



SEVENTY-NINTH

ANNUAL REPORT

OF THE

FRESHWATER BIOLOGICAL ASSOCIATION

and Accounts for the year ended 31st March 2011

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THE FRESHWATER BIOLOGICAL ASSOCIATION

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31st MARCH 2011

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Ms. F. Bowles
Professor A.G. Hildrew

Mr C. Mainstone
*Professor C.S. Reynolds
Dr I. Winfield
Dr M. Dobson (Director)

**Mr G.A. Freeman (Business Manager)

**Mrs J. Lomax (Finance Manager)

* Co-opted Member

** Attendees

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Dr M.P. Thomas
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The Duke of Wellington
The Duke of Westminster
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F.M. Wiseman

COMPLEMENT AT 31st MARCH 2011

Director	Dr Michael Dobson
Personal Assistants to the Director	Sarah A. Johnson/Julie P. McNicol
Business Manager	G. Andrew Freeman
Finance Manager	Judith Lomax
Finance and Administration Assistants	Carolyn Fletcher/Sarah Rigby
Administration Assistant, Windermere	Lynda Durrell
Administration Assistant, East Stoke	Stephanie Smith
Facilities Management, Windermere	Ken Clarke/ Matthew Freeman
Research and Facilities Manager, East Stoke	John Davy-Bowker
IT Support	Vanya Gordon
Domestic Assistant, Windermere	Gordon Lancaster
Data and Information Services	
Information Scientist, Library and Information Services	Hardy Schwamm
Bioinformatics and Web Development Manager	Dr Michael Haft
Information Support Officer	Christine Davey
Web-Developers	Simon Fox/Paul Johnson
Knowledge Transfer	Dr Karen J. Rouen
Science and Publications	Dr Melanie Fletcher
Training and Education	Simon Pawley
FreshwaterLife/Journals	Louise Miles
Post Doctoral Researcher	Dr Marie-Pierre Gosselin
PhD Student	Gary Rushworth
<i>Approximately half the staff are employed on part-time contracts</i>	
<i>Honorary Posts</i>	
Honorary Curator of the Fritsch Collection	Dr Elizabeth Y. Haworth
Honorary Information Science Fellow	Ian Pettman
Honorary Research Fellows:	Professor Patrick Armitage
	Ken Clarke
	Professor J. Malcolm Elliott
	Dr D. Glen George
	Terence Gledhill
	Dr Elizabeth Y. Haworth
	Dr Mike Ladle
	Dr Allan Pentecost
	Professor Colin S. Reynolds
	Dr Roger A. Sweeting
Honorary Editors:	
<i>Scientific and Special Publications</i>	Alan Crowden
<i>FBA News</i>	Dr Jonathan Grey
<i>Freshwater Reviews</i>	Professor Colin Reynolds

Registered Auditors:

Messrs Couch Bright King & Company, 91 Gower Street, London WC1E 6AB

Bankers:

The Cooperative Bank
147 Church Street
Preston PR1 3UD

CAF Bank Ltd
25 Kings Hill Avenue
Kings Hill, West Malling
Kent ME19 4JQ

Foreword from the President

Rarely can there have been a time when the requirement for knowledge and prediction of freshwater ecosystems has been juxtaposed with such a poverty of support for research and for professional scientists within management agencies. I should add 'at least in the UK', although I am not convinced that the situation is very much better in some other countries. Certainly there is little hard evidence that the decline in the output of scientific papers by freshwater ecologists working in the UK, highlighted in an earlier report by the Association, has been turned round. Output in *Freshwater Biology* – a journal long associated with the FBA – serves as an indicator, and as an Editor comes to my attention every year. In 2010, the journal published just 10 papers from British authors. To put this in context, the equivalent mean number per year was 30.4 in the 1970s, 22.7 in the 80s, 13.2 in the 90s and 16.9 in the 00s. This is against a background of an inexorable rise in the total number of papers published in that journal, from around 50 per year in the 70s to approaching 200 now. This decline in the absolute and relative contribution from the UK pretty much matches the decline in the number of freshwater ecologists working for the FBA, and directly for NERC in IFE and CEH subsequently. While there are a number of factors at work here, I think it is undeniable that the UK has, seemingly almost carelessly, discarded its international lead in freshwater ecological research. That said, the subject overall is making really exciting progress in terms of both fundamental research and management – which are increasingly inextricable. Questions that have been intractable for a long time are now approachable using an arsenal of novel technologies that are falling in cost. These include statistical and bioinformatics techniques that require great computing power, startling new genetical sequencing techniques, and the ability to analyse for stable isotopes, fatty acids, pharmaceutical residues and the rest. There are indeed lots of challenges, in terms of both science and management – it remains to be seen whether the UK will play a leading role in meeting them. Whatever, as an increasingly international organisation, the FBA will continue to champion the case for freshwater biological research everywhere.

Report from the Chairman of the Council

Our previous Chairman finished his report last year with a note about how staff had worked strenuously to help the organisation recover from the disastrous floods of last winter, ending with the wry observation that this was followed by a spring that “was among the driest on record in Cumbria...”. As I write this in early May in Bonnie Dundee, Scotland has just enjoyed one of the most spectacular months of fine weather, especially on the west coast, and we have now officially had the driest April since records began. Once again the nation is focusing on water, its abundance, scarcity, use, abuse and misuse.

Further afield, the spectre of conflict between nations over water is increasing, fuelled in part by poverty, trade disputes and climate change. Globally, there are over 260 internationally-shared water-courses, draining the territories of some 145 countries. Such has been the impact of new dams, river diversions and inter-basin transfers, that major rivers sometimes no longer reach the sea, while others are routinely dry for much of their length. Whilst there are many international agreements between states, 60% of these international basins have no co-operative management framework and, significantly no shared research and monitoring programmes to inform decision-making.

It is within this local and global context of environmental change and uncertainty around freshwater resources that the FBA, with its long and distinguished history seeks to make its contribution. In many ways there has never been a more relevant time to be involved in the research that we do and in the dissemination of knowledge about water and wetlands to an ever-increasing range of audiences. What has perhaps changed most is the means by which communication can be most effectively made and how to fund both it and the research that underpins it.

With that background, Council and staff have had little problem identifying potential projects and opportunities in those areas of interest in which we can excel, nor in the range of material and information services that we could provide. However, the challenge as ever has been to try to focus on a smaller number of key areas, and to raise the income to enable us to turn these ideas in to action. It is the nature of the Chairman's role on the one hand to frame the issues and on the other to worry about the resources – and our current position attempting to match operational desires with financial stability is no different.

Our aim is one of continuity, building on the work of the Director and staff in stabilizing the Association financially. Their success in controlling costs is indeed to be welcomed, but as ever the main challenge remains attracting income. Council has looked at this situation closely and while we believe we remain on the right track, there is clearly still work to be done. We have begun discussion on a revised strategy, one that will, we hope, further strengthen our position and role in the dissemination of knowledge, especially the exciting new field of electronic data storage and sharing, and attract more research income and students to East Stoke and Windermere.

The Director's report provides information on progress with existing work, such as that on freshwater pearl mussels, and the really exciting new project we have started, to develop the main database for Defra covering their national work on catchment research. This, along with our publications, including *Freshwater Reviews* and *FBA News*, conferences and other services to members, remains the heart of our work, and our thanks go to the staff for their commitment to these ends. Council was particularly pleased this year to have presentations on the work of staff at their meeting, and intend to expand on this practice.

Council welcomed two new and one returning member, Fiona Bowles, Lee Brown and Ian Dunn, as well as our new Honorary Treasurer, Peter Andrewes. We also said good bye and thanks to retiring members Mary Burgis and Dafydd Evans, and to Alan Hildrew for his sterling work in guiding the FBA as Chairman of Council over the last ten years. I am delighted that Alan had accepted the post of President. Finally, our thanks must be recorded to Sir Martin Holdgate who stood down this year as President, but has been elected as a Vice President, in recognition of his very significant contribution to the Association.

Report of Activities from the Director

Introduction

This year was financially challenging, as much of the FBA's money derives indirectly from the public purse. Although income was lower than we would have hoped for, we had some important successes securing funding and we were able to bring on development of our information and research activities in particular. Staff have shown a real commitment to their work and a desire for the FBA to succeed in its endeavours, and I would like to take this opportunity to acknowledge them for this support. Many FBA members have been in touch over the year and the messages are overwhelmingly of support for our activities and our products; these messages are important to us, and we are grateful for this very valuable feedback. Below is a brief summary of activities and events for the year ending 31st March 2011.

Data and Information Services

The Library and Information Services section was renamed Data and Information Services (DIS), better to reflect the fact that the Library is an integral part of the services currently being provided. Associated with this, a DIS Advisory Group, comprising external representatives of the end users of our services, was formed to oversee activities. This replaces several former advisory groups, including the *FreshwaterLife* (FwL) Core Group, now that FwL is fully integrated into other FBA information services. We are grateful to Bill Brierley, who also sits on FBA Council, for agreeing to chair the new Advisory Group for its first few years.

Following the Windermere flood in November 2009, the re-housing of the periodicals collection of the Library was a slow process, but was finally completed in September 2010. All of the Windermere collections are now in the Pearsall Building, including a much more tightly packed main library room and many journals arranged attractively along corridors.

The FISHNet (Freshwater Information Sharing Network) project, funded by the Joint Information Systems Committee (JISC) was completed at the end of March. This project, which developed a method of storing freshwater research data from a variety of sources, has resulted in the overhaul of the FWL website, giving the FBA a modern, flexible digital repository and information network. Its various data holdings, including the Library catalogue, are now being moved onto this new system and will be made live to users in due course. A follow on project, FISH.Link, also funded by JISC, is developing methods for extracting and combining information from the datasets held.

In December the FBA, in partnership with King's College London, was awarded a four-year contract from Defra to create and manage the data archive for the Demonstration Test Catchment project. This initiative is using three English catchments (the Eden in Cumbria, the Wensum in Norfolk and the Hampshire Avon) to determine the impacts of farming mitigation measures on water quality; our role will be to provide a sustainable and accessible archive for the data generated from this work.

The Aquatic Sciences and Fisheries Abstracts (ASFA) funded a project to enable the digitisation of 500 FBA documents (including grey literature) so that they can be made available through Aquatic Commons (<http://aquaticcommons.org>), an open access repository supported by the International Association of Aquatic and Marine Science Libraries and Information Centers (IAMSLIC). This followed the successful completion of a previous ASFA-funded project to update the standardised list of geographical place names used to key-word publications.

