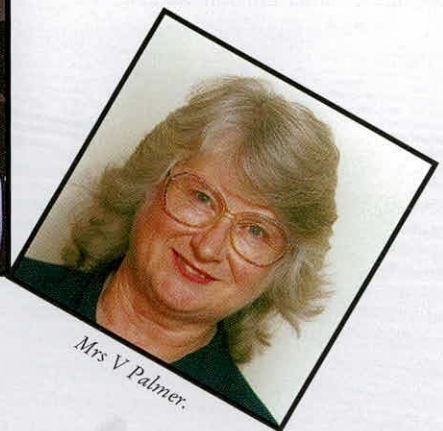




Mrs J Greggon.



Dr R Mann being presented with his retirement gift from colleagues.



Mrs V Palmer.

Staff and External Activities

Staff changes

1996/97 saw the retirement of Dr R H K Mann from the Monks Wood Laboratory after 31 years and he has since been awarded the MBE for services to Fish Ecology. Mrs V Palmer also retired after 17 years as Secretary at the River Laboratory and Mrs J Greggon after 17 years at the Windermere Laboratory. Other staff departing the Institute in 1996/97 were Mrs S M Smith, Miss J K G Ingram and Mr N Dorsett. Our very best wishes are extended to all of them in their future careers.

New appointments during the year (see photographs on pages 42 and 43) Mrs J Fenton (Executive Officer), Mrs P Corkish (Administrative Officer), Mr D Abel (Assistant to the Laboratory Steward) and Ms L M Baldwin (Personal Secretary).

Honours and promotions

Professor J M Elliott was elected an Honorary Member of the FBA and awarded a 'Certificate of Excellence' by the North American Plecoptera Society. Mr I D M Gunn obtained an

Identification Qualification (IdQ) certificate in freshwater macro-invertebrates from the Natural History Museum. Dr W A House received a DSc from Loughborough University. Professor C S Reynolds was appointed Honorary Visiting Professor at the University of Reading and delivered the Norma Wilkinson Memorial Lecture.

NERC activities

IFE staff continued to play key roles in the administration of NERC research programmes. Mr W R C Beaumont was a member of NERC IPMS Departmental Whitley Committee and the Union-side Chair of the CEH Whitley Committee; he was also Secretary to the IFE River Laboratory IPMS sub-section and Vice President for NERC IPMS Branch Council. Dr B J Finlay was a member of the Steering Group and Technical Committee – Millennium Bid for the National Biodiversity Network. Mr M T Furse was a committee member of the Countryside Survey 2000 Joint Management Team. Dr D G George was a member of the Large Scale Processes Review Panel and a member



Mrs J Fenton.



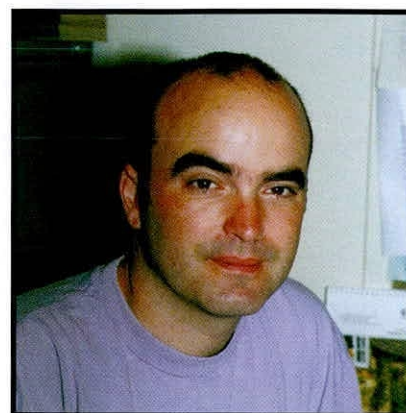
Mrs P Corkish.

of TIGER Working Group 4. Dr G H Hall was an active participant in the NERC workshop on Microbiology of Sub-surface Soils and Soil Water Interfaces at Liverpool University. Dr W A House was a member of the NERC Freshwater Sciences RG and TA Committee. Dr S C Maberly acted as the Secretary to NERC Special Topic: 'Testable Models of Aquatic Ecosystems' and Dr L May was the IFE Representative on the Environmental Diagnostics Sub-committee on Data and Quality Assurance. Professor A D Pickering was a member of the CEH Management Board, participated in the NERC Senior Staff Seminar and was a member of the Catchment Ecosystem Research Initiative (CERI) Steering Group. He also represented NERC at the DoE Bilateral and the MAFF Research Strategy Forum and was a member of the NERC/FBA Negotiating Team. Dr R W Pickup was a member of NERC Freshwater Sciences Research Grants and Training Awards Committee, NERC University Review panel member (MSc Courses) and a ROPA committee member. Professor C S Reynolds was the Chair of Core Strategic Review Panel 4. Mr M A Rouen was a member of NERC Computer Users Committee and the CEH Computing Committee. Dr E W Tipping was a member of the LOIS Working Party on Rivers.

Collaboration with other NERC Institutes

Extensive collaboration continued with most Institutes, including those of the Centre for Ecology and Hydrology (IH, ITE and IVEM). This was particularly evident as part of the arrangements for the new CEH Core Strategic Programme. Dr P D Armitage collaborated with IH on the ecological flows/PHABSIM development and with IH and ITE at Bangor, Monks Wood and Merlewood on the Urban Integrating Fund project. Indeed, Dr P D Armitage was a member of the core group of the Urban

Integrating Fund and was a Project Co-ordinator for Programme Area 3.5 (Urban Environment). Mr W R C Beaumont worked on an Integrating Fund joint research project with IH Plynlimon and ITE at Bangor; he also collaborated with all CEH institutes regarding union activities. Mr K J Clarke collaborated with IVEM whilst working on aquatic free-living viruses from Priest Pot and the effects of UV on virus generation (Integrating Fund Project). Dr F H Dawson collaborated with ITE at Banchory on European beaver re-introductions and on the Deecamp river catchment surveys; with ITE at Merlewood in connection with field stream-side surveys for the Ecofact programme; and with IH regarding standard survey/reference sites on the River Pang. He was also a CEH project co-ordinator for Programme 10 (Integrating Generic Science). Dr J G Day worked with Mr M F Turner at DML in relation to culture collection management and strategy and cryopreservation research. Professor J M Elliott was a member of Programme 4 (Freshwater Resources) for CEH Programme Review. Dr B J Finlay maintained a close association with IVEM and ITE on the Integrating Fund work, collaborated with PML and ITE in relation to the Millennium Biodiversity Project and was a Project Co-ordinator for Programme 5 (Biodiversity and Population Processes). Mr M T Furse collaborated with ITE at both Merlewood and Monks Wood over the planning of the next Countryside Survey which is scheduled to take place in 1998. He was also involved in a joint development with Monks Wood on an upgraded version of RIVPACS (version III+) and a joint development with Merlewood regarding external tutoring for Charlotte Mason College, University of Lancaster. Dr D G George collaborated with PML regarding the influence of Atlantic weather patterns on Cumbrian lakes, with the Unit for Comparative Plant



Mr D Abel.



Ms L M Baldwin.

IFE staff continued to collaborate with various institutes in all aspects of freshwater science.

IFE staff are involved in numerous NERC-wide projects.

Ecology (Professor P Grime) re TIGER and acted as Secretary to Panel 4 for the CEH Core Strategic Programme. Dr G H Hall collaborated with ITE (Merlewood, Banchory, Furzebrook) on the microbiological degradation of hydrocarbons in oiled beach materials and on methanogenesis in upland soils. Dr E Y Haworth collaborated with BGS Coastal Unit (Dr James) as part of LOIS-LOEPS Tees Project. Professor J Hilton worked with Dr B Howard (ITE Merlewood) on radionuclide movements as part of an the Integrating Fund project. Dr W A House collaborated with both IH and ITE in relation to the LOIS Programme and LOIS Special Topics with Reading and Durham Universities. He also acted as a Project Co-ordinator for CEH Programme 7 (Pollution). Mrs M A Hurley worked with IH (Dr I Littlewood) on the DoE/EA Harmonised Monitoring data. Dr M Ladle worked with IH and ITE on the flow requirements for riverine fish. Dr L May collaborated with several NERC Institutes including ITE, Monks Wood on the use of land cover data for lake catchment models; ITE, Merlewood in relation to the Environment Change Network; IH regarding the use of HOST class methods for rainfall runoff calculations and a successful Integrating Fund proposal on catchment scale phosphorus modelling. Professor A D Pickering was a member of the CEH Management Board and an Interview Panel Member for the Station Head post at ITE Monks Wood. Dr R W Pickup collaborated with ITE (Merlewood)/IVEM on an Integrating Fund project, with BGS on an EPSRC grant (co-ordinated by Bradford University) and with the Freshwater Biological Association on an EU-funded grant. Dr L C V Pinder collaborated with ITE, Monks Wood in relation to two joint bids to the EA for wetland research and monitoring, a joint bid with BBSRC to MAFF for pesticide drift/buffer zone research and a bid to the CEH Integrating Fund. He

was also in collaboration with the IH at Wallingford as part of the LOIS core programme management, a joint approach to the EA for input to the Tees Swale Ouse transfer proposal and a joint bid to the DoE for an estuarine research programme. In addition, Dr Pinder was a Project Co-ordinator for Programme 5 (Biodiversity and Population Processes) and a CEH "champion" for the CEH/Cemagref (Lyon) collaboration on biomarkers and bioindicators. Professor C S Reynolds acted as Programme Leader for Programme 4 (Freshwater Resources). Mr M A Rouen was a Project Co-ordinator for the CEH Core Strategic Programme 10 (Integrating Generic Science). Dr J T Smith worked with ITE at Merlewood on an Integrating Fund project and on the EC Inco-Copernicus Programme. In addition, he also worked with the Southampton Oceanography Centre on modelling mixing of radiocarbon in Atlantic sediments. Dr I J Winfield worked with ITE (Monks Wood) Biological Records Centre on a feasibility study for an atlas of UK freshwater fish. Dr J F Wright was in joint collaboration with ITE Monks Wood working on the SOILPACS contract for HMIP (now EA).

Scientific societies

IFE staff continued to play a full role in the work of a wide range of scientific societies. Dr P D Armitage was a member of the North American Benthological Society. Mr W R C Beaumont was a licentiate member of the Institute of Fisheries Management. Mr J H Blackburn and Mr J A B Bass were both members of the Conchological Society of Great Britain and Ireland. Ms S Brown is a member of the Society of Protozoologists. Miss C Butterwick was a member of the British Phycological Association. Dr F H Dawson was involved with the Institute of Biology as a member of the Environment sector committee, the

membership committee and the Wessex committee, where he was also regional treasurer. Professor J M Elliott was a member of the British Ecological Society and a Fellow of the Institute of Biology. Mr M T Furse was a member of the FBA. Dr E Y Haworth was a member of the British Phycological Society Flora Committee, the Quaternary Research Association, the International Society for Diatom Research and the Quekett Microscopical Club. Professor J Hilton was a Fellow of the Royal Institute of Chemistry. Dr W A House was a member of the International Association on Water Quality, the Society of Environmental Toxicology and Chemistry and a Fellow of the Royal Society of Chemistry. Mrs M A Hurley was a committee member and chair of the Lancashire and Cumbria Royal Statistical Society and a member of the International Biometric Society. Dr S C Maberly was a Council Member of the British Phycological Society. Dr R H K Mann was a member of the Fisheries Society of the British Isles, the Institute of Fisheries Management and the FBA. Dr C Paxton was a member of the Fisheries Society of the British Isles, Association for the Study of Animal Behaviour and the Palaeontological Association. Professor A D Pickering was a member of the Society for Experimental Biology, the Fisheries Society of the British Isles, the European Society for Comparative Endocrinology and also a Fellow of the Institute of Biology. Dr R W Pickup was a member of the Society for General Microbiology. Dr L C V Pinder was a Fellow of the Royal Entomological Society. Dr T G Pottinger was a member of the Fisheries Society of the British Isles and the Society for Experimental Biology. Professor C S Reynolds was a member of: the International Association of Limnology, the FBA, the British Ecological Society, the British Phycological Society and the American Society of Limnology and

Oceanography. He is also a Fellow of both the Institute of Biology and the Ecological Institute. Mr B M Simon was a member of the Society for General Microbiology. Dr E W Tipping was a member of: the Royal Society of Chemistry, the British Society of Soil Science, the International Soil Science Society, the International Humic Substances Society and the Society of Chemical Industry. Dr I J Winfield was a member of the British Ecological Society, the Fisheries Society of the British Isles, the FBA and a committee member of the North West Branch of the Institute of Fisheries Management. Dr J F Wright is a member of the British Ecological Society and the International Association of Theoretical and Applied Limnology.

Other organisations

Dr P D Armitage served on the Biological Methods committee of the British Standards Institute and Dr A E Bailey-Watts was involved with the Loch Leven Catchment Management Plan: Water Quality Working Group. Dr Bailey-Watts was also a member of the Steering Committee for pollution control and other measures to protect biodiversity in Lake Tanganyika. Mr W R C Beaumont was a member of the steering committee of the UK Acid Waters Monitoring Network and Dr J G Day served on both IPMS and UKFCC committees. Dr B J Finlay served on the SCOPE Committee on Soil and Sediment Biodiversity and Ecosystem Functioning. Mr M T Furse served on the Countryside Information System Advisory Committee to the DoE and the RIVPACS International Workshop Organising Committee. Professor J Hilton was a member of the Research Advisory Committee of the Centre for Aquatic Plant Management at Long Ashton and Dr W A House was on the MAFF Phosphorus Working Group and the DoE Technical Committee on Detergents and the Environment. Dr M Ladle was on the Dorset Wildlife

IFE staff contribute actively to the wider scientific community.

IFE staff serve on numerous outside bodies.

Trust Committee regarding Kimmeridge Reserve and Mr A A Lyle was a member of the Loch Lomond Research Group. Still in Scotland, Dr L May was Secretary and Representative for databases, modelling & GIS (local) for the Loch Leven Catchment Management Project – Water Quality Working Group. Mr I D McCulloch was the Chair of Aslib Northern Branch and Professor A D Pickering served on the Foundation for Water Research's Algal Toxins National Forum and the Planning Forum, the Earth and Environmental Assessment Panel (Environment Sub-panel) for HEFCE, the Environment Agency Area Environment Assessment Group and the UK Mirror Task Force – Environment Water. Professor C S Reynolds served on the EA Toxic Algae Task Group and OFWAT CSC for the North West and interacted with the Kendal Town Council and the Agenda 21 Advisory Committee of South Lakeland District Council. Dr I J Winfield was a member of the UK component of Baikal International Centre for Ecological Research, the IUCN/SSC Freshwater Fish Specialist Group, the IUCN/SSC Invasive Species Specialist Group, the EIFAC Working Party on the Influence of Management Practices on the Environment and a member of the Regional Fisheries Advisory Committee of the EA (NW Region). Dr J F Wright served on the Moors River Standing Committee and the Advisory Board to the Identification Qualification (IdQ) scheme run by the Natural History Museum.

