



EIGHTY-FIRST

ANNUAL REPORT

OF THE

FRESHWATER BIOLOGICAL ASSOCIATION

and Accounts for the year ended 31st March 2013

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Dr M. Dobson (Director)

**Mr S. Pawley (Business Manager)

**Mrs J. Lomax (Finance Manager)

* Co-opted Member

** Attendees

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Prof. J.D. Thomas
M. Thompson
J.F. Turpin
The Duke of Wellington
The Duke of Westminster
W.R. White
F.M. Wiseman

COMPLEMENT AT 31st MARCH 2013

Director	Dr Michael Dobson
Personal Assistants to the Director	Sarah A. Johnson/Julie P. McNicol
Business Manager/Training and Journals	Simon Pawley
Finance Manager	Judith Lomax
Finance and Administration Assistants	Carolyn Fletcher/Sarah Rigby Biliana Ivanova (Maternity Cover)
Administration Assistant, Windermere	Lynda Durrell
Administration Assistant, East Stoke	Stephanie Smith
Facilities Management, Windermere	Matthew Freeman
Domestic Assistant, Windermere	Andrew Duncan
Research and Facilities Manager, East Stoke	John Davy-Bowker
IT Support Manager	Vanya Gordon
Pearl Mussel Project/Journals	Louise Lavictoire
Data and Information Services	
Collections Manager/Library and Information Services	Hardy Schwamm
Bioinformatics and Web Development Manager	Dr Michael Haft
Web Developers	Simon Fox/Nick Bywell
Knowledge Transfer	
Science and Publications/Knowledge Transfer Manager	Dr Karen J. Rouen
Training and Education	Dr Melanie Fletcher
Knowledge Transfer Assistant	Rosalind Maberly
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
	Professor J. Malcolm Elliott
	Dr D. Glen George
	Terence Gledhill
	Dr Elizabeth Y. Haworth
	Professor Alan G. Hildrew
	Dr Mike Ladle
	Dr Allan Pentecost
	Dr Paul J. Raven
	Professor Colin S. Reynolds
	Dr Roger A. Sweeting
	Dr Ian Wallace
Honorary Editors:	
<i>Scientific and Special Publications</i>	Dr Alan Crowden
<i>FBA News</i>	Dr Jonathan Grey
<i>Freshwater Reviews</i>	Professor Colin S. 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

I began last year's report (2012) with these words: "This has been a remarkable few months – particularly writing as I do from the crowded and dry south-east of England." I quote this not to claim any particular literary merit for my words, but as yet another example of how our climate continues to confound us. The south-east, from where I am still writing, remains crowded but was, for the next eight months or so, **much** less dry, and since has been remarkably cold (even now in late May). Despite these climatic extremes, or perhaps because of them, water security remains top of the agenda, and it remains our single most important task to convince people that the 'ecosystem services' provided by 'healthy' fresh waters and their catchments are a vital part of that security, and in turn that freshwater biological sciences provides the best means of managing fresh waters.

Meanwhile, the freshwater world, as in many other spheres, continues to change unpredictably. It was originally FBA science that largely underpinned the Water Framework Directive, now in full implementation. Many scientific/technical issues remain, however, and the FBA can still play a role in training, advice and backup for the many organisations (Governmental and, particularly, non-Governmental) involved. The world of scientific societies is also in full spin. Many think that they have 'had their day' and that young people see much less reason for them now that they do not need membership to give them access to their personal and subsidised paper copies of society journals. This is too pessimistic, however, and I know that emerging scientists still want to feel part of a supportive and useful professional community. FBA founded the *Symposia for Freshwater Sciences* (SEFS), now a flourishing biennial conference underpinned by a Federation of European Freshwater Societies (EFFS). FBA can surely play a further role in developing that federation to the overall benefit of our subject. These are challenging and exciting times, and FBA needs to be forward thinking and innovative in its response.

Report from the Chairman of the Council

At our last AGM in Glasgow, we presented to members the outlines of a new strategic direction that Council and staff had been working on during the year; one that attempts to better position the FBA towards meeting the challenges of a digital world, of a rapidly changing natural and economic environment, and of developing new partnerships and ways of inter-disciplinary working. In seeking our niche in this 'new world', we have both looked to our core values and to developing those areas where we feel we can most effectively add value to freshwater science and conservation of wetland ecosystems. These include an emphasis on action to widen active membership; to provide evidence and information; to influence and broaden advocacy; and to facilitate the setting of the research agenda.

Council's focus this last year therefore has been very much on seeing how we can take this re-freshed strategy forward, and how we can do so at a time when the financial position we find ourselves in becomes ever more challenging. The losses we have sustained in recent years have been driven largely by our failure to achieve the income levels we had aimed for, though succeeding well in managing to control costs. Losses on investment income and overheads have proved a challenge, whilst avenues to raise new income from consultancy, grants, research and other sources are increasingly hard to realise. With this backdrop, Council brought in external advisors this year to help analyse our current business model and provide recommendations as to a future strategy that will slow down losses, stabilise our financial position and eventually enable us to grow again. As well as discussions with trustees, this has involved consultation with staff, members, partners and competitors, and a first draft was discussed at the Council meeting in April 2013. The final draft has just been received and will be the subject of further debate by trustees and consultation, before Council decide what direction and action the FBA now need to take to stem its losses and refocus its activities.

Discussions on our financial position and strategic direction have been very important, and very much the focus of Council's attention, but the work of the FBA and the successes of our staff have also been discussed, appreciated and celebrated. Reasons for celebrations included recognition of the 100th birthday of John Lund, and of the success of two 'best-seller' FBA publications he must surely appreciate – the *Guide to Freshwater Invertebrates* (a successor to T.T. Macan's famous 1959 publication), and the FBA Scientific Publication No. 67 *Guide to British Freshwater Invertebrates for Biotic Assessment* (a technical guide to BMWP families). The success of these publications and the quality of our annual scientific meetings reinforce the position of the FBA as a recognised authority in this field.

And whilst the funding environment has been challenging, this last year also saw some notable achievements with new grants and the successful continuation of existing projects. Our expertise with archiving and scanning data and grey literature was recognised by contracts to support the Environment Agency with work in this area, and work to assist the Riverfly Partnership, as well as continuation of the work for Defra with the Demonstration Test Catchments. The role of the Data and Information Services Advisory Group has been important in helping achieve this, as also the recent award of Heritage Lottery funding for the FBA's oral history of people's understanding of fresh water, *Clear Waters*, working with partners in Cumbria. Trustees try to ensure that they see such work in action, and our visits to the River Laboratory and Lake Windermere sites have allowed us to gain first-hand knowledge of other initiatives as well, such as the Freshwater Pearl Mussel Ark project, and to learn more of the success of our training courses both on site and externally provided.

Such successes and new grants provide hope and encouragement for the future, and I would like to thank the staff for their support and commitment during the year. In doing so I should also thank and acknowledge the contributions of the departing trustees, Bill Brierley, Chris Mainstone and Lorraine Maltby. And finally our Director Dr Mike Dobson leaves us in May 2013, after 6 very full and productive years, and on behalf of the FBA I thank him for his work and leadership, and wish Mike well for the future.

Report of Activities from the Director

Introduction

Last year there was a real feeling that the FBA was starting to turn a corner. Despite ongoing problems of various kinds, there is much positive news to report from the year. After several years of development, our training course provision expanded considerably; our data management services, on the back of our valuable contract with Defra, began to be noticed by a wider range of organisations; book sales showed a small revival, thanks to new types of products; we secured money for the first time from the Heritage Lottery Fund; and we ran a very successful volunteer-led monitoring programme. These few examples serve to demonstrate that activities in which we have been investing and developing over several years are starting to pay off, and that we can move successfully into new areas of activity, whilst all the time continuing to be relevant to the freshwater environment that is our *raison d'être*. As always, my first priority has to be to acknowledge and thank FBA staff, who continue to give their all to our Association. Below is an overview of activities for the year ending 31st March 2013.

Data and Information Services (DIS)

Web development and archiving

Work to create the data archive for Defra's Demonstration Test Catchment (DTC) and Agricultural Greenhouse Gas research platforms continued to make progress. The fundamental structure of the archive is complete and the team is well into the development phase. The repository is being created using Islandora, an open source digital repository system. The FBA team has made good contacts with the Islandora developers, based at the University of Prince Edward Island, Canada, and is sharing expertise and experiences in

order to improve the development process. Via the Islandora connection the FBA team is collaborating with the Smithsonian Institution in the USA, which is also using Islandora to create a data archive similar in design to the DTC Archive. Part of the development of the archive is to create a controlled vocabulary which the development team are tying to the FBA library's catalogue and other digital holdings in order to enhance the value of these collections by integrating them with the data in the DTC archive. The vocabulary currently contains approximately 2500 terms and can be viewed online here:

www.dtcarchive.org/vocabulary. In January 2013 the development team started work with the Riverfly Partnership (RP) to create an online data repository and archive for the Riverfly Monitoring Initiative, a national volunteer-based survey of river invertebrate populations.