Knowledge Transfer

Publications

Freshwater Reviews reached its third birthday in December. The journal's policy includes a commitment to make papers open access after three years, and the first issue is now fully accessible via the journal website (www.fba.org.uk/journals), with others following suit as their anniversaries are reached. The year saw the completion of Volume 3. Subscriptions are lower than we had hoped, but we successfully linked with BioOne (www.bioone.org), a non-profit online distributor of journals for small publishers, increasing both awareness of our title and income.

Our newest journal venture, *Inland Waters*, is produced on behalf of the International Society of Limnology (SIL) to replace the Society's long running Congress Proceedings. The first papers published in the journal, which appeared in March, were mainly derived from plenary papers from the SIL Congress in August 2010, at which the journal was launched.

Freshwater Forum is now an occasional publication, which in 2010 appeared as a special issue, guest edited by Patrick Armitage, on *The Effects of Catchment Management on Stream Process and Condition*. This issue, containing five papers, is accessible to subscribers via the journal website; most of the older papers published in *Freshwater Forum* have now been added to this site and are open access, providing a valuable resource of around 150 papers that the journal has published since its inception in 1991.

No new books were published during the year, but work continued on the *Guide to Freshwater Invertebrates*, a comprehensive introduction to the invertebrate fauna of British lakes, rivers and wetlands; and the more focused *Guide to British Freshwater Macroinvertebrates for Biotic Assessment*, which covers the families used in biomonitoring and those with which they may be confused. Both were nearly complete by the end of the year and will be published in 2011.

In September, in response to the appearance of the invasive shrimp *Dikerogammarus villosus* in the UK, the FBA produced an A4 sized identification poster to help in its identification; this has been widely distributed, both in print format and as a pdf, and also appeared in the Winter 2010 issue of *FBA News*; various external organisations approached us to ask for permission to distribute this poster among their own members, thus expanding both knowledge of this worrying new member of our fauna and also of the FBA and its activities. The FBA is represented on the recently convened Defra Aquatic Bio-security Campaign, which aims to publicise the problems caused by invasive species (specifically *D. villosus* initially) and ways to mitigate their impacts (see: www.direct.gov.uk/checkcleandry).

Meetings and training courses

The FBA held one meeting of its own during the year, the FBA Conference in Aquatic Biology, ably organised by Graham Harris from the University of Lancaster (and since elected as an FBA Vice President) with the theme: *Achieving ecological outcomes: aquatic ecological responses to catchment management*. Despite the excitement on the final day of a power cut forcing a move to an alternative venue, eclipsed later as the eruption of Eyjafjallajökull in Iceland forced overseas delegates to worry about their journeys home, the meeting was a great success. It brought together around 50 delegates from across the world, and the workshop and discussion elements built into the timetable were an effective way of stimulating useful discussion and comparison of approaches. A report on the meeting appeared in the Autumn 2010 issue of *FBA News*.

In a new departure, the FBA did not run an Annual Scientific Meeting in 2010, but instead held its AGM during the Autumn meeting of the North East and Yorkshire Freshwater Group, part of an initiative to celebrate regional groups and their contribution to freshwater understanding in the UK. Holding an AGM as part of a regional group was a great success, and we hope to repeat this in the future.

The training course programme continued through the year. A few of the advertised courses had to be cancelled, as shortage of money reduced the numbers of delegates, but most ran successfully and we also ran a bespoke course on subterranean fauna in response to a specific request from the British Geological Survey. We are keen to continue this approach with other organisations whose specific training needs we can fill.

Science

The number of mussel populations housed in the Hatchery at Windermere reached nine with the arrival of some animals from the River Lune in Lancashire. Research into these mussels centres on the PhD work of Louise Miles, who is researching various aspects of their ecology. Louise was successful in obtaining funding to study fluorescence marking techniques on juvenile mussels; the coming year will see her working on conservation genetics and also sediment preferences of juvenile mussel. Work on the North Tyne Restoration Project commenced in October; this project, funded for two years by the Environment Agency, is investigating potential impacts within the catchment which affect pearl mussels, with the ultimate goal of designing a robust, evidence-based restoration plan for the catchment. The work is being carried out by Marie-Pierre Gosselin, the FBA's first postdoctoral appointment for some years, whose first task has been to try to understand why recruitment of juvenile mussels is so poor in the catchment.

Research into reedbed ecology and restoration began in October with the appointment of Gary Rushworth as a PhD student. Supervised by Dr Lee Brown (University of Leeds, where Gary is registered) and Dr Mike Dobson, he is investigating invertebrate community composition and food web structure in reed beds of different types, within the Windermere catchment. Gary is one of seven PhD students now supported by the FBA. Helen Rosenkranz (University of Bristol) and Julia Reger (University of Sheffield) are currently in their final year, Fiona Bracken (Durham University) is in her second year, and Brian Foley (University of Ulster) is writing up his thesis. Felicity Shelley is in her first year of a CASE studentship at Queen Mary, University of London (QMUL), investigating the effects of methane concentration on river beds, and Louise Miles (Cumbria University) continues her PhD part-time as a member of FBA staff.

Work has continued in the project funded by the Scotland and Northern Ireland Forum for Environmental Research (SNIFFER) to enhance the River Invertebrate Classification Tool with new RIVPACS IV models that avoid use of predictor variables that are affected by stressors. This collaborative project with CEH and Bournemouth University has created two new RIVPACS models, a 'Hydromorphology Independent' model and an 'Alkalinity Independent' model. Both new models make use of new GIS-derived predictor variables.

Working with the QMUL River Communities team, the FBA has completed a review of deep river invertebrate sampling methods for the Environment Agency. In the next phase of this work, the FBA will be reviewing the potential need to replace RIVPACS reference sites that may have been sampled with inappropriate sampling methods.

In the River Laboratory experimental channels, the FBA has contributed to a NERC funded project led by Jon Grey (QMUL) that is studying the role of methane as a source of carbon in chalk streams. The FBA has contributed by investigating appropriate experimental configurations for the experimental channels, balancing slope and light levels to better represent a natural chalk stream.

The FBA has also continued its work on long term invertebrate monitoring of the River Frome and River Piddle along with the collection of diatom samples and temperature data.

During the summer the River Laboratory hosted MSc student Jennifer Hoare from Cardiff University. Working with John Davy-Bowker, she was gaining an understanding of the up- and down-welling research kit that John has created, in order to facilitate its use in future research into this important area. Jennifer investigated the precision and repeatability of oil-drum type seepage meters and found that these devices are prone to numerous sources of error and uncertainty. A publication on this work is planned in due course.

The 2010 Hugh Cary Gilson Award was to Louis Kitchen, of the Riverfly Partnership. His project, looking into whether the upland summer mayfly *Ameletus inopinatus* is suffering due to increasing temperatures in the high altitude streams to which it is confined, was carried out in the summer of 2010, and preliminary findings were reported in the Winter 2010 edition of *FBA News*. The 2011 award went to Chris Hassell (Carleton University, Ottawa, Canada), for a project entitled: *Ottawa's ponds: an open air laboratory for research into urban ecology*.

On a more general note, a request to Life Members to support a research fund yielded a generous £6000 for the first year, with some offers of funding for subsequent years. This provides a budget to allow staff to carry out small research projects, expenditure on which has been deferred into the new financial year.

Our Honorary Research Fellows continued their valuable output and contribution to the FBA; their individual reports appear on pages 12 to 22.

Supporting activities

In April, Windermere-based staff went on the road to four primary schools in south Cumbria as part of National Science week, teaching the pupils about the importance of fresh waters and their associated plants and animals. National Moth Night 2010 was held in May and our evening was bigger and better than ever: the 'Creatures of the night' event encompassed bats, moths and adult aquatic insects and included bat and moth talks and demonstrations, bat detectors and a moth trail. In June, we continued our partnership with National Insect Week and took part in a themed event at Manchester Museum - 'Bugs Big Saturday' - which attracted nearly 2000 visitors. We were able to host several students from local schools during the year on work experience placements.

The FBA was proud to be a sponsor of the triennial conference of the Riverfly Partnership (RP), held at the Natural History Museum in March. This is an important initiative to involve non-specialists in monitoring the health of rivers, and as such is one in which the FBA takes

an active interest, acting as a hub for training in sampling and identification techniques and with representation on the RP Steering Committee.

Sites

After several years of negotiation, the Station Cottage site at Windermere was finally sold to the National Trust (NT) in December. Mostly derelict and unused by the FBA for the past five years, the NT is planning to re-connect it with the Claife Station, a Georgian structure built on the hill above to enable its visitors to admire the view along the lake. In due course, the site will be developed as a visitor attraction. The site still houses the water tank and emergency generator for the Hatchery, so will be jointly used by the FBA and NT for the foreseeable future.

Environmental Services Group (ESG), formerly known as Soil Mechanics, is a consultancy working with the construction industry that has been a tenant of the Farmhouse at the River Laboratory for five years. Early in 2011, as part of a downsizing, they moved out of the main Farmhouse building, but have retained occupancy of part of the Farmhouse Annexe, and are intending to remain on the site for at least another five years. The Farmhouse is now vacant and we are looking for potential new tenants or alternative uses for the building.

Both FBA sites hosted university field courses in 2010; Aberystwyth, Bristol and Manchester Metropolitan Universities visited Windermere while Birmingham and Queen Mary, University of London took advantage of facilities in Dorset.

The Hatchery now plays host to some plants – spring quillwort (*Isoetes echinospora*), housed temporarily while United Utilities carries out remedial work on the west Cumbrian reservoir that is their normal home. The reservoir is one of only four sites in Cumbria in which this vulnerable plant lives, hence our involvement in helping to maintain the population during this period.

The FBA has hosted various community activities at the River Laboratory, including regular Parish Council meetings, meetings for the Frome and Piddle Fishing Association and Dorset Wildlife Trust, yoga classes and its role as a General Election polling station. We were also particularly pleased to host a field meeting of the London Freshwater Group in July 2010.

Personnel

The FBA said goodbye to two long serving and senior members of staff in 2010-11. Kearon McNicol, head of Library and Information Services, left after ten years to join the teaching profession, while Catherine Humphreys, Finance Manager, left after seven years to work for an educational publisher. We have, on the other hand, welcomed quite a few new staff members. Full details of new appointments are given in the Spring 2011 issue of *FBA News*, but briefly they are as follows.

Christine Davey joined as an Information Support Officer in November to assist the DIS and Knowledge Transfer teams, partially to help to deliver the ASFA-funded digitisation project. Paul Johnson joined as a Web Developer in September to assist with the JISC funded FISH.Link project. Marie-Pierre Gosselin, mentioned above, joined in October. Judith Lomax joined in January as Finance Manager.