Editorial commitments

Dr B J Finlay continued to edit *Archiv für Protistenkunde* and Dr D G George edited the FBA/NATO Symposium Volume 'Managing Lakes Under Conditions of Global Change'. Professor J Hilton was co-editor of Proceedings of an International Seminar on Freshwater and Estuarine Radioecology held in Lisbon. Dr M

Ladle acted as Editor for the Proceedings of the 3rd Symposium of the Fleet Study Group and Dr S C Maberly co-edited a special issue of *Freshwater Biology*. Both Dr R H K Mann and Dr T G Pottinger were assistant editors for the *Journal of Fish Biology*. Dr L May acted as the Regional Editor (Europe) for *Rotifer News*. Professor C S Reynolds co-edited *Archiv für Hydrobiologie* and Dr I J Winfield was co-editor of the SIL Plankton Ecology Group workshop on 'Trophic interactions of age-0 fish and zooplankton in temperate waters'.

The following member of staff also served as associate editors or members of the editorial board for a range of other scientific journals:

Dr P D Armitage – Regulated Rivers, Netherlands Journal of Aquatic Ecology;

Professor J M Elliott – *Annales de Limnologie, Wasser und Abwasser*;

Dr B J Finlay – FEMS Microbiology Ecology, European Journal of Protistology;

Dr E Y Haworth – *Journal of Paleolimnology*;

Dr W A House – *Internationale Revue der Gesamten Hydrobiologie*;

Dr S C Maberly – *Aquatic Botany, Internationale Revue der Gesamten Hydrobiologie*;

Dr R H K Mann – *Ecology of Freshwater Fish*;

Dr L May – *Internationale Revue der Gesamten Hydrobiologie*;

Professor A D Pickering – *Diseases of Aquatic Organisms*;

Dr R W Pickup – *Microbiology*;

Professor C S Reynolds – *Journal of Plankton Research, Aquatic Sciences, Limnologica, Limnetica, Ecological Research*;

Dr E W Tipping – *Environmental Technology*;

Dr I J Winfield – *Journal of Fish Biology, Fish and Fisheries Research*.

Collaboration with Universities

Teaching

Dr A E Bailey-Watts was a visiting Lecturer at Napier University for the MSc course in the 'Biology of Water Resource Management' and was also a visiting Lecturer at the Aristotle University of Thessaloniki, Greece and an Honorary Fellow at the University of Edinburgh. Dr J G Day lectured at the Heriot-Watt University for the UKFCC training course. Professor J M Elliott was Adjunct Professor of Freshwater Biology in the Norwegian College of Fishery Science at the University of Tromsø. Dr B J Finlay gave lectures at the Universities of Bangor, York and Konstanz. Mr M T Furse spent two weeks external tutoring in Spain for the Charlotte Mason College, University of Lancaster as part of a BSc course in "Outdoor Education and Environmental Science". He also gave a lecture and computer demonstration at Bournemouth University on RIVPACS. Professor J Hilton was a visiting Professor at Reading University. Dr W A House was an Honorary staff member at Reading University. Dr M Ladle was a Lecturer at Reading University and also gave several lectures and seminars at the University of North London. Dr S C Maberly was a visiting Professor at the University of Aarhus, Denmark where he taught a post-graduate course. Professor A D Pickering was an Associate Professor at Brunel University and a Member of Court at Lancaster University. Dr R W Pickup gave lectures to Lancaster University on 'Flow cytometry and environmental microbiology'. Professor C S Reynolds was a visiting Professor and Course Director at the Departamento de Ciencias Exactas y Naturales, Universidad de Buenos Aires and a visiting Professor and Seminar Director at the University of Reading. Dr E W Tipping was a visiting reader at the University of Lancaster. Dr I J

Winfield was a visiting lecturer at Lancaster University and a guest lecturer at the University of Wolverhampton on recent introductions of the ruffe; he was also an external examiner at both the Universities of Hull and Ulster. Dr J F Wright lectured on RIVPACS to students at Bournemouth University and to members of the Departments of Biological Sciences and Agriculture & Forestry at the University College of North Wales in Bangor. He also hosted talks on this subject at the River Laboratory for MSc Ecotoxicology students from Reading University. Seminars were also given by several IFE staff at different universities and several were actively involved in MSc and PhD examining.

Research

In addition to the above teaching commitments, 1996/97 saw a continuation of the extensive research collaboration between the IFE and universities throughout the UK, Europe and further afield. Dr P D Armitage worked in collaboration with Dr R S Wotton at UCL on slow sand filtration and chironomid ecology and with Dr P Wood at the University of Huddersfield in connection with siltation at low flows. At an international level he collaborated with the University of Umea on chironomid distribution and taxonomy; the University of La Laguna, Tenerife on chironomid distribution, with the University of Cordoba, Spain on fish habitats and with the University of Santiago, Spain on mesohabitats/ macroinvertebrates. Dr A E Bailey-Watts collaborated with Edinburgh University (Dr John Farmer) on lake and reservoir sediment chemistry, with Robert Gordon's University, Aberdeen (Dr D McStay) on the subject of laser technology and the remote sensing of algal populations and with the University of Dundee (Dr R Duck) in relation to studies at Lake Tanganyika. Mr W R C Beaumont was the

1996/97 saw a continuation of the extensive research collaboration between the IFE and universities throughout the UK.

Co-ordinator (Fish) for the UK Acid Waters Monitoring Network run by University College London. Ms S Brown liaised with the Institute of Hygiene and Epidemiology in Brussels, working on molecular systematics of vahlkampfiid amoebae. Dr F H Dawson has been involved in research relating to plant associations, distribution and habitat classification and has collaborated with researchers in both Poznan, Poland and Trebon in the Czech Republic. Dr J G Day collaborated with the University of Abertay, Dundee and the University of Stirling on cryopreservation research, with the University of Liverpool in relation to algal biotechnology and with Lancaster University on cyanobacterial identification. Professor J M Elliott collaborated with EC project partners from the Norwegian Institute for Nature Research (NINA), the Swedish University of Agricultural Sciences, the Netherlands Institute of Ecology and the University of Oviedo in Spain. Dr B J Finlay worked in association with Professor T Fenchel of the Marine Biological Laboratory, Helsingør in Denmark on microbial diversity and with Dr R Hirt of the Natural History Museum on molecular systematics; he also undertook joint research with Professor T Fenchel, Helsingør, Denmark, Professor J O Corliss in the USA and Professor C Tellez at the University of Madrid. Mr M T Furse was in collaboration with the University of Dublin (Dr D Murray) in connection with a commissioned research programme on the multi-property mapping programme for the surface waters of Madeira. He undertook joint research with the University of Valencia on the development of a RIVPACS-style system for Mediterranean rivers and also the classification of the rivers of the Cameleno Valley in Northern Spain and the relationship between the macro-invertebrate assemblages and catchment land-cover and riparian vegetation. He hosted a visit by Dr R

Norris and Mr P Blackman from the University of Canberra, Australia to discuss recent developments in RIVPACS. He was involved with a joint research programme with the University of Staffordshire and the University of Valencia on modification and testing of the Biological Monitoring Working Party score system for quantifying the ecological quality of rivers. Mr Furse also collaborated with the University of Plymouth on a common research strategy for studies of the fauna of the rivers of Asturias province, northern Spain and he acted in an advisory capacity to Mr L Winder at the University of Bournemouth on the development of a probabilistic computer key for the identification of families of aquatic-macro-invertebrates. Dr E Y Haworth worked with the University College of London and the universities of Edinburgh, Liverpool, Southampton, East Anglia and Bergen on the TIGGER programme, with Liverpool and Durham Universities as part of the LOIS-LOEPS Tees Project and again with Liverpool University on an EU-funded transuranics project. Professor J Hilton was involved with the joint development of a GIS system with Bournemouth University and Dr W A House collaborated with the Universities of Cardiff (Biochemistry), Reading (Sedimentology) and Birmingham (Biology) in relation to CASE awards and has also collaborated with the Max-Planck Institute, Bremen (Dr K de Beer) on the use of micro-electrodes to study surface sediments and biofilms and with the Institute of Surface Chemistry, Kiev, Ukraine (Dr B V Zhmud). Dr L May worked with the University of Edinburgh on GIS-based nutrient runoff/catchment models for Bassenthwaite Lake and Esthwaite Water. Dr R W Pickup worked closely with the University of Liverpool (CASE and full grant awards and DoE contract), the University of Newcastle (CASE and full grant awards), the University of Central Lancashire (PhD

The Institute maintains active contact throughout the academic world.

studentship and MSc project placement), the University of Bradford (EPSRC grant), the University of Galway (EU grant) and the University of Ghent (EU grant). Dr L C V Pinder was involved in collaborative research with the Universities of Birmingham and Loughborough on large river and floodplain ecosystems. On an international level, he also collaborated with the Universities of Lund and Umea in Sweden, the Universities of Neuchatel and Lausanne in Switzerland, the University of Rennes in France and the University of Bologna in Italy on European river margin systems. This research also involved working with the Trento Museum in Italy and CNRS, Toulouse in France. He put forward an application with the Field Studies Council and the University of Hanoi to develop taxonomic expertise and initiate a programme of biological monitoring of freshwaters as part of the Darwin Initiative. Dr T G Pottinger continued his long-standing collaboration with Professor J P Sumpter, Dr M Rand-Weaver and Dr C R Tyler of Brunel University, Dr P Balm of the University of Nijmegen in The Netherlands and Dr F Knudsen, University of Oslo, Norway. He was also coordinator for an EC FAIR Project and collaborated with the Universities of Tromsø, Oslo, Las Palmas, Barcelona and Granada. Professor C S Reynolds has worked with S E Jørgensen from the University of Copenhagen on the development of exergy models and T J Smayda from the University of Rhode Island, on marine phytoplankton functional classification. Dr J T Smith was in collaboration with the University of Glasgow working on gamma-counting radiocaesium in sediments, modeling mobility and also the University of Liverpool regarding mobility of Cs-137 and Pb-210 in soils and sediments. Internationally, Dr Smith collaborated with the University of Antwerp (Belgium) and Uppsala University (Sweden), amongst others, in relation to the EC Nuclear Fission

Safety Programme. He was also involved in a joint project in the EC Inco-Copernicus Programme with the Institute of Geological Sciences, Belarus, the Svrtsov Institute, Russia and KEMA, the Netherlands. Dr E W Tipping worked with the University of Karlstad, Sweden (Dr U Lundstrom) on chemical speciation modelling. Dr J S Welton collaborated with the University of Birmingham in relation to the image analysis of smolt video recordings. Dr I J Winfield collaborated with the Institute of Freshwater Research in Sweden, the Ontario Ministry of Natural Resources in Canada, the Finnish Game and Fisheries Research Institute and Fischereiforschungstelle Baden-Whrttemberg in Germany, whilst researching the effects of fish introductions. Dr J F Wright was involved in joint, collaborative research with Reading University and ITE Monks Wood in connection with the SOILPACS contract for HMIP. Internationally, he was visited by Dr Norris and Mr Blackman from the University of Canberra, Australia to discuss recent developments in RIVPACS. He was contacted by Dr Cressa of the University of Caracas, Venezuela with a view to initiating collaborative work.

Members of staff also acted as supervisors for students registered for PhD degrees:-

- Miss J. Anderton (Greenwich, P/t) The effects of lead mining on Ullswater, English Lake District (Dr Haworth)
- Mr S Ball (Lancaster, CASE) The role of picophytoplankton in lakes of different trophic state (Dr Maberly)
- Mr T L Beaumont (Liverpool, CASE) Interactions of cortisol and adenosensitivity during chronic stress in salmonid fish (Dr Pottinger)
- Mr G Biagini (Cardiff, CASE) Metabolic pathways in free-living anaerobic protozoa (Dr Finlay)

40 post-graduate students are engaged in research projects at IFE.

Projects cover the full range of IFE research interests.

- Mr C Brereton (London, CASE) The role of silt and mucus secreted by invertebrates in retaining organic matter over the substratum of streams (Dr Armitage)
- Mrs A Brookes (Southampton, FBA) An investigation of the influence of landscape variables on stream macro-invertebrates using a geographical information system (Mr Furse)
- Ms S Brown (Liverpool, part-time) The molecular systematics of naked amoebae (Dr Finlay)
- Miss D Bunker (Liverpool, CASE) Effects of sediment and water chemistry on sorption processes of various radionuclides in freshwater systems (Prof Hilton)
- Miss C Cannan (Southampton, CASE) Extrapolation of reach level channel and riparian habitat information to catchment scale (Dr Armitage)
- Mr F L Charlton (Edinburgh, CASE) Remote sensing of freshwater phytoplankton (Dr George)
- Mr M Child (Liverpool, NERC/CASE) Effects of UV-B radiation on microbial communities (Dr Pickup)
- Mr D Clarke (Exeter, CASE) Microthermal habitats in British rivers (Dr Ladle)
- Mr S Clough (St Andrews) Composition, distribution and dynamics of populations of river fish (Dr Ladle)
- Miss P S Davies (Leeds, Tesco (FBA)) (Provisional) Phosphorus dynamics in limnetic ecosystems (Dr Reynolds)
- Miss L A Fear (Lancaster, CASE) Microbial community changes in the gut of *Gammarus pulex* (Dr Pickup)
- Miss N J Fielding (Liverpool, NERC Targeted) Algal nutrient cycling in brackish lagoonal systems: mechanisms to control algal development in isolated dock complexes: top-down control (Dr Maberly)
- Mr R A Fleck (Dundee) Assessment of cell damage and recovery in cryopreserved freshwater protists (Dr Day)
- Miss S Griffiths (St Andrews, CASE) Schooling dynamics of dace in the River Frome (Dr Ladle)
- Miss A Hartley (Birmingham, CASE) Microelectrode studies of calcification and gas exchange in hardwater algal biofilms (Dr House)
- Miss E Hawtin (Birmingham) Chironomids in lowland rivers in relation to water quality and physical habitat (Dr Pinder)
- Mr R D Hedger (Edinburgh, CASE) Spatial scales of dynamics in lakes (Dr George)
- Mr C Hinchcliffe (Newcastle, FBA CASE) Ecology of *Ochrobium* in lake water (Dr Pickup)
- Mr R Howarth (Newcastle, CASE) Phylogenetic analysis of *Achromatium oxaliferum* (Dr Pickup)
- Mr D M John (Cardiff, CASE) Survival fate of organosilicone and alkyphenol ethoxylate pesticide adjuvants (Dr House)
- Miss W Lester (Reading, CASE) The distribution and fate of micro-organic pollutants in river sediments (Dr House)
- Miss J Long (Reading) LOIS Project (Dr House)
- Miss S J Marshall (Cardiff, CASE) Roles of natural surfactants in pollutant biodegradation in biofilms in river sediments (Dr House)
- Miss R Meade (Liverpool, CASE) In situ detection of nitrifying bacteria (Dr Pickup)
- Ms V Reid (Hull, CASE) Long-term changes in Lake Windermere zooplankton (Dr George)
- Mr G Rhodes (Liverpool, CASE) Molecular evolution of plasmids in deep sediments (Dr Pickup)
- Mr M Scott (Manchester, CASE) Climatic effects on the export of dissolved organic matter from peat (Dr Tipping)
- Mr D Short (Liverpool, CASE) Quantitative models of sediment records and atmospheric fluxes (Prof J Hilton)

Mr R Skidmore (Durham) The effect of environmental conditions on the plankton production dynamics in the feeder rivers of the Humber Estuary and the flux of autochthonous carbon to the Estuary (Dr Maberly)

Miss R Stidson (Lancaster, CASE) Chemical weathering in upland catchments (Dr Tipping)

Mr S Walker (Aberystwyth) Otolith structure as a possible indicator of stress in fishes (Drs Winfield and Pottinger)

Miss C Whitby (Liverpool, CASE) Nitrification in freshwater systems (Dr Pickup)

Mr P Wood (Birmingham, CASE) Low flows and siltation in chalk streams due to drought with particular reference to the macroinvertebrate community (Dr Armitage)

Miss S L Woodruffe (Birmingham, CASE) Biomineralisation reactions with algal biofilms and phytoplankton assemblages (Dr House)

MSc Students from the Universities of Central Lancashire, Lancaster, Glasgow, Brighton, Plymouth, Oslo and Brazil, and Farnborough College of Technology were supervised by Drs Armitage, George, Pickup, Pottinger and Smith.