During the year we worked with the Environment Agency (EA) on the second stage of creating the North West Archive, including scanning and making available online various reports. The main output of the project is 380 freely available documents (in addition to the 100 reported last year), including 15 Annual Reports of the Cumberland River Board (1960–65) and Cumberland River Authority (1966–74), 207 minutes from the “Blue Books” (Fisheries Advisory Committee Meetings, 1974–89) and various scientific reports; as a pilot for rolling this out nationwide, there are also 30 scientific reports from the EA South West Region. These are all available free of charge from www.aquaticcommons.com and will soon also be accessible via the FBA data repository. In addition to the EA material a second catalogue of FBA holdings, that of the John Lund Collection, is now also available online, at: <http://archiveshub.ac.uk/data/gb0986.lund>.

The FBA continued its collaboration with Aquatic Sciences and Fisheries Abstracts (ASFA), with Hardy Schwamm representing the FBA at the ASFA Board Meeting in June 2012 in Ireland. We also carried out work for ASFA on retrospective indexing of papers in several journals.

Heritage Lottery Fund project

In January we were awarded a grant from the Heritage Lottery Fund for a project entitled: “Clear Waters – an oral history of people's understanding of fresh water”. This exciting project, examining different and changing perspectives of water bodies in the Windermere catchment, started in April 2013.

Fritsch Collection

The centenary of the Fritsch Collection of Algal Illustrations was marked by a tea party at Windermere in June, to which associates and users of the collection from around the country attended, along with various local dignitaries. Dr Elizabeth Haworth, the curator, took the opportunity to publicise the Collection at various meetings during the year, including those of the British Phycological Society (BPS), FBA, International Diatom Society Symposium, British Diatomists and West Midlands and North West England Freshwater Group. Another important centenary was the 100th birthday of the previous curator, Dr John Lund; the BPS exhibition of algal photographs, inspired by those of Dr Lund's wife Hilda, was brought to the Lake District in February, and Dr Lund himself was able to attend its official opening.

Long-term datasets

Data from the long-term meteorological data sets held by the FBA were supplied to several MSc and PhD students.

Knowledge Transfer

Publications

One new book was published during the year. The *Guide to Freshwater Invertebrates*, FBA's Scientific Publication (SP) No. 68, was published at the end of November. Written by FBA personnel (Mike Dobson, Simon Pawley, Melanie Fletcher and Anne Powell), the guide is intended as a tribute to T.T. Macan and as a successor to his 'little blue book', and was

published thanks to a grant from the Esmée Fairbairn Foundation. In its first few months it has sold well, accounting for 44% of all income received from book sales.

Several other titles were reprinted during the year, including those that have been in short supply following losses of stock in the 2009 flood: SP17 (stoneflies), SP40 (leeches), SP42 (desmids), SP53 (caseless caddis larvae), SP55 (Simuliidae), and SP65 (Megaloptera & Neuroptera). Following the launch of the FBA's online shop (www.fba.org.uk/shop) on 1 May, by the end of the year it was accounting for around 30% of all book sales. Also reprinted, in response to high demand, were SP66 (Mayflies) and SP67 (*Guide to British Freshwater Macroinvertebrates for Biotic Assessment*).

The freely available guide to invasive freshwater shrimps was revised in December, following the discovery of yet another invasive species in the UK. For this and other free downloads, visit the FBA website at: www.fba.org.uk/downloads.

Journals

Volume 5 of *Freshwater Reviews* is now complete, and Volumes 1 and 2, published in 2008 and 2009, are freely available online (www.fba.org.uk/journals). Subscriptions are still below what we hoped, but the quality of papers submitted and published remains high and we are getting good publicity through our incorporation into 'BioOne.2' – one of two collections published by BioOne (www.bioone.org), a non-profit online distributor of journals for small publishers. Meanwhile, *Inland Waters*, published on behalf of the International Society of Limnology by the FBA, continues to do well and moved into its third volume; this title is now indexed in the Science Citation Index Expanded (and hence Web of Science), as well as ASFA, BIOSIS Previews, Current Contents and Zoological Record.

Training courses

Our fifth full season of training courses closed in October 2012 with a first – the incorporation of an examination element. The course, on the identification of invertebrate families for biotic assessment, was fully booked with 12 participants, of which four achieved the required pass mark and were awarded an "FBA certificate of competence in the identification of freshwater invertebrates to family level". We hope that this type of course will prove popular in future with those needing to demonstrate their competence.

In addition to the programmed courses, we were awarded contracts to run six bespoke courses on invertebrate identification for the EA, and two for the Loughs Agency & SCENE (Scottish Centre for Ecology and the Natural Environment). The courses were two or three days in duration, with five held at Windermere, one at the River Laboratory and two at external sites in Northern Ireland and Scotland, between October 2012 and March 2013. Courses on RIVPACS (River InVertebrate Prediction And Classification System) and RICT (River Invertebrate Classification Tool) bioassessment were also held at the River Laboratory for APEM Ltd. Two additional courses were run for the EA covering phytoplankton identification and enumeration, and the Chironomid Pupal Exuvial Technique (CPET).

A new FBA run EA scheme for accrediting individuals in invertebrate identification started in December 2012. The first candidates for this scheme, who are all internal EA staff, will sit a written examination in October 2013 and, if successful, will progress to a practical examination in February 2014.

Meetings

This year's ASM and AGM were held at the University of Glasgow in July, preceded by a tour and reception at SCENE. There were around 60 delegates and nearly 30 presentations, including posters. A one day meeting on "The History and Future of British Rivers", jointly organised by Southampton University, the Linnean Society of London and the FBA, was held at the Linnean Society in February. We were also involved in a meeting on

freshwater biodiversity, held at University College London in September, at which I presented an overview of the relevance of the FBA to biodiversity research and monitoring.

Science

Staff activities

Louise Lavictoire continued her work with the Pearl Mussel Ark Project, aided by Roger Sweeting. The annual appraisal of the animals, carried out by an external expert, Ian Killeen, found a higher proportion of adult mussels in good condition than in the previous period, a result of improvements made to culture conditions. Conditions within tanks containing adult mussels were improved and higher water flows were concentrated over mussel cages to discourage settling of fine material and to provide a more measurable flow over the mussels. A twelve-month investigation into an alternative method of rearing juvenile mussels, using an incubator, commenced in June 2012 and is nearing completion. Results from this are promising and have informed the rearing activities across the project. Surviving juveniles from previous cohorts (2008 & 2009) continue to grow well and are a valuable asset for future reintroductions into restored pearl mussel catchments.

Louise and Roger, along with Marie-Pierre Gosselin, also worked on the Tyne Restoration Project; this finished in December, and the final report, now in an advanced stage of preparation, contains recommendations for improvements required if pearl mussels are to survive in the catchment. In February FBA staff attended a meeting on “Practical implementation of freshwater pearl mussel measures” in Letterkenny, Ireland, and presented the work which has been carried out as part of the Tyne Project.

John Davy-Bowker continued to work with various colleagues on improving the RIVPACS/RICT invertebrate monitoring systems. Working with Bournemouth University, John started a new project to assess the significance of reported differences in predictions associated with moving from RIVPACS III to RIVPACS IV/RICT and to assess the significance of a long-standing issue with under-prediction of biotic index values for chalk stream sites using RIVPACS models. This project will assess the extent of these problems and make recommendations for further work to address these issues.

Further support was provided by John Davy-Bowker, Melanie Fletcher and Simon Pawley to the Westcountry Rivers Trust in support of its “Upstream Thinking Project” that seeks to improve raw water quality and all ecological aspects of the rivers in the South West Water region. Continuing the work carried out last year, we provided specialist input into monitoring activities, including invertebrate identification, training and calculating biotic indices.

John continued the invertebrate and diatom sample collection for the FBA’s River Lab Long Term Monitoring project in Dorset. Replicate samples were collected from the rivers Frome and Piddle along with data on substrate composition, plant cover and temperature logger data. We are still seeking funding opportunities to enable these samples to be processed, although a grant was secured from the Fishmongers’ Company to cover sampling costs for the current year.

Melanie Fletcher has been working with South Cumbria Rivers Trust (SCRT) to deliver pre- and post-project monitoring for river restoration projects on the River Kent system as part of a Cumbria-wide River Restoration Strategy. She has completed initial monitoring work on one project, and will return later in 2013 to do post-restoration monitoring. She has also started plans for a much bigger river restoration project with monitoring to start later this year.

MSc projects

Two MSc project students were jointly supervised by Roger Sweeting and Melanie Fletcher. Amber Smith (Kings College London) undertook a project on “Freshwater pearl mussels and salmonids: assessing the host–parasite relationship” and Sarah Freeman (Manchester Metropolitan University) completed an “Analysis of long term meteorological trends at

Windermere” using the FBA’s long-term data. Both students submitted copies of their Theses to the FBA library, presented their work at FBA seminars in Windermere and wrote summaries of their findings for articles in *FBA News*.

The Algal Bloom Pilot Project was a year-long partnership project funded by the EA and carried out in collaboration with Cumbria Wildlife Trust, the University of Stirling and the Centre for Ecology and Hydrology (CEH). Currently, the EA responds to reported algal bloom incidents on a reactive basis and the *occurrence* of blooms and scums in lakes is monitored at a national scale through regular sampling of particular lakes. However, there is no national monitoring network for algal bloom *frequency* in lakes in England & Wales. In addition, conventional *in situ* sampling of lakes is not always effective at capturing the frequency or distribution of blooms and scums, as such features are often ephemeral and patchy. Therefore, an interdisciplinary approach, including a network of volunteers and the use of satellite remote-sensed data has the potential to address these issues, and provide better data on bloom occurrence and frequency.

