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ANNUAL REPORT

OF THE

FRESHWATER BIOLOGICAL ASSOCIATION

and Accounts for the year ended 31st March 2012

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CONTENTS

Officers, Council and Staff	4
Foreword from the President	6
Report from the Chairman of Council	6
Report of Activities from the Director	7
Reports from Honorary Research Fellows	14
Trustees report for the year ended 31st March 2012	25
Financial Accounts 2011/2012	29
Auditors' Report to the Members of the Freshwater Biological Association	38

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**Mrs J. Lomax (Finance Manager)

* Co-opted Member

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R.M. Badcock
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Dr I.A.E. Bayly
J.A. Black
B. Blofield
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COMPLEMENT AT 31st MARCH 2012

Director	Dr Michael Dobson
Personal Assistants to the Director	Sarah A. Johnson/Julie P. McNicol
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Finance Manager	Judith Lomax
Finance and Administration Assistants	Carolyn Fletcher/Sarah Rigby
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Administration Assistant, East Stoke	Stephanie Smith
Facilities Management, Windermere	Matthew Freeman
Research and Facilities Manager, East Stoke	John Davy-Bowker
IT Support Manager	Vanya Gordon
Domestic Assistant, Windermere	Andrew Duncan
Data and Information Services	
Collections Manager/Library and Information Services	Hardy Schwamm
Bioinformatics and Web Development Manager	Dr Michael Haft
Information Support Officers	Rosalind Maberly/Rebekah Taylor
Web Developers	Simon Fox/Nick Bywell
Knowledge Transfer	
Science and Publications	Dr Karen J. Rouen
Training and Education	Dr Melanie Fletcher/Simon Pawley
Pearl Mussel Project/Journals	Louise Lavictoire
Post Doctoral Researcher	Dr Marie-Pierre Gosselin
PhD Student	Gary Rushworth
<i>Approximately half the staff are employed on part-time contracts</i>	
<i>Honorary Posts</i>	
Honorary Curator of the Fritsch Collection	Dr Elizabeth Y. Haworth
Honorary Information Science Fellow	Ian Pettman
Honorary Research Fellows:	
	Professor Patrick Armitage
	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 Raven
	Professor Colin S. Reynolds
	Dr Roger A. Sweeting
	Dr Ian Wallace
Honorary Editors:	
<i>Scientific and Special Publications</i>	Alan Crowden
<i>FBA News</i>	Dr Jonathan Grey
<i>Freshwater Reviews</i>	Professor Colin Reynolds

Registered Auditors:

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

Bankers:

The Cooperative Bank
147 Church Street
Preston PR1 3UD

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

Foreword from the President

This has been a remarkable few months - particularly writing as I do from the crowded and dry south-east of England. Much of north-western Europe has suffered a series of very dry winters and, in large areas of southern, central and eastern Britain, hose-pipe bans have been introduced and (lack of) water made it into the television headlines. The hydrologists and aquatic ecologists then sought to exploit an opportunity to winkle out extra resources for research on drought, only for April and early May to prove the wettest on record, sufficient to produce floods in many southern rivers. Who would work on rivers? I have found myself vainly trying to explain the occurrence of surface floods at the same time as groundwater deficit, but it is a difficult job. When it comes down to it, people are interested in keeping water off their property while ensuring the security of supply in the long term. The task is to convince the public that, if managed sensibly, catchment ecosystems can provide a sustainable supply of good quality water, with lots of fish and other wildlife, and at the same time minimise risks to health from diseases associated with water. These are the 'ecosystem services' that ecologists and others have identified. To be convincing about them needs top quality scientific knowledge and top quality communication skills. We must make the case that freshwater ecological research has much to offer in an increasingly crowded and changing world, and we must be global in our outlook. Many of the greatest challenges and threats lie in less developed countries, where rapid population growth and economic development, mixed with a changing climate, threaten water and food security and the aquatic ecosystems on which we depend. FBA should not forget that it is, at least partly, a global organisation and that some of its most enduring contributions were made by its scientists working, for instance, on the great (and some of the lesser) lakes of Africa. I hope that contribution can be acknowledged somehow, and its influence be extended into the future.

