



NRA

*Regional Review*

*1989/90*

*National Rivers Authority  
Anglian Region*

REGIONAL REVIEW - 1989/90

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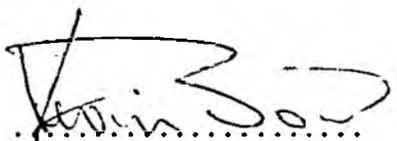
## FOREWORD

The creation of the National Rivers Authority signalled the dawning of a new era in the protection of the water environment. This has been warmly welcomed throughout the region and public expectations are exceptionally high. This is a reflection of public awareness of the issues which confront the NRA and the willingness of the public to support us in achieving these.

In the Anglian region of the NRA we inherited an establishment, together with resources, which provide a firm foundation upon which to build and move forward. It must be said, however, that public expectations are such, and the problems to be tackled complex, that resource deficiencies will need rectifying if we are to fulfil our mission.

One need is very clear and that is that we all want to see an improved environment and this cannot be achieved by the NRA in isolation. To this end, we have set ourselves the task of working for and with the public in general. Improvements have to be paid for and if we are to achieve our aims and objectives this will demand substantial investment. Higher standards will mean higher charges for goods and services and the debate about the appropriate balance has already started within the committees and the region generally. This debate is certain to be fuelled as our public profile is further enhanced by our caring and professional performance.

It is a measure of our performance that the transition from being part of a regional water authority into a significant region within the strongest environmental agency within Europe was achieved smoothly and successfully. The success of this transition is due to the commitment and ability of our employees together with the involvement of our regional committees. The sound foundation from which the region can go forward has now been set and the challenges of the future are exciting.



~~Dr Kevin Bond~~  
Regional General Manager

## KEY REGIONAL ACHIEVEMENTS

- \* The Anglian region of the NRA was established successfully. This included the creation of a purpose built regional headquarters containing computer and high technology laboratory services, and the setting up of three area and eleven district offices to provide services at the community level;
- \* Capital and revenue budgets were achieved;
- \* The skilful management of water transfer and support schemes avoided potential resource problems during the summer drought conditions;
- \* A positive and effective response was made to the major environmental problem created by the widespread appearance of blue-green algae on reservoirs, lakes and pits in the region;
- \* A firm attitude was taken towards prosecuting polluters. The region recorded what is believed to be the largest fine ever imposed in the UK for a pollution involving farm waste;
- \* Commitment to independence and competitive tendering was reinforced by keeping contracted services to the privatised regional water company to a minimum;
- \* A regional communications centre was set up to provide a 24 hour service for co-ordinating our response to emergencies and to maintain information on incidents occurring within the region;

## Operational Achievements

- \* Guidelines were produced aimed at reducing the risk of contamination of underground water sources caused by the effects of new housing, industrial and commercial development;
- \* The positive co-operation of local planning authorities was sought in curbing development in areas at risk from flooding. This remained a major issue of concern due to continuing regional pressure for development;
- \* The region was involved in the designation of two nitrate sensitive areas and two advisory areas as part of a national programme to improve water quality by controlling nitrates in water;
- \* A major monitoring programme showed improved water quality in the Humber Estuary as a result of the building of new outfalls for titanium dioxide discharges;
- \* Damage estimated at £750,000 was caused to sea defences as a result of high tides and severe gales in March;
- \* Environmental improvements to the internationally famous Wicken Fen Nature Reserve, which were undertaken as part of a flood defence project, were commended by the National Trust;
- \* A river improvement scheme near Norwich received a Construction Industry Award;
- \* The second stage of the first major strategic coastal management study in Britain was completed. Trial areas of the type of energy absorbing sea defences recommended in the report were built and proved successful;

- \* Investment in major sea and river flood defence projects targetted at protecting life and property amounted to £22 million;
- \* Fish stocks improved with a consequent improvement in angling results. A new rod licence system was introduced and income was above estimates;
- \* More navigation licences were sold and income was up 34 per cent;
- \* The conservation and regeneration of Broadland, including the removal and alleviation of the effects of phosphorus, remained a major focus of the regional research programme;
- \* The first comprehensive 'Domesday Book' study of bird and plant life on the region's rivers was launched as a major environmental initiative. The work will provide data for extensive use in flood defence and conservation work.

## REGIONAL COMMITTEE REPORTS

### Regional Advisory Board

#### Introduction - Pre vesting

The board met in shadow form during the spring and summer before being formally constituted on 1 September under the chairmanship of Mr. Peter Brandt, the national Board member for the Anglian region. During this time the primary issues discussed were the logistics of the final split from the Regional Water Authority, consultative arrangements for the setting up of regional committees and the progress through Parliament of the Water Bill.

#### Key Achievements

The first task of the Board was to assist the Regional General Manager in examining nominations for membership of the regional committees and submitting recommendations to Head Office. The number and quality of nominations resulted in the creation of well structured and representative committees. The Board also looked at the various ways in which key regional issues and the highlights of its discussions, and those of the regional committees, could best be drawn to the attention of Head Office and, as necessary, the main Board.

#### Major Incidents and Events

An outbreak of toxic algae in the region was kept under review. In the light of some adverse publicity it was agreed that a more proactive stance should be taken in 1990 to ensure public confidence was maintained and there was clearer knowledge of the relevant responsibilities of those involved in handling various aspects of the matter.

To mark the launch of the NRA a highly successful series of presentations was made to regional interest groups. Advisory Board members accompanied senior managers to eight centres where presentations were given on the structure and role of the NRA to invited audiences of representatives of local councils, conservation, industrial, farming and landowning interests.

Considerable attention was paid to the potential for drought conditions in the region in 1990 and regular reports on resources and the issues which might have to be faced were presented. The impact of the weather in terms of localised flooding and storm damage to sea defences was the subject of regular situation reports as incidents arose.

## New Initiatives

The Advisory Board supported the views of the regional and local flood defence committees that greater financial support was needed to modernise and bring up to standard much of the region's sea defences, the majority of which were built following the 1953 floods. County Councils despite their own financial difficulties remained generally supportive and the Advisory Board confirmed its desire to secure national funds to supplement local contributions. It felt that the needs of other regions affected by flooding should not detract from the Anglian case.

Other matters considered by the Advisory Board included the need in the forthcoming Green Bill for powers to seek injunctions to complement the NRA's pollution prosecution powers, and the draft Corporate Plan setting out the aims and objectives for the region in the coming year.

It was decided that in future some of its monthly meetings should be held in the operating areas to see examples of the issues and challenges at first hand, and to meet those responsible locally for the NRA's operations.

## Regional Rivers Advisory Committee

The formation and membership of the Regional Rivers Advisory Committee for the Anglian region was announced in October.

About 100 nominations were received for the 20 seats on the Committee and the membership was selected to reflect not only the wide range of conservation, recreation and water user organisations in the region but also its geographical spread - the region covers nearly a fifth of England and Wales.

The Committee, in addition to having a general responsibility to advise on regional aspects of the broad framework for river basin management, agreed that it will pay specific attention to:

- \* the system for setting and monitoring water quality objectives for river, coastal and underground waters;
- \* furthering the promotion of conservation;
- \* all aspects of the recreational use of waters under the control of the regional NRA;
- \* enforcement procedures;
- \* water resources including policy guidelines for licensing;
- \* reconciling differences between river users.

The Committee met twice, in September and February. The first meeting followed a members seminar at Robinson College, Cambridge designed to inform members of the aims and objectives of the NRA. The specific roles of the flood defence committees and the fisheries advisory committees were presented in the context of their operational activities. The role of the Regional Rivers Advisory Committee, and its interaction with the other committees, was discussed in detail.

Issues covered included:-

- \* environmental quality objectives
- \* consents and monitoring
- \* the North Sea Declaration
- \* research and development
- \* liaison with local conservation groups
- \* water resource planning and licensing
- \* water resource transfer schemes
- \* recreation and navigation
- \* public relations

The February meeting dealt with policy matters and funding. Technical matters discussed included enforcement procedures, EC bathing waters, blue-green algae, the rivers environmental database, nitrate sensitive areas, minimum acceptable flows, and development control.

The Committee agreed to have educational visits linked to their first two meetings in 1990/91.

#### Regional Fisheries Advisory Committee

The Regional Fisheries Advisory Committee met four times during the year.

