



*Lincolnshire Local
Flood Defence Committee*

Annual Report 1996/97



LINCOLNSHIRE LOCAL FLOOD DEFENCE COMMITTEE

ANNUAL REPORT 1996/97

**THE FOLLOWING REPORT HAS BEEN PREPARED
UNDER SECTION 12
OF THE WATER RESOURCES ACT 1991**

**Ron Linfield
Area Manager (Northern)**

May 1997

**Front Cover Illustration
Aerial View of Mablethorpe North End
Showing the 1996/97 Kidding Scheme**

ENVIRONMENT AGENCY



136076

LINCOLNSHIRE LOCAL FLOOD DEFENCE COMMITTEE

ANNUAL REPORT 1996/97

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LINCOLNSHIRE LOCAL FLOOD DEFENCE COMMITTEE

R J EPTON Esq - Chairman
Northholme Hall, Wainfleet, Skegness, Lincolnshire

Appointed by the Regional Flood Defence Committee

R H TUNNARD Esq - Vice Chairman
Witham Cottage, Boston West, Boston, Lincolnshire

D C HOYES Esq
The Old Vicarage, Stixwold, Lincoln

R N HERRING Esq
College Farm, Wrawby, Brigg, South Humberside

P W PRIDGEON Esq
Willow Farm, Bradshaws Lane, Hogsthorpe, Skegness
Lincolnshire

M CRICK Esq
Lincolnshire Trust for Nature Conservation
Banovalum House, Manor House Street, Horncastle
Lincolnshire

PROF. J S PETHICK - Director
Cambs Coastal Research Unit, University of Cambridge
62 Sidney Street, Cambridge CB2 3JW

Appointed by the Constituent Councils

North East Lincs Council
Councillor Mrs F Bovill
36 Macaulay Street
Grimsby DN31 2DU

North Lincs Council
Councillor P Kirk
12 Scotter Road
Scunthorpe
North Lincs DN15 8DR

