dramatically in response to heavy rain experienced on the 8th of the month. The SMD rose again until the winter rain during November to January caused it to fall, although still remaining above average for the time of year. The rise in February reflected the very low rainfall during that month.

River Flows and Fluvial Events

River levels were significantly below average from April to November, showing a steady decline throughout the period. The heavy rainfall over the Christmas and New Year period resulted in high flows and by the end of January they were returning to seasonal averages. During the first two weeks of January 1998 two Amber and 14 Yellow Fluvial Warnings were issued. River flows showed a consistent decline during February but began to show signs of improvement during March.

Groundwater Levels

The drought conditions persisted throughout most of the year under review and only during the last three months did some of the groundwaters show signs of recovery. The year under review began with all aquifers being below average. The Norfolk Chalk levels were half way between the minimum and the mean, while the Norfolk Drift levels were just above minimum. All groundwaters continued to decline steadily throughout the year, the Suffolk aquifers being particularly hard hit. By the summer of 1997 the majority of the aquifers were reaching or had already reached all-time recorded minima. At the end of the year under review the downward trend had reversed in response to the winter rainfall. The levels of Norfolk Chalk and Norfolk Drift rose rapidly to average or above for the time of year. The Suffolk Chalk levels rose gradually but at the end of the year were still below the long term minima. Suffolk Crag levels, whilst above the long term minima at the year end, were still below the seasonal minima.

Storm Tide Warning Service

The Storm Tide Warning Service operated from 1-30 April 1997 and from 1 September 1997 to 31 March 1998. However, the Environment Agency was kept informed of particularly high astronomical tides occurring during the summer months.

High astronomical spring tides, the highest of 1997, occurred during the middle part of September, affecting the Norfolk and Suffolk coast. 12 Yellow Warnings were issued.

During the period November 1997 to January 1998 two Yellow Warnings were issued.

On 28 February/1 March 1998 spring equinoctial tides, combined with surge residuals, led to flood warnings being issued along the Norfolk and Suffolk coasts. One Amber and three Yellow Warnings were issued.

FINANCIAL REPORT

The following notes apply to the accompanying statement:-

FINAL ACCOUNTS 1997/98 - VARIANCE ANALYSIS

Line Nos.

8. Operating and Management expenditure at £4237k was £12k or 0.28% more than the revised budget. £4k was on operational maintenance works and £8k on administration and general charges.
10. Additional expenditure on working capital as a result of more vehicle and plant purchases than included in budget.
16. Total income at £9128k was £89k or 0.97% more than the revised budget. This additional income was the result of additional asset sales and rechargeable works of £54k, investment income of £32k and general drainage charges of £3k.
21. Total capital expenditure was £60k more than the revised budget of £8440k, a variance of 0.71% and the maximum MAFF Grant Income was achieved.
27. Section 47 balances carried forward to 1998/99 were £230k, £29k more than the revised budget. This represents 1.80% of gross expenditure.

FINAL ACCOUNTS 1997/98

NORFOLK AND SUFFOLK LOCAL FLOOD DEFENCE COMMITTEE

(£000's)

LINE NO.		OUTTURN 1996/97	REVISED BUDGET 1997/98	OUTTURN 1997/98	VARIANCE
	A. OPERATING AND MANAGEMENT EXPENDITURE				
	Maintenance Works				
1	Main River	762	854	853	(1)
2	Sea Defences	1525	1404	1408	4
3	Flood Warning	30	68	67	(1)
4	Other	160	152	155	3
5	Land and Properties	--	--	--	
6	Contributions to IDBs	176	200	199	(1)
7	Administration and General Charges	1487	1547	1555	8
8	TOTAL OPERATING AND MANAGEMENT EXPENDITURE	4140	4225	4237	12
9	Revenue Contribution to Capital Outlay	5706	3182	3197	15
10	Working Capital	(20)	(20)	13	33
11	TOTAL EXPENDITURE	9826	7387	7447	60
	LESS INCOME				
12	Precepts	6902	7899	7899	
13	General Drainage Charges	693	786	789	3
14	Interest Received	209	259	291	32
15	Miscellaneous (Including Land Sales)	105	95	149	54
16	TOTAL INCOME	7909	9039	9128	89
17	NET SURPLUS/(DEFICIT) TRANSFERRED TO RESERVE	(1917)	1652	1681	29
	B. CAPITAL EXPENDITURE				
18	Grant Aided Works	17019	7100	7112	12
19	Non Grant Aided Works	202	190	238	48
20	Capital Salaries/Consultants Fees	1232	1150	1150	--
21	TOTAL CAPITAL EXPENDITURE	18453	8440	8500	60
	LESS				
22	MAFF Grant	12747	5258	5303	45
23	Capital Contributions	--	--	--	--
24	Revenue Contributions to Capital Outlay (in Section A above)	5706	3182	3197	15
	C. RESERVE				
25	i) Balance Brought Forward at 1.4.97	466	(1451)	(1451)	
26	ii) Transfer of Operating Surplus/(Deficit)	(1917)	1652	1681	29
27	iii) Balance Carried Forward to 1.4.98	(1451)	201	230	29
28	Grant Earning Ceiling	17000	7100	7100	--
29	Section 47 Balances % of Gross Expenditure	(6.43)%	1.58%	1.80%	