The meeting in May was a special meeting specifically to consider proposals for restructuring the committee and creating three area fisheries advisory committees to replace the five local fisheries liaison committees which had previously been operated by the Anglers Consultative Associations. The proposals were referred for local consultation and reconsidered with local views in July. The new structure was implemented within the guidelines issued from the NRA Advisory Committee.

The July meeting considered the fisheries autumn expenditure for 1988/9 and the draft of the Committee's annual report. Income was almost 11% higher than the previous year, due to increased licence sales, and the three-year cycle of duties from 1986-88 ended with a £56,000 surplus on the fisheries account. This consolidated the self-financing basis of the fisheries service in the region prior to vesting day. The annual activity and performance statistics showed a generally high level of work had been maintained throughout the service in spite of the far-reaching effects of re-organisation.

The principal item of business at the November meeting was an assessment of the first cycle of meetings of the new area fisheries advisory committees, from which it was clear that the new system had settled down successfully. The meeting also received update reports on the NRA organisation, including the progress being achieved through the fisheries functional groups, the development of a regional fish production plan, and measures to protect otters from fyke nets. A proposed policy on the control of Spring Viraemia of carp was considered and supported.

The Committee received a presentation on fish production in the region in February and supported a proposed plan to bring together the facilities for coarse fish spawning and rearing within the region into cost-effective units. Following successful completion of a five year experimental programme at the regional fisheries laboratory the region was ready to move into major production and the upgrading of existing facilities was supported as a basis for implementing the regional plan.

In February the Committee considered a detailed report on the steadily rising problems of regulating commercial eel fishermen and, particularly, on the need to protect otters from fyke nets. It was decided that a radical review of the legislative basis and future strategy for regulating these activities was required as this would provide an improved basis for their regional management. The Committee agreed to a review in conjunction with Head Office and other regions and to report back with proposals in November 1990.

Other matters considered during the year included the question of S28 contributions, policy on infectious pancreatic necrosis, farm pollution, policies for honorary water bailiffs, salmon and sea trout net returns, the review of general licences, discharge consent procedures, liaison procedures between "fisheries" and "flood defence", and the research of lowland eastern rivers being carried out by the Institute of Freshwater Ecology in the Anglian region.

#### Regional Flood Defence Committee

The Anglian Regional Flood Defence Committee, which met twice during the year, delegated its flood defence function to its five constituent local flood defence committees. These latter committees meet five to six times each year in addition to holding an annual inspection. Their activities, which tend to be more of a specific local nature, are reported to the regional committee in their annual reports. The regional committee's activities are policy making for the region as a whole.

Arising from an examination of the flood defence needs facing the region over the next ten years, currently estimated at £371m, a financial strategy within which capital works were to be undertaken was established. The strategy requires the region's top priority works, currently totalling £194m at September 1989 prices, be undertaken within five years. Generally in any one year, only works of the highest priority and urgency will be undertaken. A detailed five year capital works programme was established in accordance with this strategy.

The Ministry of Agriculture, Fisheries and Food allocates the region's grant earning ceiling between the five local flood defence committees which have considerably varying needs. For example in the Lincolnshire Flood Defence area a top priority need of over £91m has been identified, whereas in the Essex and Welland and Nene Districts the need is £19.5m and £6.5m respectively. Grant earning ceiling has to be apportioned fairly between committees to reflect their needs and the regional committee adopted a system of allocation based broadly on a combination of a local committees proposed programme and its top priority content. In future the Ministry will be requested to allocate the region's grant earning ceiling accordingly.

Considerable concern was expressed by the regional and local committees about building development in areas at risk from flooding. The committee approved a firm policy which seeks to obtain the co-operation of the planning authority in preventing such development, unless and in certain instances only, the developer is prepared to fund the necessary flood alleviation works.

A fundamental step in ensuring a consistent approach to both capital planning and in response to development proposals, is an assessment of the existing standard of protection and a comparison of that standard with a target. The committee adopted as a minimum standard of protection, the standards which had been recommended by a national working party. It also commissioned, jointly with head office and the Water Research Centre, a study to determine a national method of defining standards of protection.

The Committee endorsed a proactive policy on conservation and environmental matters and to underline its support for paying proper regard to environmental concerns approved the setting up of a regional rivers environmental database over a three year period to be financed by the local flood defence committees.

Based on the recommendations of the five local flood defence committees, the regional committee agreed to recommend for approval by the NRA, levies on the relevant local authorities, precepts on internal drainage boards and the raising of the general drainage charge. Together these will raise an estimated £32.6m for the financial year 1990/91 and result in county council increases of over 12%.

## FUNCTIONAL REVIEWS

### WATER RESOURCES

#### Inheritance

Water resource activities in Anglian reflect the fact that the region is the driest in England and Wales. In terms of effective rainfall, much of the Region is almost arid. The region is virtually totally dependent upon winter rainfall to replenish resources and an extensive system of boreholes and inter-river transfers exists and is being further developed to support rivers at times of low flow.

In general, existing demands are met equally from groundwater and surface water. Future development of surface sources will depend to a great extent upon provision of storage and maintenance of effluent quality. There is scope for further development of groundwater in some areas.

The state of resources is monitored by over 2,700 hydrometric installations ranging from complex weirs and weather stations to simple rain gauges and boreholes.

Abstraction licences number about 10,000 of which 12% are responsible for 88% of the quantity abstracted. A significant feature is the very heavy agricultural demand which has to be met in summer.

Demands of all types are increasing, notably consumptive demands because of population growth but also other demands arising from wishes to protect and improve the water environment.

#### Hydrometry

The first stage of a comprehensive review of the hydrometric network was completed and will form the basis of moves towards uniformity in terms of data measurement, collection and archiving. A system has also been identified to ensure consistency in archiving hydrogeological data.

## Demand Forecasting

Existing forecasts of demand have been collated and combined with new information where available. It is clear that privatisation of water supply has resulted in demand forecast information being regarded "as far" more confidential than in the past. Indications are that public water supply forecasts are being revised upwards and outputs available from existing source works are being revised downwards. Taken together these factors will result in large future deficiencies.

## Planning

An outline plan was prepared setting out how water resources should be developed and managed to meet demand. This plan will be expanded in conjunction with major abstractors and conservation bodies.

A combination of privatisation and the dry summer of 1989 resulted in over 50 applications from water companies for new licences or significant variations. Planning staff were fully engaged in dealing with these applications.

## Abstraction Licensing

Licence administration was concentrated at Headquarters with Area staff being responsible for customer contact and enforcement. Technical determination of new licences had been divided between Headquarters and Areas.

A new requirement under the Code of Practice on Conservation, Access and Recreation for wide consultation with conservation bodies was a particularly significant new feature of the licensing process.

The year was notable because of a large number of applications for new licences, variations and successions, with over 500 being received. X

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## Low River Flows

Dry weather in the summer and autumn served to focus attention on low flows in rivers, some of which were caused at least in part by existing licensed abstractions. Rivers particularly at risk were identified.

The region has significant capacity for transfer of water between rivers and the capability to use boreholes for river support. Major works such as the Trent - Witham - Ancholme scheme and the Ely Ouse - Essex transfer were used extensively. Boreholes associated with the Great Ouse Groundwater Scheme were used to maintain river flows and water levels in ecological sites. A Drought Order was obtained in January to reduce flows passing to tide from the River Great Ouse at Denver. This action safeguarded the ability to transfer water into Essex. Elsewhere in the region, powers were obtained to provide river support from boreholes discharging into the River Waveney and tributaries of the River Cam.

## Aquifer Protection

Guidelines were produced to minimise the risks of contamination of underground water resources from the effects of development. These are aimed at the planning and consultative process in particular.

In respect of nitrates, the region was involved in the declaration of two specific areas as Nitrate Sensitive Areas and two in Advisory Areas.

## POLLUTION CONTROL AND LABORATORIES

### Consent Applications (1 April 1989 - 27 March 1990) - Anglian Water Services

238 Consents were issued by the Secretary of State before 1 September. 105 were for sewage treatment works and most of the remainder were for storm or emergency overflows:

Descriptive Consents for small works serving not more 250 people;

Changes in the Consent Limits for works serving between 250 and 1000 people where the river provided very large dilution and where the quality of river downstream of the discharge was good. The Consents for such works were based on the capability of the existing treatment plant.

On 1 September 1989, 22 Applications with the Secretary of State were transferred to Thames Region and 281 to Anglian Region.