Despite a lack of blooms this year, due mainly to the exceptional amount of rain that fell in 2012, the project was a success. There was an enthusiastic response from volunteers, with nearly 80 taking part in 170 surveys. When blooms occurred, they were quickly spotted and reported to the EA. This pilot study also showed that the estimation of chlorophyll-a concentrations (a proxy for algal concentrations), and the identification of bloom events, is feasible from existing satellite technology. The project demonstrated that monitoring the local and ephemeral nature of blooms requires a suite of methods to be adopted and that volunteer and satellite monitoring are complementary approaches. We are hoping to continue the project and are currently waiting for news on funding. Special thanks go to all the volunteers on the project, for their interest and hard work, and to Melanie Fletcher, for managing the project so ably.

Honorary Research Fellows

Honorary Research Fellows continue to make important contributions to the profile and to the activities of the FBA, and their individual reports appear on pages 14 to 26.

PhD students and grant awardees

The PhD students funded by the FBA continue to progress well. Helen Rosenkranz (University of Bristol) successfully defended her thesis on biodiversity, architecture and functioning in response to agrochemical gradients, while Julia Reger (University of Sheffield) successfully defended hers on the molecular basis of adaptation to predator regimes using *Daphnia*; our congratulations go to both. Gary Rushworth (University of Leeds, but based at FBA Windermere) is now writing up his thesis on macroinvertebrate community structure and functional development in reed swamp habitat; while Fiona Bracken (Durham University) is completing her work on the behavioural and evolutionary ecology of lampreys – anthropogenic impacts and conservation concern. Louise Lavictoire (a member of FBA staff) continues her part-time studies with the University of Cumbria on population genetics and captive breeding practices to aid conservation of the endangered freshwater pearl mussel. Of the students for whom the FBA acts as a CASE partner, Felicity Shelley (Queen Mary University of London [QMUL]) entered her third year studying the effects of methane concentration on river food webs, while Clare Gray (also at QMUL) began research into developing a novel network-based approach to biomonitoring.

The 2012 Hugh Cary Gilson Memorial Award was made to Rachael Carrie (University of Lancaster), for a project on “The Development of Freshwater Bio-Assessment in Belize, Central America”. The work was carried out in the spring and summer of 2012, and preliminary findings were reported in the No. 58 Autumn/Winter 2012/2013 edition of *FBA News*. The winner of the 2013 award was Sara Rassner (Aberystwyth University) for her proposal entitled “Cryochytrid: are Fungi the Missing Links in High Arctic Freshwater Food Webs?”

Supporting Activities and Profile Enhancement

FBA staff continued their participation in public awareness-raising events.

In June 2012, we ran our popular Moths Plus event as part of National Moth Night. Moths Plus covers moths and adult aquatic insects and is run on the shore of Windermere with resident expert and FBA HRF, Dr Ian Wallace. Intrepid enthusiasts braved the gale-force winds and lashing rain of the British summer. Although the moths did not bother to come out in these conditions, several species of slugs and the obviously hardier caddis were recorded, much to the delight of Ian, who is the co-ordinator of the National Trichoptera Recording Scheme. Ian also played a starring role, along with staff from CEH, when we were host to the BBC Natural History Unit, filming for their short series "British Winter Up Close". The filming formed part of an episode on river and lakes, which was broadcast on 5 March 2013. We had a stand at "Insect day" at Manchester Museum and hosted a work-experience student for a placement at Windermere. As part of the Algal Bloom Pilot Project, regular talks raised the local profile of the FBA.

In Dorset the River Laboratory hosted two Thomas Hardy school site visits for their BTEC Science students and John Davy-Bowker taught a biomonitoring course over two days to Environmental Science undergraduates from Southampton University. The River Laboratory also hosted visits from the Canford School Heads of Biology Group, West Moors School, Lord Wandsworth College, and a group of 25 gifted children from local schools. The Frome and Piddle Fisheries Association also held their AGM at the River Laboratory.

In our role as a 'regional hub' for the Riverfly Partnership (RP), we continued to train volunteers in the RP invertebrate monitoring technique. Another 10 volunteers are now trained and monitoring the invertebrate populations on their local rivers. We also provided support days for existing monitoring groups to refresh their sampling and identification skills and extend their knowledge. We have secured continued funding from the EA to support our RP activities through to 2014.

I was invited to join the Environment Advisory Panel of the newly formed Canal and Rivers Trust (formerly British Waterways), and also completed two years as chair of the Lake District Still Waters Partnership in December. I represented the FBA on the board of the National Biodiversity Network Trust and the RP. John Davy-Bowker was also invited to represent the FBA on the EA's "Keeping Rivers Cool" project.

Sites

We continued to welcome external users of our facilities for training, with the University of Bristol, Manchester Metropolitan University and the University of Lancaster once again holding field courses for MSc students at Windermere, while QMUL, Birmingham University and Bournemouth University took advantage of the facilities at the River Laboratory. The FBA prepares the laboratory and other facilities for these courses, as well as providing fieldwork support and/or teaching where required. We are keen to increase the use of FBA facilities for courses and field trips, and FBA members are encouraged to promote this where opportunities arise.

2013 marks the 50th Anniversary of the River Laboratory which is being recognised through various events throughout the year. Over the past year, the site continued its general community role as the venue for Parish Council meetings, yoga classes and the local polling station. Additional meetings were held at the River Laboratory by SITA and Network Rail.

The Annexe Building at Windermere is now almost empty. CEH moved its analytical laboratory and office facilities into the Pearsall Building, thus returning CEH staff to the building seven years after their departure for Lancaster.

Membership

This year there were 1244 members as at 31st March 2013. This included 52 new members, with 79 members leaving during the year.

Each of the three editions of *FBA News* published this year were bumper issues containing topical articles, summaries of work from early-career scientists, a diary of events, Association news and summaries of our activities, and we continue to receive favourable comments from Members about the content of the Newsletter. A new development has been that *FBA News* has gone electronic, allowing us to deliver the Newsletter to Members in a more flexible way.

We have been able to continue our arrangements with Wiley-Blackwell and Springer, with individual FBA members entitled to a discount on subscriptions to the journals *Freshwater Biology* and *Aquatic Ecology*.

Personnel

Andrew Freeman, who had been the FBA's business manager since 2003, retired at the end of April. Andrew had guided the FBA through a major period of activity, from selling the Ferry House and moving into the Pearsall Building to repopulating the River Laboratory with tenants. He was a hard act to follow, but Simon Pawley, appointed internally to replace him, has done an excellent job as a replacement.

Marie-Pierre Gosselin finished in December at the end of her contract, after a little over two years working as a post-doctoral researcher on the Tyne Restoration Project. Andrew Duncan, our cleaner at Windermere, unfortunately had to retire at the end of March due to ill health. Rebekah Taylor left in the previous April (2012) to take up a post at the University for Creative Arts.

There were also some new appointments. Sarah Rigby left us temporarily in March to begin her maternity leave, and Biliانا Ivanova stepped in as maternity cover. Eloy Benito Reyes was funded to assist with the pearl mussel work for much of 2012, and then, along with Soraya Alvarez Codesal, provided assistance with the EA-funded North West Archive project. Lawrence Dobson continued to assist Matt Freeman in a voluntary capacity in site maintenance, while the Fritsch Collection welcomed Brenda Leese as a new occasional volunteer. Catherine Porter gave volunteer support to Gary Rushworth's PhD project on reedbed macroinvertebrate communities and also in digitising caddis images for future web-based resources.

Governance

Two FBA members, Dudley Williams and Gary Bilotta, responded to the call for volunteers to serve on the Grants & Awards Committee, and were subsequently appointed by the Director. They replace Roland Fleck and Graham Proudlove, who have both served on the Committee since its inception in 2007. The committee met on 18th February, to judge the annual Hugh Cary Gilson Memorial Award.

Following the retirement of Gina Douglas and Ian Winfield from FBA Council, there was a single replacement: Peter Shaw from the University Southampton. Peter was a nomination from the membership, which is always encouraged by Council and which was actively sought in 2012.

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

Invertebrate Ecology

I continue to collaborate with University of Loughborough, University of Birmingham and Bournemouth University and maintain daily contact with my colleagues in the River Communities Group (formerly CEH but now School of Biological and Chemical Sciences, QMUL) in an advisory and collaborative role.

This year most of my time has been spent working with Bournemouth University on a project funded by the EA to examine the aquatic biodiversity of 20 hectares of the Frome floodplain adjacent to the River Laboratory. This area of land has been selected as part of a habitat restoration plan to compensate for potential future losses of habitat downstream which may be exacerbated by climate change. Amphibia, macroinvertebrates, and microbial species were recorded from a variety of habitats including seepages, puddles, ponds and ditches. The samples are currently being processed but to date over 170 macroinvertebrates and a similar number of microbial taxa have been found, although these numbers are likely to increase by the end of the project.

My study of tyre tracks and puddles as anthropogenic contributors to aquatic biodiversity has been published. The tyre track pools contributed to local aquatic biodiversity by adding 29 taxa to previously published taxa lists from aquatic habitats in the area. The relative richness of the tyre track pools is attributed to their successional variation in a heterogeneous landscape. Conservation values of 9 of the 12 sites were rated *High* to *Very High* and nine regionally notable or rare taxa were recorded. It is suggested that the important conservation status of the tyre track pools warrants greater recognition and further intensive study.