SECTION 57(1) LAND DRAINAGE ACT 1991

CONTRIBUTIONS TO INTERNAL DRAINAGE BOARDS

Contributions are paid to Internal Drainage Boards for the cost of dealing with upland water flowing into their districts. This method of calculation is regionally standard, having been agreed by all the Local Flood Defence Committees. Contributions for the year ending 31 March 1998 are shown below :

REF NO	INTERNAL DRAINAGE BOARD	TOTAL (£)
NS/1	North Norfolk	935
NS/6	River Wensum	20,031
NS/7	Upper Bure	9,280
NS/8	Middle Bure	2,719
NS/9	Lower Bure	12,832
NS/10	Smallburgh	22,832
NS/11	Happisburgh To Winterton	15,914
NS/12	Repps, Martham and Thurne	9,260
NS/13	Muckfleet and South Flegg	20,309
NS/14	Upper Yare and Tas	3,726
NS/15	Lower Yare First	2,806
NS/16	Lower Yare Second	6,664
NS/17	Lower Yare Third	7,393
NS/18	Lower Yare Fourth	4,591
NS/19	Limpenhoe and Reedham	(143)
NS/20	Langley Chedgrave and Toft Monks	NIL
NS/21	Burgh Castle	2,308
NS/22	Waveney Valley	7,817
NS/23	Lower Waveney	8,205
NS/24	Lower Waveney Second	8,117
NS/25	Lower Waveney Third	8,419
NS/26	Blundeston Flixton and Oulton	334
NS/27	Oulton, Carlton Colville and Barnby	364
NS/28	Lothingland	NIL
NS/29	River Blyth	6,309
NS/30	Minsmere	427
NS/31	Upper Alde	688
NS/32	Fromus Alde and Thorpness	1,239
NS/33	Middle Alde	4,703
NS/34	River Deben (Upper)	(375)
NS/35	Lower Alde	874
NS/36	Alderton, Hollesley and Bawdsey	NIL
NS/37	River Deben (Lower)	2,920
NS/38	River Gipping	<u>7,201</u>
	TOTAL	198,699
	1997/98 REVISED BUDGET	<u>200,000</u>
	VARIANCE	<u>(1,301)</u>

FLOOD DEFENCE SCHEMES

SCHEME NUMBER	SCHEME DESCRIPTION	EXPENDITURE '000
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A. GRANT ELIGIBLE EXPENDITURE