Lincolnshire County Council**COUNCILLOR M C ANDERSON**

19 Edward Crescent, Skegness, Lincolnshire

COUNCILLOR S R CHAPMAN

4 North Foreland Drive, Skegness, Lincolnshire

COUNCILLOR J L DODSWORTH

Middle Marsh Farm, Burgh le Marsh, Skegness, Lincolnshire

COUNCILLOR M J ELFORD

24 Cheltenham Way, Mablethorpe, Lincolnshire

COUNCILLOR J PLANT

191 Rookery Lane, Lincoln

COUNCILLOR W H RUCK

71 Bartol Crescent, Boston, Lincolnshire

OBSERVERS REPRESENTING LINCOLNSHIRE AREA ENVIRONMENT GROUP**T WILSON Esq**

4 Allison Close, Messingham, Scunthorpe

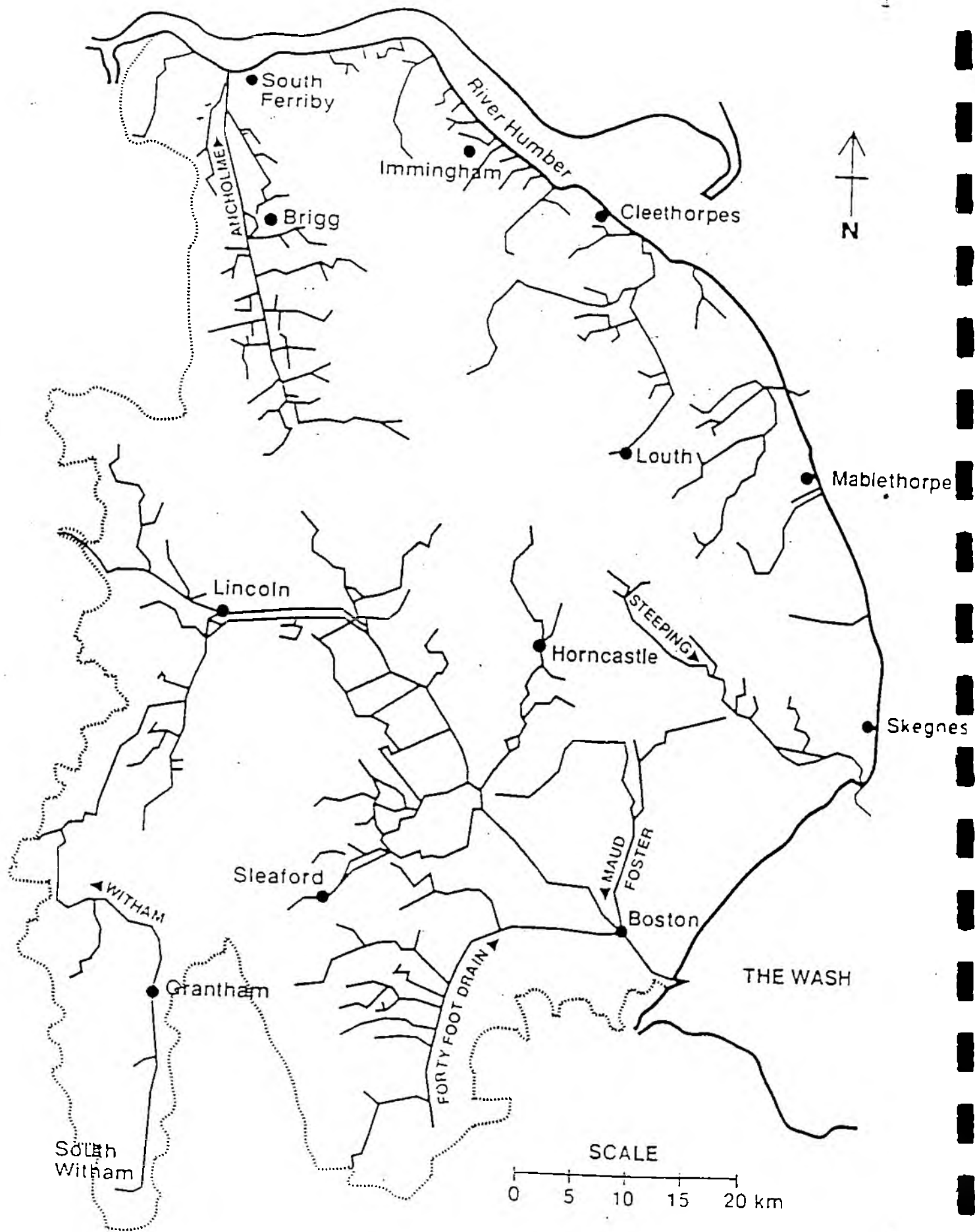
and

R B SHIELDS Esq

37 Park View, Sutton on Sea, Lincolnshire LN12 2NT

OFFICERS SERVING THE COMMITTEE**AS AT 31 MARCH 1997**

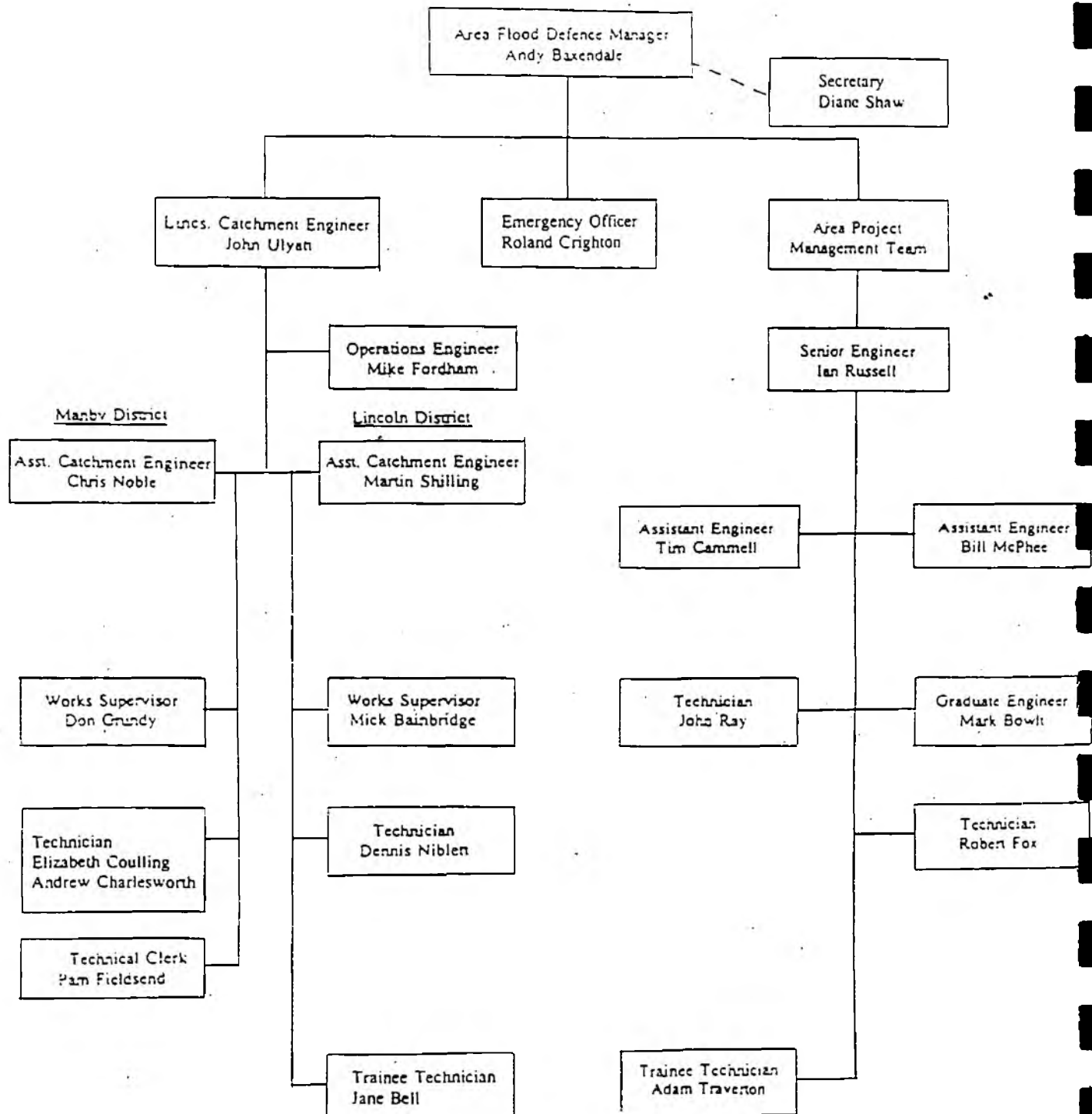
Grainger Davies	Regional General Manager
Ian Ripley	Regional Finance Manager
Ron Linfield	Area Manager Northern
Andy Baxendale	Area Flood Defence Manager
Steve Wheatley	Regional Flood Defence Manager



— NRA Main River
..... Lincolnshire Flood Defence Committee Boundary

FLOOD DEFENCE DATA 1996/97		
1.	Resident Population in Local Flood Defence District (at January 1992)	670,000
2.	Relevant population in Local Flood Defence District (at January 1992)	484,688
3.	Area of Local Flood Defence District	5,320 km ²
4.	Total length of fluvial main river	1,081 km
5.	Total length of embanked fluvial main river included in (4) above	665 km
6.	Total length of fluvial main river embankments	1,201 km
7.	Total length of fluvial main river maintained primarily for the benefit of an urban/industrial environment	170 km
8.	Total length of tidal main river	44 km
9.	Total length of tidal main river embankments/defences	28 km
10.	Total length of estuarine main river	0
11.	Total length of estuary embankment/defences	47 km
12.	Total main river length - Fluvial/Tidal/Estuary No (4) + No (8) + No (10)	1,125 km
13.	Total length of first line sea defences (the responsibility of the Anglian Region)	97 km
14.	Total length of first line sea defences maintained primarily for the benefit of an urban/industrial environment	83 km
15.	Total number of Internal Drainage Boards	10
16.	Total area of Internal Drainage Boards	2,136 km ²
17.	Income from IDB Precept	£m 1.273
18.	Levies from County Councils (relevant population) £/head	£10.50
19.	Income from County Council levy	£m 5.091
20.	General Drainage Charge rate	237.08/ha
21.	Income from General Drainage Charge	£m 0.618
22.	GEC	£m 13.6
23.	Total Grant Aided Works	£m 15.1

Northern Area
Flood Defence Staff Structure
Lincolnshire Catchment
As on 31st March 1997



AREA MANAGER'S INTRODUCTION

The first day of April 1996 began a new era in the administration of the country's management of environmental matters covering land, air and water, with the establishment of the Environment Agency as prescribed by the Environment Act 1995.

The Agency has inherited the responsibilities, functions and resources of its predecessor organisations, those being the NRA, Her Majesty's Inspectorate of Pollution and the Waste Regulation Departments of the County Councils. The functions and powers of the Regional Flood Defence Committee remain the same under the aegis of the Agency as was the case under the NRA and where RFDC's delegated powers to Local Committees, as is the case in Anglian Region, these arrangements have also continued.

The Report which follows summarises the flood defence works undertaken during 1996/97 within the Lincolnshire Catchment and outlines the associated financial position. A number of key points are highlighted below.

The Capital works Programme completed totalled £15.2 million, a reduction in expenditure compared to 1995/96 (£20.69 million) when exceptional progress on the beach nourishment scheme was achieved, a reduction also compared to the original approved budget in order to restore the Committee's balances. As a consequence of this, the Committee relinquished £1.2 million of its Grant Earning Ceiling.

HAM Dredging continued nourishment works on Phase II of Lincshore 97 from the beginning of the financial year through until 9 November, apart from a short break at the end of June and other weather related interruptions. During this period almost 1,500,000m³ of sand was placed on the frontage between just south of Chapel Outfall to just south of Huttoft Car Terrace and also short lengths to the north and south of Boygrift Outfall protecting a particularly vulnerable section of the defence.

Overall under Phase 1 and II of this scheme 4,450,000m² of sand has been placed on the beach over a frontage of 13kms, and the nourishment has performed fully to expectations in absorbing wave energy whilst monitoring has shown losses at 3% to be well within the design parameter.

Storm tides in the Autumn brought a premature end to nourishment, which as well as causing damage to the Contractor's reception vessel, also caused further damage to the defence at Lagoon Walk, necessitating the promotion of urgent works there. Two other frontages, Queens Park, Mablethorpe and Church Lane, Sutton-on-Sea, were also identified as in need of urgent works prior to being covered by nourishment, and such works were completed during the financial year.

At the meeting in January 1997, the Committee considered and conditionally approved the Strategy Report for the Lower Witham/Horncastle Flood Alleviation Scheme. The Report develops strategic flood defence options for a 50 year period involving phased bank

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improvement works and the provision of flood storage at key locations costing some £50 million overall, with expenditure during the first 10 years estimated at £30.5 million. The standard of flood protection achieved varies with land use from 1 in 25 years to 1 in 100 years, although expenditure of a further 2% would make it possible to give similar standards throughout. The strategy identifies many opportunities for environmental enhancement both in habitat expansion and restoration as well as recreational and amenity facilities.

In tandem with this major strategy, work has also been in progress to promote urgent bank protection works on the River Witham between Stamp End and Fiskerton, where berm erosion had reached a critical stage in respect of bank stability. Berm reinstatement and protection works have been in progress, the new profile was designed to provide a wet berm to create a wider range of habitat along the 900 metre length of the river.

Preparation of the Humber Estuary Management Strategy (HEMS) was noted in last year's Annual Report and in July 1996 the Document was launched by Ed Gallagher supported by speakers representing English Nature, Industry and the RSPB. HEMS, a voluntary project to facilitate decision making on the Humber, is being developed through a partnership of organisations including local authorities, private and public sectors, voluntary bodies and user groups. Whilst it has no statutory basis, it is part of the vision of HEMS that organisations with statutory responsibilities will support it by incorporating the Strategy into their plans.

The Agency is one of the key parties and has contributed to the funding of the project.