During the year the following research students were awarded the degree of Doctor of Philosophy:

Mrs L A Ashfield, Mr D Deere, Miss A S Fulcher, Mr R M Head, Mr R Hastings, Miss S McGowan, Mr I Miskin and Ms J Reeve.

International meetings and visits

Dr P D Armitage visited Brno in the Czech Republic to attend the River Bottom IV conference where he presented a paper and gave a keynote speech. Dr A E Bailey-Watts was part of the institutional resource assessment

mission to Tanzania and Zaire for the UNDP GEF Project 'Pollution control and other measures to protect biodiversity in Lake Tanganyika'. The main responsibility was for issues relating to the Special Study on Pollution of International Waters and its effects on biodiversity. Ms S Brown delivered a talk at the 34th Reunion Annuelle du Groupement des Protistologues de Langue Francaise at Banyuls-sur-Mer, France and Mr T Carrick participated in an EC contract meeting in Las Palmas. Dr F H Dawson visited Madeira to undertake RHS fieldwork for the Laboratory of Regional Engineers and also visited Ireland to undertake fieldwork and RHS surveys in connection with the EA contract. Dr J G Day went to Japan to discuss research relating to biotechnology, conservation, cryopreservation and systematics and presented a paper at an International Symposium, Tsuchiura, Japan and the Japanese Society of Phycology meeting at Hiroshima. He also visited the Sammlung von Algen Kulturen, Göttingen, Germany to discuss potential areas of future culture collection collaboration. He also presented papers at the 8th International Culture Collection Congress, Veldhoven, The Netherlands. Professor J M Elliott attended the University of Tromsø to teach and supervise graduate students; he also visited Ims, near Stavanger in Norway for the annual meeting of his EC project. He was also a keynote speaker at both the Atlantic salmon spawning target workshop in Brittany, France and the brown trout workshop, Lund, Sweden. Mr M T Furse visited Picos de Europa in northern Spain to provide external tutoring for the University of Lancaster, Charlotte Mason College. Dr D G George visited Ireland and Spain in relation to the EU funded LIFE Project; he also visited the USA to attend a long-term ecological workshop at Trout Lake, Wisconsin and attended a special symposium held in

Staff have represented the IFE at engagements throughout the world.

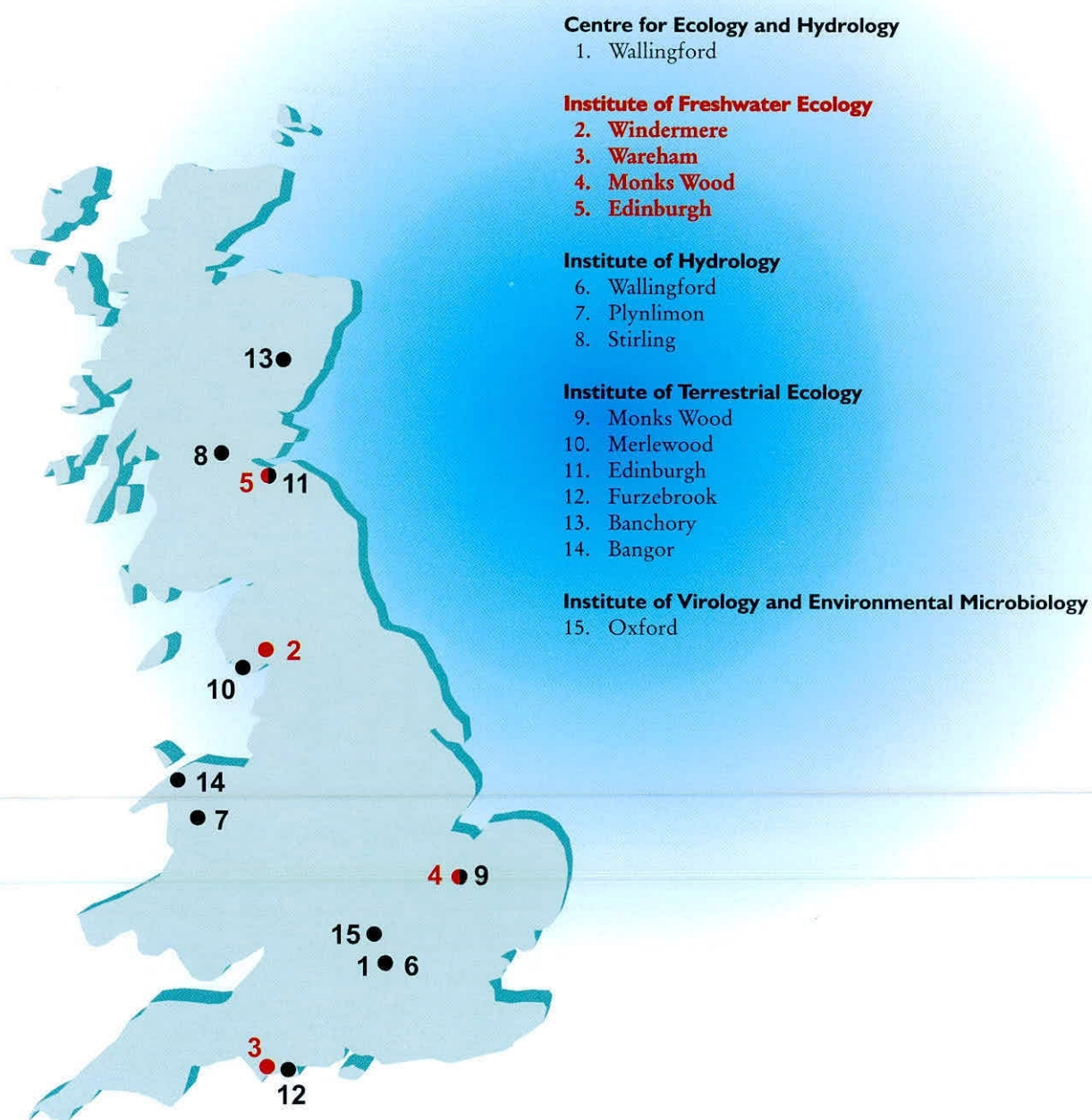
Fish and water quality issues have been particularly prominent.

Holland to mark the retirement of Professor Joop Ringelberg. Dr W A House attended a co-ordination meeting on reference standards at the Bureau of Reference Materials in Brussels and produced an abstract entitled 'Partition coefficients for pesticides in a range of surficial materials' for the 30th International Geological Congress in Peking. Mrs M A Hurley travelled to Norway to meet partners in the EC funded project under the FAIR programme on freshwater fish production. Mr M Lee went to Lough Feeagh and Lough Leane in the Republic of Ireland to install and commission two LIFE instruments. Dr R H K Mann was a keynote speaker at a meeting in Brno, Czech Republic entitled "The fish community of the river Great Ouse, a regulated lowland river: research and management". Dr L C V Pinder attended a meeting of protocol co-ordinators for the ERMAS II EC contract in Lausanne, Switzerland. Dr J T Smith attended the Inco-Copernicus meeting in Brussels and Dr R W Pickup co-authored a paper on 'The persistence of the insertion element IS1 in freshwater and sediments at the ESF network meeting in Potsdam, Germany. Dr T G Pottinger visited Las Palmas, Gran Canaria for an EC Project meeting and Professor C S Reynolds visited Ireland to initiate a contract for the Irish EPA and Copenhagen in November 1996 for a scientific collaboration with S E Jørgensen. He

also attended several meetings and seminars during 1996/97 including the 10th IAP at Granada and a Great Lakes meeting at SASAQS, Victoria Falls. Mr M A Rouen visited Granada in Spain, Lough Feeagh, Co. Mayo in Ireland and Lough Leane, Co. Kerry in Ireland in relation to the LIFE project. Dr J T Smith presented papers at several scientific meetings including the EC Nuclear Fission Safety Contract meetings held in Malaga, Spain and Udine, Italy. He also attended a workshop on "Sorption of radiocaesium to soils" held at the University of Leuven in Belgium. Dr E W Tipping visited Norway and Spain as part of the PROTOS (EU) project and gave a lecture at an international workshop on 'Interactions of small solutes with materials of environmental relevance' in Monte Verita, Switzerland. Dr I J Winfield visited both Germany and Switzerland for discussions concerning conservation of Coregonus species. This included attendance at the VI International Symposium on Biology and Management of Coregonid Fishes in Konstanz; he also attended the International Symposium on the Eurasian Ruffe at Ann Arbor, USA where he presented an oral paper on 'Recent introductions of the ruffe (*Gymnocephalus cernuus*) to Coregonus and Perca lakes in Europe and an analysis of their allopatric and sympatric natural distributions in northern Europe'.