Finally, mention must be made of Emily Bateman, a graduate from the University of Sheffield, who joined us as a volunteer in September and remained with us for the rest of the financial year and beyond, during which time she made herself indispensable with her enthusiasm and desire to get involved in so many areas of activity. Emily arrived soon after the departure of Daniel Turner, another long-serving volunteer who had spent the best part of a year with us on a sandwich year placement as part of his degree at the University of Leeds.

Governance

The AGM in September adopted the new Memorandum and Articles of Association of the FBA, replacing and simplifying those that had been in place, with amendments, since the 1930s. It also elected a new suite of Officers of Council. Sir Martin Holdgate retired from the Presidency after eight years of effective, to be replaced by our former Chairman, Professor Alan Hildrew. He, in turn, was replaced as Chairman by Professor Chris Spray. Also retiring after eight years' service was the Treasurer, Dr Ian Dunn, to be replaced by Mr Peter Andrewes. The new Articles of Association no longer require Officers to be re-elected annually, but instead allow them to stand for four-year terms but, as these new rules only came into force after the AGM, all three Officers will be standing for re-election at the 2011 AGM.

We must also record the sad loss of several Vice Presidents of the FBA during the year. Professor Clifford Mortimer and Professor C. Terence Ingold passed away in May 2010; and Sir John Gray, a former President, passed away in January 2011.

Membership

The year saw a decline in the number of members. This was anticipated as we put up fees and altered the benefits package during the year. We were disappointed to lose members in this way, but the loss was not as great as we had feared it would be. There were 48 new members and 212 lost over the year. Membership stood at 1342 at the end of March 2011.

Terry Langford stepped down after nearly 15 years as editor of *FBA News*, to be replaced by Jon Grey (Queen Mary, University of London), who takes over as it moves from four to three issues per year. We are grateful to both for dedicating their time to this important membership service.

In December we were pleased to announce the launch of our new website (www.fba.org.uk). The improved site is clean, clear and offers a reduced number of top level navigation tabs which, as well as giving information about the Association, reflect the main products and services the FBA offers. New features include links to Twitter (www.twitter.com/freshwaterbio) as well as an FBA Facebook page (www.facebook.com/freshwaterbio) and a blog on the homepage, which replaces the old news section. The site has been built with a lasting, flexible, easy to use content management system which should enable the staff to update content more easily.

Reports from Honorary Research Fellows

FBA Honorary Research fellowships are awarded to distinguished scientists who wish to continue their research after retiring from employment. The FBA provides desk space and laboratory facilities and in return gains scientific recognition through published papers as well as promotion of the Association through presentations and support.

Below are short reports from the Honorary Research Fellows outlining key science-related activities during the year. Note that many of the Fellows are also involved in other activities, including training courses, provision of advice and management of facilities, and they are mentioned in these contexts elsewhere in this report.

Patrick Armitage

Applied Invertebrate Ecology

I have collaborated with the Universities of Loughborough, King's College London, Plymouth and Southampton in working up data from previous studies and in developing new areas of research. In addition I maintain daily contact with my colleagues in the River Communities Group (formerly CEH but now School of Biological and Chemical Sciences, Queen Mary, University of London - QMUL) in an advisory and collaborative role.

The paper examining the use of Chironomidae in characterising the palaeoflow regime of a large mid-late Holocene floodplain palaeochannel of the River Trent (Derbyshire, UK), led by Loughborough University in collaboration with the Environment Agency and Natural History Museum, is now published (Howard et al 2010). Data on species and generic-level ecological associations has provided useful information on habitat characteristics and channel evolution history.

My work on the small streams of the River Frome catchment and adjacent areas continues. A paper on the relationship between catchment characteristics and faunal communities using the data from nine streams collected over the last 10 years (Armitage & Blackburn 2010) formed part of a collection of studies on the effects of catchment management on stream process and condition published in *Freshwater Forum*.

East Stoke Fen is a designated SSSI situated adjacent to the River Frome. In 2009, in collaboration with staff from Queen Mary, University of London based at the River Laboratory, a survey was carried out to identify the range of freshwater sites and describe their macroinvertebrate communities (Hawczak *et al*, submitted to *Dorset Proceedings*). The study links with an investigation of aquatic micro and meio fauna currently in progress in the Fen and supported by the Esmée Fairburn Foundation and carried out by Queen Mary staff (Prof Finlay and Dr Esteban).

My involvement with another Esmée Fairburn project (University of Plymouth and King's College London) "*Evaluating and protecting the biodiversity of tidally-influenced river reaches*" has now ceased with the publication of the Final Report. The project was a first attempt to document the biodiversity associated with transition zones and the results suggest that future work should extend the coverage; set up permanent monitoring stations in a sub-set of rivers, examine the role of anthropogenic structures and other stressors on the biota, and develop models for monitoring ecological change

My collaboration with Terry Langford (University of Southampton) and John Davy-Bowker (FBA) on a chapter on aquatic macroinvertebrates of the New Forest is now published (Langford *et al* 2010). In addition I have contributed to a document produced to underpin decisions about defining appropriate environmental targets to control adverse effects of anthropogenic flow modifications on the characteristic flora and fauna of UK rivers. (Mainstone, C.P. 2010. *An evidence base for setting flow targets to protect river habitat*. Natural England, Peterborough, pp50). The evidence contained within it is also relevant to the control of flow-related impacts on river ecology under the Water Framework Directive and the UK Biodiversity Action Plan (BAP). I am also involved with 'Purbeck Important Ponds Project in an advisory role and have re-instated the 'Botany Pond' at the River Laboratory.

Work on the effects of sediment from the Bovington training ranges has been going since November 1999 but due to financial stringencies at the Ministry of Defence this work has now ceased, although the data set will be used to examine long-term changes in widely different but adjacent water courses, the Bovington Stream and the adjacent River Frome. I still attend Bovington Conservation Group meetings and have advised the range management team on sediment control methods.

Current work includes the collation and processing of data collected from a survey of small temporary habitats and a survey of a recently modified Winterbourne (first examined by River Lab staff in the 1970s).

J. Malcolm Elliott

Ecology of Freshwater Fish and Zoobenthos

Although there is a huge amount of information in this field, there is still a need for detailed quantitative studies, especially those leading to the development of predictive models. Most of my work is aimed at fulfilling this need. However, I have also retained an interest in the natural history of freshwater animals, including the publication of monographs in the FBA

series of scientific publications. At the start of this reporting year, the book on larvae of Ephemeroptera was published and has been well received (Elliott & Humpesch 2010). A large part of my time was spent preparing a one hour Plenary Lecture for the Annual Symposium of the Fisheries Society of the British Isles on Fishes and Climate Change. A paper, based on this lecture, has now been published (Elliott & Elliott 2010), and is summarised below.

Atlantic salmon *Salmo salar*, brown trout *Salmo trutta* (including sea trout) and Arctic charr *Salvelinus alpinus* (including anadromous charr) provide important commercial and sports fisheries in Western Europe. As water temperature increases as a result of climate change, quantitative information on the thermal requirements of these three species is essential so that potential problems can be anticipated by those responsible for the conservation and sustainable management of the fisheries, and the maintenance of biodiversity in freshwater ecosystems.

Salmo salar has the highest temperature tolerance, followed by *S. trutta* and finally *S. alpinus*. For all three species, the temperature tolerance for alevins is slightly lower than that for parr and smolts, and the eggs have the lowest tolerance; this being the most vulnerable life-stage to any temperature increase, especially for eggs of *S. alpinus* in shallow water. There was little evidence to support local thermal adaptation, except in very cold rivers (mean annual temperature < 6.5°C).

The importance of developing predictive models was illustrated by data from a long-term study (1967-2000) of a juvenile anadromous *S. trutta* population. Individual-based models predicted the emergence period for the fry. Mean values over 34 years revealed a large variation in the timing of emergence with about two months between extreme values. The emergence time correlated significantly with the North Atlantic Oscillation Index, indicating that inter-annual variations in emergence were linked to more general changes in climate. Mean stream temperature increased significantly in winter and spring at a rate of 0.37 °C per decade, but not in summer and autumn, and led to an increase in the mean mass of pre-smolts. A growth model for *S. trutta* was validated by growth data from the long-term study, and predicted growth under possible future scenarios. Small increases (< 2.5°C) in winter and spring would be beneficial for growth with one-year-old smolts being more common. Water temperatures would have to increase by about 4°C in winter and spring, and 3°C in summer and autumn before they had a marked negative effect on trout growth.

I was also a co-author of three papers. The first was written for a special issue celebrating Darwin's pioneer studies on earthworms (Kutschera & Elliott 2010), and the second was one of the few papers dealing with the macroinvertebrate community on the stony shore of a subarctic lake (Klemetsen & Elliott 2010). My co-author was an ex-member of Council and a life member of the FBA. Finally, I was one of 25 authors on a paper examining trophic level asynchrony in rates of phenological change for marine, freshwater and terrestrial environments (Thackeray *et al.* 2010).

D. Glen George **Zooplankton**

Papers on the long-term effects of changes in the weather

A paper on the combined effects of enrichment and changes in the weather on the abundance of *Daphnia* in Esthwaite Water has been revised for publication. This is an expanded version of a paper presented at the meeting organised by CEH in May 2010 to review 65 years of work on the Windermere catchment. The paper now includes more information on the factors influencing the phenology of the *Daphnia* and the timing of the spring diatom bloom.

A paper on the impact of different 'weather types' on the surface temperature and mixing characteristics of four Cumbrian lakes is in preparation. The 'weather types' used are those defined in an established system of classification which reflects the daily variations in the atmospheric pressure over the British Isles. In summer, the most influential weather types were the pure and hybrid 'anticyclonic' categories. The physical stability of the lakes was

always high when the synoptic situation was dominated by these circulation types. The most pronounced increases were recorded in Esthwaite Water, a small lake situated in a sheltered valley. Systematic variations of this kind are particularly important since they can either mask or amplify the effects of global warming. Meteorologists still have a poor understanding of the processes that regulate these variations, which are often correlated with events in the Pacific as well as the Atlantic Ocean.

Proposed book 'The Lakes of Wales'

Following the FBA's meeting in Bangor, I agreed to help Dr Catherine Duigan edit a book on the lakes of Wales. This book will include chapters on topics that range from the quaternary history of the lakes to the distribution and ecology of the fish. I am currently drafting an introductory chapter and collating data for a chapter on the climatic sensitivity of selected lakes.