Report from the Chairman of the Council

Without wishing to turn each of these contributions in to a commentary on the British weather, it is hard not to start this year, like last, with a reflection on the variety - spatially and temporally - of the rainfall (or lack of it) that we have experienced this past year in the UK, and the impact this is having on freshwater biology. Living as I do in Scotland, we had the warmest March ever recorded and indeed I was out sampling aquatic invertebrates at the end of that month with students in glorious sunshine. But one person's warmth is another person's potential drought. So whilst the rains and cold weather swiftly returned up north in April, drought orders and hose-pipe bans were rapidly becoming the new topic of conversation in the south. Rivers, especially chalk streams such as the one I grew up by, the Kennet, ceased to flow, and not just in their upper reaches (the winterbournes) but in downstream reaches previously the location of water meadows and permanent flows. So, what should we make of all this? – perhaps the answer is not unconnected to where the FBA seeks now to direct its focus and new strategic direction.

Understanding what is happening to our fresh water environments has become ever more relevant in this fast changing natural, economic and social context. Knowledge transfer, as the targeted exchange of information and communicating the results of science has become termed, is now central to the mission of research councils, of statutory environmental protection agencies, of NGOs, of politicians and increasingly of the FBA. In this context, Council spent much of last year working with the Director and key members of staff reviewing and repositioning the strategic direction of the FBA.

We are all convinced that the future direction of the FBA must be closely aligned to its ability to act as a trusted intermediary in the debates about fresh water, and to be recognised as the leading independent organisation to which people will come for information and advice. Our mission therefore becomes one where we strive to promote the sustainable management of freshwater ecosystems and resources, underpinned by the best available

scientific information. The challenge then becomes how, in the modern era this can best be achieved by an organisation like the FBA.

Returning to the heart of the FBA, we believe that to achieve this new direction, we need to focus on widening our membership; on providing better and more focused evidence and information about the fresh water environment and its management; and on using our position of respected independence to influence key decision-makers and broaden our advocacy role. In this last respect, for example, we have become members of Wildlife and Countryside Link and look to work with others in this grouping to promote freshwater biology and management more effectively.

The other urgent challenge to be tackled is that of our financial position – to which Council and Finance and General Purposes Committee have returned and discussed at length with the Director and staff. It should be noted that control of expenditure has, as ever, been tight and well managed; our challenge remains to identify and attract new sustained sources of income at a time of reducing research budgets and cut backs in government and statutory agency expenditure on areas such as training, environmental monitoring, research and recruitment. We look to address this with closer analysis of costs and income from individual budgetary lines, opportunities and risks; by looking at potential futures for infrastructure such as the Annexe building, by continuing to attract tenants and new projects to our facilities at East Stoke and Windermere, and by widening membership.

Let me end though by celebrating three very different, but connected parts of our work – the Fritsch collection; the database of national work on catchment research; and the efforts and expertise of our director and staff. The Fritsch collection of Freshwater, Brackish and Terrestrial Algal Illustrations is simply unique – over 100,000 sheets and millions of illustrations begun a century ago this year by Professor Fritsch, a founder member and first chairman of the FBA. It is a credit to him and successive curators, currently Dr Elizabeth Haworth, that this collection has been maintained and expanded. In the digital information age securing its future, like that of the FBA, becomes ever more of a challenge, with little income to balance the costs of maintenance and development. Access to complex data sets is also at the heart of our successful bid to the Department for Environment, Food and Rural Affairs (Defra) that secured our role as the custodian and developer of their archive for the three Demonstration Test Catchments. Finally, no organisation progresses without the dedication of its staff and many volunteers, and it is a pleasure to acknowledge and thank them again for their work, expertise and commitment. As someone who “went back to basics” this Spring and took part in a two day aquatic invertebrate training course at Windermere, I can personally vouch for all these excellent attributes.

Report of Activities from the Director

Introduction

While last year continued to provide us with financial challenges, in many other ways it was a positive time for the FBA. There are areas of activity that are demonstrating a good external profile. For example, we were invited to carry out projects by a variety of different organisations, including the Environment Agency (EA), Westcountry Rivers Trust, Defra and Aquatic Sciences and Fisheries Abstracts (ASFA), all of which resulted in income for the FBA. A high profile is essential if we are to regain a financial even keel. Once again, thanks go to FBA staff, who are working incredibly hard and with good humour despite the increasing pressures being placed upon them. Below is an overview of activities for the year ending 31st March 2012.

Data and Information Services (DIS)

The key activity associated with DIS is the Defra contract to create the archive for the Demonstration Test Catchment projects. The first year of this project involved interaction with scientists collecting data and potential end users of the archive, in order to understand

their requirements. Towards the end of 2011, technical development started in earnest, and this will continue for several years. In January 2012 Defra provided further resources to add their Agricultural Greenhouse Gas Project data to the Archive. A website has been created for the duration of the development period, www.dtcarchive.org, to allow testing of draft versions of the Archive and portal as they become available. Work on this project began soon after the end of the JISC-funded Fish.Link project, which was completed in July 2011, and which provided valuable background by creating tools for conversion of datasets into archival standards and for adding appropriate metadata.