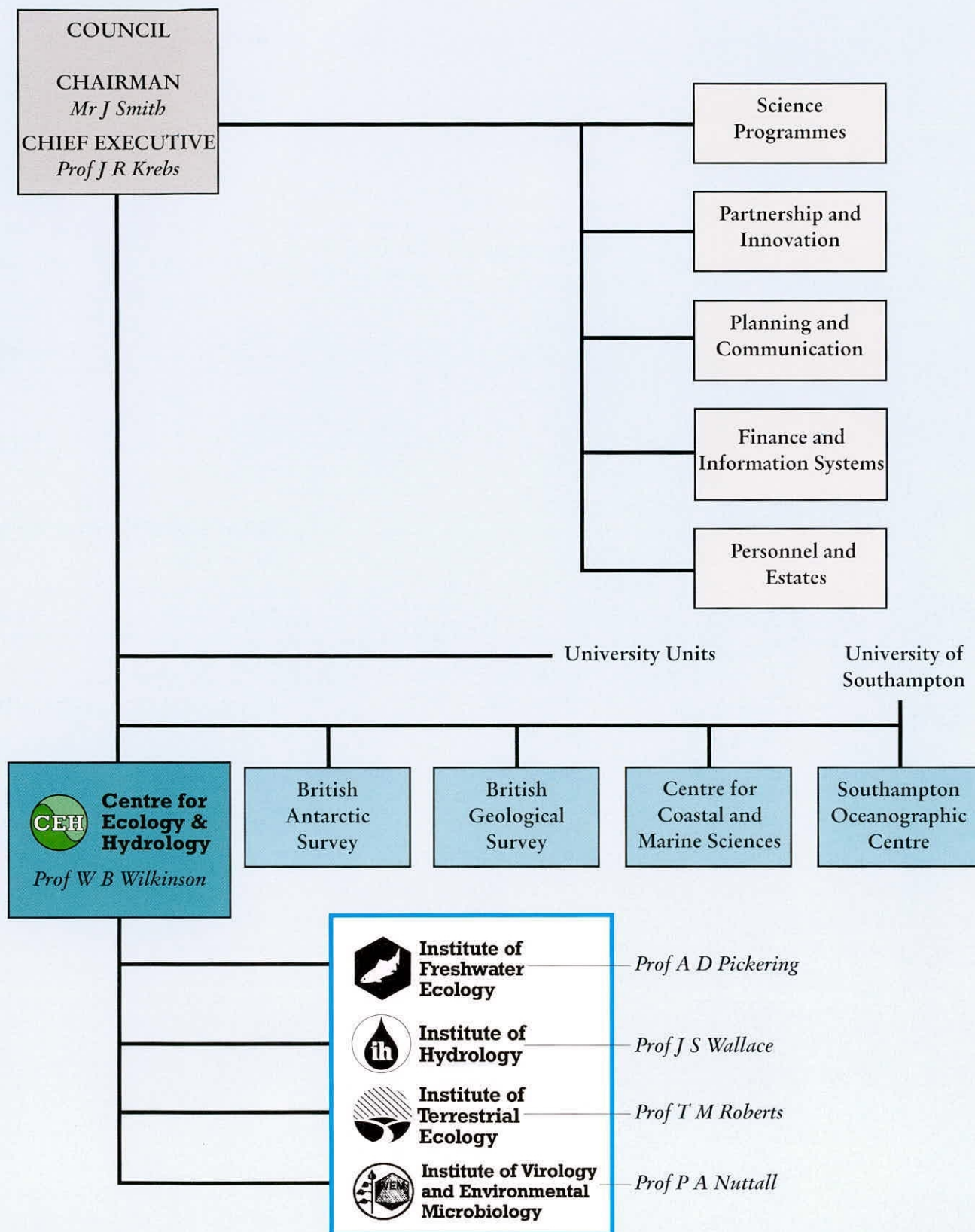
Appendix 1

Location of CEH sites



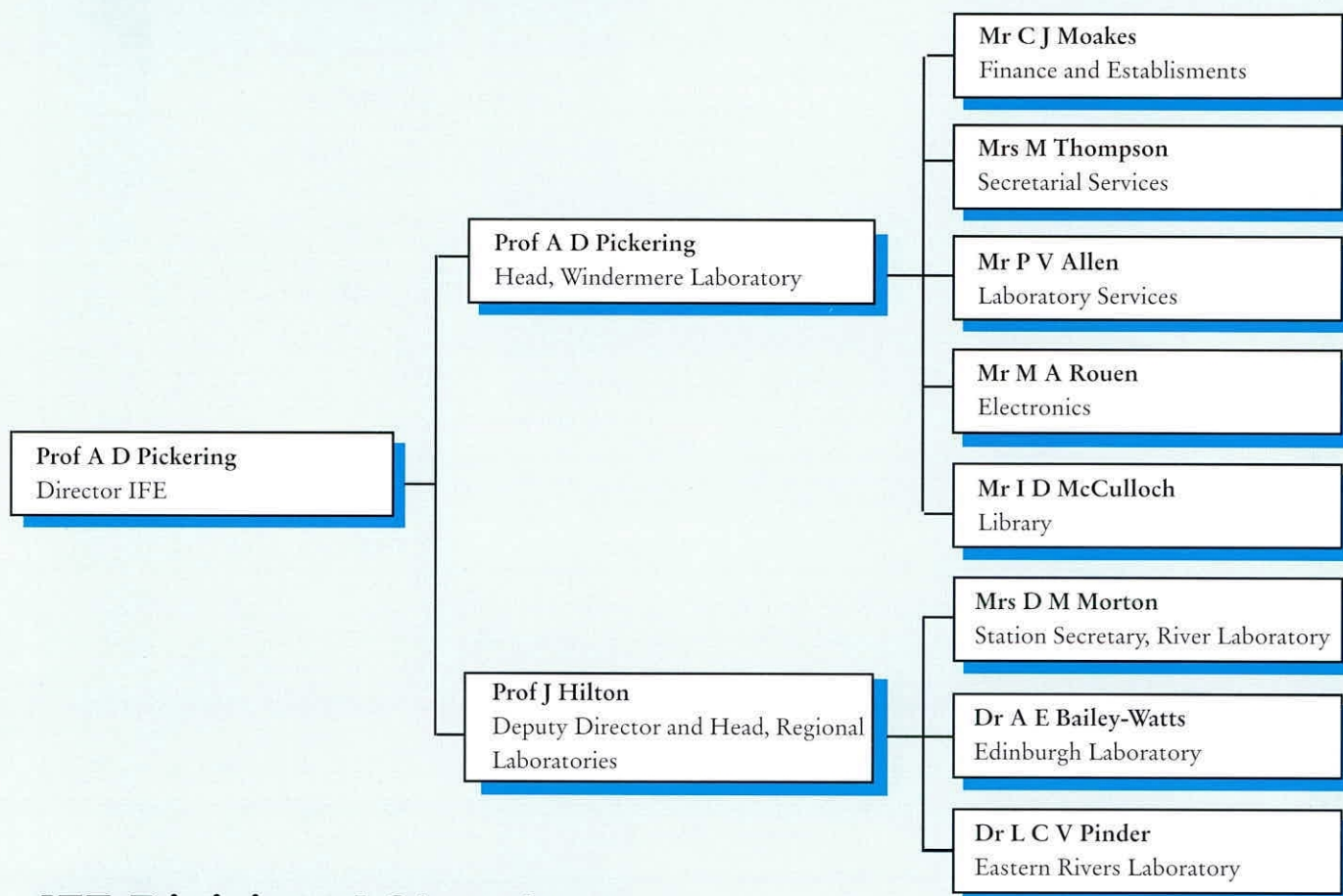
Appendix 2

NERC structure

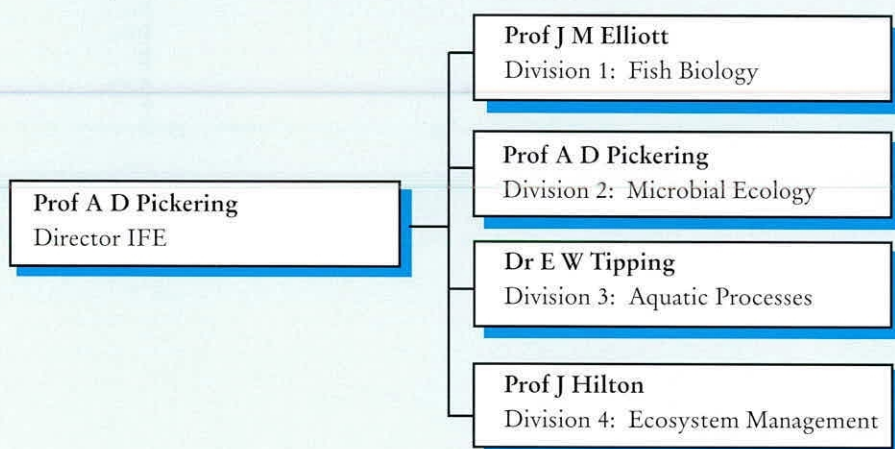


Appendix 3

IFE Management/ Administration/Services



IFE Divisional Structure

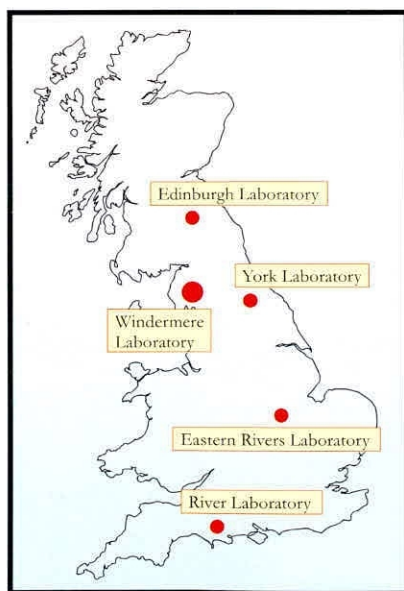


Appendix 4

The Institute of Freshwater Ecology

The Institute of Freshwater Ecology (IFE) was formed in 1989 when the Natural Environment Research Council undertook the management of the staff and the laboratories of the Freshwater Biological Association (FBA) and, therefore, draws on more than 60 years' experience into all aspects of strategic, freshwater research.

The IFE is a component Institute of the Centre for Ecology and Hydrology (see Appendix 2 for details) and as such, has the capability to adopt a truly multidisciplinary, scientific approach for the study of complex environmental problems. The Institute of Freshwater Ecology carries out research into freshwater, wetland and estuarine environments and offers a range of environmental services to an international user community, based upon a sound scientific knowledge of aquatic biology, ecology, chemistry and physics.



IFE Laboratories in the U.K.

The IFE operates from 4 laboratories located at strategic sites throughout Great Britain (the Windermere Laboratory in Cumbria, the River Laboratory in Dorset, the Eastern Rivers Laboratory in Cambridgeshire and the Edinburgh Laboratory in Midlothian) with its headquarters at the Windermere Laboratory. The staff complement is 93 posts of which 65 are directly engaged in scientific research and, at any one time, the laboratories also host over 30 visiting scientists, post-graduate students and temporary workers.

IFE scientists are active in national and international networks for environmental monitoring and research and many of the Institute's staff are visiting professors, readers and lecturers at UK Universities. Particularly strong links have been established between the IFE and Edinburgh, Lancaster, Liverpool, Birmingham, Brunel and Reading Universities. Staff hold key posts in appropriate scientific societies and serve on national and international committees and, through research collaboration and a network of contacts, are able to maintain their positions at the forefront of their respective fields.

The 'user community' of the IFE includes the NERC, Government Departments both in the UK and abroad, regulatory authorities, conservation bodies, private industry (including the water industry), the academic community and the general public, who are the ultimate end-users of research leading to wealth creation and improvement in the quality of life.



IFE Headquarters Windermere Laboratory

Further information on the services, facilities and research programme of the Institute of Freshwater Ecology can be obtained from:-

Professor A D Pickering
Director
The Institute of Freshwater Ecology
Windermere Laboratory
Far Sawrey
Ambleside
Cumbria LA22 0LP

Telephone: 015394 42468
Facsimile: 015394 46914
E-mail: ADP@wpo.nerc.ac.uk



**Institute of
Freshwater
Ecology**

Appendix 5

The Freshwater Biological Association

The FBA is an independent organisation, a registered Charity and a Company Limited by Guarantee

The Association conducts research into all aspects of freshwater science and technology and provides a Membership organisation and independent scientific opinion.

The FBA provides scientific continuity - it was founded in 1929 and has a long history of achievements in freshwater science. This includes the publication of more than 2500 papers in recognised scientific journals and a series of independent publications (including identification keys for freshwater taxa, analytical methods, etc.).

The FBA possesses one of the finest freshwater libraries in the world, and provides essential advisory services to its members. Many national and international awards and honours have been bestowed upon the Association and its senior staff in recognition of the quality and importance of their scientific achievements.

Membership is open to individuals and organisations that wish to support the Association. Members receive copies of the FBA's Freshwater Forum, and its newly launched Newsletter. They may obtain other publications, including Freshwater Biology, at a substantial discount, visit the Laboratories, and use the Library by agreement with the Director.

The Mission of the FBA is to promote freshwater science:

- through an innovative research programme
- an active membership organisation
- by providing sound, independent scientific opinion

The FBA has four core objectives:

1. To support a programme of research of the highest quality by attracting scientists of the highest calibre as staff, research fellows, students and visitors and providing them with a well-found laboratory, opportunities and training to develop their interests.
2. To promote freshwater science by all means available, including education and provision of a membership organisation in which those committed to the subject can share common interests.
3. To provide sound, independent scientific opinion on matters relating to fresh waters and their conservation to local and national governments, organisations and individuals.
4. To maintain and develop the following services for a growing membership and the wider community:
 - The library and other international archives including electronic access to new databases.
 - A publication programme including scientific publications (including keys), special volumes, materials for general education and the application of new technology to provide greater access to our knowledge base.
 - A programme of national and international meetings, collaborating with other bodies where appropriate.
 - General and specialist courses.

All enquiries concerning Membership and the Association's activities should be addressed to:

The Acting Director
Freshwater Biological Association
The Ferry House
Ambleside
Cumbria LA22 0LP

Telephone: 015394 42468
International: 4415394 42468
Facsimile: 015394 46914
E-mail: CSR@wpo.nerc.ac.uk



Appendix 6

Staff list at 31 March 1997

Management/Administration

Director, Windermere Laboratory

Prof A D Pickering Band 2 (S)

Head of Regional Laboratories

Prof J Hilton Band 3 (S)

Secretary to Director

Mrs M Thompson Band 7 (A)

(Windermere)

Mrs Y Dickens Band 8 (A) Pt

Ms L Baldwin Band 8 (A)

Mrs S M Dent Band 8 (T) Pt

Mrs J C Rhodes Band 8 (T) Pt

Miss K Ross Band 8 (A)*

(River Laboratory)

Mrs D M Morton Band 7 (A)

Mrs S Smith Band 8 (A)

Mrs S A Taylor Band 9 (A) Pt

Finance Officer

Mr C J Moakes Band 5 (A)

Finance and establishments

Ms P Parry Band 7 (A)

Mrs J C Fenton Band 7 (A)

Mrs P Corkish Band 8 (A)

Mrs S Handley Band 8 (A) Pt

Mrs A E Taylor Band 8 (A) Pt

FBA Director

Dr J G Jones Band 3 (S)

Fish Biology

Division Head

Prof J M Elliott Band 3 (I)

Mrs M A Hurley Band 4 (S) Pt

Dr M Ladle Band 4 (S)

Dr T G Pottinger Band 4 (S)

Dr J S Welton Band 4 (S)

Dr I J Winfield Band 4 (S)

Mr W R C Beaumont Band 5 (S)

Mr T R Carrick Band 5 (S)

Mr P R Cubby Band 6 (S)

Miss J M Fletcher Band 7 (S)

Dr P Garner RF*

Dr C G M Paxton RF*

Mr T M Beaumont RS

Mr E D Clarke RS

Mr S C Clough RS

Miss S W Griffiths RS

Mr S Walker RS*

Microbial Ecology

Division Head

Prof A D Pickering Band 2 (S)

Dr B J Finlay Band 3 (I)

Prof C S Reynolds Band 3 (I)

Dr E Y Haworth Band 4 (S)

Dr S C Maberly Band 4 (S)

Dr R W Pickup Band 4 (S)

Mr K J Clarke Band 5 (S)

Dr G H Hall Band 5 (S)

Dr A E Irish Band 6 (S)

Mrs J E Parker Band 6 (S)

Mrs M M Dent Band 7 (S)

Mrs R M Hindle Band 7 (S) Pt

Mrs H E H Mallinson Band 7 (S)

Dr G F Esteban RF

Dr J Porter RF

Mr S Ball RS

Mr G Biagini RS

Mr M Child RS

Miss P S Davies RS

Miss L A Fear RS*

Miss N A Fielding RS

Mr C Hinchcliffe RS

Mr R Howarth RS*

Miss R Meade RS

Mr G Rhodes RS

Miss C Whitby RS

Culture Collection of Algae and Protozoa

Dr J G Day Band 5 (S)

Ms S Brown Band 6 (S)

Ms C Butterwick Band 6 (S)

Ms A Cook Band 8 (S) Pt

Ms J Tompkins Band 8(A) Pt

Mr R A Fleck RS

Fritsch Collection of Algal Illustrations

Honorary Curator

Dr J W G Lund*

Mrs E G Devlin Band 8 (S)Pt

Mrs E B Monaghan Band 8 (S)Pt

Aquatic Processes

Division Head

Dr E W Tipping Band 3 (I)

Dr D G George Band 4 (S)

Mr B M Simon Band 5 (S)

Mr C P Woof Band 5 (S)

Ms D P Hewitt Band 6 (S)

Mr E Rigg Band 6 (S)

Mr A J Lawlor Band 7 (S)

Mr S Lofts Band 7 (S)

Mr F L Charlton RS

Miss A Hartley RS

Mr R D Hedger RS

Mr D M John RS

Miss W M Lester RS

Miss J Long RS

Miss S J Marshall RS

Miss V Reid RS*

Mr M J Scott RS

Mr R E Skidmore RS

Miss R Stidson RS

Miss S L Woodruff RS

Ecosystem Management

Division Head

Prof J Hilton	Band 3 (S)
Dr P D Armitage	Band 4 (S)
Dr A E Bailey-Watts	Band 4 (S)
Mr R T Clarke	Band 4 (S)
Dr F H Dawson	Band 4 (S)
Mr M T Furse	Band 4 (S)
Dr W A House	Band 4 (S)
Dr L C V Pinder	Band 4 (S)
Dr J F Wright	Band 4 (S)
Mr J A B Bass	Band 5 (S)
Mr I S Farr	Band 5 (S)
Mr R J M Gunn	Band 5 (S)
Dr L May	Band 5 (S)
Mr J H Blackburn	Band 6 (S)
Mr I D M Gunn	Band 6 (S)
Mr P Henville	Band 6 (S)
Dr G P Irons	Band 6 (S)
Mr A Kirika	Band 6 (S)
Mr D V Leach	Band 6 (S)
Mr A A Lyle	Band 6 (S)
Dr J T Smith	Band 6 (S)
Miss M S Warwick	Band 6 (S)
Mr G D Collett	Band 7 (S)
Mr D R Orr	Band 7 (S)
Mr A C Pinder	Band 7 (S)
Mr F H Denison	Band 8 (S)
Mr I T Harris	Band 8 (S)
Mrs K L Symes	Band 7 (S)
Dr J M Winder	Band 7 (S)
Mrs A M Brookes	RF*
Dr S Harrison	RF
Mr C Brereton	RS
Miss D Bunker	RS
Miss C E Cannan	RS
Miss E Hawtin	RS*
Mr D Short	RS
Mr P Wood	RS

Laboratory Services

Windermere Laboratory

Mr M A Rouen	Band 5 (S)
Mr P V Allen	Band 6 (T)
Mr M J Lee	Band 6 (T)
Mr T I Furnass	Band 7 (T)
Mr D I Aspinall	Band 7 (T)
Mr J Crompton	Band 7 (T)
Mr B M Godfrey	Band 7 (T)
Mr P M Hodgson	Band 7 (T)
Mr J B James	Band 8 (S)
Mr D V Abel	Band 9 (T)
Mr S Thomson	Band 9 (T)Pt
Miss N E Pitts	Band 9 (T)

Library

Mr I D McCulloch	Band 7 (L)
Miss C M Williams	Band 7 (L)
Mrs K Crompton	Band8(A) Pt
Mrs O Jolly	Band8(A) Pt
Mr I Pettman	FBA Pt.