The work on the South Winterbourne Stream near Dorchester with Jon Bass, which was stimulated by a 'rehabilitation' project on the system and the need to determine its effects, has been analysed and a paper submitted in September 2012. We intend to re-examine some of the sites in 2013 to investigate the effects of the abnormally wet conditions which have cancelled the normal dry period associated with winterbourne streams. The absence of the dry period may fundamentally alter faunal community structure and have repercussions for the survival of the stonefly *Nemoura lacustris* (new to Britain).

In addition to these two projects I have provided information on nuisance chironomid midges to Bournemouth and West Hampshire Water Company (now SembCorp) and prepared an Expert Witness Report for SembCorp for use in legal proceedings. The yearly survey of the Bovington Stream which drains the MOD tank training ranges has now been restarted and much of my time has been spent transferring records to staff from Queen Mary College who are now handling the surveys. We have over 10 years data on changes in invertebrate communities both in the River Frome and the Bovington Stream itself which will form the basis of a future paper on long-term changes.

I continue to have links with Dorset Wildlife Trust in relation to their Ponds project and work on wet woodlands and have supervised one student and 2 volunteers working on the Frome Floodplain.

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. Apart from refereeing papers for different journals, most of my time has been spent on two large papers and these are summarised below.

The first publication is on the dynamics of a leech population, and was written with a colleague from Sweden, Lennart Persson, who is a professor at the University of Ume (Persson & Elliott, 2013). I first met Lennart when I taught a course on the quantitative ecology of fish at the University of Lund in 1977, and we have maintained contact ever since. One aspect of his work is the role of cannibalism in the dynamics of fish populations, and our paper examines a similar role in a leech population.

The theory of cannibal dynamics predicts a link between population dynamics and individual life history. In particular, increased individual growth has been shown in both modelling and empirical studies to result from a destabilisation of population dynamics. We used data from a long-term study of the dynamics of two leech (*Erpobdella octoculata*) populations to test the hypothesis that maximum size should be higher in a cycling population; one of the study populations exhibited a delayed feedback cycle while the other population showed no sign of cyclicity. A hump-shaped relationship between individual mass of one-year-old leeches and offspring density the previous year was present in both populations. As predicted from theory, the maximum mass of individuals was much larger in the fluctuating population. In contrast to predictions, the higher growth rate was not related to energy extraction from cannibalism. Instead the higher individual mass is suggested to be due to increased availability of resources due to a niche widening with increased individual body mass. The larger individual mass in the fluctuating population was related to a stronger correlation between the densities of one-year-old individuals and two-year-old individuals the following year in this population. Although cannibalism was the major mechanism regulating population dynamics, its importance was negligible in terms of providing cannibalising individuals with energy, subsequently increasing their fecundity. Instead, the study identifies a need for theoretical and empirical studies on the largely unstudied interplay between ontogenetic niche shifts and cannibalistic population dynamics.

The second paper is a detailed study of the life cycle of the mayfly, *Baetis rhodani*. The chief objectives were: (i) to describe and compare quantitatively the life cycles of the summer and overwintering generations, including laboratory experiments to determine the number of eggs laid per female and the number of larval instars; (ii) to test Dyar's hypothesis; (iii) to test for density dependence in the life cycle. Samples of larvae and downstream-drifting adults (newly-emerged sub-imagines and spent female imagines) and counts of egg masses were taken every two weeks over 39 months in a small stony stream. Although females from the summer generation were smaller than those from the overwintering generation, and laid fewer eggs, the relationship between the number of eggs laid by a female and body length was the same for both generations, being described by a power function. An exponential equation described the relationship between the mean body length of each instar and instar number; hence Dyar's hypothesis was validated. Adult males emerged after 17 or 18 larval instars and females after 18 or 19 instars in the summer generation, with higher values of 25 or 26 instars for males and 26 or 27 instars for females in the overwintering generation. Mean instar body length in the summer generation was always larger than that in the overwintering generation, but this did not produce larger final instar larvae because the fewer instars resulted in males and females being smaller on emergence than in the overwintering generation.

Male subimagines started to emerge before females and their emergence patterns indicated that there were two cohorts in each generation. Ovipositing females in the first cohort were

always larger than those in the second cohort. Therefore, four mean values for eggs/female (=eggs/egg mass) were used to convert egg masses m^{-2} to eggs laid m^{-2} . Larvae were divided into six stages: I = instar 1, II = instars 2–5, III = instars 6–10, IV = instars 11–16, V = instars 17–24 (overwintering generation only), VI = final instars prior to emergence. There were two clear modal densities for each larval stage in each generation, confirming the presence of two cohorts. These modal densities were used to estimate loss-rates between successive larval stages, and 'k-factor analysis' was used to examine the relationship between loss-rates for a particular larval stage and the modal value for eggs or larvae at the start of that stage. Loss-rates in larval stage II were density-dependent, and were when population regulation occurred. For all other larval stages, loss-rates were density independent and fairly constant with no significant differences between the two generations. Life tables were constructed for egg densities close to the range of modal values found in the stream (1332–11512 m^{-2}). The egg density that yielded the maximum number of final instar larvae, and hence adults, was 2700–2750 m^{-2} with poorer survival for initial egg densities below and above these values.

This study has shown: (i) the mechanism for population regulation was density-dependent survival in larval stage II (instars 2–5); (ii) the importance of obtaining information on egg densities and their role in density-dependent processes; (iii) the necessity of frequent sampling for a quantitative description of complex life cycles of aquatic insects.

D. Glen George

Limnology and Zooplankton Ecology

Airborne remote sensing

My review on the application of airborne remote sensing to study the physical dynamics of lakes and the spatial distribution of phytoplankton has just appeared in *Freshwater Reviews*. Since this will be my last involvement in the field, I have deposited the associated aerial photography in the FBA Library together with some supporting notes.

Impact of climate change on lakes

The other paper published in 2012 was an account of the influence of the Gulf Stream on the composition of phytoplankton in a Spanish reservoir. Since the time-series analysed was quite short, more work is needed to understand the processes responsible for this 'teleconnection'. Since 2012 was a year of climatic extremes, I have once again turned my attention to the long-term records maintained by the FBA. The summer of 2012 was very wet and such dull conditions are known to influence the surface temperature of the lakes. Previous studies (Fig. 1) have shown that the variance of the measured lake temperatures decreases when there is more cloud. I have now updated the temperature records for Windermere so that these analyses can be updated.

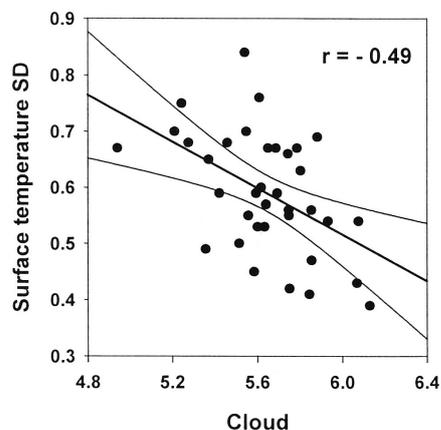


Fig. 1. The relationship between the variability (standard deviation) of the Windermere water temperatures and the cloud cover (annual means).

Proposed book 'The Lakes of Wales'

The creation of the new Natural Resources Body for Wales has delayed some of the work planned on the book. I continue to process data and work on chapters where I am the lead author.

Terry Gledhill

Invertebrate Taxonomy

Due to health problems I have been unable to get in to the laboratory as often as I would have liked over the past year, hence the shortness of this report.

The move from my laboratory, which I shared with Dr Elizabeth Haworth, into an office/laboratory, shared with Professor Malcolm Elliott and Dr Allan Pentecost, was completed without too much stress thanks to help from colleagues Matt Freeman and Simon Pawley. Thanks also to my wife Judith for all her help and encouragement in the transfer.

Collaboration continues with my co-authors on the last volume (third) of the key to the European water mites. At genus level the keys refer to Europe as a whole whilst at species level the area treated includes Central and Northern Europe extending in the west to the south-western margin of the Pyrenees, in the south to the southern margin of the Alps and in the east to the eastern borders of Austria, Slovakia, Poland and the Baltic countries. We are now dealing with the last two of the eight accepted Superfamilies, the Hygrobatoida with ten families and the Arrenuroidea with twelve families – all with numerous genera and species. We are hoping to have this volume ready for publication by the end of 2013.

I have identified or confirmed several collections of subterranean crustaceans for Lee Knight, the Biological Recorder for Subterranean Crustacea.

Elizabeth Haworth

Curator of the Fritsch Collection of Algal Illustrations

Celebrations to mark the centenary of the Fritsch Collection of Algal Illustrations meant that this was a busy year. The 2012 Calendar was successful, with interest expressed by the recipients and passed on! PowerPoint presentations were made at a series of meetings over the summer, using desmid and diatom examples of how to search. For the Birthday Party celebration, the cake decoration combined Prof. Fritsch's own sheet of *Ceratium hirundinella* (one of 99 sheets!) which also represented the FBA's monitoring of Esthwaite Water. Fritsch Notelets are still available. An article on the Collection also appeared in the November *Cumbria Life* magazine.

Few additions have been made to species sheets this year due to other work but access to literature is slowly improving due to exchanges and our subscription to the European Botanical and Horticultural Libraries group. A volunteer, Mrs Brenda Leese, is now helping to add data. I continue to provide information mainly in response to emails sent on general circulation or specifically to the Fritsch Collection. Many are requests for help in identification and I have also been corresponding with a woman producing a diatom checklist for Egypt.