Online FBA membership facilities, access to the library catalogue and digitised Fritsch sheets and citations are all currently being prepared and investigated, as spin-off benefits from the activities associated with the Defra Archive project.

The FBA jointly hosted a data management workshop on 14th February with our partners at King's College London. The workshop was well attended by a variety of different groups; a full report on the workshop is currently being prepared and will be available in the near future.

With input from Rebekah Taylor and Rosalind Maberly (see below, under personnel), we have successfully completed some cataloguing projects for our Collections. We are now in the position of describing collections to archival standards (ISAD(G), EAD), using specialist software [Archivist's Toolkit](#) to create catalogues. We have completed two pilot collections: The Vera Collins Catalogue is online (<http://archiveshub.ac.uk/data/gb0986.colv>), and we hope to publish the John Lund Catalogue in due course. (Note: this catalogue went live in June 2012).

Cataloguing work led to a contract with the EA North West to digitise and catalogue 100 EA grey literature reports. The documents in this *Environment Agency Fisheries Archive* are available via the [Aquatic Commons](#) repository in full text and free of charge, while the catalogue can be found on the Archives Hub: <http://archiveshub.ac.uk/data/gb0986.enva>.

DIS is working towards high visibility of and easy access to FBA's various collections in one digital repository. The *FreshwaterLife* website will be switched off once its contents are fully inventoried, and the name will be re-used in due course for the FBA repository. This will include FBA holdings, such as the digitised components of the Fritsch Collection, as well as content being held on behalf of external clients.

As part of our collaboration with the International Association of Aquatic and Marine Science Libraries and Information Centers (IAMSLIC), Hardy Schwamm represented the Aquatic Commons at the Steering Group for OceanDocs in Oostende, Belgium, in January 2012. The FBA continued its collaboration with ASFA, with Hardy representing the FBA at the ASFA Board Meeting in September 2011 in Ecuador.

The Fritsch Collection benefited from the donation of a very valuable collection of original illustrations of algae by their creator, David Williamson. This was reported in *FBA News*, No 56, Spring 2012.

Knowledge Transfer

Publications

The *Guide to British Freshwater Macroinvertebrates for Biotic Assessment*, the latest addition to the FBA's Scientific Publication series (No. 67), was published in October 2011. Written by FBA staff and intended as a concise guide to family-level identification, sales have been extremely good – so much so that we are already considering a reprint! As well as being aimed at a wider audience than our species-level keys, it is also the first title to benefit from a complete redesign of the style of FBA books, aimed at achieving a more contemporary look. In line with this review, the size of Scientific Publications will now be variable, depending on what works best for the particular title concerned. Completion of the *Guide to Freshwater Invertebrates* was delayed, but the reporting period ended with it entering the layout phase, so we hope to see it in print soon.

Mike Dobson was asked by Defra to produce a guide to invasive freshwater shrimps (and one isopod) that may be recorded in the UK in due course. This was published in March 2012 as a free download on the FBA website and will be available in printed form later in the year, once feedback has been received and incorporated. For this and other free downloads, visit the FBA website at: www.fba.org.uk/downloads.

The FBA's journal, *Freshwater Reviews*, continues to attract high quality, peer-reviewed articles on varying topics in the freshwater sciences. It has now entered its fifth year, with Volume 4 (2 issues) published during 2011 and Volume 1, published in 2008, now entirely open access via the journal website (www.fba.org.uk/journals). Since January 2010, the journal has also been included in 'BioOne.2' – one of two collections published by BioOne (www.bioone.org), a non-profit online distributor of journals for small publishers. Marketing to increase the subscription base for the journal is to be stepped-up during 2012, and we would welcome any offers of help from FBA members who are willing to act as 'champions' for individual institutions with whom they have contacts.

Inland Waters, produced on behalf of the International Society of Limnology (SIL), has completed its first year. As with *Freshwater Reviews*, it is primarily an online journal with articles published subsequently in print. Volume 1, comprising three issues, was published in 2011, and Issue 1 of Volume 2 was published in early 2012.

During the latter half of the period much work went into developing the FBA online shop. Thanks must go particularly to Karen Rouen and Simon Fox for their input into this project (which went live on 1 May 2012).