The tidal defences of the Estuary, vital to the continuation of much of the human activity present in the lowland areas surrounding the Estuary, also have impacts on most other elements of the environment, some of which are potentially vulnerable to unsympathetic improvement works.

Previous studies have identified and quantified tidal defence improvement works required in phases over the next 50 years, some of which are considered urgent and necessary before the year 2000, as a consequence the Agency set up Inter Regional Management for the Estuary and appointed a Humber Strategies Manager.

In the longer term, the Agency needs to determine a Flood Defence Strategy, but much of the information necessary for this is not available, however the studies required to achieve it have been put in hand. In the meantime, it is necessary to continue to protect people and property against tidal flooding and consequently an extensive consultation process is in place in order that environmentally, technically and economically acceptable options can be determined for these urgent works.

The programme of maintenance works was completed as planned and the standards achieved have remained unchanged over the last three years. Enhanced standards introduced in 1994 provided for additional bushing as well as weed control and bank maintenance works, but

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also one-off enhancement measures, which this year included the third phase of the major dredging of the Maud Foster/Stonebridge Drain system.

In response to the Direction by the Minister of Agriculture, Fisheries and Food to the NRA to provide warnings of floods directly to the public as from 1st September 1996, a considerable amount of work was undertaken in the planning, installation of equipment and implementation of the systems necessary in time to meet this deadline. In the event all the new facilities were in place and available for use in a real tidal event which occurred at the end of August, so that the initial target, which was to at least replicate standards previously achieved by the Police, was fulfilled whilst the system was tested under operational conditions.

The National target level of service for the year 2001 is to deliver warnings to at least 80% of properties in advance of flooding taking place and a review is in progress to identify and prioritise improvements needed to meet this standard.

As was the case in 1995/96, rainfall this year was less than mean values in each month except November, December and February and in most months markedly so. Consequently, river flows were below mean values throughout the year and there was no occasion when the rivers reached levels sufficiently high enough to trigger a fluvial warning. On the other hand, a total of 58 tidal warnings were issued from the Area Control Room, comprising 18 Amber and 40 Yellow.

The preparation of Management Plans has continued however in order to reflect all of the Agency's functional interests, new plans are called Local Environment Agency Plans (LEAPs) whilst all previously raised CMPs will be augmented in the next two years to become LEAPs. During the year Action Plans have been produced for the Upper Witham and the Ancholme together with annual reviews for Grimsby, Louth and the Lower Witham. Shoreline Management Plans for Lincolnshire and the Wash have been completed as well as a Strategic Study for the frontage from Gibraltar Point to Skegness Pier.

Consultation with external groups and authorities is a priority in every element of our work, both revenue and capital as well as during the preparation of these plans. In this way, it is intended that all our activities are undertaken in an environmentally sensitive manner or, where disturbance is unavoidable, mitigation measures are put in place and longer term enhancements are engendered.

In conclusion, thanks are due to the funding bodies, the County Councils, the Internal Drainage Board and, of course, the Ministry of Agriculture, Fisheries and Food who have enabled the Agency to increase the level of protection against flooding provided this year to several thousand more people, large areas of residential, industrial and agricultural land along the Lincolnshire Coast by the Lincshire Beach Nourishment works as well as to continue the maintenance of standards elsewhere.

RON LINFIELD
Area Manager
May 1997

OPERATIONS REPORT

CAPITAL WORKS 1996/97

Summary

Expenditure on the Committee's Capital Programme, including Salaries and Fees, was distributed over the categories of schemes as below:

1.	Grant Eligible Schemes	£
a)	Fluvial Flood Defence Works	1,779,233
b)	Sea and Tidal Defence Works	13,207,494
c)	Flood Warning Schemes	79,839
	Total	<u>15,066,566</u>
2.	Non Grant Eligible Schemes	
a)	Fluvial Flood Defence Works	127,868
b)	Sea and Tidal Defence Works	30,025
c)	Contributions	8,199
	Total	<u>166,092</u>
	Grand Total	<u><u>15,232,658</u></u>

Notable Schemes

The principal schemes in progress during the year are described below and these notes are followed by a full listing of schemes upon which expenditure was incurred.

Sea Defence Mablethorpe to Skegness

i) Part 30 - Beach Nourishment Phase II

Continuing without interruption from last year, the contractor HAM Dredging maintained production until 9th November with the exception of a short break at the end of June, a planned break to allow maintenance of the pipelines and changes to the offshore facilities, and several weather related periods when nourishment was halted. During this time a further 1,803,295 cubic metres of sand was placed on the beach from just south of Chapel Outfall to just south of Huttoft Car Terrace, together with

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a short length either side of Boygrift Outfall. Nourishment of this isolated length was undertaken for the protection of the vulnerable length of defence on the frontage. The length of beach nourished during the year measured just over 6 kms, so that together with Phase 1 of the scheme and the length of Beach Training Works, some 13kms has been completed, and a total of 4,446,125 cubic metres of sand placed.

Monitoring of the nourished profile since works began has indicated that in spite of some very adverse sea conditions, the losses of sand overall at 3% are well within the design parameter, and whilst there has been seasonal changes to the profile as anticipated, the performance of the nourished beach has been excellent.

Anderby Outfall - the extension of this sea outfall to conform with the new beach profile was completed early in the year.

Ingoldmells Outfall - additional rock armour was placed at the seaward end of this outfall following aggressive sea conditions which caused local scouring of the beach.

ii) Part 64 - Stepwork at Queens Park, Mablethorpe

The significant lowering of the beach protecting this 40 year old defence, together with its ageing condition, meant it did not meet the criteria that it must have not less than two years residual life immediately prior to being covered by beach nourishment. Since nourishment will not reach this frontage until the summer of 1998, a scheme was promoted to refurbish the defence by providing a new steel sheet piled toe with capping beam and constructing new in-situ concrete stepwork over the old structure.

Works on site began in November 1996, and the new defence completed in late March 1997, at a cost of £270,000.

iii) Lincoln Washland Gate Enhancement

Whilst there has been no occasion since the commissioning of the Lincoln Washlands when it has been necessary to operate the control gates in flood conditions, they have been regularly operated for maintenance and exercise purposes. The reliability of performance in these conditions gave cause for concern and such concern was deepened when key spares for the operating system were no longer obtainable due to the demise of the original supplier. Consultants were commissioned to design gate operating gear and control equipment, which not only duplicated the power source, but allowed for manual operation in a last resort and ensured that key components could be maintained or repaired at all water level conditions.

The scheme, estimated to cost £474,000, was promoted and a contract let in September 1996. Detail design and fabrication followed with installation commencing in January 1997, substantial completion was achieved by the end of March.

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iv) River Witham - Stamp End Lock to Fiskerton

The north bank (left bank) of the River Witham from Stamp End, Lincoln to Boston is subject to the flood defence provisions of the Great Northern Railway Act 1846, and following the Lincolnshire River Board (River Witham) Transfer Order 1962, the Agency as successor to the Board, has responsibility for the consequential duties and liabilities for the length of bank from Stamp End to Horsley Deeps, near Bardney. One of the more rigorous provisions requires the Agency to compensate landowners for any loss or damage caused by flooding resulting from the failure of the bank. Erosion of the berm protecting the bank has in places been reduced to the extent that its structural stability would be threatened in conditions of high river flows. In response to this, the condition of the bank between Stamp End and Fiskerton Sluice was evaluated and any necessary works identified were grouped in order of priority.

A scheme was promoted to deal with the most urgent sections and in the current year a length of 900 metres of the eroded berm has been stabilised. The works involved the installation of steel sheet piling as protection to the re established berm formed by imported fill material. The berm has been constructed as a wet berm over much of the length which will provide enhanced habitat when it has fully recolonised.

v) River Ancholme Bridges

Under the River Ancholme Act 1767, the Agency is liable for the maintenance of seven bridges over the River Ancholme, five of which are listed structures, the remaining two are of historic interest and effectively all of them are subject to Listed Buildings Approval.

Following a structural assessment of the bridges, it was recommended that a zero weight limit be imposed on them, effectively closing them for all use. A feasibility study was undertaken to determine the course of action necessary to meet the Agency's liability in respect of the 1767 Act, the Listed Building Status, and economic, technical and environmental aspects.