After 1 September 1989, 219 Time-Limited Consents were issued by the regional NRA under the direction of the Secretary of State.

### Water Qualities (1 January 1989 - 31 December 1989)

For the three-year period ending in December 1989, the percent of time spent within the required limits was about 88%, the same as for the previous three-year period ending in December, 1988.

For the three-years ending in December, 74.7% (3,400 km) of river lengths met their standards. This compared with 78.6% (3,579 km) reported for the three years ending in December, 1988. This suggests that standards in 1989 were worse than in 1986 although changes of this magnitude have been reported before - for example from 1983 to 1984 and from 1985 to 1986.

The main reason for the apparent decline in compliant length was the harmonisation of the sampling programme introduced over the past two years. This brought in increased sampling rates for rivers in the north and centre of the Region. These new rates mean that it is possible to pick up as significant, smaller violations of the river quality standards which had previously been missed.

### Regulation (Calendar Year 1989)

There was an overall decline in the quality of effluent discharges to the water environment. (See page 29).

Compliance statistics for flow of effluent are a robust indicator of trends in potential environmental impact and all results indicated an overall worsening of effluent quality.

The percent of works compliant with upper tier criteria in time-limited consents was 75.0 per cent. No works should fail a time-limited consent.

There are now 31 works with criteria for non-sanitary substances (mainly List I and II Dangerous Substances), in Legal Consents. The works at Ashton, and Royston failed non-sanitary determinand criteria in Legal Consents:

At the end of 1988, 276 small works had legal descriptive consents, compared with 349 at the end of 1989. About 92 percent (254 works) were inspected at least once in 1988, compared to 69 percent (241 works) in 1989. The overall number inspected is similar.

## Compliance of Non-A.W.S. Effluents (Calendar Year 1989)

The proportion of compliant Non-Plc sewage treatment works was 44.7% (38 works). This is similar to last year. The figure for works owned by the Property Services Agency was 60% (21 works). This is better than last year.

The proportion of compliant trade effluent discharges was 32.5% (39 works) and similar to last year.

The compliance position is generally poor but the potential impact of most of these effluents is small.

## Laboratories

The laboratory at Aqua House performed chemical analysis for all our samples of environmental waters and industrial effluents. Effluents from sewage treatment works operated by Anglian Water Services were analysed under contract by Anglian Water Services under a temporary arrangement made necessary by privatisation.

Due to resource limitations, some specialist analyses for the Surface Water Directive were carried out under contract by Huntingdon Research Centre.

The requirements for new and complex analyses continued to increase. New analytical equipment is being obtained. This will enable the region to deal with most of the needs of European Directives, the Red List and the Paris Commission.

In mid-February, the new laboratory at Kingfisher House, Orton, was formally accepted and activities transferred from Aqua House. By the end of March, all samples collected by Anglian Region were being analysed at Orton.

Staff numbers were increased to 38 and training records were established for most staff. In-house training is a major workload on senior staff due to the recruitment of less-experienced analysts.

The Laboratory Information Management System was in the final stages of testing.

Analytical quality control was established, and good results were achieved in the Water Research Centre's Aquacheck Scheme.

Accreditation by the National Measurement Accreditation Scheme is planned for next year.

## Major Achievements

During the year systems were established for managing the monitoring programme. All information on sampling points and sampling obligations is now held on computer and is linked automatically to maps. The computer display enables staff, or the public, to see at a glance, all the monitoring done at any location. The system covers all the chemical and biological analyses provided by the laboratory services and more than 100 sets of analyses are needed to cover the requirements of the legislation and other duties.

A system of River Quality Indices was produced which can computationally assess compliance with standards for all river uses, Directives and other requirements as well as the achievement of the sampling and analytical programmes.

The region successfully prosecuted a farmer for piggery effluent pollution of Sapiston River. Mr J E Clarke, of Drinkstone in Suffolk, who had four previous convictions for similar offences, was fined £10,000 and at a subsequent hearing ordered to pay £20,000 towards the Authority's legal and technical costs. Compensation for restocking costs will be determined by a civil court and may amount to a further £27,000.

This is the largest fine imposed for a pollution offence within the Anglian Region and is believed to be the largest fine ever imposed in the United Kingdom for a pollution offence involving farm waste.

There was a substantial increase in the routine biological monitoring programme. This reflected the N.R.A.'s intention to meet its responsibilities towards maintaining and improving river quality and to the protection of flora and fauna of the region's rivers under the Water Act.

A major investigation into the algal populations of over 200 waters in the Anglian Region was undertaken during the year. A total of 56 waters were found to have significant populations of potentially toxic species of blue green algae and tests showed that 31 were positively toxic. The whole incident lasted many weeks and required a concerted effort by the N.R.A. staff and patience from the affected users. As a result of the incident the NRA nationally set up a special Task Force to report on the matter and to make recommendations for future action. The work is being co-ordinated by the Anglian Region.

Anglian's river water quality model, SIMCAT, was applied to rivers in the U.K., Portugal and India and is being developed with the help of the Water Research Centre for more general application in other countries.

An intensive survey of titanium dioxide outfalls in the Humber Estuary confirmed that the areas of impact around the new outfalls were substantially smaller than those found previously around the old outfalls. The report attracted significant local media interest.

Mathematical models developed by the Water Research Centre were extended to include techniques for calculating effluent standards defined as 95-percentiles and a water quality model for the Orwell Estuary was used to help to determine future quality standards for discharges to the estuary. The Great Ouse estuary was examined using a similar model.

The region was selected to handle data returns to the D.O.E. and National N.R.A. from all the regions, for the requirements of E.C. Directives and the 1990 River Classification Survey.

#### FLOOD DEFENCE

The Anglian Region operates its flood defence function on the basis of three areas which in turn are divided into eleven operational districts.

The region is empowered to carry out flood defence works on 5,800kms of main river, 1,231kms of which are embanked watercourses crossing low lying highly productive agricultural land. There are some 450kms of tidal and estuarine main river having an associated length of embankments of about 950kms. The region also maintains about 320kms of first line sea defences, the maritime coastal authorities having the responsibility for the remainder of the coast.

The region also has a responsibility for the general supervision of flood defence works over an area of about 26,800km<sup>2</sup> and which includes 122 internal drainage boards.

## Fluvial and Tidal Flooding

Apart from a tidal surge of 0.5m during September, which reached danger level at Wisbech and caused the three Canvey Barriers on Thameside to be closed, there were no significant flooding events until the last quarter of the period. During January, February and March the region suffered heavy rainfall and gale to storm force, generally south westerly, but occasionally north westerly winds. These resulted in washland flooding, severe damage to the sea defences and further loss of the beach material, the foreshore and the saltings. The problems were particularly severe at Heacham, where some 3m of shingle beach were lost, at Easton Bavants north of Southwold, at Trimley Marsh near Felixstowe, on all the west facing frontages of the Blackwater and Colne Estuaries, at Clacton and Jaywick where sand was stripped from the recharged beaches and at various locations along Thameside. The Thameside barriers were closed on many occasions and, eight times in quick succession during a prolonged storm. The total cost of repairing the damage was estimated at about £0.75m.

Before the start of the storm tide season a flood warning seminar was held with the local authorities, internal drainage boards and police forces to ensure that all emergency procedures were understood. This was followed by an emergency exercise designed to test communication links and was based on real flood events of the 1978 and 1983 tidal surges for the east of the region and the fluvial flooding event of 1981 for the north of the region.

## Technical Developments

Following the completion of the second stage of the sea defence management study, probably the most extensive study on coastline processes and properties to have been carried out in the United Kingdom, the third stage was commissioned. This comprises a wide range of tasks aimed at filling the data gaps identified in Stage II, developing a better understanding of the coastal mechanisms identified and refining the "management system" as a fully operational tool for coastal managers. There are essentially four aspects to the work: field measurements, detailed studies, preparation of monitoring guidelines and further development of the GIS based management system. These will lead to specific recommendations for further sea defence works and provide a coherent framework for the long term management of the coast.

One of the principal findings of the second stage of the study was the need to develop sea defences which would absorb wave energy. A trial area of open stone asphalt was built on the sea wall at Bohuns Hall, Tollesbury on the north bank of the Blackwater estuary. The construction proved to be efficient and wave energy was absorbed within the revetment system. Work of a similar nature was undertaken on the South Humber Bank.