Meetings and training courses

The FBA Annual Scientific Meeting and AGM returned to the River Laboratory in 2011. This was a popular and successful meeting, with 29 oral presentations, one of our largest meetings in recent years. The number of students speaking was particularly good to see. Thanks are due especially to Steph Smith for local organisation.

The programme of training courses established over recent years continued during 2011/12, at both Windermere and the River Laboratory. Unfortunately a few courses had to be cancelled as the financial squeeze limited the number of participants. On the other hand, new applied courses on bioassessment using the River InVertebrate Prediction And Classification System (RIVPACS) and the River Invertebrate Classification Tool (RICT) were popular, and we were commissioned to run a bespoke workshop on phytoplankton for the EA.

Collaboration with the EA to develop a formal accreditation scheme for the identification of freshwater invertebrates to species level is ongoing.

Science

Staff activities

Working with the Queen Mary, University of London (QMUL) River Communities team, John Davy-Bowker completed a report that seeks to standardise the methodology used for deep river invertebrate sampling in the UK. This project, funded by the EA, considers the thresholds between shallow and deep river sampling techniques and provides clear guidelines on the point at which the shallow water kick sampling technique should be changed to either airlift or long-handled pond net sampling. The report considers the impact of deep river sampling techniques for the RIVPACS models. Additional items investigated included a detailed ergonomic assessment of airlift sampling.

The FBA worked with 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. We provided specialist input into monitoring activities, including invertebrate identification, training and calculating biotic indices.

The FBA continued the invertebrate and diatom sample collection for its 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 to enable these samples to be processed.

This year the FBA also successfully reared nymphs of several stonefly species of the genus *Nemoura*. These stoneflies are found in several of the Winterbourne streams close to the River Laboratory. The adults that have been obtained will be used to help prepare the forthcoming revision to the FBA stonefly key.

The work of the Freshwater Pearl Mussel Ark Project to maintain the Ark and to rear juvenile mussels continues with ongoing financial support from the EA and Natural England. To date, the project has successfully reared juvenile mussels to 3 ½ years old (120 individuals) and to 2 ½ years old (50 individuals). Younger juveniles from later cohorts also survive but numbers are unknown due to their small size. Mortality rates in the youngest juveniles remain high and research is ongoing into the possible causes of this. Research is also being conducted on other aspects of pearl mussel ecology including: geographical variation in preferred host fish species; substrate requirements of juvenile mussels; glochidial number and growth rates on fish; population genetics of different populations of pearl mussels. Collection of juvenile mussels in summer 2011 was the highest achieved to date (93,000 individuals) and successful reproduction (glochidial encystment) was achieved for eight out of the nine populations currently at the FBA. We continue to promote pearl mussel conservation through a series of talks to interested parties and are contributing to a proposed CEN (European Committee for Standardization) standard on the “Environmental Requirements of the Freshwater Pearl Mussel *Margaritifera margaritifera*”.

The North Tyne Restoration Project, jointly funded by the EA, FBA and Northumbrian Water, aims to investigate the reasons behind the decline of pearl mussels within the catchment and to produce a restoration strategy for the North Tyne catchment. Marie-Pierre Gosselin has completed an extensive literature review and analysis of previously collected data, along with a first season of field data collection on physico-chemical conditions in the North Tyne and its main tributary, the Rede. Working with the above partners and the Tyne Rivers Trust and Natural England, a restoration strategy for the catchment will be produced in 2012.

In early 2012 the EA commissioned a collaborative pilot project to involve volunteers in monitoring algal blooms in Cumbrian lakes. The project started in January 2012 and the response to the call for volunteers was been extremely positive, with almost 100 volunteers interested in participating. Its outcomes will be reported fully in due course.

The Life Members' research fund is starting to be spent. Louise Lavictoire used some of the money to visit the Technische Universität München, in Munich, Germany to learn about genetic methods relevant to her research activities. More locally, Melanie Fletcher and Simon Pawley are working with Allan Pentecost on a biological survey of Belle Isle on Windermere; although in the middle of one of the most studied lakes in the world, relatively little is known about the littoral fauna and flora of this small island.

Honorary Research Fellows

We were pleased to be able to appoint three new Honorary Research Fellows last year: Alan Hildrew, who retired from QMUL; Paul Raven, who retired from the EA; and Ian Wallace, who continues to work part time as Curator of Conchology & Aquatic Biology at the National Museums Liverpool. Ken Clarke, an Honorary Research Fellow since 2007, resigned his post, but continues to maintain an involvement with the FBA as a volunteer. Individual reports from Honorary Research Fellows appear on pages 14 to 24, and demonstrate their continuing valuable input and contribution to the FBA.