The study determined that improvements could be made to each bridge without altering the aesthetic value, as required for Listed Buildings, which would achieve the restoration of suitable weight limits ranging from 40 tonnes for Castlethorpe, Snitterby and Broughton Bridges, to 13 tonnes for Cadney, 10 tonnes for Hibalstow, 7.5 tonnes for Saxby and 5 tonnes for Horkstow.

A scheme was prepared and a contract let in July 1996, with the works completed and the bridges re opened in December for all but Horkstow Bridge, which is only available for pedestrian use. This is an unusual example of a listed suspension bridge, and during the course of the work, corrosion damage to the suspension system within the masonry abutments was discovered. Further measures have been designed to overcome this problem, and this additional work will be carried as a Variation to the Contract during the maintenance period.

SEA DEFENCES MABLETHORPE TO SKEGNESS

BEACH NOURISHMENT PHASE II



MARSH YARD, HUTTOFT - BEFORE AND AFTER NOURISHMENT



SEA DEFENCES MABLETHORPE TO SKEGNESS

ANDERBY OUTFALL EXTENSION



PART 64 - STEPWORK AT QUEEN'S PARK



LINCOLN WASHLAND GATE ENHANCEMENTS
RIVER CONTROL GATES OPERATED BY ROPES & WINCHES



INLET/OUTLET GATES OPERATED BY RACK & PINION



RIVER WITHAM - STAMP END LOCK TO FISKERTON

STEEL PILED TOE AND RE-ESTABLISHED BERM



RIVER ANCHOLME BRIDGES - HIBALSTOW BRIDGE



Expenditure on Capital Schemes including salaries and fees was as follows:

1. **Grant Eligible Schemes**

a) Fluvial Flood Defence works

	£	£
Lincoln Washland Gates	497,175	
ARTs Phases 1, 2, 3 and 4	258,767	
Lower witham/Horncastle Flood Relief	150,219	
Lower Witham Stamp End to Fiskerton	338,627	
River Freshney Flood Alleviation	34,076	
River Rase Improvement Works	34,088	
Lincoln District syphon Renewal	27,422	
River Witham and River Till Washlands	12,834	
River Ancholme Bridges Reconstruction	426,961	
Miscellaneous Expenditure and Credits	(936)	
Total Grant Eligible Fluvial Works		1,779,233

b) Sea and Tidal Defence Works

	£	£
Sea Defences Mablethorpe to Skegness		
Part 40 - North of Vickers Point	23,177	
Part 59 - Moggs Eye	366,249	
Part 60 - Sandilands/Boygrift	90,954	
Part 61 - Ramp and Stepwork at Mablethorpe	119,401	
Part 63 - North of Church Lane, Sutton	63,905	
Part 64 - Stepwork, Queens Park, Mablethorpe	283,937	
Part 65 - Sand Fencing	42,110	
Part 66 - Splashdeck at Sandilands	9,599	
Emergency Works at Anderby	346,595	

	£	£
Part 30 - Beach Nourishment Phase I	26,712	
Part 30 - Ingoldmells Outfall	19,018	
Part 30 - Beach Nourishment Phase II	11,023,862	
Part 30 - Remaining Works	15,406	
Part 30 - Beach Training Works	81,219	
Part 30 - Environmental Baseline Survey	8,880	
Mablethorpe Kidding Scheme 1995/96	6,600	
Mablethorpe Kidding Scheme 1996/97	39,147	
Urgent Works - Lagoon Walk	232,290	
Lagoon Walk - Phase II	14,058	
Shoreline Management System 1996/97	82,523	
Skegness - Gibraltar Point Strategy Study	32,603	
Saltfleet to Donna Nook	10,000	
Boston River Walls	11,595	
Witham Outfall - Cut End to Grand Sluice	9,137	
Witham Outfall - Remaining Works	7,486	
Wash Banks - Gibraltar Point to Tabbs Head	18,992	
Humber Bank Improvement Scheme	37,098	
Humber Bank Toe Works Phase 3	147,152	
Miscellaneous expenditure and credits	37,789	
Total Grant Eligible Sea and Tidal Defence		13,207,494

c) Flood Warning Schemes

	£	£
Regional flood Warning Schemes	79,839	
Total Flood Warning Schemes		79,839
Total Grant Eligible Schemes		15,066,566

2. Non Grant Eligible Schemes

a) Fluvial Flood Defence Works

	£	£
River Ancholme Bank Reconstruction	74,148	
River Witham Autogate	8,269	
Carr Dyke Bridges Reconstruction	2,000	
Great Eau Withern Mill	5,327	
Grand Sluice Apron	10,440	
Black Dyke Waddingham	23,416	
Miscellaneous expenditure and credits	4,268	
Total Non Grant Eligible Fluvial Works		127,868

b) Sea and Tidal Defence Works

	£	£
East Halton Skitter	23,041	
New Cut Outfall Sea Door	6,984	
Total Non Grant Eligible Sea and Tidal		30,025

c) Contributions

	£	£
Upper witham IDB - Various Schemes	38,049	
Ancholme IDB Hibalstow Pumping Station	28,350	
Provision not incurred	(58,200)	
Total Contribution		8,199
Total Non Grant Eligible Schemes		166,092
Grand Total Capital Expenditure		15,232,658

MAINTENANCE WORKS

The following schedule gives details of works undertaken and the expenditure incurred on each activity. One-off Enhancements described in text relate to a specific programme of additional works identified as necessary following the October 1993 fluvial flood defence for which the Committee made special provision.

	Expenditure £000
Dredging	220
<p>Main River lengths totalling 24 kms were dredged with the works being undertaken by the Authority's Regional Contractor together with external contractors for some works. The following watercourses were included in the programme: Burton Catchwater, River Waring, River Ancholme, Buck Beck and Mother Drain.</p> <p>One off enhancement dredging of Maud Foster Drain was completed between Rawsons Lane and Stonebridge Drain Aqueduct.</p>	
Weed Control	326
<p>Weedcutting or raking was carried out in a total length of 1050 kms of main river. Methods used included week cutting boats, weedcutting buckets or weedrakes mounted on hydraulic excavators and by hand using scythes where necessary. Additional cuts were undertaken in several watercourses to maintain an acceptable standard.</p>	
Banks and Embankments	521
<p>Bank mowing, the control of burrowing vermin, stabilisation and protection works were carried out on a total length of 3377 km of bank and embankment. Stone revetment to the berm of the River Ancholme was carried out downstream of Broughton Bridge.</p> <p>The right bank of Kettleby Beck between the Ancholme and Cadney Road was reconstructed as a one-off enhancement. The One-off Enhancement programme of bushing work was continued this year and watercourses dealt with included Duckpool Catchwater, Barlings Eau, South Forty Foot Drain, Carr Dyke, River Brant, River Witham, Upper Ancholme, River Lud, River Lymn and Tetford Double Dyke.</p>	
Structures	170
<p>The programme of maintenance works on river control structures, weirs, sluices, outfalls, flap valves, Agency owned bridges was completed and the programme of safety audit inspections continued.</p>	

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Obstructions	48
The removal of blockages and debris causing or likely to cause an obstruction to flow in main river was carried out as necessary, with particular attention paid to known trouble spots and urban areas during period of high flow. The heading includes the removal of fallen trees from main river.	
Pumping	51
The routine maintenance and operation of the Agency's Pumping Stations was carried out as required.	
Sea and Tidal Defences	415
The repair and maintenance of hard defences, earth banks, dune defences, groynes, beaches and access ways was carried out to complete the programmed work.	
Emergency and Other Activities	35
Includes the cost of patrols of rivers and sea defences during periods of alert together with any works undertaken as emergency during such events.	
Total Expenditure on Operational Activities	1786
Service Direct	498
This relates to non operational expenditure and includes contributions to IDB's in respect of highland water, flood warning costs, land and property, research and development, surveys etc.	
Administration and General Charges	1844
Total Operating and Management Expenditure	4128

RAINFALL, RIVER FLOW, FLOODING AND FLOOD WARNING

Rainfall

Areal Situation

In an average year, South Lincolnshire receives 600mm of rainfall, whilst in the North of the County is slightly wetter with 632mm.