I continue to collate obituaries and bibliographies of algological and other scientists, which has been recently augmented by material given by David Williamson. It is a very interesting collection and could be more used. I would appreciate any items from current journals we no longer access.

As CEH now use my upstairs room, considerable rearrangement of the Fritsch Room has been needed to accommodate my own items. The Fritsch Collection Website was also restyled in November, by Mike Haft, enabling me to learn how to edit it so that I can update the information.

Following attendance at the International Diatom Symposium in Ghent, I have become linked to a European taxonomy group who are wanting to use my early scanning electron study on *Fragilaria* spp. This has meant hunting in my stored boxes for the samples and the

records. I have also checked the sheets in the Fritsch Collection relating to that genus and closely related genera prior to producing this useful group online. The resulting spreadsheet lists includes c. 330 species names under which these diatoms have been published which, of course, includes many synonyms tracing the changes in our understanding. We now also know that the type illustrations and/or diagnoses of 192 names are included, and I have been able to correct information and add further items. Most repairs were because the figures were coming detached, mainly where cow-gum was used. The next step is to photograph and file all 626 sheets not only for the projected diatom workshop in the summer of 2013 but with the hope of creating a pilot website.

I took part in the Blue Green Algal Monitoring project and continued my connection with the Nottingham palaeolimnological studies on Windermere and lakes of the catchment.

In January I arranged for the Hilda Canter-Lund Memorial Prize exhibition to be displayed at the Ambleside local library and we were delighted that John Lund came to the first afternoon. This has proved very successful and was also displayed at the Windermere Library.

Alan Hildrew

Ecology of Streams and Rivers

In October 2012 I finally retired from QMUL, having been retained on a 25% contract for the 12 months previous to that. I am now an Emeritus Professor of Ecology at QMUL, as well as President of the FBA, Chief Editor of *Freshwater Biology* and, of course, an FBA Honorary Research Fellow. I also continue to part-supervise two PhD students at Queen Mary, have done some MSc teaching there and am still involved in the Acid Waters Monitoring Network (soon to be relaunched as the Uplands Waters Monitoring Network).

I again served as a chairman of a NERC Grants panel (of the NERC BESS programme) and of the Zoological Society of London Awards Committee, I also joined the Scientific Advisory Board of the School of Biosciences of Cardiff University and continued as a member of Natural England's (NE) Scientific Advisory Committee (NESAC) – where my main role is regularly to remind NE that fresh waters also need to be conserved! I have given invited research seminars at NERC CEH Wallingford and at the joint Linnean Society–FBA symposium on “The history and future of British rivers and waterways” and examined a Masters thesis at the University of Hertfordshire. I carried out a small contract for FBA, when the Association was asked to undertake an independent review of the Blandford Fly control programme and the likely consequences, in terms of speed of return of the biting nuisance, upon cessation of the control measures (on cost grounds). A final highlight of 2012 was when I was awarded the International Ecological Institute prize (Limnetic Ecology) for 2012, and was invited to Oldendorf to receive my prize and to give a lecture.

Apart from these duties I have mainly been concerned with writing papers and beginning a book as part of the IEI prize. In terms of publications I was particularly pleased recently to publish a co-paper in *Global Change Biology* showing that the rate of cellulolytic decomposition in Ashdown Forest streams had accelerated between 1978 (when I first measured it) and 2010, consistent with an amelioration of acidity. This is the first evidence of a recovery in an ecosystem process (decomposition) as a consequence of de-acidification (itself a consequence of emission controls). This is a rare ecological good news story! I am also currently working on a project to look again at the longitudinal distribution of hydroptychid (Trichoptera) larvae along the River Usk, having surveyed it originally in 1968/69!

Mike Ladle

Ecology of Fish

In 2012 North Dorset District Council commissioned two reports on the efficacy of our treatment of the River Stour with *Bti*. Both were apparently favourable. The Council have again contracted Dr Stewart Welton and myself, under the auspices of the FBA, to control

the Blandford Fly in 2013. It is possible that, in order to reduce costs, they will in future do a treatment in alternate years. There seems no reason to suppose that this scheme (suggested by myself), will not be successful. The reduced monitoring of recent years continued and again appeared to be adequate. The current *Bti* formulation of VectoBac 12AS is much more easily mixed and dispersed than the TEKNAR-HPD which was used prior to 2010 and seems to be a considerable improvement.

I still visit the River Laboratory to liaise with members of the staff of FBA and other organisations. I have undertaken to try and catch pike for a study on the genetics of the species in FBA controlled stretches of 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 advisor to the River Allen Association. The River Frome Conservation Trust (of which I was chairman) was wound up in 2012 and the remaining funds of almost £10,000 were allocated to maintenance of the fish counting facilities at the River Laboratory.

The run of salmon on the Frome in 2012 was apparently poor (FBA Counter figures) but despite this 12 salmon and 9 sea trout were landed at East Stoke and 17 salmon, about 21 sea trout/trout, 1 pike and 6 grayling were landed at West Holme. All salmon are now returned alive.

I am 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. Repair work has now been carried out on all bridges at East Stoke. Other bridges at West Holme still need attention. The severe weather of 2012 has resulted in a great deal of bank erosion on some stretches of the river and may cause problems in the near future. The number of anglers taking up rods at West Holme has increased.

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

Limnology and Algology

This year saw the publication of a review of the subaerial Cyanobacteria with co-author Brian Whitton in the new edition of the *Ecology of Cyanobacteria*. The review entailed considerable additional fieldwork, much of it in Cumbria. A discussion with Dr C. Ellis of the Royal Botanic Garden, Kew led to the preparation of a review of the corticolous algae of temperate forests which again entailed substantial field work and analysis from sites in Cumbria, Yorkshire and the Scottish Highlands. This study germinated from the cyanobacterium review where it was realised that virtually nothing is known of forest algae. As a result of the new study, which is about to be submitted for publication, we know a little more. The investigation of the freshwater red alga *Chroothoece*, mentioned in the previous report has been completed and is to be submitted for publication shortly. During the fieldwork a rare desmid, *Cosmarium dovrense* was rediscovered in a Yorkshire site after a gap of over 100 years. David Williamson and I have a paper in press describing in some detail its ecology at the new site.

Work on phosphorus in lakes continues with some sampling of the Windermere sediments by divers; it is hoped that the sampling and analysis will continue this year. The study on *Vaucheria* calcification in the River Kent also continues. This project should be completed this year and the write-up started in autumn. There has also been considerable involvement in the FBA 'algal bloom' project with regular attendance at meetings, holding field and laboratory activities at a range of venues and lectures throughout the past year. The Malham diatom paper has been submitted and returned for revision prior to publication. In all a busy year with a number of research projects well in hand.

Ian Pettman*Data and Information Retrieval*

The majority of my Fellowship time this year has been spent working with Hardy Schwamm (Collections Manager/Library and Information Services), mainly on revenue generation. This has encompassed both advising on the preparation of funding bids and assisting with the work involved to complete successful bids. It has grouped quite neatly into calendar quarters.

April to June 2012

Over the first three months of this reporting period I assisted Hardy in preparing a range of bids for the ASFA Board Meeting held at the Marine Institute, Galway 25/29 June 2012.

Three bids were detailed and presented by Hardy. One was successful and implemented and completed during this reporting period. Another was agreed in outline for possible implementation in 2013/14 and the last was put "on hold" by the ASFA Board:

The first, a bid to produce 1100 retrospective records for the ASFA Database from two important freshwater journals, was submitted prior to the meeting and the results of a positive email vote by the National Representatives was ratified at the Board Meeting.

The second, a continuation of the first but involving two other input centres (France and Italy) in order to cover non-English papers, was agreed in principle – it was agreed that a detailed bid could be submitted to the 2013 Board Meeting.

The third, a merging of two subject thesauri, had been suggested by ProQuest (the commercial publisher of ASFA). Hardy and I had worked up and costed several possible approaches but the ASFA Board did not see this work as a priority at this time.

July to September

In this period I mainly assisted Hardy with preparation for the DTC project "Vocabulary Workshop" which was held over two days in August; the working up of the resulting term lists and ideas into the basic structure for a vocabulary to serve both the DTC contract and the wider needs of the FBA Repository; and preparing for the Data and Information Services Advisory Group (DISAG) meeting in September.

October to December

Further assistance was given to Hardy on the development of the Vocabulary – particularly some of the more tricky relationships and hierarchies of such areas as nutrient cycling. Advice was also given on some difficulties arising in the ASFA Retrospective Records contract and on the necessary procedures to see these changes through the Food and Agriculture Organisation of the United Nations (FAO) Contracts system. This was achieved and the contract amended successfully.

January to March

Due to the pressures on Hardy – work having to start on two other successful contract bids during this period – I completed the remaining 738 records for the ASFA Retrospective Records contract. All 1100 records were submitted by Hardy in early February 2013 to the satisfaction of the ASFA Secretariat and ProQuest.

I attended the DISAG Meeting on 20th March 2013.