PhD students and grant awardees

The PhD students funded by the FBA are all progressing well. Brian Foley (University of Ulster) successfully defended his thesis on the controls and consequences of oxygen depletion in lakes, and Helen Rosenkranz (University of Bristol) and Julia Reger (University of Sheffield) expect to submit their respective theses later this year. Gary Rushworth (University of Leeds, but based at FBA Windermere) and Felicity Shelley (QMUL) both transferred successfully into their second year, and Fiona Bracken (Durham University) into her third year. Louise Lavictoire (a member of FBA staff) continues her part-time studies with the University of Cumbria, and successfully upgraded to a PhD during the year. In addition to the PhD students, we were pleased to host Rosie Sweeney (Manchester Metropolitan University) on her MSc placement during the summer of 2011. Rosie undertook an analysis of the carbon footprint at our Windermere site, the findings of which have been reported issue of *FBA News*, No 56, Spring 2012.

The 2011 Hugh Cary Gilson Award was made to Chris Hassell (Carleton University, Ottawa, Canada), for a project looking into the biodiversity of storm water management facilities in Ottawa. The work was carried out in the spring and summer of 2011, and preliminary findings were reported in the November 2011 edition of *FBA News*. The winner of the 2012 award was Rachel Carrie, for her proposal entitled: *The Development of Freshwater Bio-Assessment in Belize, Central America*.

Supporting activities and profile enhancement

Engagement with promoting the public understanding of science has been limited due to the financial climate. However, FBA staff participated in a half-day event at a local school during National Science Week, and in two "Insect Days" during National Insect Week. The latter two events, in York and Manchester, each attracted over 1000 people. Melanie Fletcher also delivered two lectures to university students. In Dorset, the University of the Third Age and Thomas Hardy School both had visits and tours of the River Laboratory. We also hosted a work-experience student for a one week placement at Windermere.

To improve the marketing of FBA products and services, our promotional literature has been updated and expanded during the year, and a central list of marketing contacts developed, to help us promote our publications, courses, conferences, facilities and services more effectively.

We continued to train Riverfly Partnership (RP) volunteers in the RP invertebrate monitoring technique. Another twelve 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.

The biennial Symposium for European Freshwater Sciences (SEFS), convened by the European Federation of Freshwater Sciences (EFFS), was held in Girona, Spain from 27 June to 1 July 2011. This seventh SEFS attracted a record attendance of over 500 delegates and provided the FBA with an excellent opportunity to promote the Association among European colleagues. Colin Reynolds has now stood down from his role as Convenor of EFFS, but continues to represent the FBA, along with Mike Dobson and Alan Hildrew.

The FBA was invited to apply for membership of the Wildlife and Countryside Link (www.wcl.org.uk), an umbrella body for organisations devoted to protecting the environment and enjoyment of the countryside. Our involvement is with the Water Working Group, whose main activity is production of the regularly updated *Blueprint for Water*. Full membership was granted just after the end of the reporting period, in April 2012. We also contribute to the UK Government's All Party Parliamentary Group on Biodiversity, which was launched in July 2011.

Sites

The FBA hosted five externally-run field courses during the year, with students from University of Bristol and Manchester Metropolitan University visiting the Windermere site, while the River Laboratory played host to Bournemouth University, University of Birmingham and QMUL. Lancaster University students also made a day trip to the Windermere 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.

The River Laboratory was the location of a wide variety of community activities. It hosted a *Jaws n' Claws* event in May, as part of *Purbeck Aware Week*, which attracted lots of families who were able to enjoy demonstrations including microscope work. Other users of the facilities for meetings and exhibitions were the Frome, Piddle and West Dorset Fisheries Association, Dorset Wildlife Trust and Wessex Water, while it continued its general community role as the venue for Parish Council meetings, yoga classes and the local polling station.

A major activity during the year was work on vacating the Annexe Building at Windermere, to allow future development. All Collections that were stored in the Annexe were assessed and processed, including de-duplication, removal of items with no long-term value and cataloguing of material. All remaining paper-based material was moved into the basement of the Pearsall Building by the end of February 2012, while wet samples have been relocated to the Gas House. Stocks of publications were moved to the Pearsall Building.