During 1996/97 (April to March inclusive) the North received 481mm (76%) and the South had 433mm (72%). This low rainfall year, following 1995/96, when values were even lower at 410mm and 414mm respectively, has been the driest 2 year period for about 200 years, and this situation was naturally reflected in low river flows.

Monthly Rainfall

The areal rainfall bar charts which follow show that only in November and December did rainfall exceed historic mean values in North Lincolnshire, whilst in the South, August and October were also slightly wetter than average. In every other month, rainfall was significantly less than average and the accumulative annual deficit was in excess of 150mm.

Soil Moisture

From April through till November, soil moisture deficits were greater than the historic mean values, creating new maximum values in June and September. November rainfall brought the deficit below mean values until the end of 1996, but from then on it increased and finished the period well above mean values.

River Flow

Throughout the preceding year river flows were below historic mean values, and much of the time were close to minimum values, so with below average rainfall in 1996/97 the flows were close to or even below historic minimum values for the whole year. This situation is represented graphically for 4 No. representative river gauging sites in the flow diagrams which follow.

FLOODING

Fluvial Events

As reported last year, with only 75% of normal rainfall, there was no occasion this year when river flows reached threshold levels likely to give rise to flooding. However, the Area Duty Officer monitored rainfall, flows and river levels on a daily basis, maintaining awareness of the Catchment conditions using ARTS, the Regional Telemetry System, and the Weather Radar System whether at home or in the office.

The frequency of monitoring was increased as necessary when circumstances demanded and this included the opening of the Area Control Room for monitoring purposes, however, at no time was it necessary to scale up the activity to give warnings.

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Tidal Events

In April and during the period August to March, the Area Duty Flood Officer monitored tidal conditions on a daily basis in order to check the likely effects of forecast residuals and wave height received from the Storm Tide Warning Service.

A duty team was organised for all forecast tides approaching within 0.3 metres of Danger Level and, on receipt of an "Alert" message from STWs, routine procedures were carried out to enable initial forecasts to be passed to the Police Forces 12 hours in advance of the tide.

Receipt of an "Alert Confirmed" message initiates the opening of the Control Room. As an additional safeguard in circumstances where the tidal residual information indicates rapidly changing or unstable residuals close to high water, and where there were to be an error in timings, actual residuals at high water could be much higher, then the Duty Officer also sets up a duty team to monitor the tide.

There were 10 occasions this year when the Area Control Room was opened for tidal monitoring which resulted in the issue of 18 Amber and 40 Yellow Warnings.

Amber Warnings were issued for the morning tides on 29th and 30th August, 29th October and for the evening tides on 12th November and 9th February.

Of these, the later autumn events were the more significant, when Force 7 winds from the northwest to northeast quarter resulted in aggressive sea conditions and caused overspray at some frontages, but no problems of property flooding. The October tide broke through the dune defence to the south of Lagoon Walk and the November tide resulted in HAM Dredging's Reception Vessel dragging its anchors and going aground on the sea defences to the south of Boygrift Outfall.

In the February tide, high residuals occurred in the Wash and this resulted in some seepage problems adjacent to the Haven in Boston.

FLOOD WARNING

On 1st September the Agency took up its new responsibilities to provide flood warning to the public following the Ministerial Direction issued in March 1996.

All the systems and procedures were completed and implemented in time to ensure that existing levels of service were matched or improved. In the event, the new systems were operated very successfully during the tidal events at the end of August to provide a timely demonstration of them in advance of the deadline.

Flood Warning Dissemination Plans were produced and discussed with the Police Forces and Local Authorities, and circulated to relevant bodies for consultation.

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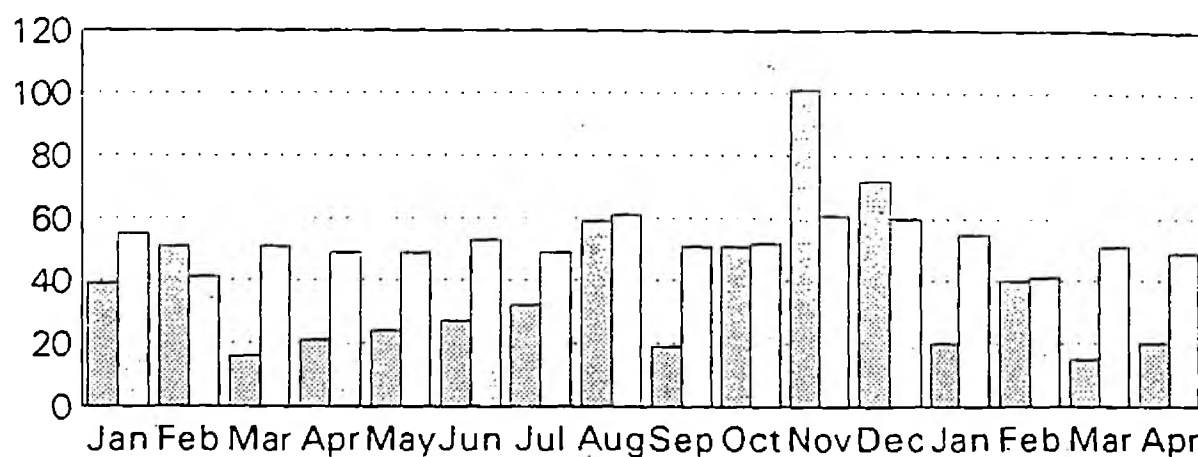
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The following arrangements are now in place:

- i) Flood Warning Dissemination Plans are available which define the Flood Warning Systems in operation.
- ii) National and Local Flood Warning leaflets which identify flood risk areas and define procedures have been circulated to relevant organisations and directly mailed to homes in the principal flood risk areas.
- iii) A media campaign was implemented.
- iv) Flood Warnings are broadcast on local radio stations at any time and may appear on Regional TV and Teletext page 105.
- v) In appropriate circumstances up to 100 people will be advised directly by telephone that warnings are in force for their area using Automatic Voice Messaging.
- vi) A recorded information system is operating providing regularly updated information on Tel No 0345 88 11 88. All calls charged at local rate.