Trial installations of a new Norwegian geotextile for embankment stabilisation were made at five sites, tidal and fluvial, within Norfolk. The initial results were encouraging.

## Capital Works

In the Anglian Region priority is given to flood defence works which protect people and property from flooding, principally by the sea. Total capital expenditure during the period was about £22m and included major sea defence works at South Humberbank, between Mablethorpe and Skegness, on the tidal banks of the Rivers Welland, Nene and Great Ouse, at Boston, King's Lynn, Hunstanton, Great Yarmouth, Felixstowe, Aldeburgh, Heybridge, Point Clear and Blockhouse Wick, and at Burnham. The start of the sea defence works at Aldeburgh was performed by John Gummer, MP, Minister for Agriculture, Fisheries and Food.

Fluvial works were undertaken on the Lincoln Flood Alleviation Scheme which was nearing completion, on a flood alleviation scheme at Barnwell in Northamptonshire and on the Cambridgeshire Lodes where a £0.5m project to strengthen and raise the banks was completed.

### General

A great deal of effort was made to consult the public and to promote some of the region's major flood defence works, in particular the works of beach recharge south of Hunstanton, works at Steeple Stone in Essex, the Colne Barrier and the Ouse Washes. Public exhibitions and presentations were held, some of which attracted well over 500 visitors.

East Anglia is an area which is experiencing a rapid and high growth rate. The region was involved in giving evidence at public inquiries connected with proposed development on the A10 trunk road between Cambridge and Ely as well as along the main A45 corridor and the A1-M1 link road.

The setting up of a method to determine actual standards of protection, the classification of the land protected and the establishment of target standards of protection is an essential step in defining both the region's and the nation's flood defence objectives. A pilot scale study was started primarily within the region but also within Welsh and Yorkshire regions to define the appropriate methodology.

### FISHERIES

#### Pre-vesting:

A two year experiment was completed in the Essex Fisheries District to assess the effectiveness of an increased honorary bailiff force and it was concluded that the current policy of maintaining only a limited force should be continued.

A major fisheries survey and restocking exercise was carried out on the River Sapiston and Little Ouse after the death of over 10,000 adult fish caused by a discharge of pig slurry to River Sapiston in March 1989. Five tonnes of roach and bream plus 1,000 8 cm chub were restocked as part of the re-instatement operation and the costs of £27,000 were sought against the polluter.

The warm dry summer proved exceptionally suitable for obtaining coarse fish stocks from Grafham Water. The fish shoaled abundantly in the shallows and the Region's netting team achieved a record crop of 13 tonnes of fish, mostly roach and bream, for stocking into coarse fisheries.

#### Post-vesting

The three year rolling programme of quantitative surveys of all the region's river fisheries continued throughout the year. Major surveys of the rivers Waveney, Ancholme, and Great Ouse (Bedford to Brampton) featured strongly in the programme. The fieldwork for a survey of the entire catchment of the River Nene was completed.

A five year programme at the Regional Fisheries Laboratory to establish spawning and early rearing techniques for all major coarse fish species was successfully completed during the year. A regional plan for coarse fish production was formulated and hatchery/early rearing facilities increased and upgraded in preparation for moving towards full production in 1990/91.

The first two prosecutions under S30 of the Salmon and Freshwater Fisheries Act, 1975, were successfully taken in the region for the unconsented introduction of carp to a fishery in Cambridgeshire. In separate cases both the supplier and fishery owner were found guilty and fined £600 (with £125 costs) and £600 (with £250 costs) respectively.

Otter guards to prevent otters from entering fyke nets set for eels were issued free with all eel net licences for 1990. Eel fishermen have been asked to use them voluntarily and complete a questionnaire on their experiences with them. A review of the future organisation and regulation of eel fisheries has started within the region.

Under a new byelaw, introduced in 1988, the region operated a catch-return system for commercial salmon and sea trout netmen for the first time. Over 90% of fishermen made a return by the end of the year indicating a catch of over 3,200 fish weighing in excess of 5.4 tonnes. Four salmon weighing 18.18 kg were included in the returns from the interceptory sea trout fishery which operates primarily along the North Norfolk coastline. Attempts were made to collect the remaining returns.

The specialised services provided from the Regional Fisheries Laboratory were widened further by the setting up of a toxicity testing facility. Although founded primarily on fish, the tests carried out will also include invertebrates and other organisms. The service will give support primarily to the pollution control function but will also assist with fisheries investigations.

The introduction of a new rod licence system based entirely on regional licences was successfully accomplished. Although the recovery of returns from agents was not complete by the end, the returns indicated approximately 226,600 annual and 7-day rod licences sold compared with 228,676 in the previous year when divisional licences were also available. Income was well above estimates. A total of 159 salmon/sea trout net licences and 779 eel net licences were also sold, the latter being a major reduction which further highlights difficulties with eel net enforcement. A total of 294 general licences were issued of which 288 were daily block.

## RECREATION

### Recreation Planning Process

There were several meetings of water recreation panels run by the two Regional Councils for Sport and Recreation in the region. The panels represent local authorities and providers and users of water based facilities. Main issues discussed included the Water Act 1989 and Code of Practice, the role of the NRA and the privatised water companies with reference to sport and recreation, the impact of blue/green algae contamination and the appropriate roles of the various water bodies in dealing with the problem; membership and terms of reference of the RRAC's and regional recreation strategies.

The main strategy review affecting the region is for the Great Ouse and its associated waterways forms the basis of NRA regional recreational policy in the catchment. The year also saw the start of a review of the strategy for waters in Essex and parts of Suffolk.

Recreation meetings were held with a number of local authorities in the area, in particular the Nene Valley officer working party, run by the Northamptonshire County Council, working parties organised by the Huntingdonshire District Council and Middle Level Commissioners. The main issues discussed included the use of water and land in river valleys for recreation/conservation purposes and access improvements to water facilities.

Six meetings of the NRA Anglian Region's three local recreational panels took place during the year. Main items of interest were the possibility of introducing boat pollution byelaws; the role of the NRA; navigational hazards on the rivers requiring managerial action; flood defence and navigation projects affecting navigation; involving dredging, piling and weed cutting etc; navigation safety issues; land drainage capital works programmes; DOE capital schemes; navigation expenditure for the year, liaison arrangements and club activities.

### Recreational Management

All appropriate land and waters in the region are let on licence to clubs and organisations. This has proved to be an effective method of meeting NRA responsibilities for the provision of recreation compared to direct management.

The region uses byelaws for general management of recreation activities. The Recreational (Water Parks) Byelaws 1981 form the basis of management of the Authority's water parks and apply to Toft Newton Reservoir, Coronation Flood Relief Channel (Welland), Great Ouse Cut-off Channel, Great Ouse Flood Relief Channel and various borrow pits.

### Coarse Fish Angling and Eel Fishing

Over 450 miles of river bank are let on licence to approximately 60 clubs and organisations and 35 licence renewals/new licences/ options to renew took place during the year. These licences contain provisions by the occupier to restrict the use of lead weights and control the misuse of tackle and disposal of litter. The issue of day tickets and charges for casual users are controlled in the licence by clauses to the effect that day tickets must be available to the public. All new eel licences now invite licencees to use otter guards on fyke nets.

The trout fishery owned by the NRA at Toft Newton continued to be let on lease to the private sector.

The region's fisheries provided excellent sport generally and fish stocks improved with consequent improvement in angling results.

On the Great Ouse system a catch of 140 lb bream at Holywell produced a match record. On the Sixteen Foot Drain at Stonea a winning catch record of 87 lb bream took place during the NFA (Div 5) national championships on the Middle Level system.

Fish catches on the Nene at Peterborough and Northampton were above average with good results in the Welland (bream, dace, chubb).

The hot, dry summer contributed to weed growth, which affected the sport, particularly match angling. In addition the discovery of potentially toxic blue/green algae led to the major reservoirs in the region being closed down by the owners for recreational use for about six weeks in the summer.

### Sailing, Canoeing and Motor Cruising

The NRA encourages sailing and canoeing at those facilities which are suitable to accommodate the activity. These sports are permitted by licence/lease to clubs affiliated to the RYA and BCU respectively, an Education Authority or well organised groups such as the Forces, scout groups or voluntary youth groups which must be controlled by qualified personnel. The NRA owns the highly successful canoe slalom course at Cardington administered by the BCU. The main licence/lease reviews carried out during the year included a number of sailing club premises, commercial moorings and a boat hire facility.