River Laboratory

Mr G A Richards	Band 9(T)
Mrs J Whitmarsh	Band 9(T) Pt

Honorary Research Fellows

FBA

Dr A D Berrie*
Mr T Gledhill*
Dr J W G Lund*
Dr H M Lund*
Dr J F Talling*
Dr L G Willoughby*

Abbreviations:

S	Scientific
A	Administration
L	Librarian
T	Technologist
I	Individual Merit Promotee
Pt	Part-time
RF	Research Fellow
RS	Research Student
*	FBA - not IFE establishment

Appendix 7

Research projects at 31 March 1997

Programme 1 : Soil and Soil/Vegetation Interactions

Project 1.1	Physicochemical processes affecting soil/water interactions
Issue 1.1.1	Solid-solution partitioning of chemical species
Issue 1.1.2	Organic matter decomposition and the production of humic substances

Programme 2 : Land Use Science

Project 2.1	Long term and large scale monitoring of land use
Issue 2.1.1	National scale survey of land use and cover
Project 2.2	Land use systems
Issue 2.2.5	Holistic catchment studies
Project 2.4	Landscape function and modelling
Issue 2.4.3	Integrated modelling of land use processes including social and economic variables

Programme 3 : The Urban Environment

Project 3.1	Patterns of urban land/water use and associated habitats
Issue 3.1.1	Pattern and distribution of urban habitats in relation to past and present land/water use
Project 3.2	Factors and processes determining the development of urban environments
Issue 3.2.3	Aquatic ecosystem function

Programme 4 : Freshwater Resources

Project 4.4	Integrated water quality modelling
Issue 4.4.2	Catchment models: diffuse sources
Issue 4.4.3	In-stream water quality modelling
Issue 4.4.4	Whole-catchment modelling
Project 4.5	Integrated biotic response modelling
Issue 4.5.1	Flow resistance in channels and river ecosystems health
Issue 4.5.2	Integration of models of water quantity, quality and biotic variability
Issue 4.5.3	Improvement and diversification of biotic models
Issue 4.5.4	Biotic responses to long term environmental change
Issue 4.5.5	Maintenance of knowledge base
Project 4.6	Fish dynamics
Issue 4.6.1	Fish population dynamics
Issue 4.6.2	Acoustic deflection and counting of migratory smolts
Issue 4.6.3	Determination of habitat requirement
Project 4.7	Physiological performance of freshwater fish
Issue 4.7.1	Physiological performance of freshwater fish

Project 4.8	Fish performance models
Issue 4.8.1	Models of growth and survival

Programme 5 : Biodiversity and Population Processes

Project 5.1	Biodiversity characterisation, pattern and monitoring
Issue 5.1.1	Species richness in relation to environmental factors
Issue 5.1.2	Methodologies for biodiversity assessment in Europe
Issue 5.1.3	Microbial diversity in fresh waters
Issue 5.1.6	Biodiversity in rivers
Project 5.2	Ecosystem function and biodiversity
Issue 5.2.2	Role of microbial diversity with respect to ecosystem function
Project 5.4	Conservation and restoration of biodiversity
Issue 5.4.1	Single species conservation programmes: monitoring and evaluation
Issue 5.4.4	Community attributes of restored ecosystems

Programme 6 : Pest and Disease Control and Risk of Assessment for GMOs

Project 6.1	The development of sustainable insect pest management strategies
Issue 6.1.4	Ecological impact of microbial control agents for disease vectors
Project 6.3	Environmental impact of GMOs and potentially invasive species
Issue 6.3.3	Development and risk assessment of genetically modified bacteria

Programme 7 : Pollution Assessment and Control

Project 7.1	Radionuclides
Issue 7.1.1	Parameterisation of radionuclide contamination and transfer
Issue 7.1.5	Development of countermeasures
Project 7.2	Acidifying pollutants
Issue 7.2.5	Surface water and catchment scale impacts
Project 7.4	Toxic metals
Issue 7.4.1	Transport and deposition
Issue 7.4.2	Soil processes and soil plant transfers
Issue 7.4.4	Ecotoxicology and environmental standards
Project 7.5	Organic pollutants
Issue 7.5.1	Monitoring
Issue 7.5.2	Transport and food-chain transfer
Issue 7.5.3	Biological degradation and transformation
Issue 7.5.4	Physico-chemical processes controlling transport in soils and water
Issue 7.5.5	Catchment-scale processes
Issue 7.5.6	Ecotoxicology and environmental standards

Programme 9 : Global Change

Project 9.1	Greenhouse gas budgets and cycles
Issue 9.1.7	Soil sinks of methane
Project 9.3	Forecasting and detecting the impacts of global change
Issue 9.3.1	Regional hydrology and freshwater quality
Issue 9.3.2	Colonisation, dispersal and extinction of species

Issue 9.3.4	Species responses to elevated CO ₂
Issue 9.3.5	Ecosystem responses to elevated CO ₂
Issue 9.3.6	Ecosystem responses to elevated UV-B radiation

Programme 10 : Integrating Generic Science

Project 10.2	Remote sensing
Issue 10.2.1	Algorithm development
Project 10.3	Instrumentation
Issue 10.3.1	Intelligent sensor clusters
Project 10.5	Analytical chemistry
Issue 10.5.3	Trace metal distribution and speciation
Issue 10.5.4	Bioavailability of nutrients and pollutants
Issue 10.5.5	Samples matrices
Project 10.6	Databases and reference collections
Issue 10.6.1	Integrity and accessibility of databases and collections within CEH
Issue 10.6.2	Monitoring environmental change
Issue 10.6.4	Microbial diversity
Project 10.7	Biometrical applications, research and development
Issue 10.7.1	Biometrical collaboration

Appendix 8

Scientific Papers

(P) Peer Reviewed

- Allison E.H. 1996
Estimating fish production and biomass in the pelagic zone of Lake Malawi/Niassa: a comparison between acoustic observations and predictions based on biomass size-distribution theory. In: *Stock assessment in inland fisheries* (ed. I.G. Cowx) p224-242. Oxford. Fishing News Books.
- Allison E.H. 1996
Stock assessment considerations in large lakes and reservoirs. In: *Stock assessment in inland fisheries* (ed. I.G. Cowx) p337-344. Oxford. Fishing News Books.
- Allison E.H., Ngatunga B.P. & Thompson A.B. 1995
Identification of the pelagic fish. In: *The fishery potential and productivity of the pelagic zone of Lake Malawi/Niassa. Scientific report of the UK/SADC Pelagic Fish Resource Assessment Project* (ed. A. Menz) p159-178. Chatham. Natural Resources Institute.
- Allison E.H., Patterson G., Irvine K., Thompson A.B. & Menz A. 1995
The pelagic ecosystem. In: *The fishery potential and productivity of the pelagic zone of Lake Malawi/Niassa. Scientific report of the UK/SADC Pelagic Fish Resource Assessment Project* (ed. A. Menz) p351-367. Chatham. Natural Resources Institute.
- Allison E.H., Thompson A.B., Ngatunga B.P. & Irvine K. 1995
The diet and food consumption rates of the offshore fish. In: *The fishery potential and productivity of the pelagic zone of Lake Malawi/Niassa. Scientific report of the UK/SADC Pelagic Fish Resource Assessment Project* (ed. A. Menz) p233-278. Chatham. Natural Resources Institute.
- Armitage P.D., Blackburn J.H. & Symes K.L. 1995
The environmental quality of a small urban water course, assessed with macroinvertebrate data. *Proceedings of the Dorset Natural History and Archaeological Society* 117 117-122 (P)
- Armitage P.D. & Gunn R.J.M. 1996
Differential response of benthos to natural and anthropogenic disturbances in 3 lowland streams. *Internationale Revue der Gesamten Hydrobiologie* 81 161-181 (P)
- Armitage P.D., Symes K.L. & Blackburn J.H. 1994
Environmental quality assessment of the Win Stream (Dorset) using macroinvertebrate data. *Proceedings of the Dorset Natural History and Archaeological Society* 116 105-110
- Bailey-Watts A.E. 1996
A brief review of Loch Leven studies. In: *Diffuse pollution and agriculture. SAC-FRPB conference, 12-13 April 1995, University of Edinburgh*. Poster paper. (P)
- Baroudy E. 1995
Arctic charr (*Salvelinus alpinus*) in Windermere (Cumbria). *Freshwater Forum* 5(3) 185-192 (P)
- Bennion H., Duigan C.A., Haworth E.Y., Allott T.E.H., Anderson N.J., Jiggins S. & Monteith D.T. 1996
The Anglesey lakes, Wales, UK - changes in trophic status of three standing waters as inferred from diatom transfer functions and their implications for conservation. *Aquatic Conservation: Marine and Freshwater Ecosystems* 6(2) 81-92 (P)
- Berrie A.D. (ed.) 1992
Invertebrate communities of rivers: structure and function. Proceedings of a symposium to mark the twenty-fifth anniversary of the River Laboratory of the Freshwater Biological Association. *Hydrobiologia* 248(1) 92p (P)
- Biagini G.A., Hayes A.J., Suller M.T.E., Winters C., Finlay B.J. & Lloyd D. 1997
Hydrogenosomes of *Metopus contortus* physiologically resemble mitochondria. *Microbiology* 143(5) 1623-1629 (P)
- Brady P.V. & House W.A. 1996
Dissolution and crystallisation of mineral surfaces. In: *The physics and chemistry of mineral surfaces* (ed. P.V. Brady) Boca Raton. CRC Press. (P)
- Brady P.V. & House W.A. 1996
Surface-controlled dissolution and growth of minerals. In: *Physics and chemistry of mineral surfaces* (ed. P.V. Brady) p225-305. Boca Raton. CRC Press. (P)

- Caron D.A. & Finlay B.J. 1994
Protozoan links in food webs. In: *Progress in protozoology. Proceedings of the IX International Congress of Protozoology, Berlin 1993* (ed. K. Hausmann & N. Hulsmann) p125-130. Stuttgart. Gustav Fischer Verlag. (P)
- Clarke R.T., Furse M.T., Wright J.F. & Moss D. 1996
Derivation of a biological quality index for river sites: comparison of the observed and the expected fauna. *Journal of Applied Statistics* 23 311-332 (P)
- Clough S. & Ladle M. 1997
Diel migration and site fidelity in a stream-dwelling cyprinid, *Leuciscus leuciscus*. *Journal of Fish Biology* 50 1117-1119 (P)
- Crisp D.T. 1996
Environmental requirements of common riverine European salmonid fish species in fresh water with particular reference to physical and chemical aspects. *Hydrobiologia* 323(3) 201-221 (P)
- Crisp D.T. 1996
Experimental studies on planting artificial stream channels with unfed and six weeks fed salmon (*Salmo salar* L.) and trout (*Salmo trutta* L.) fry/parr. *Ecology of Freshwater Fish* 5(2) 68-75 (P)
- Crisp D.T. & Mann R.H.K. 1996
Preface. *Hydrobiologia* 323(3) p199 (P)
- Daniels R.E., Harrison A.F., Parkinson J.A., Hall G.H. & Bayfield N.G. 1995
Disposal of oiled beach material in sandy coastal soils. In: *International Maritime Organisation symposium on oil spills, Long Beach, California*
- Day J.G. 1996
Conservation of microbial diversity: the roles of algal and protozoan culture collections. In: *Culture collections to improve the quality of life. Proceedings of ICC 8* (ed. R.A. Samson, J.A. Stalpers, D. van der Mei & A.H. Stouthamer) p173-177. The Netherlands. CBS Baarn.
- Day J.G. & McCulloch I.D. 1996
Algae on the internet. *Journal of Applied Phycology* 8 205-210 (P)
- Day J.G. & McLellan M.R. 1995
Conservation of algae. In: *Genetic preservation of plant cells in vitro* (ed. B. Grout) p75-98. Berlin. Springer.
- Day J.G. & Tsavalos A.J. 1996
An investigation of the heterotrophic culture of the green alga *Tetraselmis*. *Journal of Applied Phycology* 8(1) 73-77 (P)
- De Jonckheere J.F., Brown S. & Robinson B.S. 1997
On the identity of the amoebflagellates *Didasculus thornstoni* and *Adelphamoeba galeacystis*. *Journal of Eukaryotic Microbiology* 44(1) 52-54 (P)
- Deere D., Porter J., Pickup R.W. & Edwards C. 1996
Direct analysis of starved *Aeromonas salmonicida* in lakewater. *Journal of Fish Diseases* 19 459-468 (P)
- Deere D., Porter J., Pickup R.W. & Edwards C. 1996
Survival of cells and DNA of *Aeromonas salmonicida* released into aquatic microcosms. *Journal of Applied Bacteriology* 81(3) 309-318 (P)
- Elliott J.M. 1996
British freshwater Megaloptera and Neuroptera: a key with ecological notes. Ambleside. Freshwater Biological Association, 68p.
- Elliott J.M. 1996
The relationship between smolt density and fry density in salmonids. *Journal of Fish Biology* 48(5) 1030-1032 (P)
- Elliott J.M. 1996
Temperature-related fluctuations in the timing of emergence and pupation of Windermere alder-flies over 30 years. *Ecological Entomology* 21 241-247 (P)
- Elliott J.M., Fletcher J.M., Elliott J.A., Cubby P.R. & Baroudy E. 1996
Changes in the population density of pelagic salmonids in relation to changes in lake enrichment in Windermere (northwest England). *Ecology of Freshwater Fish* 5(4) 153-162 (P)
- Elliott J.M., Hurley M.A. & Allonby J.D. 1996
A functional model for maximum growth of immature stone loach, *Barbatula barbatula*, from three populations in north-west England. *Freshwater Biology* 36 547-554 (P)
- Elliott J.M. & Reynolds C.S. 1996
Lake enrichment and Windermere charr. *Biological Sciences* 8(5) 17-20 (P)
- Elliott J.M. 1997
An experimental study on the natural removal of dead trout fry in a Lake District stream. *Journal of Fish Biology* 50 870-877 (P)
- Elliott J.M. 1997
Stomach contents of adult sea trout caught in six English rivers. *Journal of Fish Biology* 50 1129-1132 (P)