Areal Rainfall

North Lincolnshire



1996

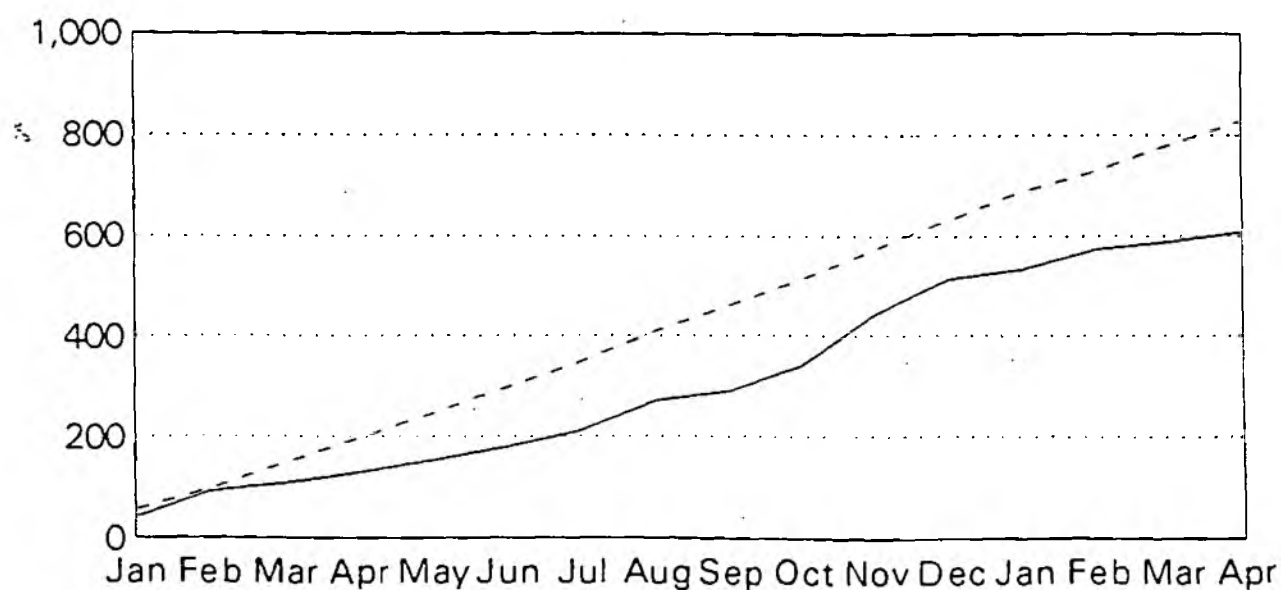
1997

Rainfall in mm

Current Hist. mean

Cumulative Areal Rainfall

North Lincolnshire



1996

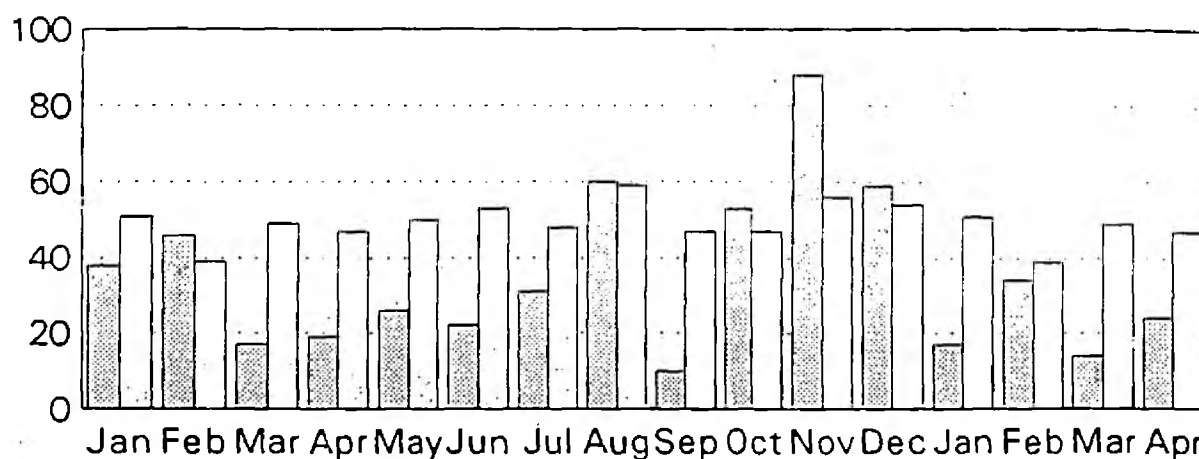
1997

Rainfall in mm

Current Hist. mean

Areal Rainfall

South Lincolnshire



1996

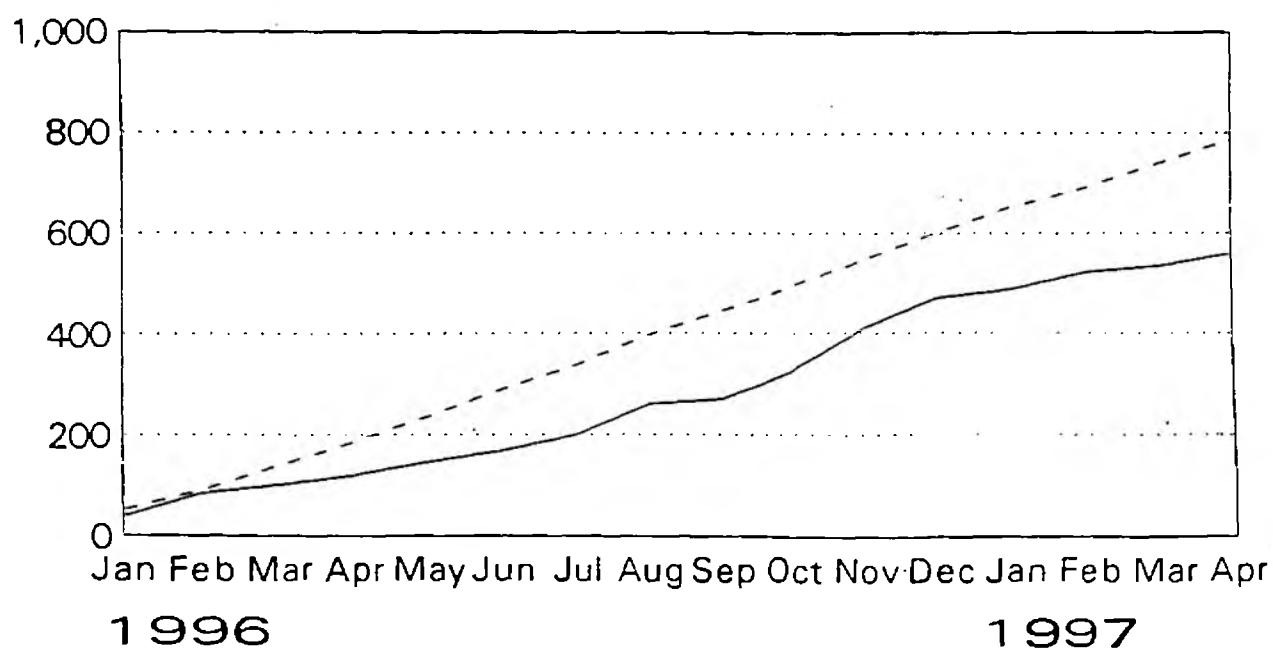
1997

■ Current □ Hist. mean

Rainfall in mm

Cumulative Areal Rainfall