Terry Gledhill

Invertebrate Taxonomy

The second volume of the key to water mite species of central and north-western Europe was published in the spring of 2010. This volume deals with two large superfamilies, Hydryphantoidea and Lebertioidea. Keys and diagnoses are provided for the two superfamilies, nine families, nine subfamilies, 33 genera, 20 subgenera and 178 species. The keys to species are followed by species descriptions with additional information on similar species, preadult stages, habitat and biology and distribution. Work on volume three, in collaboration with colleagues Dr Reinhard Gerecke (University of Tübingen, Germany), Dr Harry Smit (University of Amsterdam, The Netherlands), Dr Antonio Di Sabatino (University L'Aquila, Italy) and Dr Vladimir Pesic (University of Crna Gora, Montenegro) continues. This, the final volume, also deals with two large Superfamilies, Hygrobatoida and Arrenuroidea, both with many genera and species.

I examined and identified 'water mites' collected by Lee Knight (Subterranean Crustacea Recorder) and Tim Johns (Environment Agency) during the 'Groundwater Animals UK' project (lead organisation, Roehampton University). The majority of mites collected were freshwater halacarids (aquatic mites related to the marine Halacaroidea). Water mites in the strict sense, Hydrachnidia, were absent from these samples.

I am currently examining 'water mites' collected by Mark Dunscombe (Roehampton University) from the hyporheic of the River Skirfare in the Yorkshire Dales National Park.

A week in April was spent teaching Octavian Pacioglu, a PhD student at Roehampton University, the techniques of preparation and identification of water mites, both Hydrachnidia and Halacaridae.

The subterranean amphipod crustacean *Microniphargus leruthi* Schellenberg, 1934 was discovered in East Cork, Ireland in 2006, with more recent finds in Louth, Mid Cork and Clare. This species was previously known from a small number of locations in Belgium, Germany and Luxembourg. The disjunct distribution of this species suggested its occurrence in Britain (as the genus name suggests, it is a small species ca. 2mm). I have examined and confirmed the identity of specimens collected by Lee Knight and Tim Johns (GW project) and Debbie Allen and J. Sorrenson (British Geological Survey) as *Microniphargus leruthi*. The species is currently recorded from Dorset, Devon, Somerset and Gloucestershire.

In May I tutored a two day course on the identification of subterranean amphipod crustaceans at the River Laboratory for Dr Louise Maurice and Debbie Allen (BGS) and Tim Johns (EA).

Verification of identifications of invertebrates for colleagues, from extra FBA sources and refereeing of manuscripts (mostly for *Zootaxa*) has continued.

**Elizabeth Haworth *Diatoms and Palaeolimnology*
Honorary Curator of the Fritsch Collection of Algal Illustrations**

Diatoms and Palaeoecology

Actual diatom research has been minimal this year but the interest remains and in helping others; the diatom chapter for the 2nd edition of British Flora has been revised for publication in 2011. Because of my involvement in the dating of sediment records using those of the phytoplankton, I attended the meeting celebrating 65 years of Windermere catchment studies in Spring 2010. I also attended the 21st International Diatom Symposium in Minneapolis/St Paul, where I had worked in the University of Minnesota's Limnological Research Center in 1967.

Further work on Windermere has involved me with the recent Southampton Oceanography and British Geological Survey study of the Windermere Basin and also in collaboration with Dr Suzanne McGowan (recent FBA Gilson Award holder) on a paper on recent sedimentary records illustrating the changes in sewage treatment in the Windermere catchment and their effect on the lake.

Fritsch Collection of Freshwater, Brackish and Terrestrial Algal Illustrations

Progress has been slow as my input is only part-time. However, the request for voluntary help produced several responses and I have had several visits from Brian Godfrey, an FBA member in Dorset. Together we have attended to various matters in several three day sessions, entering new data, conservation repairs to some of the sheets and recently adding further digital photos of Desmids to our files in preparation for an online website. I hope to find other volunteers who may give more valuable help of this type.

Checking the species sheets before photography for the errors that have come in from published data, provides an interesting and historical view of algal nomenclature; authors mistakes travel through time like Chinese whispers! However, the need for identifying taxa to the correct original description remains of supreme importance and taxonomy is continuously evolving.

While journal literature alerts are useful, my access to libraries remains limited and we are grateful for algal taxonomy reprints. The Fritsch Collection continues to provide help and responds to requests for information.

Mike Ladle

Dorset Fishery Management and Ecology

Dr Stewart Welton and I again collaborated successfully on the control of the Blandford Fly for a number of local authorities in Dorset. Analysis of samples of larvae, taken before and after application of a different formulation of *Bti* VectoBac 12AS. This was found to be a very effective simuliicide when used against the larvae of *Simulium posticatum* under the conditions prevailing in the River Stour.

The reconnaissance survey was completed in mid-March. As a result, treatment was planned for late March-early April. Larval monitoring and treatment with VectoBac 12AS were carried out in the period 8-9 April under medium flow conditions and average water temperatures, after several earlier postponements due to heavy rain, high river levels and turbid water conditions.

Analysis of samples of larvae, taken before and after application of VectoBac 12AS, showed that the mean mortality was 99% (91% odds ratio method of calculation) at Blandford and 100% at Longham. These are the best results since the control programme began twenty years ago.

I still visit the River Laboratory to liaise with members of the staff of FBA and other organisations and in 2010-2011 have again been assisting with the capture and tagging of pike. In January 2011 while fishing for pike baits on FBA water I caught a small chub – a species not previously known to occur in the River Frome.

I again attended meetings of the Wessex Region Fisheries Forum and will continue to do so as required. I have also continued as chairman of the River Frome Conservation Trust and as advisor to the River Allen Association.

The run of salmon on the Frome in was again poor but as in 2010 catches were substantial and as far as I can ascertain the FBA water at West Holme produced 16 fish, half the catch for the entire River (the fisheries are valued on the basis of numbers caught). All salmon are now returned alive.

I am still responsible for the administration of the FBA fishing at West Holme, dealing with the fishermen, fees, fishing rota and reporting on the state of the fishery, its banks and bridges etc. As I said last year the fishing hut at West Holme has been replaced and it is excellent. The bridge furthest upstream at East Stoke has been well repaired and is now in good condition. Other bridges at East Stoke and West Holme however, are still in an unsatisfactory condition and will need to be repaired in the near future.

As usual I volunteered my services to the annual fund raising auctions of the Atlantic Salmon Trust and the Salmon and Trout Association.

Allan Pentecost

Algal Ecology

I retain a particular interest in the ecophysiology of freshwater algae and the chemistry of phosphorus in freshwaters. This year has seen the publication of three articles and progress in both of the above areas.

A laboratory study of photosynthesis and calcification in *Rivularia*, a colonial freshwater cyanobacterium, was published in the *European Journal of Phycology*. The work was undertaken with Uli Franke of the Max Planck Institute of Marine Biology at Bremen. His laboratory was equipped with an oxygen optode that allowed oxygen production to be mapped in two dimensions as a function of the photosynthetically available radiation. Our set-up allowed us to measure photosynthesis within *Rivularia* colonies and determine the depth within the colony where it was at a maximum. Under conditions simulating a bright summer day, maximum rates were obtained at depths of 1-3 mm below the colony surface. Microanalysis of the calcium carbonate content of the colonies demonstrated that this did not correspond with the maximum rate of calcium carbonate deposition and confirmed that calcification is only partially linked to photosynthesis. Freshwater streams in which *Rivularia* grows have a high alkalinity and dissolved calcium content, permitting carbon dioxide gas to escape to the atmosphere. This leads to calcium carbonate supersaturation in the water and the growth of non-photosynthetic calcium carbonate within the *Rivularia* colonies.

Two further algae articles were published. During a survey of the cyanobacterium genus *Schizothrix*, noted in the previous report, a site containing *Mesotaenium kramstei* was discovered. This is a rare desmid, and with the assistance of David Williamson, we have been able to obtain a better understanding of its ecological requirements.

After a summer field course and lecture given to the Cave Research Group on cave floras, a small study was undertaken on the 'lamp floras' of English tourist caves. These floras develop around points of illumination deep within caves and are often dominated by algae. The floras of three caves were investigated and White Scar Cave in Yorkshire proved to be of particular interest. Here, the cyanobacterium *Phormidium valderianum* growing on the wet cave walls was enriched with the photosynthetic pigment phycoerythrin when exposed directly to the fluorescent lighting, but enriched with phycobilins when exposed only to light reflected from the cave walls. This unusual example of 'chromatic adaptation' was

demonstrated by comparing the emission spectrum of the lamps to the absorption spectra of the pigments. The cave algae floras of the UK are poorly known compared with those of the European mainland and the resulting article provided several new records of cave algae for the UK.

Other work included an uncommissioned report on the algae from the Tarn Hows area of Cumbria for Natural England; further analytical work on the Malham Tarn marl cores, a report on the phytoplankton of Malham Tarn for the National Trust, progress on a review of subaerial cyanobacteria with Professor Brian Whitton and taxonomic revisions for the new edition of the Freshwater Algae of the British Isles. A trip to Iceland in the summer allowed a short study of some hot spring algae at Stjani, and a lava-cave flora at Laki is to be published in the future.

The phosphorus review work has been delayed by work on the library, but a considerable amount of reading was undertaken on lake phosphorus modelling in preparation for a review on the history and development of these models.

Ian Pettman

The two main aims of this fellowship are 1) to be available to the Data and Information Services (DIS) staff for consultation and mentoring and 2) to undertake research, development and contracts on information retrieval tools and systems for the aquatic sciences.

Consultation for DIS staff encompassed the following:

- assistance with regular enquiries for library, unpublished documents, data and samples; advising on search and retrieval strategy for literature searches;
- contributing to monthly DIS strategy/management meetings; development of vision/mission/aims and objectives for DIS;
- assisting with funding bids to ASFA, JISC and Defra, most which have been successful;
- a bid to host Aquatic Commons (unsuccessful), plus assistance with poster presentation for the IAMSLIC meeting in Argentina;
- training in thesaurus software and in standards for FISHNet and Defra work.

The majority of the information retrieval work in this period has been contracted input for tool and system development. Some useful work is beginning with Manchester University on vocabularies and the SKOS Standard - being developed as resources for the FISH.Link and Defra contracts and future bids.

Asfa Geographic Authority work ran from March to September 2010 and was undertaken with Hardy Schwamm. We produced an enlarged and revised Geographic Authority List (GAL); a revised Geographic Indexing Guidelines section for the ASFA Indexing Guidelines publication; and an enlarged and corrected "Pick-List of Geographic indexing terms". The Pick List is incorporated in the ASFA input software and used by Partners when indexing documents. It comprised approximately 15,000 strings (mainly erroneous) and now (post contract) comprises approximately 26,000 geographic indexing strings relevant to the aquatic sciences and corrected in line with the new GAL.

I assisted with the FISHNET and FISH.Link projects wherever possible. This included an ongoing project to produce an Excel spreadsheet of the Bill Smyly crustacean data collected by Smyly from the Cumbrian Tarns from the original document roll in the unpublished collection, in order to augment the Tarns Database data in the FISHNet project.