Paul Raven*River Ecology and Morphology*

My research interest in fluvial morphology and river ecology continues on several fronts. In the summer I carried out river habitat surveys in two nature reserves noted for their ancient oak woodland habitat in south Gloucestershire. Results were presented to the local nature reserve management committee, who had asked for management advice when they realised

the national importance of the streams in these reserves. In October I surveyed a small stream in pristine beech forest in eastern Slovakia, together with Hugh Dawson and colleagues from the University of Bratislava who had previously carried out aquatic macro-invertebrate studies there. These sites have been added to the 'benchmark' river habitat survey database of near-natural rivers chosen from a wide range of bio-geographical areas across Europe. In September, Peter Scarlett (CEH) and I helped to survey some rivers in Silesia (southern Poland) and provided tuition at a River Habitat Survey training course there, organised by the University of Poznan.

I have organised two informal discussion sessions at the River Laboratory aimed at strengthening links between fluvial geomorphology and river ecology. This has involved Iwan Jones (QMUL) who is working on a major European project on calibrating morphological characteristics of river catchments. The River Laboratory library has proved a valuable resource for material that will be included in the book I am co-authoring (with Nigel Holmes) on *Rivers and Streams*, as part of the *British Wildlife Collection* series.

As a British Ecological Society (BES) Council member I helped to promote and peer review a short publication on "the ecological consequences of extreme events in fresh waters" as the first in the re-launched "Ecological Issues" series. This will be published at a Parliamentary reception celebrating the BES centenary year, on 25th June 2013. I have been the FBA representative on the Shadow Registration Authority for the Chartered Institute of Ecology and Environmental Management (CIEEM) working on the eligibility criteria, application and selection process for approving Chartered Ecologists. I also chaired a session at the FBA/Southampton University conference "History and Future of Rivers" held in London on 21st February. I continue to use my FBA affiliation in my capacity as an editorial board member of the international journal *Aquatic Conservation*.

Colin S. Reynolds

Ecology of Phytoplankton

I have continued with tasks that I hope fulfil the requirements of my FBA Fellowship, although it is sometimes difficult to distinguish what is work within the specific interests of FBA and what might be seen more as those of CEH. With the demise of my undertaking to make counts of phytoplankton collected as part of the CEH routine monitoring, I have been free to consider working up data pertaining to extensive datasets collected by the EA, as part of a collaborative project to devise a simple methodology for standardising the interpretation of phytoplankton assemblages for assessing water quality. Data available cover several hundreds of UK and European lakes through distinct seasonal phases. The manipulation of these datasets involves computing power and competence that I do not have but my collaborator is well-equipped in both departments. We have already demonstrated to our own satisfaction that the existing categories of classification are well-founded – we now need to write up the evidence for publication.

In a similar context, but drawing on a different approach and quite different data, I am working with my CEH colleagues to demonstrate that the philosophy of the PROTECH model depends upon robust and quantifiable adaptive traits of the organisms to simulate their dynamic ecological behaviour, independently of their specific identities and, where relevant, of well-reported ecological data.

My editorial work for the FBA's *Freshwater Reviews* has been demonstrated by the publication of the two parts of Volume 5. However, the supply of new submissions to process has reduced. I and my hard-working colleagues at Windermere are doing what we can to ensure that this is a temporary hiatus.

Roger Sweeting*Water Quality and Fish Biology*

This is my sixth year as an Honorary Research Fellow. The freshwater pearl mussel Ark project continues to be my major area of interest. During 2012–13 we maintained the nine different English populations at FBA's Windermere hatchery. Our main aim is to maintain these populations and to produce viable offspring which we will grow on until the restoration of their parent river catchments is sufficient to enable them to be restocked.

Last year I reported that some populations only complete their larval stage on salmon, others only on brown trout (migratory and non migratory) and some on both species. We have also been using Arctic charr as experimental hosts to mimic some of the historic co-occurrences of pearl mussels and charr. There has been some successful encystment and excystment with these charr which will be formally reported in the near future.

In 2012 over 60,000 juveniles were collected from fish hosts from six of the mussel populations. The extremes of weather (and water temperature) experienced over the last three years continue to confuse our understanding of the timing for critical events in the mussel life cycle. Our largest juvenile so far produced is now five years old (since release from the host fish) and is over 25 mm in length.

There are three people involved in the pearl mussel project besides myself: Louise Lavictoire, Eloy Reyes and Matthew Freeman. We produce annual reports for our partners, NE and the EA; if you wish to see these please contact us.

The Tyne pearl mussel restoration project was extended by three months until the end of the 2012 calendar year with a grant from Northumbrian Water enabling a second full season of habitat sampling. Our findings confirm that the River Rede, the major tributary of the North Tyne, is capable of being practically restored for pearl mussels.

There are several anomalies in the behaviour of the Tyne pearl mussels as far as their life cycle is concerned: in the hatchery mussels there is a winter drop off as well as the more usual summer excystment. Such situations have been reported in the literature (Ziuganov et al. 1994) in Russia, but not as yet in western Europe.

Our fifth report has been presented to the EA and we are now discussing the implications and actions that should result from it.

As an adjunct to the work with pearl mussels we have obtained a grant to investigate the potential of using other bivalve mussels as biofilters in waste water as part of a knowledge transfer project with the University of Cumbria and the Sellafield Nuclear Establishment.

With Hardy Schwamm I have been part of a project with the North West Region of the EA concerning the organisation of old reports and publications held by the Agency. The FBA will act as a repository for the more valuable documents which are being archived as electronic files or as original documents which will be more easily searched and retrieved than is currently possible. This project makes use of my previous experience with water quality, biological and fishery work in the water industry as well as my time with FBA.

This year I have carried out several health examinations on freshwater fish under Section 30 of the Salmon and Freshwater Fisheries Act (1975), used by the EA.

Locally I continue as vice chairman of the SCRT and participate in the project to restore reed beds on Windermere. I also continue my work in the development of standard methods in BSi and the Comité Européen de Normalisation (CEN) particularly with reference to the Water Framework and Habitats Directives.

Ian Wallace

Taxonomy and Distribution of Trichoptera

This year most work has focused around the large UK (except Northern Ireland and Channel Isles) Trichoptera distribution record database, which now stands at 248,000 entries. The adult records were sent to the DAET project (Distribution Atlas of European Trichoptera) co-ordinated under the Biofresh Project and are being processed, and the entire database is now with the Biological Records Centre for incorporation into the maps on the National Biodiversity Network "Gateway" web site. Completion of editing the database enabled me to use it to prepare, for Natural England, a revised list and species accounts of Scarce and Threatened Caddis for this country including candidates for an IUCN Red List. I was also able to use it to prepare verification rules, for the Biological Records Centre, to screen records being submitted electronically to them, e.g. via on-line recording packages such as "iRecord". The rules flag-up records that are out of the known distribution range or at a season when the species is usually not recordable. The resultant automatic approval of many records focuses the scarce time resource of verifiers such as myself.

I delivered a caddis training course for the FBA in June.

I gave a talk at the Annual Conference of the NBN at the Royal Society and a similar talk to the annual recorders meeting at the Biological Records Centre; the talks focused on how to maintain and develop interest in recording freshwater invertebrates. I attended a conference on Freshwater Biodiversity in the UK, and an FBA workshop on freshwater data processing, held in London. I also attended the annual meeting of the Riverfly Recording Schemes which was held at FBA, Windermere; the latter was a milestone in developing the recording schemes' outputs.

A review of the new FBA publication *Guide to British Freshwater Macro-invertebrates for Biotic Assessment* was written for the Entomologist's Monthly Magazine, and I am preparing a review of *Guide to Freshwater Invertebrates* for the same publication.

Taxonomic work has focused on collection of material to revise the FBA "Caseless Caddis Key" of Edington and Hildrew. Considerable effort is going into obtaining early instars of a suite of species to enable the resultant keys to have size cut-offs for the characters. This work will continue this year, and as well as field collection of larvae it is hoped to rear several from the egg.

The FBA and EA are developing a suite of training modules to assist staff to learn species-level identification for caddis larvae; I wrote my module several years ago but this year have developed a marking protocol in readiness for launch of the scheme.

Other species currently being reared from eggs are *Limnephilus affinis* Curtis and *L. incisus* Curtis. These are the only common UK caddis species (barring the micro-caddis the Hydroptilidae) that are currently inseparable as larvae.

Probably the most unusual aspect of work with the FBA was my appearance on a BBC2 programme about wildlife in winter; I was talking about leaf-litter break-down in streams.

The forthcoming year will focus on further exploiting the database and developing a network of local caddis record verifiers. Towards the end of the year I hope to have enough material to be able to start writing and illustrating the new Caseless Caddis Larva Handbook.

Publications by FBA Staff and Honorary Research Fellows

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**THE FRESHWATER BIOLOGICAL ASSOCIATION
(A COMPANY LIMITED BY GUARANTEE)
TRUSTEES' REPORT FOR THE YEAR ENDED 31ST MARCH 2013**

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 31st March 2013.

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 1st April 2012 to 31st March 2013 are listed on page 30 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 Trustees are responsible for preparing the Annual Report and the Financial Statements in accordance with applicable law and regulations.

Company law requires the Trustees 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 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 Association, 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 2013
(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

This year has seen an increase in income from several key areas of activity, and has resulted in a significantly reduced operating deficit before net gains on investments, dropping from £313,144 in 2012 to £188,616 in 2013. During the year the Association withdrew £173,000 from the Investec holdings in order to cover its financial commitments.