### Footpaths

The opportunity was taken during the year to co-operate and assist the Broads Authority and a number of local authorities in the opening up or reopening of footpaths to water areas. An example was co-operation with the Broads Authority in reopening an abandoned footpath around Hardly Flood by providing material for foot bridge construction over the Chet, near Chegrave and Lodden. Discussions also took place with local authorities to create footpaths along the Nene near Thorney and Peterborough and along the Welland at Market Deeping.

### Moorings

The NRA Anglian Region owns over 220 moorings at South Ferriby (Ancholme), Boston Haven (Witham), Upware (Reach Lode), Denver (Great Ouse), Kyme Eau. All these licences were reviewed during the year and in view of the increase in the waiting list for the moorings, charge increases ranged between 20 to 50 per cent.

### Pollution from Boats

The region raised the question of the need to make byelaws to control pollution from boats and this is now being investigated at national level.

### Promotion

The region contributed technical information to private sector publishing concerns regarding the recreational waterways, produced a navigation booklet for boat owners using the waterways and issued press releases relating to river safety issues and boat speeding. A booklet was produced on freshwater fishing in the eastern area, identifying the location of stillwater and river coarse and trout fisheries in Norfolk, Suffolk and parts of Essex, together with plans showing NRA owned banks where fishing in tidal waters is available free of charge. A code of conduct for waterways in the region was also published.

### Flood Defence Capital Works Impacting Upon Recreation

The completed beach recharge scheme at Jaywick created significant new beach areas for recreation and boat mooring behind the breakwaters.

Works started on the Cambridgeshire Lodes and the Ouse Washes with major benefits for recreation activity particularly fishing, boating and walking.

The Aldeburgh Sea Defence Scheme started, which ensured continued yachting and other recreational activities at Slaughden.

New sea defences at Felixstowe Ferry provided protection to Felixstowe Sailing Club.

Negotiations started with the Wivenhoe Sailing Club on the club's possible replacement on a site downstream of a proposed tidal barrier on the River Colne.

## CONSERVATION

The region's conservation work took the form of a routine programme which was established pre-vesting and continued unchanged for the remainder of the year.

### River Corridor Surveys

As part of the duty to further conservation, the region carries out habitat surveys of river corridors for all stretches that are programmed for routine maintenance dredging. Eighty-eight different stretches were surveyed during 1989 totalling over 200 kms. These surveys served not only to identify and, through their recommendations, protect valuable wildlife habitats, but also highlighted opportunities to enhance the existing environment. As part of this latter aspect tree planting schemes on the Nar and Ivel, creation and restoration of ponds, and the establishment of new in-stream riffles on the Lark at the site previously over-dredged, were examples of the successful building in of conservation initiatives into routine flood defence operations.

In addition to these pre-dredging surveys, about 10% of rivers are annually resurveyed to audit the effectiveness of the survey technique and responses to it. Audit surveys of 20 kms during the year showed widespread success in retaining features of conservation value. Where results were apparently less successful measures were instigated to review and produce solutions in areas of potential conflict.

### Rivers Environmental Database System

While river corridor surveys provide an effective tool for conservation work they are essentially piecemeal and reactive in nature to the immediate needs of the flood defence programme. In order to get a more balanced view of the overall conservation value of watercourses, and influence planning and environmental impact assessment of new works, the region have developed a strategic survey capability for all rivers. Initial R and D work was completed during the year on 400 kms in Lincolnshire, and a further 533 kms spread across the region. Detailed habitat mapping, plant species, birds and aspects of fluvial geomorphology were recorded for each 500 metre length; the data being entered onto a computer for ready access, analysis and the production of indices and reports. One particular aspect involved working with a local County Wildlife Trust in Suffolk to survey the Deben catchment. The Trust produced a comprehensive report on the conservation value and habitats of the river system which is being used to help plan routine flood defence and riverbank maintenance policies in a manner sympathetic to the environment.

The Rivers Environmental Database system is being introduced fully in 1990 with survey work programmed to cover all 6000 kms of main river over the next three years.

### Coastal Wildlife Survey

A four year ecological survey was begun covering the complete coastline of the Anglian region. This incorporated detailed habitat mapping both of NRA maintained raised seabanks and other area of dunes, shingle and saltmarsh. For the seabanks a survey of plants and breeding bird species was undertaken by trained field surveyors throughout the summer. Two hundred and fifteen kms of seabank were surveyed in 1989; the data being recorded for each 500 metre section on specially drawn habitat maps at a 1:2500 scale. Areas of sanddune, shingle and salt marsh between the Humber and Wash have also been surveyed using the NCC's methodology of National Vegetation Classification. In addition censuses of winter wading bird populations were carried out at regular time intervals along the coast.

The coastal survey work involved close collaboration with the NCC and results are being provided to them in exchange for similar data from areas they have already covered. The survey data is also being used extensively within the regional NRA, being entered onto the Geographical Information System set up by the flood defence section as part of the coastal management strategy.

### Environmental Impact Assessment

Ecological surveys play an important role in the environmental assessment of proposed projects, both at their early stages of appraisal and more formally if and when an environmental statement is produced. In 1989 seven environmental statements were prepared for flood defence works, with the two relating to major schemes on the Ouse Washes being particularly sensitive and comprehensive. In addition many more projects were the subject of ecological river corridor type surveys at an early planning stage. Such studies were not restricted to flood defence works. The potential effects of river support by pumping from boreholes as part of the Cambridgeshire Lodes/Granta groundwater development scheme were assessed by sampling invertebrate communities in the headwater streams and receiving watercourses, as well as doing river corridor habitat surveys. Sites of high conservation value were identified enabling the initial scheme proposals to be modified to conserve the most important areas. Other environmental surveys as part of water resource scheme assessment were carried out at Chippenham Fen, and on the Gwash and Glen rivers during 1989.

Training, Research and Development: Conservation training needs were recognised and a programme was started to increase knowledge and awareness amongst staff of all functions. One initiative involved the Suffolk Wildlife Trust in a joint programme for training local river superintendants and their workforce in the county. An in-house training day was followed with a series of small site based sessions of a practical nature with dredging machinery on the riverbank. Other courses were arranged for operational flood defence staff and conservation input included in regular meetings of new works staff. Procedural guidelines were produced covering all aspects of our conservation duty across the region, as well as particular guidelines on environmental surveys and assessment.

Research programmes with a strong conservation role included the continued development of methods and techniques for river and coastal surveys, and data handling. The use of invertebrates to aid conservation habitat assessment and the production of subsequent management recommendations was investigated, as was the hydrodynamics of fenland systems in East Anglia (in conjunction with NCC and the Broads Authority).

Conservation Liaison: Annual Conservation Liaison Meetings were held in each of the three operational areas in the region during spring. The capital and maintenance programmes for the year were presented, along with reports on surveys and longer term plans, to a wide range of environmental organisations. Collaborative projects and links with other environment bodies remained high, covering such areas as site management (NCC), training (NCC, RSPB, County Wildlife Trusts) research (NCC, BTO, Broads Authority) production of guidelines (RSPB), estuaries review (NCC) and surveys (County Wildlife Trusts, NCC, RSPB). In April, Anglian region co-hosted a two day conference on conservation within the water industry at Loughborough.

## NAVIGATION

### Navigation Maintenance and Management

The region is responsible for over 300 miles of recreational waterways and over 60 locks. It has a statutory obligation to maintain the main navigation channels and navigation works of these waterways.

The waterways are subject to byelaws, which are the principal mechanism of management of the waterways and are concerned primarily with boat construction and equipment, speed limits and safety and non registration offences.

Total operating costs during the year were estimated at £600,000.

### Registration and charges

Charges for the registration of craft are limited by statute to initially £2 and £1 thereafter for each registration. A navigation charge is made in accordance with an annual tariff. Pleasure boats are charged under various classifications (manual, sailing and cruising) and the scale relates to the overall length of the craft.

Clubs and youth organisations obtain certain benefits from bulk registrations. The licencing scheme provides for a regional licence for all recreational waterways, the principal waters being the River Great Ouse and the River Nene systems, a restricted licence for the Ancholme, Glen and Welland only and a further restricted licence for the River Stour only.

Hire craft (cruisers) are charged 3 times the normal rate and hire craft (day boats) are charged 1.5 times.