I represented the FBA at the ASFA Board Meeting, June 2010 in Morocco – along with Hardy, where we presented the Geographic work and tabled the successful bid for digitization funding.

Colin Reynolds

Ecology and Modelling of Phytoplankton

My career has been built around experiences in field sciences, gained whilst with the Field Studies Council, and research on phytoplankton dynamics, undertaken under the supervision of the FBA, before its programmes were taken over by the Natural Environment Research Council, first as the Institute of Freshwater Ecology and then as the Centre for Ecology of Hydrology). My interest in plankton, which began in my years as an undergraduate, was able to flourish under the guidance and supervision of Dr J.W.G.Lund. The work I did at Windermere was mainly experimental; I led the programme on the large limnetic enclosures (the "Lund Tubes") in Blelham Tarn, from 1978 to 1984. There followed a fascinating seven-year interlude investigating the factors governing plankton dynamics in rivers. The last years of my employment were dominated by data analysis and, with Anthony Irish, devising model approaches to simulating *in-situ* growth and mortality of phytoplankton, using the accumulated data from the Blelham work. We succeeded in developing the essentials of the PROTECH family of models, which have helped to refine our understanding of phytoplankton ecology, attested in the publication of several books and many papers and reports, and in our ability to apply the model to formulating solutions to a series of practical problems experienced by the private water companies, their regulators and of major strategic developments, such as the Cardiff Bay Barrage and the Upper Thames scheme.

I have kept up some of these interests under my fellowship arrangement. The last twelve months have been particularly exciting, as recent work with former colleagues (Maberly, Parker, DeVille) and students (Elliott, Kruk), has resulted in publications assessing the strengths and values of the original contributions. I am particularly encouraged by the powerful verification by Carla Kruk of the allusions I made thirty years ago, about the decisive links between phytoplankton morphology and dynamics. How species are selected and how populations are built in the wild provide the basis of the latest essays that I have submitted for publication. Another, co-authored at Windermere, provides an analysis of a forty-year sampling programme on Grasmere, during which the lake deteriorated as a result of sewage disposal and then recovered through its management. Far from a simple tale of phosphorus eutrophication and recovery, changes to the lake have been governed primarily by its erratic hydrography.

I have continued to support the regard and affection in which the FBA is held by editing its journal, *Freshwater Reviews*. We have a small but dedicated team who work hard to maintain a high quality of contributions and a high standard of presentation (and on which we are frequently complimented) but I regret that external factors still make it difficult to win new subscriptions.

Finally, I report my continuing work for the European Federation of Freshwater Sciences. The federation of the various national associations promoting limnology and freshwater sciences now involves twelve constituent bodies, the Limnological Society of Turkey and the Slovakian Limnological Society being the newest members.

Roger Sweeting

Water Quality and Fish Biology

The Hatchery as an ark for pearl mussels continues to be my major area of interest. During 2010-2011 we have added a further population to the Ark from the River Lune: on arrival many of these animals were in a slightly stressed condition although after two weeks all 31 adults seem to be feeding (determining the health of adult mussels is not easy and the accepted technique of assessing it is by a relatively crude measure of the strength of their adductor muscles). So there are now nine different English populations present at the FBA's Windermere hatchery. Our main aim is to maintain these populations and enable them to produce viable offspring which we will rear until the restoration of their parent river catchments is sufficiently complete to allow restocking to be carried out.

Last year I reported that some populations only complete their larval stage on salmon and others only on brown trout. The mussels received from the River Clun (Shropshire) just over a year ago seem determined to prove they are an exception in that there are still glochidia on both brown trout and salmon after 6 months although there are marked differences in sizes. The extremes of weather (and water temperature) experienced in the last year continues to confound our understanding of the timings for critical events in the mussel life cycle. Our largest juvenile so far produced is now over three years since release from the parent and is a tremendous 12 mm in length.

We have improved the hatchery facilities this year with the completion of the first part of the emergency oxygenation system and the rebuilding of a large shed within the hatchery perimeter: this is in anticipation of more work being carried out in the hatchery in the near future.

An Environment Agency (North East Region) grant has enabled us to employ a post doctoral researcher from September 2010 for the next two years. It was originally a three-year proposal but has been affected by 'fiscal squeezing'. Progress with deciphering data from biological, geological and chemical analyses from the North Tyne (and its major tributary the River Rede) has yielded some new information which we anticipate will provide the basis of any planned pearl mussel restoration in these catchments.

My thanks are due to Louise Miles for her hard work on the project and also to our new post-doctoral researcher, Marie-Pierre Gosselin who brings hydromorphological expertise to the group. Support from my fellow HRF, Ken Clarke, and from Matt Freeman continues to be invaluable.

In 2010 we anticipated rearing a number of locally sourced Arctic charr. Although this was not possible we were able to rear and expose to some of our pearl mussel stock some 1000 Arctic charr derived from Canadian (Yukon) eggs. Although the stock is genetically distinct from our local charr there is evidence of successful infection with glochidia, thus providing additional environmental implications.

The Windermere reedbed restoration project previously referred to in 2010 is still in the application stage-we anticipate some progress this year and are involved in the successful Heritage Lottery Bid called Windermere Reflections.

I participate in the development of standard methods in BSi and CEN (the Comité Européen de Normalisation), particularly with reference to the Water Framework Directive: in February it resulted in a two day CEN workshop being held at FBA to provide a platform for setting water quality criteria for pearl mussel environments.

Nationally I work as an examiner for the Institute of Fisheries Management and locally am vice chair of the South Cumbria Rivers Trust. Both of these organisations provide the much needed link to practical aquatic conservation science.

A report has been completed for the University of Oxford WildCru group on the feasibility and costs of rearing of native crayfish in the Hatchery.

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**THE FRESHWATER BIOLOGICAL ASSOCIATION
(A COMPANY LIMITED BY GUARANTEE)
TRUSTEES' REPORT FOR THE YEAR ENDED 31ST MARCH 2011**

The members of the Council of the Freshwater Biological Association (the Association), acting as Trustees of the Association submit their Annual Report and audited Accounts for the year ended March 31st 2011.

The financial statements have been prepared in accordance with the current Financial Reporting Standards in use and The Statement of Recommended Practice (revised 2005) for Charities (the SORP). The Accounting Standards Board recognises the SORP as being in line with its Code of Practice and the Freshwater Biological Association agrees to follow these principles.

Trustees

The Trustees of the Freshwater Biological Association during the period April 1st 2010 to March 31st 2011 are listed on page 26 of the Trustees' Report. The majority of the members of the Council of Trustees are nominated by either the Council or the general membership and proposed for election at the AGM. These appointments are for four years and Council Trustees cannot be elected for a further term until one year has elapsed since the end of their previous term of office. A further two Trustees are nominated by The Royal Society and the Fishmongers' Company. A review of Trustees skills has been previously undertaken and this has been used to inform the nomination process for prospective Trustees.

Statement of Trustees' Responsibilities

The members of the Council are responsible for preparing the Annual Report and the Financial Statements in accordance with applicable law and regulations.

Company law requires the members of Council to prepare financial statements for each financial year which give a true and fair view of the state of affairs of the Association and of the surplus or deficit of the Association for that period. In preparing those financial statements, the Council is required to:

- select suitable accounting policies and apply them consistently
- make judgements and estimates that are reasonable and prudent
- prepare the financial statements on the going concern basis unless it is inappropriate to assume that the Association will continue its activities.

The Trustees of the Council are responsible for the management of the Association's activities in accordance with its Memorandum and Articles of Association and for the keeping of proper accounting records which disclose with reasonable accuracy the financial position of the Association and which enables the Trustees to ensure that the financial statements comply with the Companies Act 2006. They are also responsible for safeguarding the assets of the Association and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

In accordance with company law, as the Trustees of the Council, we confirm that:

- So far as we are aware, there is no relevant audit information of which the Association's auditors are unaware; and
- We have taken all the steps that we ought to have taken in order to make ourselves aware of any relevant audit information and to establish that the Association's auditors are aware of that information.

Status

The Association is a Company Limited by Guarantee (registered number 263162) and a registered Charity (registered number 214440). The Council of Trustees have no interests in the Association as defined by the Companies Act 2006 and receive no remuneration for their services to the Association. The Association's Trustees do receive reimbursement of travel and subsistence costs necessarily incurred in the performance of their duties. The liability of the Members is laid out in clauses 7 and 8 of the Articles of Association and limits the liability of the members to £10 each.

The Trustees of the Association meet twice yearly to discuss and review the strategic direction of the Association; the operational activities of the Association are fully delegated to the Director. A sub committee of the Council, the Finance and General Purposes Committee, has delegated strategic responsibilities and meets on a regular basis to receive reports on activities from the Director, Finance Manager and Business Manager. The terms of reference for the Finance and General Purposes Committee are reviewed periodically by the Council of Trustees. The delegation of authority to the Director is also reviewed by the Council of Trustees.

**THE FRESHWATER BIOLOGICAL ASSOCIATION
TRUSTEES' REPORT FOR THE YEAR ENDED 31ST MARCH 2011
(Continued)**

Objectives of the Charity

The objects of the Association, as defined by its Memorandum, are to promote the investigation of the biology (in the widest interpretation of the word) of the animals and plants and other organisms found in fresh (including brackish) waters, and to promote the sound and sustainable management of freshwater ecosystems and resources. The current strategic objectives focus on:

- Meeting the information needs of all those involved with freshwater research and management, (whether as amateurs or professionals) by maintaining specialist information resources, along with effective knowledge transfer and knowledge exchange mechanisms
- Supporting high quality research in freshwater science by providing grants, international standard research facilities and mechanisms for facilitating research partnerships
- Maintaining itself as a thriving membership organisation in which those committed to freshwater biology can share common interests.

Review of Activities

The Statement of Financial Activities and the Balance Sheet show that the resources available to the Association have decreased slightly, with a negative net movement of funds totalling £13,776 giving a closing fund balance of £5,220,521. The decrease in the value of members' funds has arisen from realised and unrealised gains on the Association's investments of £205,279, due to the continued improvement in the overall global financial market, set against an operating deficit of £219,055.

This year has seen another reduction in the financial deficit from £282,331 to £219,055. This is a result of the combined effect of an increase in income of £71,264, and an increase in expenditure of £7,988. This is after a one-off receipt of £78,151, being the insurance settlement for the November 2009 flood, the expenditure for which was made in previous periods. The deficit on the Income and Expenditure account has arisen as a result primarily of the Association's charitable activities and the activities it undertakes to generate funds. Investment income declined to £78,492 and the reduction in cash holdings has resulted in a significant drop in interest. This has been the result of the reduction of the value of the funds over the recent years through drawdowns to cover working capital commitments. During the year the Association withdrew £105,000 from the Rensburg Sheppards holdings in order to cover its financial commitments; this was less than the overall deficit as various cash payments were received in advance that have been carried forward into 2011-12, when the relevant expenditure will be incurred.