South Lincolnshire



1996

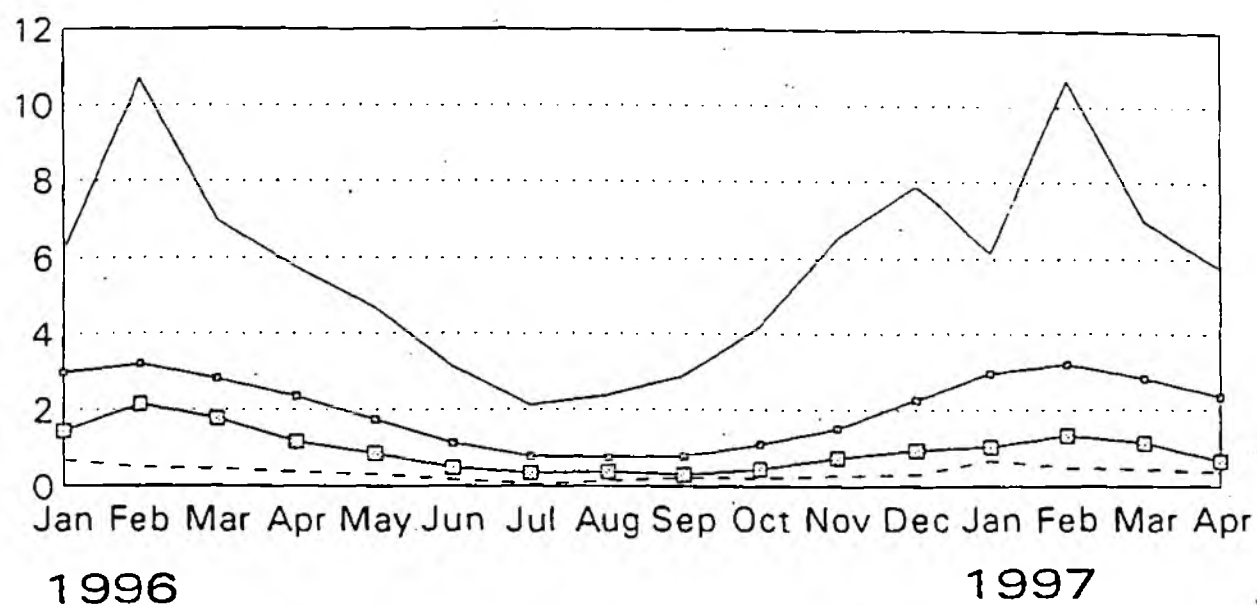
1997

— Current - - Hist. mean

Rainfall in mm

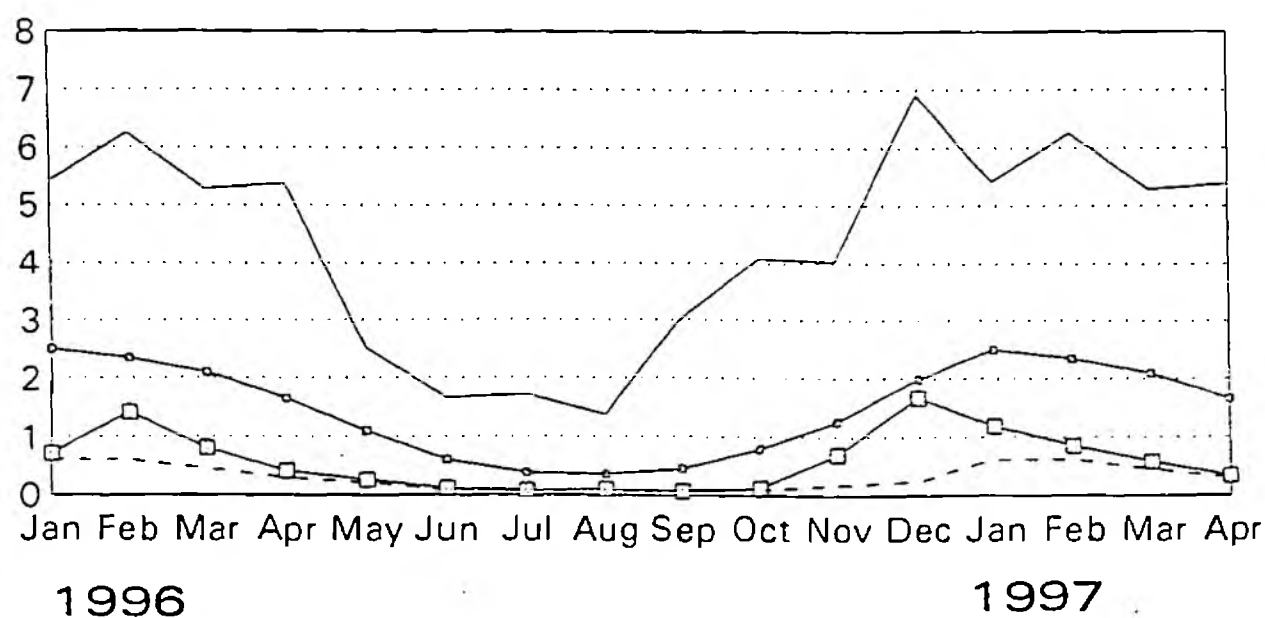
Monthly Mean River Flows

River Witham at Claypole



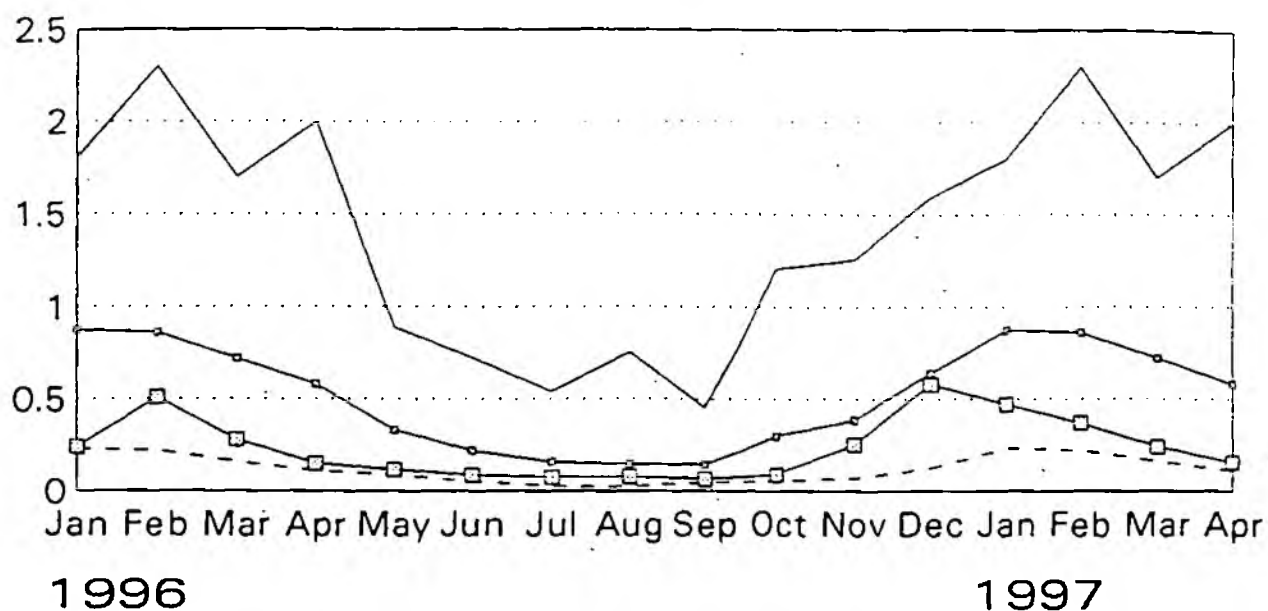
Monthly Mean River Flows

River Bain at Fulsby



Monthly Mean River Flows

River Rase at Bishopbridge

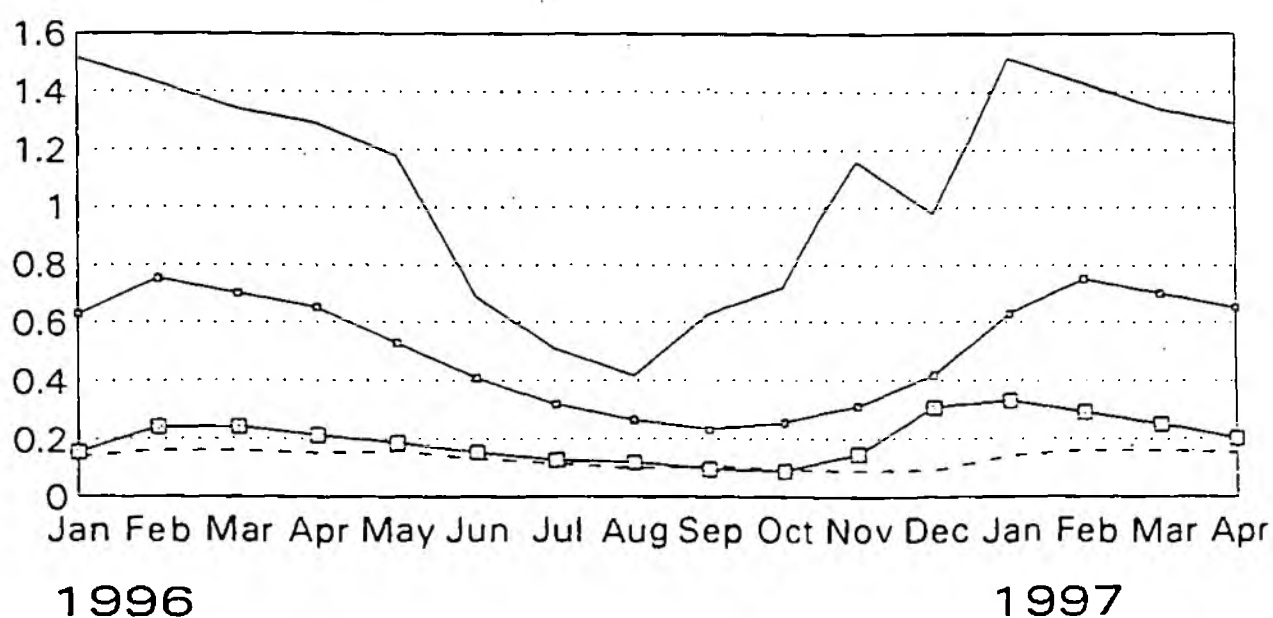


Current Hist.mean Hist.max. Hist.min.