Sailing, rowing and canoeing have been encouraged with block registration arrangements being available for clubs affiliated to the respective national organisations, in order to ensure that they maintain the high training and safety standards laid down by those organisations. This also applies to youth organisations, such as guides, scouts and cadet forces.

The region supported special events on recreational waters by organisations for charitable purposes, by granting exemptions from registration of the byelaws. Conditions were applied regarding timing and location, taking into account the interests of other river users.

The region has a reciprocal navigation agreement with the British Waterways Board for boats registered on the River Nene to use the Grand Union Canal between Northampton and Leighton Buzzard and between Northampton and Market Harborough and in return BWB registered boats can use the Nene for a similar period of 14 days without payment.

About 5,700 navigation licences were issued (an increase of nearly 5.5%) despite navigation charges being increased by 24.5%. The rise in the number of licences resulted in part from greatly increased enforcement activity on the waterways during the boating season.

Income rose by over 34% from £296,000 to £398,000. The increases in charges had been due to the former Water Authority's aim to reduce the deficit on the navigation account by eliminating, over the medium term the difference between the total operating and management expenditure and the income from boat charges. The aim was to increase charges every year by 20% plus inflation. To the relief of boat owners and marina operators using the waterways, the NRA approved a 10% increase for 1990/91.

## Promotion

A navigation booklet for the NRA Anglian Region's recreational waterways was produced and will be available for the coming season. Other promotional activities include the production of a code of conduct for waterways in the region, together with press releases relating to boat speeding dangers.

## Navigation Byelaw Enforcement

The region achieved its aim of inspecting 5% of all boats subject to the byelaws for boat construction and equipment compliance. For non registration, speeding, water skiing and continued non compliance of boat construction and equipment requirements, the target was set for 100% prosecution in the magistrates courts of all such offences.

## Jet Skiing

The increasingly popular recreational activity of jet skiing caused problems during the year in terms of safety and conflict with other river users. As a result the region decided jet skiing should not be allowed on its recreational waterways, as the craft failed to meet the requirements of the equipment and construction byelaws.

## Navigation Works

Over £100,000 was spent on capital works on navigation projects. These included the widening and deepening of stretches of the Old West River, mooring improvements, safety works to landing stages and locks, the provision of new landing stages at Brandon Staunch, St Ives, Brampton and Denver Locks, and a number of sluice modifications and reconstructions. Eight landing stages were completed on the River Nene navigation.

A flood defence scheme to retain and strengthen the banks of the Cambridgeshire Lodes also started during the year. This project has significant beneficial effects for navigation on the Lodes.

Discussions continued with the Inland Waterways Association to reopen Welches Dam Lock and the Forty Foot Navigation.

## CROSS FUNCTIONAL AND SUPPORT SERVICES REVIEWS

### ADMINISTRATION

By co-ordinating activities throughout numerous office moves, and setting up and implementing systems, procedures to meet staff needs, the administration function played an integral part in establishing the region's physical organisation.

Key achievements included:

1. New RHQ building project and associated move.
2. New offices/major refurbishments at Brampton, Ipswich, Chelmsford, Kelvedon, Bedford, Spalding.
3. Setting up regional print facility at Orton.
4. Introducing a courier system for regional sample collection/mail.
5. Standardising on administration and committee procedures.
6. Co-ordinating the Transfer Scheme.

## LEGAL SERVICES

### Pollution Prosecutions

There were 18 successful prosecutions with fines totalling £23,250.00 and costs awarded of £28,713.00. These figures included the prosecution of Mr J E Clarke, Rookery Farm, Drinkstone. (See page 10).

### Other Major Matters

#### Water Bill

The legal section was heavily involved in commenting on the processing of the Water Bill through Parliament in the spring of 1989.

#### Transfer Scheme

The Transfer Scheme enabled the division of the assets and liabilities of the Anglian Water Authority between the NRA and Anglian Water Services Ltd. The Legal Section were part of the team involved in the preparation of the Scheme, which also provided for a number of arrangements covering matters such as, information technology and laboratory services.

#### A10 Public Inquiry

The region objected to three proposed new settlements in Cambridgeshire, due to the potential risk of flooding. Agreement in principal was reached with all three developers and negotiations started with regard to final amendments to the documentation.

#### A45 Public Inquiry

Negotiations were opened with seven developers in an attempt to enable the NRA to withdraw objections to the developers' proposals to build new settlements on the A45 corridor. The objections related to problems of surface water. The Inquiry started in February 1990. Agreement was reached with two developers and planning conditions were submitted to the Inquiry. Negotiations were underway on the other five proposed developments at the end of the year.

## ESTATES MANAGEMENT

The section provides a professional and comprehensive valuation and estate management service. In addition, work valued at about £25,000 was contracted out to the private sector.

The main role during the year was to carry out valuations for capital works and to ensure that sufficient interests in land and property were obtained to meet the region's revenue and capital programmes... The main capital schemes involving input during the year were - Stowmarket and Needham Market Flood Prevention Scheme (all interests in land had to be acquired by agreement to enable the scheme to proceed), Heybridge Tidal Defences, Colne Barrier, South Farnbridge land - fill sea defences, Ouse Washes South and Middle Level Barrier Banks, Cambridgeshire Lodes, Kings Lynn Tidal Defences, Lincoln Flood Prevention Scheme, Great Yarmouth Flood Defence Scheme, Barnwell Flood Alleviation Scheme.

#### Land Management

The role of the section is to manage and maintain land in an efficient and cost effective manner. Approximately 300 property reviews (rent reviews and relets) were carried out.

## Rating

To meet the NRA objective of minimising its rating liabilities, a review of the Region's rateable property was undertaken during the year with considerable reductions and rate refunds achieved.

## Offices

The principal office matters handled during the year were the purchase of the North Essex district office at Kelvedon, the assignment of the lease on Apex House, Peterborough, the release of temporary accommodation at Werrington and the placing of Aqua House, Peterborough on the market for short-term letting.

## Property Records System

Major achievements were the completion of the Property Transfer Order showing all the assets transferred from the former Anglian Water Authority to the NRA and the development of a computerised property records system with significant data input.

## PUBLIC AND MEDIA RELATIONS

The regional profile was established through a major media launch on 1st September and by a series of special 'roadshow' presentations at eight venues in the region to target key group audiences. Substantial interest was shown by invited groups and a major mail shot of information about the NRA and the regional organisation supplemented the initial publicity activity. Media days were organised in each of the three operational areas and a 24-hour media service established.

Widespread media interest was shown in a wide variety of regional activities with more than 1,300 enquiries logged during the year, the majority post September. 84 press releases were issued with over 60 television and 230 radio broadcasts recorded. The vast majority of media publicity was positive.

Public consultation exercises on major schemes attracted large audiences to local exhibitions, displays or consultative meetings and included Aldeburgh sea defences, proposals for beach recharge between Hunstanton and Heacham, the Ouse Washes barrier banks scheme, the Colne Barrier, and Woodbridge tidal defences.

The official opening of the regional headquarters by Lord Crickhowell and the first regional visit by the national Board were key events.

A number of publications about the region were produced for external circulation and over 400 enquiries and requests for information were handled during the period. (See page 31).

## PLANNING

### Corporate Planning

Corporate Planning in the Anglian Region is part of strategic management. A culture was developed in which issues are identified, priorities selected in relation to strategic objectives, action plans developed and implemented and the effects monitored. The process is dynamic with evaluation of performance used to feedback and refine priorities and action plans.

The unit plans prepared for the shadow NRA Unit identified over 360 key tasks. Objectives for the year were used during the annual staff appraisal process to set major objectives to be achieved for each individual and criteria were identified for ongoing review.

A monthly report is prepared for the Management Group and senior officers. This Report provides executive information to demonstrate the performance of the organisation towards meeting regional targets and objectives including budgets and capital programme and identifies issues requiring management attention.

A Corporate Plan for 1990/91 was prepared and resources and budgets allocated. A Management Action Plan is prepared which identifies our priorities and details the key actions to be completed. This will be used during the staff appraisal process to target efforts and resources for the coming year.

### Emergency Planning

A regional communications centre was established in the new regional headquarters in Peterborough. It provides the co-ordinating and main communications centre for dealing with emergencies. Real time telemetry provides data from remote river level and flow gauges, rain gauges, sluices and water quality monitors. The organisation, including its workforce of 450 craftsmen and manuals, is now able to respond to emergencies in a timely and efficient manner.