- Elliott J.M., Lyle A.A. & Campbell R.N.B. 1997
A preliminary evaluation of migratory salmonids as vectors of organic carbon between marine and freshwater environments. *Science of the Total Environment* 194/195 219-223 (P)
- Esteban G.F. & Finlay B.J. 1996
Morphology and ecology of the cosmopolitan ciliate *Prorodon viridis*. *Archiv fur Protistenkunde* 147(3) 181-188 (P)
- Farmer J.G., Eades L.J., Mackenzie A.B., Kirika A. & Bailey-Watts A.E. 1996
Stable lead isotope record of lead pollution in Loch Lomond sediments since 1630 AD. *Environmental Science and Technology* 30(10) 3080-3083 (P)
- Farmer J.G., MacKenzie A.M., Eades L.J., Kirika A. & Bailey-Watts A.E. 1995
Influences on the extent and record of heavy metal pollution in sediment cores from Loch Tay in a mineralised area of Scotland. In: *Proc. Tenth Internat. Conf. Heavy Metals in the Environment* p45-48.
- Fenchel T. & Finlay B.J. 1994
Anaerobic leftovers. *Amer.Sci.* 82 203-204 (P)
- Fenchel T. & Finlay B.J. 1994
The evolution of life without oxygen. *Amer.Sci.* 82 22-29 (P)
- Ferguson A.J.D., Pearson M.J. & Reynolds C.S. 1996
Eutrophication of natural waters and toxic algal blooms. *Issues in Environmental Science and Technology* No.5 27-41 (P)
- Findlay A.D., Thompson D.W. & Tipping E. 1996
The aggregation of silica and haematite particles dispersed in natural water samples. *Colloids and Surfaces A - Physicochemical and Engineering Aspects* 118(1/2) 97-105 (P)
- Findlay A.D., Thompson D.W. & Tipping E. 1996
Electrokinetic properties of oxide particles in natural waters. *Colloids and Surfaces A - Physicochemical and Engineering Aspects* 111(3) 203-212 (P)
- Finlay B.J., Corliss J.O., Esteban G. & Fenchel T. 1996
Biodiversity at the microbial level: the number of free-living ciliates in the biosphere. *Quarterly Review of Biology* 71(2) 221-237 (P)
- Finlay B.J., Esteban G.F. & Fenchel T. 1996
Global diversity and body size. *Nature* 383(6526) 132-133 (P)
- Finlay B.J. & Fenchel T. 1996
Ecology: role of ciliates in the natural environment. In: *Ciliates: cells as organisms* (ed. K. Hausmann & P.C. Bradbury) p417-440. Stuttgart. Gustav Fischer. (P)
- Finlay B.J., Fenchel T. & Embley T.M. 1993
Methanogen endosymbiosis in anaerobic ciliates. In: *Trends in microbial ecology. Proceedings of the sixth international symposium on Microbial Ecology, Barcelona, 6-11 September 1992* (ed. R. Guerrero & C. Pedros-Alio) p285-288. Barcelona. Spanish Society for Microbiology. (P)
- Finlay B.J., Maberly S.C. & Esteban G.F. 1996
Spectacular abundance of ciliates in anoxic pond water: contribution of symbiont photosynthesis to host respiratory oxygen requirements. *FEMS Microbiology Ecology* 20(4) 229-235 (P)
- Franco C., Esteban G.F. & Téllez C. 1996
Description of *Metabakuella bimarginata* sp. n., and key to the ciliate family Bakuellinae Jankowski, 1979. *Acta Protozoologica* 35 (4) 321-330 (P)
- Garcia-Ruiz R. & Hall G.H. 1996
Impacto de los residuos derivados del cultivo en jaulas de truchas: fosfora. *Investigaciones de la Biosfera* 1 61-68 (P)
- Garcia-Ruiz R. & Hall G.H. 1996
Phosphorus fractionation and mobility in the food and faeces of hatchery reared rainbow trout (*Oncorhynchus mykiss*). *Aquaculture* 145 183-193 (P)
- Garner P. 1996
Diel patterns in the feeding and habitat use of 0-group fishes in a regulated river: the River Great Ouse, England. *Ecology of Freshwater Fish* 5(4) 175-182 (P)
- Garner P. 1996
Microhabitat use and diet of 0+ cyprinid fishes in a lentic, regulated reach of the River Great Ouse, UK. *Journal of Fish Biology* 48 367-382 (P)
- Garner P. 1997
Sample sizes for length and density estimation of 0+ fish when using point sampling by electrofishing. *Journal of Fish Biology* 50(1) 95-106 (P)

- Garner P., Bass J.A.B. & Collett G.D. 1996
The effects of weed cutting upon the biota of a large regulated river. *Aquatic Conservation* 6(1) 21-29 (P)
- Garner P. & Clough S. 1996
Habitat use by dace *Leuciscus leuciscus* (L.) in a side channel of the River Frome, England. *Fisheries Management and Ecology* 3(4) 349-352 (P)
- George D.G. & Happey-Wood C.M. 1996
The remote sensing of a power station plume in Llyn Peris (Snowdonia). In: *Remote sensing science and industry. Proceedings of the 22nd annual conference of the Remote Sensing Society* (ed. D.N.M. Donoghue & Y. Zong) p325-332. Nottingham. Remote Sensing Society. (P)
- Gibson C.E., Foy R.H. & Bailey-Watts A.E. 1996
An analysis of the total phosphorus cycle in some temperate lakes: the response to enrichment. *Freshwater Biology* 35(3) 525-532 (P)
- Gray N.D., Pickup R.W., Jones J.G. & Head I.M. 1997
Ecophysiological evidence that *Achromatium oxaliferum* is responsible for the oxidation of reduced sulfur species to sulfate in a freshwater sediment. *Applied and Environmental Microbiology* 63(5) 1905-1910 (P)
- Guhl B.E., Finlay B.J. & Schink B. 1996
Comparison of ciliate communities in the anoxic hypolimnia of three lakes: general features and the influence of lake characteristics. *Journal of Plankton Research* 18(3) 335-353 (P)
- Gunn R.J.M. & Armitage P.D. 1996
The macro-invertebrates of some freshwater streams in the Folkestone area. *Transactions of the Kent Field Club* 15(1) 19-32
- Hartley A.M., House W.A., Leadbeater B.S.C. & Callow M.E. 1996
The use of microelectrodes to study the precipitation of calcite upon algal biofilms. *Journal of Colloid and Interface Science* 183 498-505 (P)
- Hartley S.E. 1995
Mitochondrial DNA analysis distinguishes between British populations of the whitefish. *Journal of Fish Biology Supplement A* 47 145-155 (P)
- Hartley S.E. 1996
High incidence of Atlantic salmon x brown trout hybrids in a Lake District stream. *Journal of Fish Biology* 48(1) 151-154 (P)
- Haworth E.Y., Pinder L.C.V., Lishman J.P. & Duigan C.A. 1996
The Anglesey lakes, Wales, UK - a palaeolimnological study of the eutrophication and nature conservation status. *Aquatic Conservation: Marine and Freshwater Ecosystems* 6(2) 61-80 (P)
- Haygarth P.M., Warwick M.S. & House W.A. 1997
Size distribution of colloidal molybdate reactive phosphorus in river waters and soil solution. *Water Research* 31(3) 439-448 (P)
- Head I.N., Gray K.J., Clarke K.J., Pickup R.W. & Jones J.G. 1996
The phylogenetic position and ultrastructure of the uncultured bacterium *Achromatium oxaliferum*. *Microbiology* 142(9) 2341-2354 (P)
- Heaney S.I., Parker J.E., Butterwick C. & Clarke K.J. 1996
Interannual variability of algal populations and their influence on lake metabolism. *Freshwater Biology* 35(3) 561-577 (P)
- Hesketh N., Jones M.N. & Tipping E. 1996
The interaction of some pesticides and herbicides with humic substances. *Analytica Chimica Acta* 327(3) 191-201 (P)
- Hilton J., Nolan L., Geelhoed-Bonouvrie P. & Coman R.N.J. 1997
The effect of different treatment processes on estimates of radionuclide distribution coefficients in freshwater sediments. *Water Research* 31(1) 49-54 (P)
- Hilton J., Nolan L. & Jarvis K.E. 1997
Concentrations of stable isotopes of cesium and strontium in freshwaters in northern England and their effect on estimates of sorption coefficients (K-d). *Geochimica et Cosmochimica Acta* 61(6) 1115-1124 (P)
- House W.A., Farr I.S. & Orr D.R. 1991
The occurrence of synthetic pyrethroid and selected organochlorine pesticides in river sediments. In: *Pesticides in soils and water. Proceedings of a symposium organised by the British Crop Protection Council held at the University of Warwick, Coventry, UK, March, 1991* p183-192. Thornton Heath. BCPC Publications.
- House W.A., Leach D.V., Long J.L.A., Cranwell P., Smith C., Bharwaj L., Meharg A., Ryland G., Orr D.O. & Wright J.F. 1997
Micro-organic compounds in the Humber rivers. *Science of the Total Environment* 194/195 357-371 (P)

- House W.A., Leach D.V., Warwick M.S., Whitton B.A., Pattinson S.N., Ryland G.P., Pinder A.C., Ingram J.K.G., Lishman J.P., Smith S.M., Rigg E. & Denison F.H. 1997
Nutrient transport in the Humber rivers. *Science of the Total Environment* 194/195 303-320 (P)
- Howard A., Irish A.E. & Reynolds C.S. 1996
A new simulation of cyanobacterial underwater movement (SCUM'96). *Journal of Plankton Research* 18(8) 1375-1385 (P)
- Hurley M.A. 1996
A statistical method to identify different survival patterns of culturable microbes in environmental microcosms. *Journal of Microbiological Methods* 27 199-205 (P)
- Hurley M.A., Currie J.E., Gough J. & Butterwick C. 1996
A framework for the analysis of Harmonised Monitoring Scheme data for England and Wales. *Environmetrics* 7(4) 379-390 (P)
- Jarvie H.P., Neal C., Leach D.V., Ryland G.P., House W.A. & Robson A.J. 1997
Major ion concentrations and the inorganic carbon chemistry of the Humber rivers. *Science of the Total Environment* 194/195 285-302 (P)
- Jones J.G. 1996
Microbial processes in large rivers. *Archiv für Hydrobiologie Supplementband* 113 67-77 (P)
- Jones R.I., Young J.M., Hartley A.M. & Bailey-Watts A.E. 1996
Light limitation of phytoplankton development in an oligotrophic lake - Loch Ness, Scotland. *Freshwater Biology* 35(3) 533-543 (P)
- Kramer J.R., Allen H.E., Davison W., Godtfredsen K.L., Meyer J.S., Perdue E.M., Tipping E., Van de Meent D. & Westall J.C. 1997
Chemical speciation and metal toxicity in surface freshwaters. In: *Reassessment of metals criteria for aquatic life protection* (ed. H.L. Bergman & E.J. Dorward-King) p57-70. Pensacola, Florida. SETAC Press.
- Kudelsky A.V., Smith J.T., Ovsiannikova S.V. & Hilton J. 1996
Mobility of Chernobyl-derived ¹³⁷Cs in a peatbog system within the catchment of the Pripyat River, Belarus. *The Science of the Total Environment* 188 101-113 (P)
- Ladle M. 1996
The Fleet - proceedings of the third symposium. Dorset County Council, 130p
- Ladle M. & Welton J.S. 1997
The Blandford fly - absolutely the last word. *Bulletin British Simuliid Group* No.8 7-8
- Ladle M. & Welton J.S. 1995
Experimental manipulation of chalk river ecosystems. In: *Proc. ECOMAN Symposium*.
- Ladle M. & Welton J.S. 1996
An historical perspective of the 'Blandford fly' problem and attempted control of the pest species using *Bti*. *Integrated Pest Management Reviews* 1 103-110 (P)
- Lancaster J., Real M., Juggins S., Monteith D.T., Flower R.J. & Beaumont W.R.C. 1996
Monitoring temporal changes in the biology of acid waters. *Freshwater Biology* 36(1) 179-201 (P)
- Leeks G.J.L., Neal C., Jarvie H.P., Casey H. & Leach D.V. 1997
The LOIS river monitoring network; strategy and implementation. *Science of the Total Environment* 194/195 101-109 (P)
- Lyle A.A. & Maitland P.S. 1997
The spawning migration and conservation of smelt *Osmerus eperlanus* in the River Cree, southwest Scotland. *Biological Conservation* 80 303-311 (P)
- Maberly S.C. 1993
Sources of inorganic carbon in photosynthesis by *Asterionella formosa*. *The Phycologist* 34 p33 (P)
- Maberly S.C. 1996
Diel, episodic and seasonal changes in pH and concentrations of inorganic carbon in a productive lake. *Freshwater Biology* 35(3) 579-598 (P)
- Maberly S.C., Surif M. & Parker J.E. 1996
The effect of CO₂ concentration on the photosynthesis, growth and distribution of *Dinobryon* and other chrysophytes. *The Phycologist* 43 p26 (P)
- Madsen T.V., Maberly S.C. & Bowes G. 1996
Photosynthetic acclimation of submersed angiosperms to CO₂ and HCO₃⁻. *Aquatic Botany* 53 (1/2) 7-19 (P)
- Maitland P.S. & Lyle A.A. 1996
The smelt *Osmerus eperlanus* in Scotland. *Freshwater Forum* 6 57-68 (P)
- Mann R.H.K. 1996
Environmental requirements of European non-salmonid fish in rivers. *Hydrobiologia* 323(3) 223-235 (P)