Key points of financial interest in **Data and Information Services** were further awards of grants to extend activities in data management, sharing and archiving. The most important of these in the long term is the award from Defra to create and manage the Archive for the Demonstration Test Catchment initiative, worth £350,000 to the Association over four years, which contributed some £37,000 to income during 2010-11. The JISC-funded projects continued, with completion of the FISH.Net project (income £92,000 for the financial year) in March 2011, while the FISH.Link project (income £32,000 for the financial year) continues until July 2011. The library secured funding from ASFA worth £23,000 for the financial year. The integration of the Library and Collections with Data services has aided the process of securing external funding.

Activity relating to journals was important for **Knowledge Transfer** during the year. While *Freshwater Reviews* continues to be run at a net cost, the link with Bio-One, a non-profit online distributor of independent titles has proved to be useful, resulting in a small amount of income for the 2010 calendar year, which should increase in future years. The FBA is now publishing *Inland Waters* on behalf of SIL, and the first income for this was received in August 2010, upon the launch of the journal, the £35,000 income, representing payment for the previous year's set up costs.

Although there was a slight reduction in **Membership** during the year, the most significant cause of the decline in Membership income was due to the Environment Agency cancelling its Technical Services Agreement. Membership subscriptions were raised slightly in January 2011, along with a revision of membership benefits, but the Trustees are satisfied that fees continue to represent very good value for the services received, and that the Association will continue to attract students and a broader spectrum of freshwater enthusiasts to its membership base. This is in line with the Association's charitable objectives as well as continuing to ensure that access to the Association is not financially prohibitive.

**THE FRESHWATER BIOLOGICAL ASSOCIATION
TRUSTEES' REPORT FOR THE YEAR ENDED 31ST MARCH 2011
(Continued)**

Research income was enhanced by receipt of funding from the Environment Agency, totalling £160,000 over two years, for the Tyne Restoration Project. This was originally planned as a three year project, and the Association is still exploring options for restoring the third year's funding.

The **River Laboratory** at East Stoke remains both financially and scientifically viable in the medium term, with the majority of the tenants having been established at the site for some time. APEM took on further space on the site, ensuring that the main building remains fully tenanted. The Farmhouse was vacated in March 2011, but its tenant, ESG (formerly Soil Mechanics Ltd), has taken on a new lease in the Farmhouse Annexe. The combination of income and FBA scientific activity at the River Laboratory ensure that it continues to be central to the achievement of the Association's strategic and charitable objectives.

Significant changes for the **Windermere** site included the completion in December 2010 of the sale of Station Cottage to the National Trust for £125,000, being the book value at the time of the sale. The insurance claim for the November 2009 flood damage to the Annexe was agreed and the settlement of over £78,000 was received in November 2010, as noted above. The future of the Windermere Annexe is the subject of ongoing investigation.

Governance changes include the updated Memorandum and Articles of Association, which allow the FBA to be more flexible in methods of communication with members, and also with the timing of the Annual General Meeting. Extending the term limits of Officers of Council of the FBA allows for better continuity, which will be of benefit to the Association.

The continued funding of PhD studentships and award of the Hugh Cary Gilson Fund, totalling £23,915, is considered by the Trustees to be a major contribution towards its compliance with the **Public Benefit Test** laid out in section 4 of The Charities Act 2006. Training courses continue to require some subsidy in order to keep them affordable to individual participants, and other public outreach activities continue to be fully funded by the FBA, further adding to this compliance.

Financial Reserves Policy

The purpose of the Association's reserves is to provide sufficient protection for the Association against changing financial circumstances and to maintain the long term viability of the Association in order to promote its principal charitable objectives. The level of reserves, as reflected in the Unrestricted General Fund Account, and including the revaluation reserve, is represented by Tangible Assets, net current assets and a liquid investment asset reserve. The remaining unrestricted designated funds are made up entirely of liquid investment assets, currently invested on the UK Stock Exchange. These reserves are considered sufficient for the Association to meet its short to medium term expenditure obligations.

Investment Policy

The Association's investments are detailed in Note 13(b) to the Financial Statements. The Finance and General Purposes Committee approved an Investment Policy in December 2005, which provides the framework for the complete investment portfolio of the Association. The policy states that the portfolio should be structured to provide a balanced return between income and capital growth, whilst being sufficiently diversified to spread risk. The Trustees ensure that any investments held reflect the ethical considerations of the Association and that no investment shall be held that is contrary to its objectives.

The majority of the Association's investments (55% by value at 31st March 2011) are managed by Rensburg Sheppards and are considered by the Trustees to be satisfactorily managed. The Investment Policy was reviewed by the Trustees in March 2009 and no changes were made.

Plans for Future Periods

It remains the Association's aim to bring income and expenditure into balance during future periods, through a combination of expanding its income generating activities in line with its charitable objectives and continued rigorous control of expenditure.

Risk Management

During the year the Trustees reviewed the risks to which the Association is exposed and any changes were updated in the Association's Corporate Risk Register. This document was approved by the Council of Trustees, and is reviewed annually by the Council of Trustees as part of its governance arrangements.

**THE FRESHWATER BIOLOGICAL ASSOCIATION
TRUSTEES' REPORT FOR THE YEAR ENDED 31ST MARCH 2011
(Continued)**

Public Benefit Test

Under the terms of The Charities Act 2006, the Trustees have a statutory duty to report on the Association's compliance with the Public Benefit Test, as laid out in section 4 of the Act. The Trustees consider that the aims and objectives of the Association are able to deliver a public benefit and have given due regard to that fact.

Trustees

The following were members of the Council during the year, appointed in accordance with the Articles of Association.

President

Sir Martin Holdgate CB, MA, PhD, Hon.DsC, FIBiol (to 22.09.10)
Prof. A.G. Hildrew PhD (from 22.09.10)

Chairman of Council

Prof. A.G. Hildrew PhD (to 22.09.10)
Prof. C.J. Spray MBE (from 22.09.10)

Honorary Treasurer

Dr. I.G. Dunn MBiol (to 22.09.10)
Mr P.M. Andrewes (from 22.09.10)

Representative Members

The Fishmongers' Company - Dr C. Askew
Royal Society - Professor B. Finlay FRS

Elected Members

Mr P.M. Andrewes (to 22.09.10)
Ms F. Bowles (from 22.09.10)
Dr S. Brierley
Dr L. Brown (from 22.09.10)
Dr M.J. Burgis (to 22.09.10)
Ms G.L. Douglas
Dr I.G. Dunn MBiol (from 22.09.10)

Dr D. Evans (to 22.09.10)
Dr J.I. Jones
Mr C. Mainstone
Prof. L. Maltby
Prof. C. J. Spray MBE (to 22.09.10)
Prof. B. Whitton
Dr I.J. Winfield

The above report has been prepared in accordance with the special provisions of Part 15 of the Companies Act 2006 relating to small companies.

The Ferry Landing
Far Sawrey, Ambleside
Cumbria, LA22 0LP

Dated this 15 June 2011
By Order of the Council
Professor C.J Spray
Chairman of Council

THE FRESHWATER BIOLOGICAL ASSOCIATION
STATEMENT OF FINANCIAL ACTIVITIES
(INCLUDING INCOME AND EXPENDITURE ACCOUNT)
FOR THE YEAR ENDED 31st MARCH 2011

Incoming Resources		Unrestricted Funds		Total	Total
Incoming resources from generated funds	Note	<u>General</u>	<u>Other</u>	<u>2011</u>	<u>2010</u>
		£	£	£	£
<u>Voluntary income:</u>					
Awards and donations	4	15,799	-	15,799	50,052
Activities for generating funds	5	338,647	-	338,647	252,756
Investment income & bank interest	6	78,492	-	78,492	90,861
		-----	-----	-----	-----
		432,938	-	432,938	393,669
Incoming resources from charitable activities:					
	7				
Membership services		30,109	-	30,109	45,114
Scientific research & activity		244,606	-	244,606	71,460
Information & collections		23,004	-	23,004	43,200
Knowledge transfer activities		18,416	-	18,416	124,366
		-----	-----	-----	-----
		316,135	-	316,135	284,140
		-----	-----	-----	-----
Total incoming resources		749,073	-	749,073	677,809
		-----	-----	-----	-----
Resources expended					
Cost of generating funds	8	464,780	-	464,780	416,627
<u>Costs of charitable activities:</u>					
	9				
Membership services		47,006	-	47,006	56,804
Scientific research & activity		187,443	23,915	211,358	143,417
Information & collections		5,952	3,182	9,134	54,639
FBA library		79,484	-	79,484	95,064
Knowledge transfer activities		34,030	-	34,030	68,716
Governance costs	10	122,336	-	122,336	124,873
		-----	-----	-----	-----
Total resources expended		941,031	27,097	968,128	960,140
		-----	-----	-----	-----
Net (outgoing)/incoming resources before transfers and other recognised gains/(losses)		(191,958)	(27,097)	(219,055)	(282,331)
Gain on the revaluation of tangible assets		-	-	-	405,277
Net gain on investments	13b	174,103	31,176	205,279	987,418
		-----	-----	-----	-----
Net movement of funds in year		(17,855)	4,079	(13,776)	1,110,364
Reconciliation of funds					
Total funds brought forward 2010		2,705,752	2,528,545	5,234,297	4,123,933
		-----	-----	-----	-----
Total funds carried forward 2011		2,687,897	2,532,624	5,220,521	5,234,297
		=====	=====	=====	=====

All incoming resources and resources expended derive from continuing activities and the Statement of Financial Activities includes all gains and losses recognised in the year.

The realised gain from the sale of Station Cottage of £114,306 over the historical cost of £10,694 has been transferred to the General Fund Account.

The total net gain on investments of £205,279 (2010: £987,418) includes realised gains of £22,158 (2010: realised losses of £14,789) attributable wholly to the General Fund Account.