One of this year's successes for the organisation was training income, which totalled £93,386 compared with £18,415 the previous year. This was largely due to the large number of bespoke courses run for external clients, including the Loughs Agency and a series of introductory invertebrate identification courses for the Environment Agency; in total, these brought in over £52,000. A programme of examination in order to provide external accreditation for Environment Agency staff began during the year, raising £20,600. Among the advertised courses, the new *Invertebrate identification for biotic assessment (including examination)* was particularly popular and oversubscribed.

Research continues to generate a significant proportion of the income for the organisation. Several research-related projects were completed during the year, of which the most important financially were the Lake Algal Bloom Pilot Project, completed in March 2013, which generated £65,000 for the financial year, and the North Tyne Restoration Project, completed in December 2012, which generated £40,000 of income. The Freshwater Pearl Mussel Ark Project benefited from increased income, this year totalling £74,500, some of which supports associated research activity.

Data and Information Services were successful in securing new income. The Defra-funded Demonstration Test Catchment Archive project continued for a further year, but with additional funds to incorporate the Agricultural Greenhouse Gas Platform; the total income from these projects was £118,810. The library secured funding totalling £60,732, compared with £16,133 the previous year, largely from work for the Environment Agency to continue with cataloguing grey literature and creating a digital archive.

Income from publications continued to rise. The FBA's Scientific Publication No. 67 continued to sell well, and was joined during the year by No. 68, the *Guide to Freshwater Invertebrates*, whose sales income was £7,686. Book sale income therefore rose from £19,864 to £28,078. Journals, in contrast, showed a slight decline in income: *Inland Waters*, the journal produced on behalf of the International Society of Limnology, raised £36,521 during the year, slightly down on the previous year's income; *Freshwater Reviews* raised £10,769, although this was still not enough to cover the cost of its production.

There was a small reduction in Membership during the year and membership income decreased slightly from £28,530 to £27,882.

The River Laboratory in Dorset continues to maintain its role as a facility attracting tenants involved in freshwater and related sciences. One of the current tenants, Queen Mary University of London, renewed its contract and two others, Game and Wildlife Conservation Trust and Bournemouth University, increased their space occupied. Work has been done on the farmhouse with the intention of attracting new tenants to the site. Rental income increased slightly to £180,138, while there was also training and scientific income generated from the site.

At Windermere, the Pearsall Building welcomed staff from CEH who relocated into the building. Towards the end of the financial year planning permission had been granted (with conditions) for the Annexe development.

**THE FRESHWATER BIOLOGICAL ASSOCIATION
TRUSTEES' REPORT FOR THE YEAR ENDED 31ST MARCH 2013
(Continued)**

The Trustees' recommendation was that the planning permission is accepted and that funding options are now explored; this development is expected to form part of the focus for the future strategy of the organisation.

The award of grants totalling £20,119 is considered by the Trustees to be a major contribution towards the FBA's compliance with the Public Benefit Test as laid out in The Charities Act 2011. The various public activities including educational outreach, speaking at conferences and running subsidised training courses, also add to this compliance, as does support for students on placements at FBA sites. The number of large contributions towards PhD studentships was reduced relative to the previous year, but this reduction in expenditure is considered prudent as the FBA tackles its ongoing deficit. The reduction in the overall deficit is a demonstration that changes made over previous years are coming to fruition.

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 largest element of the Association's investments (44% by value at 31st March 2013) is managed by Investec and is 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

During the year the business planning process identified the need for a major strategic review in order to determine the optimum way of realising the charitable objectives whilst at the same time continuing the proactive steps made to reduce the ongoing deficit. At the close of the financial year this review was still ongoing.

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.

Public Benefit Test

Under the terms of The Charities Act 2011, the Trustees have a statutory duty to report on the Association's compliance with the Public Benefit Test. 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.

**THE FRESHWATER BIOLOGICAL ASSOCIATION
TRUSTEES' REPORT FOR THE YEAR ENDED 31ST MARCH 2013
(Continued)**

Trustees

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

President

Prof. A.G. Hildrew

Chairman of Council

Prof. C.J. Spray MBE

Honorary Treasurer

Mr P.M. Andrewes

Representative Members

The Fishmongers' Company
Royal Society

Mr A. Wallace
Prof R. Battarbee FRS

Elected Members

Ms F. Bowles
Dr S. Brierley
Dr L. Brown
Dr A. Crowden
Dr E. Dollar
Ms G.L. Douglas (to July 2012)

Dr I.G. Dunn
Mr C. Mainstone
Prof. L. Maltby
Dr P. Shaw (from July 2012)
Dr I.J. Winfield (to July 2012)

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 6 June 2013
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 2013

Incoming Resources		Unrestricted Funds		Total	Total
Incoming resources from generated funds	Note	<u>General</u>	<u>Other</u>	<u>2013</u>	<u>2012</u>
		£	£	£	£
<u>Voluntary income:</u>					
Awards and donations	4	17,005	-	17,005	21,118
Activities for generating funds	5	218,544	-	218,544	209,672
Investment income & bank interest	6	67,473	2,384	69,857	87,369
		-----	-----	-----	-----
		303,022	2,384	305,406	318,159
Incoming resources from charitable activities:					
	7				
Membership services		27,882	-	27,882	28,530
Scientific and special publications		28,078	-	28,078	19,864
Journals (including <i>Freshwater Reviews</i>)		47,290	-	47,290	49,273
Scientific research & activity		343,600	-	343,600	310,684
Information & collections		60,662	70	60,732	16,133
Knowledge transfer activities		93,386	-	93,386	18,415
		-----	-----	-----	-----
		600,898	70	600,968	442,899
		-----	-----	-----	-----
Total incoming resources		903,920	2,454	906,374	761,058
		-----	-----	-----	-----
Resources expended					
Cost of generating funds	8	219,914	-	219,914	183,649
<u>Costs of charitable activities:</u>					
	9				
Membership services		46,096	-	46,096	52,994
Scientific publications and journals		106,378	-	106,378	100,815
Scientific research & activity		333,107	20,119	353,226	392,498
Information & collections		-	71	71	3,019
FBA library/Data & Information Services		223,351	-	223,351	123,593
Knowledge transfer activities		82,470	-	82,470	106,192
		-----	-----	-----	-----
Governance costs	10	63,484	-	63,484	111,442
		-----	-----	-----	-----
Total resources expended		1,074,800	20,190	1,094,990	1,074,202
		-----	-----	-----	-----
Net (expenditure) for the year before transfers and other recognised gains/(losses)		(170,830)	(17,736)	(188,616)	(313,144)
Net gain/(loss) on investments	13b	312,148	55,844	367,992	(27,750)
		-----	-----	-----	-----
Net movement of funds in year		141,268	38,108	179,376	(340,894)
Reconciliation of funds					
Total funds brought forward 2012		2,394,458	2,485,169	4,879,627	5,220,521
		-----	-----	-----	-----
Total funds carried forward 2013		2,535,726	2,523,277	5,059,003	4,879,627
		=====	=====	=====	=====

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 total net gain on investments of £367,992 (2012: total net loss of £27,750) includes realised losses of £3,319 (2012: realised gains of £6,361) attributable wholly to the General Fund Account.

THE FRESHWATER BIOLOGICAL ASSOCIATION
BALANCE SHEET AS AT 31ST MARCH 2013
COMPANY NUMBER 263162

	Note	2013		2012
		£	£	£
Fixed Assets				
Tangible	13a		1,917,283	1,956,645
Investments	13b		3,108,312	2,913,320
			-----	-----
			5,025,595	4,869,965
Current Assets				
Debtors and Prepayments	14	109,544		95,647
Cash at Bank and in Hand		101,446		69,132
		-----		-----
		210,990		164,779
Less Current Liabilities				
Creditors (due within 1 year)	15	(177,582)		(155,117)
		-----		-----
Net Current Assets			33,408	9,662
			-----	-----
Total Assets Less Current Liabilities			£ 5,059,003	£ 4,879,627
			=====	=====
Representing Members' Funds				
Unrestricted				
General Fund	16		2,265,137	2,117,075
Designated Funds	17		2,523,277	2,485,169
Revaluation Reserve	18		270,589	277,383
			-----	-----
			£5,059,003	£ 4,879,627
			=====	=====

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 6 June 2013

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 approximately 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

(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) resources for the year

This is stated after charging:

	<u>2013</u>	<u>2012</u>
	£	£
Depreciation	39,362	48,282
Auditors' remuneration	2,800	2,700
	<u> </u>	<u> </u>

<u>Incoming Resources</u>	<u>Unrestricted Funds</u>		<u>2013</u>	<u>2012</u>
	<u>General</u>	<u>Other</u>	£	£
	£	£		
4. Awards and Donations				
Membership donations	8,591	-	8,591	905
Legacies and other donations	7,664	-	7,664	19,136
Gift Aid	750	-	750	1,077
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	17,005	-	17,005	21,118
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
5. Activities for generating funds				
Land and building income:				
Windermere	11,185	-	11,185	16,225
East Stoke	180,138	-	180,138	167,570
Windermere ferry contract	20,418	-	20,418	21,884
Miscellaneous income	6,803	-	6,803	3,993
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	218,544	-	218,544	209,672
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
6. Investment income				
Bank deposit interest	58	-	58	182
Investment Income	67,415	2,384	69,799	87,187
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	67,473	2,384	69,857	87,369
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
7. Charitable activities				
Membership services	27,882	-	27,882	28,530
Scientific and special publications	28,078	-	28,078	19,864
Journals (including <i>Freshwater Reviews</i>)	47,290	-	47,290	49,273
Research contract	71,011	-	71,011	52,493
Scientific research & activity	63,448	-	63,448	115,163
Direct funding and grants	90,331	-	90,331	55,800
Data & Information Services	118,740	70	118,810	87,228
FBA Library	60,732	-	60,732	16,133
Training courses and meetings	93,386	-	93,386	18,415
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
	600,898	70	600,968	442,899
	<u> </u>	<u> </u>	<u> </u>	<u> </u>