Exercises were held to test the region's response to emergencies. These generally proved the efficiency of the Region's systems and responses.

### Town and Country Planning

Anglian Region is the largest and fastest growing Region in the NRA. During the year 34,000 planning applications were considered by the NRA as a statutory consultee and comments made to planning authorities. Area planning staff regularly visit the main district councils and deal with as many applications as possible during the visit. Over 95% of applications were dealt with within 28 days. At the strategic level, the Region is closely involved in the development of Local and Structure Plans with the Broads Authority, 14 County Councils and 62 District Councils in our area.

A number of publications were distributed to councils including a document explaining how effective liaison can be maintained between the NRA and planning authorities and a leaflet explaining the policy of the NRA to resist development in areas of flood risk. The comments of the NRA are advisory and we have experienced problems, particularly on environmental matters, due to deficiencies in legislation.

Two major public enquiries started during 1990 concerning applications for a number of new settlements in Cambridgeshire. (See Legal Section).

### R & D PROJECTS

Broadland communities, their conservation and regeneration continued to be a major focus in the research programme. Phosphorus removal and the alleviation of the effects of phosphorus pollution being the areas of greatest attention.

Research on river corridor methodology for conservation and its application to routine engineering work was virtually completed. This work is now being included as an operational requirement for river dredging, maintenance etc. to ensure that alterations to the habitats are carried out sensitively.

Work started on the habitat requirements for fish and invertebrates to improve local river quality.

Work began on the development of a number of computer models to look at the relationships between rainfall, recharge and abstraction to evaluate potential yields. Other programmes are being developed for the prediction of pollution plumes in underground aquifers and time of travel in streams.

Investigations started on the ecological status of the Welland and Witham estuaries. This will give the definitive baseline on the present qualities of the estuaries. It will also provide data for future calculations of consents and provide a framework for environmental assessments. This is the final area of work to evaluate all the major freshwater discharges to the Wash.

The project on the Essex saltings continued to look at the erosion and accretion rates, the health of the vegetation and the bird and mammal populations.

Data was collected on the importance of the vegetation and intertidal feeding areas associated with all the sea defences in the region. This will enable future engineering works to take into account the effects they will have on ecologically important sites.

#### INFORMATION SYSTEMS

An information technology planning group was established to oversee the developments of information systems within the region. Users future requirements were evaluated and a strategy/plan produced outlining the development of systems in the immediate future taking into account current hardware platforms. To assist in the process a corporate data model was produced.

The uses of Geographical Information Systems (GIS) within the Region were evaluated comprehensively. As a result of a detailed appraisal of GISs on the market a small scale pilot application is being developed on a workstation.

The Bull dual DPS8/70 mainframe was installed and tested. Staff recruited to operate the system started a 3 month parallel running exercise with Anglian Water Plc. All the financial (including income collection) and the main strategic scientific systems are being implemented.

A Logica MC16 telemetry system, comprising two PDP-11 computers and 200 outstations was transferred from Anglian Water and recommissioned. A MicroVax 3500 was installed and linked to the PDP computer to run applications based on telemetry data.

A mobile radio system comprising a Mobicom control system, 29 base stations linked to Peterborough by private wire, and 500 mobile radios, was transferred from Anglian Water and recommissioned.

During the past year many small business systems were installed on personal computers particularly in areas where clerical support had not been available. Major applications completed included personnel and recruitment, transport, planning liaison, discharge consent applications, asset register and rod licences.

## PERSONNEL

### Recruitment and Training

During the year the Region engaged/promoted 182 permanent staff and workmen, 74 of whom were internal moves/promotions. 82 people left the NRA. Recruitment advertising costs were approximately £60,000.

A training needs survey was undertaken as part of the performance appraisal round and from this information a regional training plan was formulated to meet the needs identified during the three years to 1992.

1,700 man-days training were undertaken including a significant amount relating to computers, COSHH, Health and Safety representatives, pollution prosecutions, herbicides and pesticides and emergency aid.

Identifying supervisory potential was given high priority and three 2 day assessment centres were planned.

57 employees undertook Open University, day-release and evening class courses amounting to 1,131 man-days in a full year.

### Manpower Planning

A review of existing workforce was undertaken to identify potential skill shortfalls. The age profiles, skills, length of service and turnover of employees were analysed. A manpower plan was drawn up to meet the anticipated manpower needs in the Region.

### Health and Safety

From the 1st January 1990, the Safety Adviser and Assistant Safety Adviser transferred to the Personnel Section. From 1st September there were a total of 8 reportable (over 3 days lost time) accidents within the region with no prosecutions or enforcement notices issued by the Health and Safety Executive.

Safety audits were carried out in all operational areas.

### Computerisation

Work continued throughout the year consolidating the region's leading expertise in this area. Information held on the system was verified by employees. This enables the production of effective management information on request and provided the corner-stone of some major exercises viz allowance review of staff, senior management benefits returns, staffing review, etc.

## FINANCE

The region carried out a capital programme of £36 million, comprising five separate flood defence programmes, specific programmes for each functional service and an exit E.F.L. programme.

Grants and contributions associated with the programme totalling £10<sup>1</sup>/<sub>2</sub> million were obtained, exclusive of the exit E.F.L. programme for the year. The exit E.F.L. was £7.4 million.

Revenue costs amounted to £31.3 million comprising flood defence £16.3 million, water resources £6.3 million and other DoE services of £8.7 million.

Flood defence income from precepts, Internal Drainage Board contributions, General Drainage Charges and miscellaneous items totalled to £33.1 million. Water resources and fisheries licence income amounted to £8.5 million and £1.1 million respectively. - Other Income amounted to £0.6 million.

Flood defence reserves at March 1990 were approximately £7<sup>1</sup>/<sub>2</sub> million, which reflected the receipt of monies in respect of deferred credit balances and the refund of the 1988/89 provision for re-organisation costs. These reserves are to be used over a period of five years, and will partly off-set the increases in the capital programmes.

A water resources surplus of £700,000 will be used equally over the following two years to alleviate increases in charges.

The asset position at the end of the year, after writing off intangibles showed a total historic net value of £38 million, of which flood defence and water resources represented £5 million and £19 million respectively.

Water resources charges are based on current cost depreciation; the equivalent current cost figure for water resources was £88 million.

Detailed budgetary control was maintained throughout the year for all levels of the region and involved both finance section staff and spending officers working closely together to achieve targets.

Good progress was made in refining Exchequer systems and Head Office salaries and creditor payments were undertaken after September.

The finance section was actively involved in project appraisals, contract audit and related matters and more generally operated as an integral part of the operations of the region giving guidance and help on an on-going basis.

N.B. The above figures are subject to up-date on completion of the final accounts.



**NRA**

*National Rivers Authority  
Anglian Region*

## THE REGIONAL ADVISORY BOARD

The Regional Advisory Board acts as an interface between the activities of the regional committees, is the forum for considering and resolving matters and issues which are of common regional interest and the bridge between the region and national headquarters.

The Board comprises a Chairman, who is a member of the national Board of the NRA; the Regional General Manager; and the chairmen of the three regional committees – flood defence; fisheries advisory; rivers advisory.

In the Anglian region the Advisory Board members are:

### CHAIRMAN



**PETER BRANDT**  
Chairman Atkins Fulford Ltd. Formerly Chief Executive of Merchant Bankers, William Brandt's Sons and Co. Member, NRA Board (1989 to date), Chairman, Anglian Regional Advisory Board (1989 to date).

### REGIONAL GENERAL MANAGER



**PETER BULLOCK**  
Director of Technical Services and Board Member, Anglian Water (1986-1989). General Manager, Cambridge Division (1983-1986); Regional Manager, water supply (1978-1982); Divisional Manager, Stour and Colchester Water Divisions (1974-1978).

## COMMITTEE CHAIRMEN



### REGIONAL FLOOD DEFENCE COMMITTEE

**JOHN MARTIN CBE**  
Farms 800 hectares in family partnership on Cambs/Norfolk border. Chairman, Littleport and Downham IDB (1971-88); Member, Great Ouse LLDC and predecessors (1967-88), Chairman (1983-88); Chairman, Anglian Regional LDC (1988 to date).  
Vice President, Association of Drainage Authorities; Member, MAFF Regional Panel (1973-85), Chairman (1981-85); Member, MAAF Research Priorities Board (1984-88); Member, CBI Eastern Regional Council (1981-84). Member, Agricultural Research Council (1968-78). Member Anglian Water (1988-1989).