Flows in
cumecs

Monthly Mean River Flows

River Lud at Louth

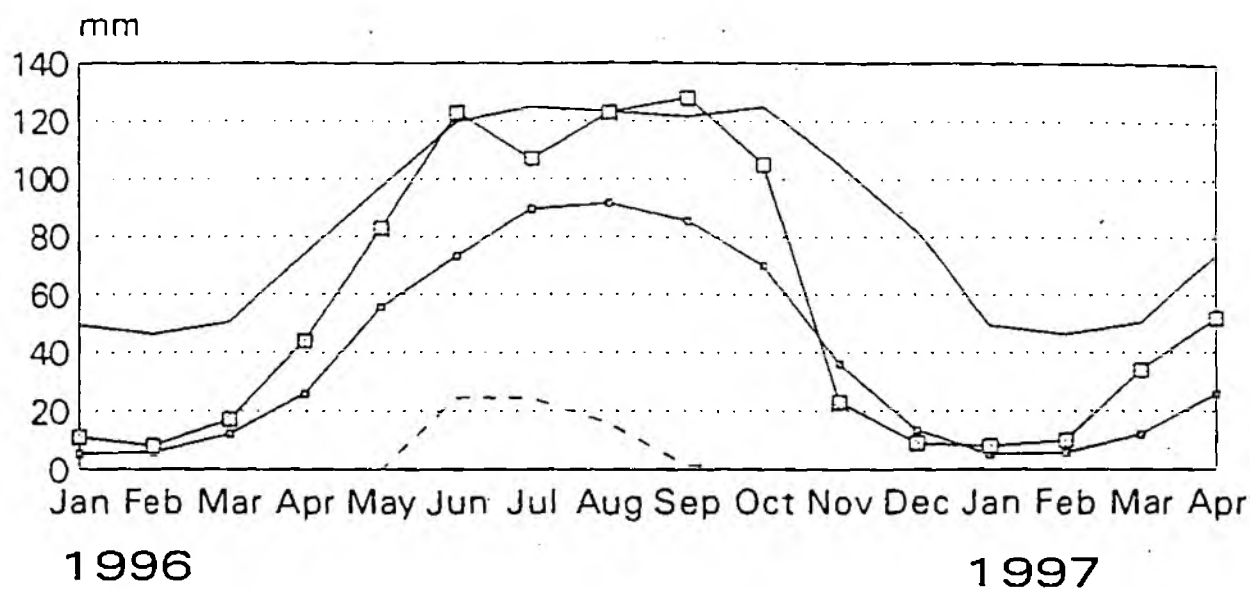


Current Hist.mean Hist.max. Hist.min.

Flows in
cumecs

Areal Soil Moisture Deficits

Lincolnshire Catchment



Values at
end of month

—□— Current —○— Hist.mean — Hist.max. - - - Hist.min.

CONSERVATION AND FLOOD DEFENCE

The Agency has a duty to ensure that environmental issues are taken into account in all of its operational and regulatory activities. In 1996/97 Conservation staff continued to work with and support all functions to achieve this goal.

Regional Conservation staff are involved in the project appraisal process for Capital Flood Defence Schemes including guidance on environmental assessment requirements.

Area Conservation staff are responsible for an input into Flood Defence Maintenance Works. Wherever possible opportunities to enhance riparian habitats within the existing maintenance programme were identified.

This work was greatly assisted by the Rivers Environmental Database, which helps to identify sensitive areas and sites most suitable for enhancement.

The continuing development of enhancement works as part of the maintenance programme includes not only site specific enhancements, but also best practice procedures for all types of maintenance work, this enable the Agency to address issues which have arisen in LEAP's.

Enhancement works are typically collaborative projects sometimes involving riparian owners where land is taken to achieve these objectives. Work beyond the scope of the maintenance programme is fed into the Capital programme and examples are given below.

River Witham - Stamp End to Fiskerton Sluice

As part of the Capital Scheme to reinstate the channel berm along a 900 metre length of the River Witham, habitat enhancement has been provided by the provision of a wet berm at the waters edge. this has been planted with reeds and when established it will provide an area covered by 150mm of water to the benefit of a wide variety of plants and wildlife.

River Ancholme

In association with berm revetment works, similar wet berm facilities have been provided over a further stretch of the river.

LINCOLNSHIRE – LOCAL FLOOD DEFENCE COMMITTEE
DRAFT FINAL ACCOUNTS 1996/97

(£ 000's)

Line No.	Outturn 1995/96		Approved Budget 1996/97	Revised Budget 1996/97	Outturn 1996/97	Variance	Note
INCOME							
1	4,967	County Council Levies	5,091	5,091	5,091		
2	1,242	Int.Drainage Board Precepts	1,273	1,273	1,273	(0)	
3	614	General Drainage Charges	630	620	618	(2)	
4	268	Other	211	211	295	84	1
5	215	Interest - on cash-flow	217	220	220		
6	387	- on Section 47 balances	229	212	216	4	
7	7,693	Total Income	7,652	7,627	7,712	85	
EXPENDITURE							
8	1,441	Maintenance - Main River	1,292	1,370	1,371	1	
9	415	- Sea Defences	415	415	415		
10	492	Other Operational Costs	488	498	498		
11	1,468	Operational Support - Regional	1,361	1,361	1,361		
12	346	- National	283	283	283		
12		- N.I.S.	200	200	200		
13	6,434	Revenue Contr. to Capital	4,539	3,870	3,913	44	
14	(49)	Working Capital	50	50	37	(12)	
15	10,547	Total Expenditure	8,628	8,046	8,079	33	
16	(2,854)	SURPLUS / (DEFICIT)	(976)	(419)	(367)	52	8
RESERVE							
17	6,679	Section 47 Balances b/f	4,659	3,825	3,825		
18	(2,854)	Surplus / (Deficit)	(976)	(419)	(367)	52	
19	3,825	Section 47 Balances c/f	3,683	3,406	3,458	52	8
CAPITAL							
20	89	Grant Aided Works - Fluvial	1,472	1,258	1,197	(61)	2
21	19,112	- Tidal / Sea Defences	13,128	12,342	12,374	32	3
22	355	Non Grant Aided Works	378	378	359	(19)	4
23	1,142	Design & Supervision	906	1,200	1,302	102	5
24	20,698	Total Capital Spend	15,884	15,178	15,233	55	
25	14,264	MAFF Grant	11,345	11,308	11,320	11	6
26		Contributions					
27	6,434	Revenue Contr. to Capital	4,539	3,870	3,913	44	7
	20,698	Total Capital Income	15,884	15,178	15,233	55	
28	16,800	Grant Earning Ceiling (G.E.C.)	13,600	13,600	13,600		

DRAFT FINAL ACCOUNTS 1996/97

Variance Analysis

Variations to the approved budget are shown on the report.

Notes explaining these variances are as follows:

Income

1. The Committee's income for the financial year 1996/97 is very much as previously predicted with the exception of income from other sources where the sale of the Agency's Southery depot has generated additional income.

Expenditure

There are no variances to report as the maintenance programme has outturned at the forecast budget level.

Capital

2. The outturn for the Grant Aided Fluvial capital programme is lower than the forecast due to delays with the Lincoln Washland Gates project.
3. The outturn for Tidal Sea Defences Grant Aided capital works is higher than anticipated due to additional works relating to the Mablethorpe to Skegness beach nourishment project.
4. The Non-Grant eligible capital programme outturn is lower than expected due to accruals that have been written off relating to Internal Drainage Board Capital contributions.
5. Progression of on-going and future capital programmes has resulted in higher than forecast design and supervision costs.

Principally these programmes relate to the Mablethorpe/Skegness Beach Nourishment, the Humber Estuary and the Lower Witham Strategy.
6. As a result of the changes to the Grant eligible capital programme, the amount of income receivable from MAFF has increased.
7. Revenue contributions to Capital have increased due to the increase in capital expenditure exceeding the increase in MAFF grant income.

Reserves

8. The Committee's section 47 balances are higher than previously predicted as a result of the variances report above, this increase is mainly due to the sale of the Agency's Southery depot.