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

<u>Resources Expended</u>	Unrestricted Funds		<u>2013</u>	<u>2012</u>
	<u>General</u>	<u>Other</u>		
	£	£	£	£
8. Cost of generating funds				
Land and buildings:				
Windermere	13,457	-	13,457	17,282
East Stoke	189,372	-	189,372	155,670
Windermere ferry contract	17,085	-	17,085	10,697
	-----	-----	-----	-----
	219,914	-	219,914	183,649
	-----	-----	-----	-----
9. Cost of charitable activities				
Membership services	46,096	-	46,096	52,994
Scientific and special publications	79,677	-	79,677	69,365
Journals (including <i>Freshwater Reviews</i>)	26,701	-	26,701	31,450
Scientific research activity and awards	219,913	-	219,913	287,819
Direct Funding & Grants	57,528	20,119	77,647	-
Research contract	55,666	-	55,666	104,679
Fritsch	-	71	71	3,019
The FBA library	93,874	-	93,874	123,593
Data & Information Services	129,477	-	129,477	-
Knowledge transfer	82,470	-	82,470	106,192
	-----	-----	-----	-----
	791,402	20,190	811,592	779,111
	-----	-----	-----	-----
10. Governance Costs				
Council meetings and reimbursements to Trustees	6,145	-	6,145	7,119
Other costs – direct and indirect:				
Audit fees	2,800	-	2,800	2,700
Other fees	6,452	-	6,452	35,710
Staff costs	38,336	-	38,336	57,407
Irrecoverable VAT	9,751	-	9,751	8,506
	-----	-----	-----	-----
	63,484	-	63,484	111,442
	-----	-----	-----	-----
11. Staff				

Average number of employees was 23 (18 FTE) paid employees (2012: 24) during the year to 31st March 2013.

Total Staff Costs in the year were:	<u>2013</u>	<u>2012</u>
	£	£
Salaries	502,517	491,951
Employer's National Insurance Contributions	37,093	37,189
Employer's Pension contributions	55,501	57,110
	-----	-----
Total	595,111	586,250
	=====	=====

There were no employees in the remuneration band £60,000 to £69,999, or above (2012: none).

12. Trustee Remuneration

No members of Council received any remuneration during the year. Travel costs and Council expenses amounting to £6,145 (2012: £7,119) were paid to 11 (2012: 12) 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 2012	1,955,000	121,830	26,034	2,102,864
Additions	-	-	-	-
Disposals	-	-	-	-
	-----	-----	-----	-----
At 31st March 2013	1,955,000	121,830	26,034	2,102,864
	-----	-----	-----	-----
Accumulated Depreciation				
As at 1st April 2012	45,608	87,593	13,018	146,219
Charge for the year	22,804	13,954	2,604	39,362
	-----	-----	-----	-----
At 31st March 2013	68,412	101,547	15,622	185,581
	-----	-----	-----	-----
Net book value				
At 31st March 2013	1,886,588	20,283	10,412	1,917,283
	=====	=====	=====	=====
At 31st March 2012	1,909,392	34,237	13,016	1,956,645
	=====	=====	=====	=====

The historical cost of Freehold Land & Buildings is £1,334,148 (2012: £1,334,148).

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 Peill and Co. for the land and buildings at the Windermere site and by Powis Hughes for the site at East Stoke in Dorset. 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 2012		2,913,320
Additions/(Disposals)		(161,343)
Investment Management fees		(11,657)
Net Investment Gains:		
Attributed to General Fund Account (Note 16)	312,148	
Gain on revaluation attributed to the Frost Bequest (Note 17)	55,844	
	-----	367,992

Market Value at 31st March 2013		3,108,312
		=====

During the year, £173,000 of capital has been transferred from the account held at Investec (2012: £230,000) 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	2,181,267
Represented by:	
Investments held on UK Stock Exchange	2,942,194
Cash held as part of Portfolio	166,118

	<u>3,108,312</u>

The principal investments at 31st March 2013 were:

	<u>Market Value</u>	<u>% of Total</u>
	£	%
<u>M & G Charifund</u>		
19,366 Income Units	254,111	8.2
6,026 Accumulation Units	957,155	30.8
<u>J P Morgan Asset Management Ltd</u>		
153,977 Bond Units	365,171	11.7
94,223 UK Equity Fund Units	167,299	5.4
	-----	-----
	<u>1,743,736</u>	<u>56.1</u>

The accumulated units received during the year that were reinvested for capital growth had a cash value equivalent of £55,879 (2012: £49,791).

14. Debtors

	<u>2013</u>	<u>2012</u>
	£	£
Trade Debtors	38,377	24,675
Other Debtors	54,542	59,972
Prepayments	16,625	11,000
	-----	-----
	<u>109,544</u>	<u>95,647</u>

15. Creditors

PAYE, NIC and pension	15,940	18,493
Trade Creditors	27,901	22,831
Other Creditors and Accruals	29,309	12,642
Deferred income	69,979	88,340
VAT creditor	34,453	12,811
	-----	-----
	<u>177,582</u>	<u>155,117</u>

16. General Fund Account

	<u>2013</u>	<u>2012</u>
	£	£
<u>General Fund Account</u>		
Balance brought forward	2,117,075	2,396,926
Net movement in funds before transfers and other recognised gains	(188,616)	(313,144)
	-----	-----
	1,928,459	2,083,782
Transfer net movement to Other Funds (Notes 4 to 10)	17,736	41,249
Unrealised gain/(loss) arising from revaluation of Investments (Note 13b)	312,148	(21,544)
Transfer from Revaluation Reserve (Note 18)	6,794	13,588
	-----	-----
	<u>2,265,137</u>	<u>2,117,075</u>

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

17. Other Funds

	<u>31.3.2012</u>	<u>Income</u>	<u>Expenditure</u>	<u>Transfers</u>	<u>31.3.2013</u>
	£	£	£	£	£
<u>Unrestricted Designated</u>					
Fritsch Fund	101	70	(71)	-	100
Frost Bequest	478,814	55,844*	-	(15,421)	519,237
Frost Exhibition	2,314	2,384	(20,119)	15,421	-
Hugh Cary Gilson Fund	3,940	-	-	-	3,940
Freshwater Science Fund	2,000,000	-	-	-	2,000,000
	-----	-----	-----	-----	-----
<u>Total</u>	<u>2,485,169</u>	<u>58,298</u>	<u>(20,190)</u>	<u>-</u>	<u>2,523,277</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>31.3.2013</u>	<u>31.3.2012</u>
	£	£
Tangible Fixed and Current Assets	73,895	91,631
Quoted Investments	2,449,382	2,393,538
	-----	-----
	<u>2,523,277</u>	<u>2,485,169</u>

Unrestricted Designated Funds represents sums bequeathed, donated, or established by Council to the Association for the furtherance of its charitable activities by means of specific sponsorship, but expendable at the discretion of the Trustees. 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. In the short-term the Fund will be kept constant.

18. Revaluation Reserve

	£
Balance brought forward at 01.04.2012	277,383
Transfer to general fund – difference on historical cost depreciation charge and actual depreciation charge on the revalued amount	(6,794)

Balance carried forward at 31.03.2013	<u>270,589</u>

19. Capital Commitments and Contingent Liabilities

There were no capital commitments or contingent liabilities at 31st March 2013.

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)

21. 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 most recent actuarial valuation was carried out as at 31 March 2011. The Pensions Act 2004 and the Scheme Funding Regulations issued in 2005 require schemes to adopt the Statutory Funding Objective – to have sufficient and appropriate assets to cover their 'technical provisions'. Under legislation, the assumptions underlying the technical provisions are set by the Trustee after consultation with the Employers. The assumptions include margins for prudence that the Trustee considers appropriate given the Employer's willingness and ability to support the Scheme (the "employer covenant"). In relation to the past service liabilities the financial assumptions were derived from market yields prevailing at the valuation date.

At the valuation date (March 2011), the market value of the assets of the scheme was £35,343.7 million and the value of the scheme's technical provisions was £32,433.5 million indicating a deficit of £2,910.2 million. The funding level was 91% of the benefits which had accrued to members after allowing for expected future increases in earnings.

The Trustee has determined (after consultation with the Employers) a plan to pay off the shortfall of £2,910.2 million by 31 March 2021 which requires the employers to make additional payments of 3.4% of salaries for the first six years to 31 March 2017, and of 2% for the four years to 31 March 2021.

The USS pension scheme is now closed to new employees within the FBA and an alternative defined contribution stakeholder pension scheme is offered with Scottish Widows.

The total pension cost for the Association for the year to 31st March 2013 was £55,501 (2012:£57,110) which was 16% of pensionable salaries for the USS Pension and 9% of pensionable salaries for the Scottish Widows Pension.

Outstanding Pension contributions as at 31st March 2013 were £6,827.

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 2013 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 27, 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 2013 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
June 2013

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