MTA44809	HOLLESLEY PUMPING STATION	3
MTA49023	ARTS PHASE PHASE 3 BATCH B	103
MTA49044	ARTS PHASE 4 BATCH D	3
MTB40244	R.DEBEN WOODBRIDGE PHASE 1	4
MTB40247	R.DEBEN WOODBRIDGE PHASE 4	1
MTB40248	R.DEBEN WOODBRIDGE PHASE 5	6
MTB40375	SOUTH OULTON BROAD	411
MTB40402	BROADLAND COMP 11 HALVGTE PH 2 & PH 6	15
MTB40408	BROADLAND COMP 11 HALVGTE PH 8 : R.YARE	171
MTB40409	BROADLAND COMP 11 HALVGTE PH 9	1,306
MTB40506	BROADLAND:REEDHAM/HADDISCOE CUT	99
MTB40601	BROADLAND COMP 36 STH BREYDON	1
MTB41410	GREAT YARMOUTH ABC WHARF	150
MTB42004	BROADLAND - SITE INVESTIGATION	34
MTB42007	BROADLAND - HYDRAULIC MODEL	(4)
MTB42010	BROADLAND - MONITORING	37
MTB40274	R.GIPPING STOWMARKET FLOOD PROT N	12
MTB40323	BAWDSEY SEA DEFENCES	7
MTB40371	WELLS/BURNHAM OVERY IMPS	1
MTB41308	HAPPISBURGH / WINTERTON PHASE 2	3,971
MTB41314	HAPPISBURGH / WINTERTON - STRATEGIC MONT	72
MTB41502	CLEY SEA DEFENCES PHASE 2	4
MTB41550	SALTHOUSE FLOOD PROTECTION	44
MTB41935	BROADLAND - COMPARTMENT 35	3
MTB43000	BROADLAND PPPP/PFI	20
MTB43111	BL COMP 11 - URGENT WKS BREYDON	39
MTB43112	BL COMP 11 - HALVERGATE CONTRACT 2	2
MTB43113	BL COMP 11 - HALVERGATE CONTRACT 3	5
MTB43221	BL COMP 22 - FERRY RD/WINDMILL	45
MTB43222	BL COMP 22 - BURGH NORTON CONTRACT 2	5
MTB43223	BL COMP 22 - BURGH NORTON CONTRACT 3	5
MTB43350	BL COMP 35 - HADDISCOE ISLAND STRATEGY	9
MTB43351	BL COMP 35 - URGENT WORKS RAVEN HALL	425
MTB43360	BL COMP 36 - SOUTH BREYDON STRATEGY	(3)
MTB43361	BL COMP 36 - HUMB FM/CHURCH FM	25
MTB43410	BL UDP - REEDHAM	6
MTB48894	SHORELINE MONITORING - 1997/98	79

7,112

FLOOD DEFENCE SCHEMES

SCHEME NUMBER	SCHEME DESCRIPTION	EXPENDITURE '000
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B. NON GRANT ELIGIBLE EXPENDITURE

MTA44809	HOLLESLEY PUMPING STATION	1
MTA49012	ARTS PHASE 2	2
MTA49023	ARTS PHASE 3 BATCH B	19
MUC41041	MENDHAM SLUICE	1
MUC41043	LOTHINGLAND 100 - RUSHMERE ARC	39
MUD41052	TRIMLEY AND SHOTLEY F.D.	21
MUC41057	IDB CONTRIBUTIONS - 1997/1998	30
MUD41059	BRANCASTER RING BANK	11
MUD41060	BRANCASTER WEST MARSH WALL	21
MTB40323	BAWDSEY SEA DEFENCES	2
MTB40370	FELIXSTOWE FERRY MONITORING	8
MTB40371	WELLS/BURNHAM OVERY IMPS	1
MTB40376	HOLME DUNES	9
MTB41302	HAPPISBURGH/WINTERTON PHASE 1	1
MTB41308	HAPPISBURGH/WINTERTON PHASE 2	3
MTB41330	WAXHAM/SEA PALLING TOE PROTN	3
MTB41550	SALTHOUSE FLOOD PROTECTION	1
MTB48893	SHORELINE MONITORING - 1996/97	8
MTB48894	SHORELINE MONITORING - 1997/98	10
MTB42005	BROADLAND - PUBLIC LIAISON	3
MTB42006	BROADLAND - STATUTORY LIASON	2
MTB42125	ALDE/ORE - SFFLK ESTUARY STRATEG	2
MTB42126	BLYTH - SFFLK ESTUARY STRATEGY	1
MTB42127	DEBEN - SFFLK ESTUARY STRATEGY	1
MTB43000	BROADLAND PPPP/PFI	1
MTB43110	BL COMP 11 - HALVERGATE STRATEG	1
MTB43220	BL COMP 22 - BURGH NORTON STRAT	7
MTB43360	BL COMP 36 - STH BREYDON STRATEG	2
MTB43430	BL UDP BRUNDALL	14
MTB43440	BL UDP NORTH OULTON BROAD	8
MTB43450	BL UDP SOMERLEYTON	2
MTB43460	BL UDP SURLINGHAM	5

238

C. SALARIES 346

D. CONSULTANTS 804 1,150

TOTAL CAPITAL EXPENDITURE 8,500