THE FRESHWATER BIOLOGICAL ASSOCIATION
BALANCE SHEET AS AT 31st MARCH 2011
COMPANY NUMBER 263162

	Note	2011		2010
		£	£	£
Fixed Assets				
Tangible	13a		2,000,952	2,129,820
Investments	13b		3,171,070	3,070,791
			-----	-----
			5,172,022	5,200,611
Current Assets				
Debtors and Prepayments	14	189,527		130,617
Cash at Bank and in Hand		93,496		67,926
		-----		-----
		283,023		198,543
Less Current Liabilities				
Creditors (due within 1 year)	15	(234,524)		(164,857)
		-----		-----
Net Current Assets/(Liabilities)			48,499	33,686
			-----	-----
Total Assets Less Current Liabilities			£ 5,220,521	£ 5,234,297
			=====	=====
Representing Members' Funds				
Unrestricted				
General Fund	16		2,396,926	2,300,475
Designated Funds	17		2,532,624	2,528,545
Revaluation Reserve	18		290,971	405,277
			-----	-----
			£5,220,521	£ 5,234,297
			=====	=====

These accounts have been prepared in accordance with the special provisions relating to small companies within Part 15 of the Companies Act 2006.

Approved on behalf of Council by Professor C. J. Spray : Chairman 15th June 2011

THE FRESHWATER BIOLOGICAL ASSOCIATION
(Limited by Guarantee)
NOTES TO THE ACCOUNTS

1. Status

The Association is a Company Limited by Guarantee and not having a Share Capital. The liability of the Members who constitute the Association is limited to £10 per Member. An elected Council of Trustees who constitute honorary directors of the Association for Companies Act purposes manages the affairs of the Association. Details of the Council Members are given in the Trustees Report.

2. Accounting Policies

(a) Accounting Convention

These accounts have been prepared under the Historical Cost Convention as modified by the revaluation of fixed assets (note 13) and provide the required information in accordance with the Statement of Recommended Practice (revised 2005) for Charities, applicable UK standards and the Companies Act 2006.

(b) Fund Accounting

The General Fund is made up of unrestricted funds, which are available for use at the discretion of the Trustees of the Association in the furtherance of the general objectives of the Association.

Designated funds represent unrestricted funds that have been bequeathed, donated or set aside by the Trustees of the Association for the furtherance of its activities by means of specific sponsorship.

(c) Incoming Resources and Resources Expended

Membership, Life Membership, donations, and other voluntary income is included only when received, whilst all other income, such as rent, publications, ferry commission, and confirmed grant income is accounted for on a receivable basis. Grant income is deferred when it relates to activities in future periods. All expenditure is accounted for on an accruals basis, net of VAT. Irrecoverable VAT is expensed in the statement of Financial Activities under the heading of Governance costs. Directly attributable costs are charged in full to the relevant activity; indirect costs are apportioned across all activities on the basis of area for building related overheads and headcount for all other administration, I.T. and consumable costs.

(d) Tangible Assets and Depreciation

Freehold property at Windermere and East Stoke was revalued during the year ended 31st March 2010 using an 'existing use' basis, in line with FRS15. The Freshwater Biological Association has adopted FRS15 and will formally revalue its property class of tangible assets every five years. Depreciation will be charged in future years on the buildings element only, which represents 60% of the total value of this class of tangible assets. Scientific apparatus and other equipment below the value of £1,000 are not capitalised.

Depreciation is charged on a straight line basis, in order to write off the assets over their useful economic lives as follows:

Buildings over 50 years
 Computer Equipment over 4 years
 Scientific Equipment over 5-10 years

Previously no depreciation has been charged on buildings.

(e) Library and Stocks

No value is attributable in these accounts to the library or to stocks of publications as their net value is not considered material.

(f) Cash Flow

The FBA is considered a small reporting entity for the purposes of FRS1 and is exempted from producing a cash flow statement.

(g) Investments

The value of the investments which are held as part of the Association's investment portfolio are restated at market value.

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

3. Net (outgoing)/incoming resources for the year

This is stated after charging:

	<u>2011</u>	<u>2010</u>
	£	£
Depreciation	47,532	21,152
Auditors remuneration	2,600	2,781
	<u> </u>	<u> </u>

	Unrestricted Funds		<u>2011</u>	<u>2010</u>
Incoming Resources	General	Other	£	£
	£	£		
4. Awards and Donations				
Membership donations	11,096	-	11,096	42,682
Legacies and other donations	-	-	-	-
Gift Aid	4,703	-	4,703	7,370
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	15,799	-	15,799	50,052
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
5. Activities for generating funds				
Scientific and special publications	13,616	-	13,616	12,732
<i>Freshwater Reviews</i>	7,910	-	7,910	5,088
Land and building income:				
Windermere	18,700	-	18,700	20,236
East Stoke	164,770	-	164,770	160,242
Research contract	105,081	-	105,081	36,905
Windermere ferry contract	19,832	-	19,832	15,465
Miscellaneous income	8,738	-	8,738	2,088
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	338,647	-	338,647	252,756
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
6. Investment income				
Bank deposit interest	114	-	114	138
Investment Income	78,378	-	78,378	90,723
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	78,492	-	78,492	90,861
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
7. Charitable activities				
Membership services	30,109	-	30,109	25,114
Technical service agreements	-	-	-	20,000
Scientific research & activity	192,356	-	192,356	71,460
Freshwater <i>Life</i> programme	-	-	-	10,000
Direct funding and grants	52,250	-	52,250	89,175
FBA Library	23,004	-	23,004	19,025
Training courses and meetings	18,416	-	18,416	49,366
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	316,135	-	316,135	284,140
	<u> </u>	<u> </u>	<u> </u>	<u> </u>

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

<u>Resources Expended</u>	Unrestricted Funds		<u>2011</u>	<u>2010</u>
	<u>General</u>	<u>Other</u>		
	£	£	£	£
8. Cost of generating funds				
Scientific and special publications	49,806	-	49,806	60,940
<i>Freshwater Reviews</i>	23,776	-	23,776	31,027
Land and buildings:				
Windermere	119,721	-	119,721	81,737
East Stoke	219,082	-	219,082	220,458
Research contract	42,228	-	42,228	14,600
Windermere ferry contract	10,167	-	10,167	7,865
	-----	-----	-----	-----
	464,780	-	464,780	416,627
	-----	-----	-----	-----
9. Cost of charitable activities				
Membership services	47,006	-	47,006	56,804
Scientific research activity and awards	187,443	23,915	211,358	143,417
<i>FreshwaterLife</i> programme	5,952	-	5,952	40,299
Fritsch	-	3,182	3,182	14,340
The FBA library	79,484	-	79,484	95,064
Knowledge transfer	34,030	-	34,030	68,716
	-----	-----	-----	-----
	353,915	27,097	381,012	418,640
	-----	-----	-----	-----
10. Governance Costs				
Council meetings and reimbursements to Trustees	5,954	-	5,954	6,864
Other costs – direct and indirect:				
Audit fees	2,600	-	2,600	2,781
Other fees	23,040	-	23,040	13,873
Staff costs	73,022	-	73,022	90,282
Irrecoverable VAT	17,720	-	17,720	11,073
	-----	-----	-----	-----
	122,336	-	122,336	124,873
	-----	-----	-----	-----
11. Staff				

There were 23 (18 FTE) paid employees (2010: 22) of the Association at 31st March 2011.

Total Staff Costs in the year were:	<u>2011</u>	<u>2010</u>
	£	£
Salaries	455,933	430,553
Employer's National Insurance Contributions	28,472	28,122
Employer's Pension contributions	56,791	49,645
	-----	-----
Total	541,196	508,320
	=====	=====

There were no employees in the remuneration band £60,000 to £69,999, or above (2010: none).

12. Trustee Remuneration

No members of Council received any remuneration during the year. Travel costs and Council expenses amounting to £5,954 (2010: £6,864) were paid to 13 (2010: 15) members of Council.

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

13. Fixed Assets(a) Tangible

	<u>Freehold Land & Buildings</u>	<u>Computer Equipment</u>	<u>Scientific Equipment</u>	<u>Total</u>
	£	£	£	£
Cost or Valuation				
At 1st April 2010	2,080,000	74,191	26,034	2,180,225
Additions	-	43,664	-	43,664
Disposals	(125,000)	-	-	(125,000)
	-----	-----	-----	-----
At 31st March 2011	1,955,000	117,855	26,034	2,098,889
	-----	-----	-----	-----
Accumulated Depreciation				
As at 1st April 2010	-	42,594	7,811	50,405
Charge for the year	22,804	22,124	2,604	47,532
	-----	-----	-----	-----
At 31st March 2011	22,804	64,718	10,415	97,937
	-----	-----	-----	-----
Net book value				
At 31st March 2011	1,932,196	53,137	15,619	2,000,952
	=====	=====	=====	=====
At 31st March 2010	2,080,000	31,597	18,223	2,129,820
	=====	=====	=====	=====

The historical cost of Freehold Land & Building is £1,334,148 (2010: £1,344,842). During the year Station Cottage was sold for £125,000 and this equals the revalued amount. The realised gain of £114,306 over the historical cost of £10,694 has been transferred to the General Fund Account.

The Association revalued its Freehold Land and Buildings in line with FRS15 and adopted the revaluation of this class of assets at March 31st 2010. The valuations were carried out by external Independent Chartered Surveyors on an 'existing use' basis and undertaken by Piell and Co. for the land and buildings at the Windermere site and by Powis Hughes for the site at East Stoke in Dorset, and created a surplus Revaluation Reserve of £405,277. The Council of Trustees consider that there has not been any material change to this valuation since the 31st March 2010.

(b) Investments

Quoted investments are valued in accordance with their UK Stock Exchange listings at the balance sheet dates.

	£	<u>Quoted Investments</u>
		£
Market Value at 1st April 2010		3,070,791
Additions/(Disposals)		(90,893)
Investment Management fees		(14,107)
Net Investment Gains:		
Attributed to General Fund Account (Note 16)	174,103	
Gain on revaluation attributed to the Frost Bequest (Note 17)	31,176	

		205,279

Market Value at 31st March 2011		3,171,070
		=====

During the year, £105,000 of capital has been transferred from the account held at Rensburg Sheppards (2010: £315,500) to assist with working capital requirements.

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

13. Fixed Assets (Cont)	<u>Quoted</u> <u>Investments</u>
	£
Acquisition Values	2,499,019
Represented by:	
Investments held on UK Stock Exchange	3,080,004
Cash held as part of Portfolio	91,066

	<u>3,171,070</u>

The principal investments at 31st March 2011 were:

	<u>Market Value</u>	<u>% of Total</u>
	£	%
<u>M & G Charifund</u>		
19,366 Income Units	225,064	7.1
6,026 Accumulation Units	764,490	24.1
<u>J P Morgan Asset Management Ltd</u>		
153,977 Bond Units	213,814	6.7
94,223 UK Equity Fund Units	234,552	7.4

	<u>1,437,920</u>	<u>45.3</u>

The accumulated units received during the year that were reinvested for capital growth had a cash value equivalent of £48,988 (2010: £44,910).