### REGIONAL FISHERIES ADVISORY COMMITTEE

**PETER TOMBLESON OBE**  
Executive Director, National Anglers Council (1977 to date); Chairman, Regional FAC (1974 to date); Chairman, Regional Recreation and Conservation Committee (1986-1989); Member, Anglian Regional LDC (1983 to date).  
Vice Chairman, National Fisheries Advisory Committee, Immediate Past President; Institute of Fisheries Management. Member, Nene River Board, Welland and Nene River Authority (1964-1974). Member, Anglian Water (1974-1989).



### REGIONAL RIVERS ADVISORY COMMITTEE

**CHRISTOPHER GROOME**  
Head of Electronics, Engineering and Construction, National Economic Development Office. Member, Anglian Regional LDC (1983 to date); Deputy Chairman, Anglian Regional FAC (1988-1989); Member, Burton Latimer Town Council (1974 to date, Chairman, 1978-79 and 1986-87); Member, Kettering Borough Council (1976 to date). Member, Anglian Water (1983-1989).

APPENDIX 2 - Regional Committee Members

Regional Rivers Advisory Committee

C Groome (Chairman)

S Ashford  
N Boast  
J Carmichael  
D Clarke  
H Darbon  
N Field  
D George

R Godber  
P Horton  
D Latham  
C Lumber  
J Loveys  
J Martin

P Moorhouse  
J Pilling  
A Prater  
G Searle  
R Sisman  
P Tombleson

Regional Fisheries Advisory Committee

P Tombleson, OBE (Chairman)

J Martin  
C Groome  
S Amos  
M Labern  
A Wheeler

D Lloyd  
M Foster  
C Clare  
K Ball

S Alden  
P Peachey Edwards  
J McGuire  
L Cass

Regional Flood Defence Committee

J Martin, CBE (Chairman)

J Childs  
H Duffield  
B Clark  
W Grant  
F Thornton

C Groome  
P Tombleson  
R Gibson  
J Horrell  
D Fisher

J Ellis  
D Hoyes  
F Rockliffe  
A Northen  
F Gales

APPENDIX 3

Senior officers and professional advisers

Regional General Manager - Peter Bullock (to 31st March 1990)  
- Kevin Bond (from 1st April 1990)

Regional Managers:

Environment and Fisheries - Alan Tetlow  
Flood Defence and Operations - Clive Mason  
Finance and Common Services - Roger Hyde  
  
Public Relations Officer - Jerry Dodd  
  
Solicitor - Terry Williams

Professional Advisers

Financial - Peat Marwick McLintock

APPENDIX 4 - Selected Activity and Performance Statistics

Pollution Control including Laboratory Services

POLLUTION INCIDENTS (1 APRIL 1989 - 28 MARCH 1990)

Industrial Chemicals	=	133
Organic Industrial Waste	=	69
Agricultural Pesticides	=	26
Organic Farm Wastes	=	140
Oil and Related Products	=	526
Untreated Sewage	=	449
Miscellaneous	=	249
<hr/>		
Total	=	1592

PROSECUTIONS (1 APRIL 1989 - 27 MARCH 1990)

Industrial Chemicals	=	2
Organic Industrial Waste	=	2
Organic Farm Wastes	=	11
<hr/>		
Total	=	15

WATER ACT REGISTER ENQUIRIES (1 APRIL 1989 - 28 MARCH 1990)

Commercial	=	49
Env. Groups	=	50
Industry	=	37
Angling Clubs	=	7
Students / Research	=	43
Official Bodies etc	=	42
Others	=	32
<hr/>		
Total	=	260

CONSENT APPLICATIONS (1 APRIL 1989 - 27 MARCH 1990)

Applications lodged with the NRA:

Sewage Works - Numeric	=	31
Sewage Works - Descriptive	=	8
Water Treatment Works	=	3
Surface Water Sewers	=	22
Storm Sewage Overflows	=	68
Pumping Station Overflows	=	39
Emergency Overflows	=	182
Outfalls	=	1
<hr/>		
Total	=	354

Applications lodged with the NRA:

Sewages to Land	=	866
Sewages to River	=	585
Trades to Land	=	21
Surface Waters to River	=	301
Trades to River	=	73
<hr/>		
Total	=	1846

Compliance of A.W.S. S.T.W.'s Effluents.  
(1 JANUARY 1989 - 31 DECEMBER 1989)

Receiving Water	Number of Works	Percent Compliant			
		Works		Flow	
		1988	1989	1988	1989
Non-tidal	680	92.9	85.8	92.5	91.0
Tidal	32	81.3	84.4	88.7	82.9
Total	712	92.6	85.6	91.8	89.3

AUDIT SAMPLING PROGRAMME: PLANNED AND ACTUAL

	Sites		Samples / Visits	
	Planned	Actual	Planned	Actual
<u>FRESHWATER</u>				
Rivers, Canals, Broads	1069	1165	12612 <sup>1</sup> 13026 <sup>3</sup>	11749 <sup>2</sup>
Groundwaters	577	432	2228	2661
Sediments	80	78	140	143
<u>SALTWATER</u>				
Estuaries, Coasts	122	222	2008	2576
Sediments	138	50	202	60
<u>DISCHARGES</u>				
AWS Numeric	1120	1234	10187 <sup>1</sup> 14388 <sup>3</sup>	15174 <sup>4</sup>
AWS Descriptive	349	242	1396	363
Trade & Non-AWS	450	398	2595	3470

Notes (1) Number needed for audit.  
 (2) All samples for all reasons totalled 18200.  
 (3) Planned practicable minimum.  
 (4) Compare with 19307 in 1988.

## APPENDIX 5

### Public Relations Publications

Corporate regional brochure

Information pack containing loose leaf A4 information sheets on:

- 1) role of NRA
- 2) national and regional organisation
- 3) national and regional management structure
- 4) regional statistics
- 5) profile of Regional Advisory Board members
- 6) how to contact the NRA
- 7) Regional telephone/address directory

Who's who in the Anglian region

Leaflets on schemes: Aldeburgh

- : Happisburgh to Winterton
- : Ouse Washes (2)
- : Lodes-Granta groundwater scheme
- : Colne Barrier (2)
- : Ipswich

Leaflets on

- : New regional headquarters
- : Public Register
- : Discharge consents
- : Development in flood risk areas
- : Pollution - the safe way with silage
- : Pollution - together we can beat it
- : Regional tide tables
- : Drivers handbook
- : Code of conduct for waterways
- : Navigation in the Anglian Region

For national NRA

- : COSHH handbook
- : COSHH leaflet

APPENDIX 6

Research Contracts and Publications

A. PUBLICATIONS

There has been no formal publications of the results of research work in Academic Journals but progress reports have been received regularly on research projects and the following final reports have been received:

Ecology of the Nene Estuary

Assessment of the Environmental Impact of Organotin Residues From Contaminated Sediments

Habitat Assessment in the Welland Catchment

B. CONTRACTS

The major projects contractors and the costs are set out below.

<u>PROJECT</u>	<u>CONTRACTOR</u>	<u>COSTS</u> <u>(£'000)</u>
521 Environment requirements for River Invertebrates	Leicester University	20
205 Hydrological Mechanisms in Wetlands	Birmingham University	21
363 Biodegradation of Tri Butyl Tin Oxide Antifouling Paints	Imperial College	18.5
398 Biological significance of Tri Butyl Tin Oxide in the Broads	Naiad Aqua	10
381 Conservation of Saltings	ITE, RSPB and Hull University	38
420 Methyl Mercury in Sediments	Imperial College	12
519 Fish Habitat Improvement	Leicester University	15
204 River Corridor Methodology	Various contractors	22.5
309 Weather Radar and Flood forecasting	Salford University	26
362 Metal Speciation in Sediments	Imperial College	20.3
389 R Lark Resource Appraisal	Birmingham University	22
447 R Glen Study University	Loughborough	18

<u>PROJECT</u>	<u>CONTRACTOR</u>	<u>COSTS</u> <u>(£'000)</u>
432 Blackwater Estuary Model	Birmingham University	17
501 Witham and Welland Estuary Study	Unico-Marine	78
394 River Flora and Fauna Database	Ecosurveys	24
500 Coastal Wildlife Database	Ecosurveys	75