- Mann R.H.K.** 1996
Fisheries and economics. In: *Pike: biology and exploitation* (ed. J.F. Craig) p219-241. London. Chapman and Hall. (P)
- Mann R.H.K.** 1996
Habitat requirements of cyprinid fish. EIFAC.
- Mann R.H.K. & Winfield I.J.** 1992
Restoration of riverine fisheries habitats. Bristol. NRA, 86p
- Marker A.F.H. & Collett G.D.** 1991
Turbidity and plant growth in large, slow-flowing rivers. Bristol. NRA, 54p
- May L., Place C.J. & George D.G.** 1996
Estimating total phosphorus losses from diffuse sources within the catchment of Bassenthwaite Lake. In: *Diffuse pollution and agriculture: proceedings of a conference held in Edinburgh, 12-14 April 1995* (ed. A.M. Petchey, B.J. D'Arcy & C.A. Frost) p247-250.
- McDonald I.R., Hall G.H., Pickup R.W. & Murrell J.C.** 1996
Methane oxidation potential and preliminary analysis of methanotrophs in blanket bog peat using molecular ecology techniques. *FEMS Microbiology Ecology* 21(3) 197-211 (P)
- Monteith D.T., Renshaw M. & Beaumont W.R.C.** 1995
The United Kingdom acid waters monitoring network data report for 1994-1995 (year 7). Report to the Department of the Environment (contract no. PECD 7/12/02) and the Department of the Environment Northern Ireland. London. ENSIS Ltd, 116p
- Muller M. & Finlay B.J.** 1994
Protists of anaerobic environments. In: *Progress in protozoology. Proceedings of the IX International Congress of Protozoology, Berlin 1993* (ed. K. Hausmann & N. Hulsmann) p101-104. Stuttgart. Gustav Fischer Verlag. (P)
- Murray R. & Pettman I.** 1997
The UNiVerse project. *New Library World* 98(1133) 53-59 (P)
- Neal C., House W.A., Jarvie H.P., Leeks G.J.L. & Marker A.F.H.** 1997
Conclusions to the special volume of Science of the Total Environment concerning UK fluxes to the North Sea, Land Ocean Interaction Study river basins research, the first two years. *Science of the Total Environment* 194/195 467-477 (P)
- Neal C., House W.A., Leeks G.J.L. & Marker A.F.H.** 1997
UK fluxes to the North Sea, Land Ocean Interaction Study (LOIS) - river basins research, the first two years 1993-1995. *Science of the Total Environment* 194/195 1-4 (P)
- Neal C., Robson A.J., Harrow M., Hill L., Wickham H., Bhardwaj C.L., Tindall C.I., Ryland G.P., Leach D.V., Johnson R.C., Bronsdon R.K. & Cranston M.** 1997
Major, minor, trace element and suspended sediment variations in the River Tweed: results from the LOIS core monitoring programme. *Science of the Total Environment* 194/195 193-205 (P)
- Noble L., Pettman I. & Varley A.** 1997
Environmental effects on oceans, rivers and inland waters. In: *Information sources in environmental protection* (ed. S. Eagle & J. Deschamps) p65-96. London. Bowker Saur.
- Ojala A., Heaney S.I., Arvola L. & Barbosa F.** 1996
Growth of migrating and non-migrating cryptophytes in thermally and chemically stratified experimental columns. *Freshwater Biology* 35(3) 599-608 (P)
- Pettman I.** 1996
Project UNiVerse - an introduction. In: *Proceedings of the sixth meeting of the European Association of Aquatic Sciences Libraries and Information Centres (EURASLIC) held at the Foundation for International Studies, Valetta, Malta, 25-26 April 1996* (ed. D.S. Moulder, K. Djorup & S. Heath) p75-79. Plymouth. Plymouth Marine Laboratory.
- Pettman I.** 1996
Recent developments relevant to the aquatic sciences in the United Kingdom - April 1994 to April 1996. In: *Proceedings of the sixth meeting of the European Association of Aquatic Sciences Libraries and Information Centres (EURASLIC) held at the Foundation for International Studies, Valetta, Malta, 25-26 April 1996* (ed. D.S. Moulder, K. Djorup & S. Heath) p51-54. Plymouth. Plymouth Marine Laboratory.
- Pettman I.** 1996
Sixth meeting of the European Association of Aquatic Sciences Libraries and Information Centres - summary of meeting and closing remarks. In: *Proceedings of the sixth meeting of the European Association of Aquatic Sciences Libraries and Information Centres (EURASLIC) held at the Foundation for International Studies, Valetta, Malta, 25-26 April 1996* (ed. D. S. Moulder, K. Djorup & S. Heath) p107-109. Plymouth. Plymouth Marine Laboratory.

- Pettman I.** 1996
Workshop 2: EU funding of library projects. In: *Proceedings of the sixth meeting of the European Association of Aquatic Sciences Libraries and Information Centres (EURASLIC) held at the Foundation for International Studies, Valetta, Malta, 25-26 April 1996* (ed. D. S. Moulder, K. Djorup & S. Heath) p99-104. Plymouth. Plymouth Marine Laboratory.
- Pickering A.D.** 1997
Husbandry and stress. In: *Furunculosis multidisciplinary fish disease research* (ed. E.-M. Bernoth, A.E. Ellis, P.J. Midtlyng, G. Olivier & P. Smith) p178-202. San Diego. Academic Press. (P)
- Pickup R.W., Mallinson H.E.H., Rhodes G. & Chatfield L.K.** 1997
A novel nickel resistance determinant found in sewage-associated bacteria. *Microbial Ecology* 33(3) 230-239 (P)
- Pickup R.W., Rhodes G., Cobban R.J. & Clarke K.J.** 1996
The postponement of non-culturability in *Aeromonas salmonicida*. *Journal of Fish Diseases* 19 65-74 (P)
- Pinder L.C.V., Marker A.F.H., Pinder A.C., Ingram J.K.G., Leach D.V. & Collett G.D.** 1997
Concentrations of suspended chlorophyll a in the Humber rivers. *Science of the Total Environment* 194/195 373-378 (P)
- Pinder L.C.V. & Morley D.J.** 1995
Chironomidae as indicators of water quality with a comparison of the chironomid faunas of a series of contrasting Cumbrian tarns. In: *Proc. 17th Symp. Royal Entomological Society* p272-293.
- Planas D., Maberly S.C. & Parker J.E.** 1996
Phosphorus and nitrogen relationships of *Cladophora glomerata* in two lake basins of different trophic status. *Freshwater Biology* 35(3) 609-622 (P)
- Porter J.P., Pickup R.W. & Edwards C.** 1996
Fluorescent probes and flow cytometry: new insights into environmental bacteriology. *Cytometry* 23 91-96 (P)
- Porter J.P., Pickup R.W. & Edwards C.** 1997
Evaluation of flow cytometric methods for the detection and viability assessment of bacteria from soil. *Soil Biology and Biochemistry* 1 91-100 (P)
- Pottinger T.G., Carrick T.R., Hughes S.E. & Balm P.H.M.** 1996
Testosterone, 11-ketotestosterone, and estradiol-17 β modify baseline and stress-induced interrenal and corticotropic activity in trout. *General and Comparative Endocrinology* 104 284-295 (P)
- Pottinger T.G. & Moore A.** 1997
Characterization of putative steroid receptors in the membrane, cytosol and nuclear fractions from the olfactory tissue of brown and rainbow trout. *Fish Physiology and Biochemistry* 16(1) 45-63 (P)
- Pottinger T.G. & Pickering A.D.** 1996
Genetic basis to the stress response: selective breeding for stress-tolerant fish. In: *SEB seminar series: fish stress and health in aquaculture* (ed. G.K. Iwama, A.D. Pickering & J.P. Sumpter) p171-193. Cambridge. Cambridge University Press. (P)
- Prenda J. & Granado-Lorencio C.** 1996
The relative influence of riparian habitat structure and fish availability on otter *Lutra lutra* L. sprainting activity in a small Mediterranean catchment. *Biological Conservation* 76(1) 9-15 (P)
- Reynolds C.S.** 1995
Successional development, energetics and diversity in planktonic communities. In: *Ecological perspectives of biodiversity* (ed. T. Abe, S. Levin & M. Higashi) Kyoto. Centre for Ecological Research. (P)
- Reynolds C.S.** 1996
Algae. In: *River biota: diversity and dynamics* (ed. P. Calow & G. Petts) p6-26. Oxford. Blackwell. (P)
- Reynolds C.S.** 1996
Phosphorus recycling in lakes: evidence from large limnetic enclosures for the importance of shallow sediments. *Freshwater Biology* 35 623-645 (P)
- Reynolds C.S.** 1996
The plant life of the pelagic. *Verhandlungen der Internationalen Vereinigung fur Theoretische und Angewandte Limnologie* 26 97-113 (P)
- Reynolds C.S.** 1996
The threat of algal blooms in proposed estuarine barrages: models, predictions, risks. In: *Barrages: engineering design and environmental impacts* (ed. N. Burt & J. Watts) p83-89. Wallingford. John Wiley & Sons Ltd. (P)
- Reynolds C.S. & Descy J.-P.** 1996
The production, biomass and structure of phytoplankton in large rivers. *Archiv fur Hydrobiologie Supplementband* 113 161-187 (P)

- Saxby-Rouen K.J., Leadbeater B.S.C. & Reynolds C.S. 1996
Ecophysiological studies on *Synura petersenii* (Synurophyceae). In: *Chrysophytes: progress and new horizons* (ed. J. Kritiansen & G. Cronberg) p111-124. Berlin. J.Cramer. (P)
- Skidmore R.E., Maberly S.C. & Whitton B.A. 1997
Special topic focus - phytoplankton dynamics and the riverine flux of autochthonous carbon. *LOIS Newsletter No.11* 8-9
- Smith J.T. & Howard B. 1996
Chernobyl in perspective. *NERC News Autumn* 28-29
- Smith J.T., Leonard D.R.P., Hilton J. & Appleby P.G. 1997
Towards a generalized model for the primary and secondary contamination of lakes by Chernobyl-derived radiocesium. *Health Physics* 72(6) 880-892 (P)
- Sutcliffe D.W. (ed.) 1996
First international symposium: The ecology of large rivers, Krems, Austria, 18-22 April 1995. *Archiv für Hydrobiologie Supplementband* 113(1/4) 630p (P)
- Symes K.L., Armitage P.D. & Cannan C.E. 1997
Application of the relational database approach to a nested study of biological and physical data from a lowland river. *Regulated Rivers - Research and Management* 13(2) 185-198 (P)
- Taylor M.R., Moss S.T. & Ladle M. 1996
Comparison of the culturable bacterial community in the midgut of larval *Simulium ornatum* Meigen (complex) (Simuliidae: Diptera) with that of the surrounding microhabitat. *Archiv für Hydrobiologie* 138(1) 33-44 (P)
- Taylor M.R., Moss S.T. & Ladle M. 1996
Scanning electron microscopy of the digestive tract of larval *Simulium ornatum* Meigen (complex) (Diptera: Simuliidae) and its associated microbial flora. *Canadian Journal of Zoology* 73 1640-1646 (P)
- Thompson A.B., Allison E.H. & Ngatunga B.P. 1995
Spatial and temporal distribution of fish in the pelagic waters. In: *The fishery potential and productivity of the pelagic zone of Lake Malawi/Niassa. Scientific report of the UK/SADC Pelagic Fish Resource Assessment Project* (ed. A. Menz) p201-232. Chatham. Natural Resources Institute.
- Thompson A.B., Allison E.H., Ngatunga B.P. & Bulirani A. 1995
Fish growth and breeding biology. In: *The fishery potential and productivity of the pelagic zone of Lake Malawi/Niassa. Scientific report of the UK/SADC Pelagic Fish Resource Assessment Project* (ed. A. Menz) p279-306. Chatham. Natural Resources Institute.
- Tipping E. 1997
Hydrochemical modelling of the retention and transport of metallic radionuclides in the soils of an upland catchment. *Environmental Pollution* 94(2) 105-116 (P)
- Tipping E. 1997
Modelling the interactions of metals with dissolved organic matter in surface waters. In: *Reassessment of metals criteria for aquatic life protection* (ed. H.L. Bergman & E.J. Dorward-King) p106-108. Pensacola, Florida. SETAC Press.
- Tipping E., Marker A.F.H., Butterwick C., Collett G.D., Cranwell P.A., Ingram J.K.G., Leach D.V., Lishman J.P., Pinder A.C., Rigg E. & Simon B.M. 1997
Organic carbon in the Humber rivers. *Science of the Total Environment* 194/195 345-355 (P)
- Warren A., Day J.G. & Brown S. 1997
Cultivation of protozoa and algae. In: *Manual of environmental microbiology* (ed. C.J. Hurst, G.R. Knudsen, M.J. McInerney, L.D. Stezenbach & M.V. Walter) p61-71. Washington. ASM Press. (P)
- Warwick M.S. & House W.A. 1995
Nutrient fluxes: the dynamics of N and P in rivers. In: *Diffuse pollution and agriculture: proceedings of a conference, Edinburgh, 12-14 April* p243-246. (P)
- Whitehead P.G., Barlow J., Haworth E.Y. & Adamson J.K. 1997
Acidification in three Lake District tarns: historical long term trends and modelled future behaviour under changing sulphate and nitrate deposition. *Hydrology and Earth System Sciences* 1 197-204 (P)
- Willoughby L.G. & Chinabut S. 1996
Self-stalling in *Aphanomyces invaderis*, the fungal pathogen of freshwater, tropical fish affected by Epizootic Ulcerative Syndrome (EUS). *Aquatic Animal Health Research Institute Newsletter* 5(2) 2-3 (P)
- Winder J.M. 1996
Oysters - their variations in time and space. In: *The Fleet Lagoon and Chesil Beach. Proc.3rd Symp.of the Fleet Study Group* p93-94. Dorset County Council.