14. Debtors	<u>2011</u>	<u>2010</u>
	£	£
Trade Debtors	102,166	83,105
Other Debtors	62,690	29,186
Prepayments	24,671	18,326
	-----	-----
	<u>189,527</u>	<u>130,617</u>

15. Creditors		
PAYE, NIC and pension	25,651	9,330
Trade Creditors	36,321	21,241
Other Creditors and Accruals	13,156	14,879
Deferred income	152,668	116,609
VAT creditor	6,728	2,798
	-----	-----
	<u>234,524</u>	<u>164,857</u>

16. General Fund Account	<u>2011</u>	<u>2010</u>
	£	£
<u>General Fund Account</u>		
Balance brought forward	2,300,475	1,669,149
Net movement in funds before transfers and other recognised gains	(219,055)	(282,331)
	-----	-----
	2,081,420	1,386,818
Transfer net movement to Other Funds (Notes 4 to 10)	27,097	20,642
Unrealised gain arising from revaluation of Investments (Note 13b)	174,103	893,015
Realised gain on the sale of Station Cottage	114,306	-
	-----	-----
	<u>2,396,926</u>	<u>2,300,475</u>

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

17. Other Funds

	<u>31.3.2010</u>	<u>Income</u>	<u>Expenditure</u>	<u>Transfers</u>	<u>31.3.2011</u>
	£	£	£	£	£
<u>Unrestricted Designated</u>					
Fritsch Fund	6,302	-	(3,182)	-	3,120
Frost Bequest	473,759	31,176*	(19,915)	-	485,020
Frost Exhibition	32,919	-	-	-	32,919
Hugh Cary Gilson Fund	15,565	-	(4,000)	-	11,565
Freshwater Science Fund	2,000,000	-	-	-	2,000,000
	-----	-----	-----	-----	-----
<u>Total</u>	<u>2,528,545</u>	<u>31,176</u>	<u>(27,097)</u>	<u>-</u>	<u>2,532,624</u>
	=====	=====	=====	=====	=====

* Gain on revaluation of investments (Note 13b).

The balances of these funds are included in the Balance Sheet totals of Assets and the portions attributed to the Unrestricted Funds are:

	<u>31.3.2011</u>	<u>31.3.2010</u>
	£	£
Tangible Fixed and Current Assets	132,880	159,977
Quoted Investments	2,399,744	2,368,568
	-----	-----
	<u>2,532,624</u>	<u>2,528,545</u>
	=====	=====

Designated Funds represent sums bequeathed or donated to the Association for the furtherance of its activities by means of specific sponsorship.

The unrestricted designated funds have been set up in order to support the furtherance of the Association's charitable activities. Briefly:

Fritsch Fund – fund established to support the scientific collection of algal illustrations together with taxonomic references.

Frost Bequest – the fund was established from a bequest from the estate of Winifred Frost. The purpose of the fund is to provide income and interest to the Frost Exhibition Fund and represents the original capital sum and accumulated capital growth.

Frost Exhibition – this fund represents the income and interest received from the investments associated with the Frost Bequest. The purpose of this fund is to support studentships and fellowships in freshwater biology and limnology and in particular, studies associated with freshwater fish.

Hugh Cary Gilson – this bequest from Hugh Cary Gilson provides a yearly award to support Members' research activities irrespective of their organisation or status.

Freshwater Science Fund – this fund was established by Council in order to support the attainment of the FBA's core charitable activities. This represents a long term commitment by the Association to the promotion of freshwater science. It has been decided in the short-term that the Fund will be kept constant.

18. Revaluation Reserve

	£
Balance brought forward at 01.04.2010	405,277
Transfer to general fund – realised gain on sale of Station Cottage	(114,306)

Balance carried forward at 31.03.2011	<u>290,971</u>
	=====

19. Capital Commitments and Contingent Liabilities

There were no capital commitments or contingent liabilities at 31st March 2011.

20. Taxation Status

As a Registered Charity (No 214440), the Association is not liable to Income and Corporation Taxes.

**THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)**

20. FRS 17 Retirement Benefits

The Association participates in the Universities Superannuation Scheme (USS), a defined benefit scheme which is externally funded and contracted out of the State Second Pension (S2P). The assets of the scheme are held in a separate trustee-administered fund, the Universities Superannuation Scheme Ltd being the Trustee and because of the mutual nature of the scheme, the scheme's assets are not hypothecated to individual institutions and a scheme wide contribution is set. The Association is therefore exposed to actuarial risks associated with other institutions' employees and is unable to identify its share of the underlying assets and liabilities of the scheme on a consistent and reasonable basis as required by FRS 17 and it therefore accounts for the scheme as if it were a defined contribution scheme. The amount charged to the income and expenditure account represents the contributions payable to the scheme in respect of the accounting period.

The latest triennial actuarial valuation for the scheme was scheduled for 31st March 2011. The latest triennial actuarial valuation for which we have available information was at 31st March 2008. This was the scheme's first valuation under the new scheme-specific funding regime introduced by the Pensions Act 2004, which requires schemes to adopt a statutory funding objective, which is to have sufficient and appropriate assets to cover their technical provisions. The assumptions which have the most significant effect on the result of the valuation are those relating to the rate of return on investments (i.e. the valuation rate of interest), the rates of increase in salary and pensions and the assumed rates of mortality. In relation to the past service liabilities the financial assumptions were derived from market yields prevailing at the valuation date. It was assumed that the investment rate of return for pre and post retirement would be 6.4% per annum, salary increases would be 4.3% per annum and pensions would increase by 3.3% per annum. In relation to the future service liabilities the assumptions used are an investment return of 6.1% per annum, including an additional investment return assumption of 1.7% per annum, salary growth of 4.3% per annum and pension increases of 3.3% per annum. The valuation was carried out using the projected unit method, which is in common use for funding pension schemes in the UK.

At the valuation date, the market value of the assets of the scheme was £28,842.6 million and the value of the scheme's technical provisions was £28,135.3 million indicating a surplus of £707.3 million. The assets therefore were sufficient to cover 103% of the benefits which had accrued to members after allowing for expected future increases in earnings. Using the FRS 17 formula as if USS was a single employer scheme, the actuary estimated that the funding level at March 31st 2008 was 104% and on a Pension Protection Fund basis the estimate was 107%. However the fluctuation in global investment markets since 31st March 2008 has led to a reduction in the estimate of the scheme specific funding level from 103% to 91%, indicating a deficit of £3,065 million at 31st March 2010.

The Trustee believes that over the long-term equity investment and investment in selected alternative asset classes will provide superior returns to other investment classes. The Trustee aims to expose the fund to equities that are diversified both geographically and by sector and recognises that it would be possible to select investments that provide income flows broadly similar to estimated cash liabilities. However in order to meet the long term funding objective, the Trustee recognises the need to take on a degree of investment risk relative to the liabilities, which is to seek a greater return than the matching assets would provide, whilst maintaining a prudent approach to meeting the fund's liabilities. The strong positive cash flow of the scheme means that it is currently not necessary to realise investments to meet liabilities and the actuary has confirmed that cash flows are expected to remain positive for the next ten years.

In the financial year the Association closed the USS pension scheme to new employees and offered an alternative defined contribution stakeholder pension scheme with Scottish Widows. As the set up of the scheme has yet to be finalised there is an amount of £6,694 on the balance sheet in outstanding contributions.

The total pension cost for the Association for the year to 31st March 2011 was £56,791 (2010:£49,645) which was 16% (£51,039) of pensionable salaries for the USS Pension and 9% (£5,752) of pensionable salaries for the Scottish Widows Pension. Pension benefits of presently retired and seconded staff of the Association are administered by the Natural Environment Research Council.

**INDEPENDENT AUDITORS' REPORT TO THE MEMBERS OF
THE FRESHWATER BIOLOGICAL ASSOCIATION**

We have audited the financial statements of The Freshwater Biological Association for the year ended 31st March 2011 which comprise the Statement of Financial Activities, the Balance Sheet and the related notes. The financial reporting framework that has been applied in their preparation is applicable law and United Kingdom Accounting Standards (United Kingdom Generally Accepted Accounting Practice).

This Report is made solely to the Association's Members, as a body, in accordance with Chapter 3 of Part 16 of the Companies Act 2006. Our audit work has been undertaken so that we might state to the Association's Members those matters we are required to state to them in an Auditor's Report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the Association and its members as a body, for our audit work, for this Report, or for the opinions we have formed.

Respective responsibilities of trustees and auditor

As explained more fully in the Trustees' Responsibilities Statement set out on page 23, the Trustees (who are also the directors of the charitable company for the purposes of company law) are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view.

Our responsibility is to audit and express an opinion on the financial statements in accordance with applicable law and International Standards on Auditing (UK and Ireland). Those standards require us to comply with the Auditing Practices Board's Ethical Standards for Auditors.

Scope of the audit of the financial statements

An audit involves obtaining evidence about the amounts and disclosures in the financial statements sufficient to give reasonable assurance that the financial statements are free from material misstatement, whether caused by fraud or error. This includes an assessment of: whether the accounting policies are appropriate to the Association's circumstances and have been consistently applied and adequately disclosed; the reasonableness of significant accounting estimates made by the Trustees; and the overall presentation of the financial statements. In addition, we read all the financial and non-financial information in the Trustees' Report to identify material inconsistencies with the audited financial statements. If we become aware of any apparent material misstatements or inconsistencies we consider the implications for our report.

Opinion on financial statements

In our opinion the financial statements:

- give a true and fair view of the state of the Association's affairs as at 31st March 2011 and of its incoming resources and application of resources, including its income and expenditure, for the year then ended;
- have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice applicable to Smaller Entities; and
- have been properly prepared in accordance with the Companies Act 2006.

Opinion on other matter prescribed by the Companies Act 2006

In our opinion the information given in the Trustees' Report for the financial year for which the financial statements are prepared is consistent with the financial statements.

Matters on which we are required to report by exception

We have nothing to report in respect of the following matters where the Companies Act 2006 requires us to report to you if, in our opinion:

- adequate accounting records have not been kept or returns adequate for our audit have not been received from branches not visited by us; or
- the financial statements are not in agreement with the accounting records and returns; or
- certain disclosures of Trustees' remuneration specified by law are not made; or
- we have not received all the information and explanations we require for our audit; or
- the Trustees were not entitled to prepare the financial statements in accordance with the small companies regime and take advantage of the small companies exemption in preparing the Trustees' Report.

91 Gower Street
London
WC1E 6AB
15 June 2011

Dean Cates BA, ACA (Senior Statutory Auditor)
for and behalf of Couch Bright King & Co
Chartered Accountants &
Statutory Auditors