- Winfield I.J. (ed.) 1996
Food consumption by fish, their food base and the Allen paradox. *Polish Archives of Hydrobiology* 43 281p (P)
- Winfield I.J., Adams C.E. & Fletcher J.M. 1996
Recent introductions of the ruffe (*Gymnocephalus cernuus*) to three United Kingdom lakes containing *Coregonus* species. *Annales Zoologici Fennici* 33 459-466 (P)
- Wood P.J. & Armitage P.D. 1997
Silt and siltation in the lotic environment. *Environmental Management* 21 203-217 (P)
- Wotton R.S., Chaloner D.T. & Armitage P.D. 1996
The colonisation, role in filtration and potential nuisance value of midges in slow sand filters. In: *Advances in slow sand and alternative biological filtration* (ed. N. Graham & R. Collins) p149-158. Chichester. John Wiley and Sons. (P)
- Wright J.F. 1996
Application of a prediction technique for determining the biological quality of high mountain rivers using macroinvertebrates. In: *1st conferencia internacional Sierra Nevada: conservacion y desarrollo sostenible, volumen 2* (ed. J. Chacon Montero & J.L. Rosua Campos) p171-185. Universidad de Granada. (P)
- Wright J.F., Blackburn J.H., Gunn R.J.M., Furse M.T., Armitage P.D., Winder J.M. & Symes K.L. 1996
Macroinvertebrate frequency data for the RIVPACS III sites in Great Britain and their use in conservation evaluation. *Aquatic Conservation: Marine and Freshwater Ecosystems* 6 141-167 (P)
- Wright J.F., Furse M.T., Clarke R.T., Moss D., Gunn R.J.M., Blackburn J.H., Symes K.L., Winder J.M., Grieve N.J. & Bass J.A.B. 1995
Testing and further development of RIVPACS. Part 1 - main report. Bristol. National Rivers Authority, 80p
- Wright J.F., Furse M.T., Clarke R.T., Moss D., Gunn R.J.M., Blackburn J.H., Symes K.L., Winder J.M., Grieve N.J. & Bass J.A.B. 1995
Testing and further development of RIVPACS. Part 2 - tables and figures. Bristol. National Rivers Authority, 116p
- Wright J.F., Moss D., Clarke R.T. & Furse M.T. 1996
Biological assessment of river quality using the new version of RIVPACS (RIVPACS III). In: *Freshwater quality: defining the indefinable?* p102-108. London. HMSO. (P)
- Zhmud B.V. 1996
Charge regulation at the surface of porous solids: a comparison between the results obtained using different potential-to-charge relations. *Journal of Colloid and Interface Science* 183(1) 111-117 (P)
- Zhmud B.V. & House W.A. 1997
Electrical double layer and charge regulation for a homotattic surface. *Journal of Colloid and Interface Science* 187 509-514 (P)

Contract Reports

Armitage P.D. 1997

Appraisal of the use of ecological information in the management of low flows in rivers. Progress report #8115/1 for the period November 28 1996 - January 30 1997. 15p.
Environment Agency North West Region.

Armitage P.D. 1997

Appraisal of the use of ecological information in the management of low flows in rivers. 89p, appendices.
Environment Agency.

Bailey-Watts A.E. 1996

The ecology of the phytoplankton of Loch Leven during 1995 - a personal assessment. 23p, 1 appendix, 13 figures. Scottish Environment Protection Agency.

Bass J.A.B. & May L. 1996

Zooplankton interactions in the River Thames. Final report. 34p.
Environment Agency Thames Region.

Beaumont W.R.C. 1996

Acid waters monitoring 1996. Report on fish studies. 9p, tables, figures.
ENSIS Ltd.

Beaumont W.R.C., Welton J.S. & Ladle M. 1997

The 1996 East Stoke Salmon Counter records. 2p, figures.
Institute of Freshwater Ecology.

Blackburn J.H., Winder J.M. & Gunn R.J.M. 1996

River Chess enhancement scheme. Results of macroinvertebrate sample processing. 17p. Environment Agency Thames Region.

Dawson F.H., Gunn I.D.M., Leach J.J. & Hornby D.D. 1996

River habitat survey 1996. Survey sheets - Scotland. Environment Agency.

Dawson F.H., Hornby D.D., Gravelle M., Nicholson N. & Scarlett P. 1996

River habitat surveys - River Nidd.
Environment Agency Northumbria and Yorkshire Region.

Dawson F.H. & Newman J.R. 1996

Mean trophic rank macrophyte survey. Interim 'current best-available' guidance on the use/application of the MTR System for the Assessment of Trophic Status and the designation of Sensitive Areas (Eutrophic) for Urban Waste Water Treatment Directive. 40p.
Environment Agency.

Dawson F.H. & Newman J.R. 1996

Mean trophic rank macrophyte survey. Progress to September 1996. 6p. Environment Agency.

Dawson F.H., Scarlett P., Blackburn J.H., Collett G.D., DeVille M.M., Gravelle M., Grieve N.J., Gunn I.D. M., Harris I.T.B., Henville P., Hornby D.D., Leach J.J., Nicolson N. & Orr H.G. 1996

River habitat survey 1996 - survey sheets England and Wales. Part I site numbers 6002-6728. Environment Agency.

Dawson F.H., Scarlett P., Blackburn J.H., Collett G.D., DeVille M.M., Gravelle M., Grieve N.J., Gunn I.D. M., Harris I.T.B., Henville P., Hornby D.D., Leach J.J., Nicolson N. & Orr H.G. 1996

River habitat survey 1996 - survey sheets England and Wales. Part II site numbers 6730-7523. Environment Agency.

Dawson F.H., Scarlett P., Blackburn J.H., Collett G.D., DeVille M.M., Grieve N.J., Harris I.T.B., Henville P., Hornby D.D., Leach J.J. & Nicolson N. 1996

River habitat survey 1996. Quality assurance. Environment Agency.

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Elliott J.M., Fletcher J.M. & Cubby P.R. 1996

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- Furse M.T. & Ibbotson A.T. 1996
Impact of crayfishery on the River Thame. Progress report for the period April - June 1996. 8p. National Rivers Authority Thames Region.
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Impact of crayfishery on the River Thame. Progress report for the period 1st July - 30th September 1996. 10p. Environment Agency Thames Region.
- Gunn I.D.M. & May L. 1996
Analysis of 1995 zooplankton samples - Loch Leven NNR. Report to Scottish Natural Heritage - April 1996. 21p. Scottish Natural Heritage.
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- Gunn R.J.M., Blackburn J.H., Winder J.M., Wright J.F. & Symes K.L. 1996
An audit of performance in the analysis of biological samples. Ecosurveys Ltd. 3p, 2 tables, 1 appendix. Ecosurveys Ltd.
- Gunn R.J.M., Blackburn J.H., Winder J.M., Wright J.F. & Symes K.L. 1996
An audit of performance in the analysis of biological samples in 1995. Government Laboratory, Isle of Man. 8p, 1 appendix. Isle of Man Government.
- Gunn R.J.M., Blackburn J.H., Winder J.M., Wright J.F. & Symes K.L. 1996
An audit of performance in the analysis of biological samples in 1995. IRTU, Northern Ireland. 12p, 1 appendix. Industrial Research & Technology Unit Northern Ireland.
- Gunn R.J.M., Blackburn J.H., Winder J.M., Wright J.F. & Symes K.L. 1996
An audit of performance in the analysis of biological samples in 1995. NRA Welsh Region: primary audit. 13p, 1 appendix. National Rivers Authority Welsh Region.
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An audit of performance in the analysis of biological samples in 1995. NRA Southern Region: primary audit. 11p, 1 appendix. National Rivers Authority Southern Region.
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An audit of performance in the analysis of biological samples in 1995. NRA North West Region: AQC audit. 14p, 1 appendix. National Rivers Authority North West Region.
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- Gunn R.J.M., Blackburn J.H., Winder J.M., Wright J.F. & Symes K.L. 1996 *An audit of performance in the analysis of biological samples in 1995. NRA Welsh Region: AQC audit.* 14p, 1 appendix. National Rivers Authority Welsh Region.
- Gunn R.J.M., Blackburn J.H., Winder J.M., Wright J.F. & Symes K.L. 1996 *An audit of performance in the analysis of biological samples in 1995. NRA Thames Region: AQC audit.* 13p, 1 appendix. National Rivers Authority Thames Region.
- Gunn R.J.M., Blackburn J.H., Winder J.M., Wright J.F. & Symes K.L. 1996 *An audit of performance in the analysis of biological samples in 1995. NRA South Western Region: AQC audit.* 15p, 1 appendix. National Rivers Authority South West Region.
- Gunn R.J.M., Blackburn J.H., Winder J.M., Wright J.F. & Symes K.L. 1996 *An audit of performance in the analysis of biological samples in 1995. Tweed River Purification Board.* 10p, 1 appendix. Tweed River Purification Board.
- Gunn R.J.M., Blackburn J.H., Winder J.M., Wright J.F. & Symes K.L. 1996 *An audit of performance in the analysis of biological samples in 1995. Tay River Purification Board.* 10p, 1 appendix. Tay River Purification Board.
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- Gunn R.J.M., Blackburn J.H., Winder J.M., Wright J.F. & Symes K.L. 1996 *An audit of performance in the analysis of biological samples in 1995. Clyde River Purification Board.* 11p, 1 appendix. Clyde River Purification Board.
- Gunn R.J.M., Blackburn J.H., Winder J.M., Wright J.F. & Symes K.L. 1996 *An audit of performance in the analysis of biological samples in 1995. Forth River Purification Board.* 11p, 1 appendix. Forth River Purification Board.
- Gunn R.J.M., Blackburn J.H., Winder J.M., Wright J.F. & Symes K.L. 1996 *An audit of performance in the processing of macro-invertebrate samples. APEM Ltd.* 5p, 1 appendix. National Rivers Authority Northumbria and Yorkshire Region.
- Hall G.H., Cubby P.R., DeVille M.M., Fletcher J.M., Haworth E.Y., Hewitt D., Hodgson P., James J.B., Lawlor A.J., Parker J.E., Rigg E. & Woof C. 1996 *A survey of the limnological characteristics of the lakes of the English Lake District: the Lakes Tour 1995.* 50p, 10 figures, 4 appendices. Environment Agency North West Region.
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The United Kingdom Acid Waters Monitoring Network. Data report for 1995-1996 (year 6). 134p. Department of the Environment/Department of the Environment (Northern Ireland).
- Parr T.W., Bunce R.G.H., Hallam C., Scott A., Eversham B.C., Harding P., Roy D., Henderson I.G., Baillie S.R., Crick H.Q.P., Furse M.T., Harris S. & Woiwod I.P. 1996
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- Parr T.W., Bunce R.G.H., Hallam C., Scott A., Eversham B.C., Harding P., Roy D., Henderson I.G., Baillie S.R., Crick H.Q.P., Furse M.T., Harris S. & Woiwod I.P. 1996
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Smolt trapping using acoustic techniques. R and D progress report April 1996. 3p. National Rivers Authority.
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Smolt trapping using acoustic techniques. R and D progress report July 1996. 8p. National Rivers Authority.
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- Welton J.S., Beaumont W.R.C., Pinder A.C., Ladle M., Crisp D.T., Masters J.E.G., Winfield I.J. & Fletcher J.M. 1996
1995 survey of the coarse fish of the River Tees: interim report. 130p. National Rivers Authority Northumbria and Yorkshire Region.
- Welton J.S., Beaumont W.R.C., Pinder A.C., Ladle M. & Masters J.E.G. 1996
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- Welton J.S., Beaumont W.R.C., Pinder A.C., Ladle M. & Masters J.E.G. 1997
1996 survey of the coarse fish of the River Tees: interim report. 91p. Environment Agency North East Region.
- Welton J.S., Gunn R.J.M. & Farrugia F. 1996
Macroinvertebrate sampling of wooded and open sections of tributaries of the River Itchen. 2p, 7 tables. Ministry of Agriculture, Fisheries and Food/Environment Agency Southern Region.
- Welton J.S., Gunn R.J.M. & Farrugia F. 1997
Macroinvertebrate sampling of wooded and open sections of tributaries of the River Itchen - October 1996. 2p, 7 tables. Ministry of Agriculture, Fisheries and Food/Environment Agency Southern Region.
- Winfield I.J., Fletcher J.M. & Cubby P.R. 1996
Conservation of the schelly of Haweswater. Progress report for period April 1996 to October 1996. 21p, 10 tables, 5 figures. North West Water.

Winfield I.J., Fletcher J.M. & Cubby
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report for period January 1996 to
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Authority North West Region.

Winfield I.J., Fletcher J.M. & Cubby
P.R. 1996
*Fish introductions in Bassenthwaite
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North West Region.

Winfield I.J., Fletcher J.M. & Cubby
P.R. 1997
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population of Bassenthwaite Lake,
1996.* 16p, 7 tables, 5 figures.
Environment Agency North West
Region.

Winfield I.J. & Winfield D.K. 1997
*The winter feeding behaviour of
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North West Water.

Wright J.F. 1996
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Wright J.F., Blackburn J.H., Winder
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*Aquatic invertebrate surveys at Avon
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Wright J.F., Furse M.T., Clarke R.T.,
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N.J. & Bass J.A.B. 1996
*Testing and further development of
RIVPACS. Part 1 - main report.* 72p.
National Rivers Authority.

Wright J.F., Furse M.T., Clarke R.T.,
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J.H., Symes K.L., Winder J.M., Grieve
N.J. & Bass J.A.B. 1996
*Testing and further development of
RIVPACS. Part 2 - tables and
figures.* 110p. National Rivers
Authority.

Wright J.F., Winder J.M., Gunn
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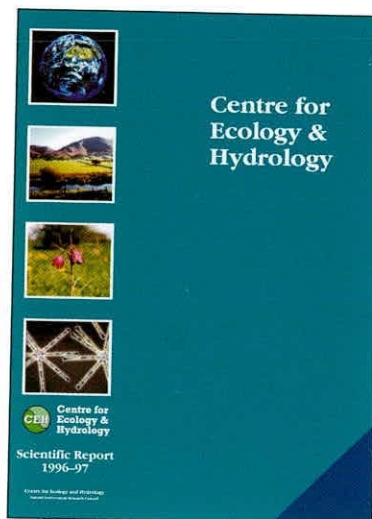
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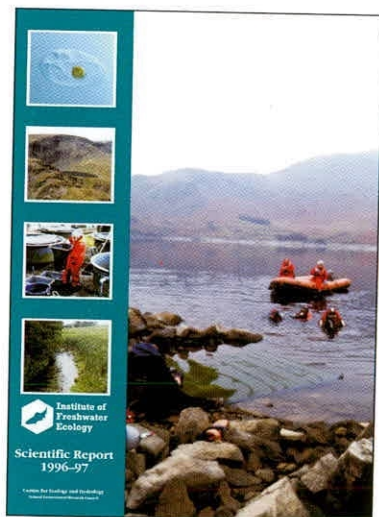
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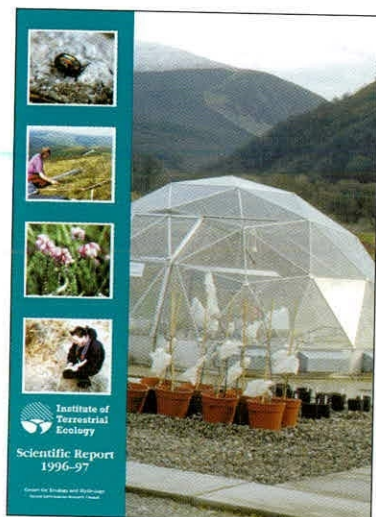
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