Membership

Membership numbers have settled following the steep decline in the previous year, but are still showing a net reduction: there were 42 new members and 116 lost over the year, and membership stood at 1269 at the end of March 2012. We are concerned to understand the causes of decline and to identify ways of encouraging and retaining new members. To this end, Christine Davey led a consultation among students, to identify their desires from a membership organisation. A combination of online surveys and focus groups provided much insight, and some ideas that we are rolling out as resources allow. One of the first new initiatives was the launch of a monthly e-newsletter for members; produced for a restricted group of subscribers for some years, as part of the former *FreshwaterLife* project, *Freshwater Matters* was rebranded and is now sent to all FBA members for whom we have a valid email address.

Meanwhile, our printed members' newsletter *FBA News* continues to thrive. Although the frequency has been reduced to three issues per year during 2011, this has been offset by producing 'bumper' issues. In 2012, thanks to ever improving technology and hence lower prices, we were able to adopt a recycled paper. In terms of third-party membership benefits, we have been able to continue our arrangements with Wiley-Blackwell and Springer, with individual FBA members entitled to a discount on subscriptions to *Freshwater Biology* and *Aquatic Ecology*.

Personnel

Christine Davey, who joined the FBA as an Information Support Officer in November 2010 to assist the DIS and Knowledge Transfer teams, left at the end of her contract in July 2011. However, we have been able to continue to benefit from her enthusiasm for promoting the FBA among young people, by engaging her on short contracts for membership development work, as noted elsewhere in this report.

Paul Johnson left the DIS team in June 2011, and was replaced by Nick Bywell. Gordon Lancaster, who had worked as a domestic assistant/cleaner at the Windermere site since 1996, initially on contract but latterly directly employed by the FBA, retired in January 2012;

he was replaced by Andrew Duncan, who is also able to help, from time to time, with site maintenance activities. Ken Clarke, who had worked on a part-time basis for some years on site maintenance, along with his role as an Honorary Research Fellow, retired in May 2011.

The FBA played host to several volunteers during the year. Emily Bateman, who had volunteered for nine months, left the FBA early in the period to take up a freshwater research position with ADAS in Cambridge, which has now been made permanent. Rowan Rumball is studying for an MSc at the University of Lancaster and is volunteering for one day per week until September 2012, helping with the pearl mussel project as well as some invertebrate surveys. Jayne Wilkinson, a second year undergraduate at the University of Nottingham, volunteered for a month during the summer to gain some practical skills. She undertook a range of activities including counting and recording glochidia for the Pearl Mussel Ark Project; the preservation and maintenance of the archive invertebrate specimen collection; invertebrate sampling and identification and reed bed conservation work.

Rebekah Taylor volunteered to help with cataloguing our unpublished collections, and within a few months we were able to offer her some temporary paid work, as described above. Similarly, Rosalind Maberly joined us in October 2011 and was employed part-time from January 2012. Both have continued with us into the new financial year.

Eloy Benito Reyes, a student at Universidad Autónoma de Madrid (Spain), applied to spend time in Windermere as part of an EU-funded Leonardo da Vinci Scholarship exchange programme. He spent three months working mainly on the pearl mussel project, while his partner Soraya Alvarez Codesal did several weeks' voluntary work with the Fritsch Collection. Chris Gibson and Brian Godfrey, two retired FBA members, also continued to do occasional voluntary days with the Fritsch Collection.

Lawrence Dobson, who has been an occasional volunteer as a site maintenance assistant for several years, has been a weekly volunteer for much of the year, and of great assistance to Matt Freeman, the Site Manager, since the retirement of Ken Clarke.

Governance

FBA Council produced a new strategy over the year, better to reflect the direction in which the Association needs to move. This includes a new mission, vision and specific objectives, as follows:

Vision: *to be the leading independent UK organisation for freshwater information and advice.*

Mission: *to promote the sustainable management of freshwater ecosystems and resources, underpinned by the best available science.*

Objectives:

- *To widen active membership*
- *To provide evidence and information*
- *To influence and broaden advocacy*
- *To facilitate the setting of the research agenda*

The year was marked by several sad losses. David Le Cren, a Vice President and former Director, passed away in November 2011. We must also record the unexpected and untimely passing of one of our Council members, Mr Simon James, who died in March 2012.

Simon James had been appointed to Council only in July 2011, along with two other new members, Dr Alan Crowden and Dr Evan Dollar, replacing this year's retirees: Dr Iwan Jones and Professor Brian Whitton. We also welcomed two new representative members of Council. Professor Rick Battarbee became the Royal Society representative, following the retirement of Professor Bland Finlay, while Andrew Wallace replaced Dr Clive Askew as the Fishmongers' Company representative.

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.

Please also note that Terry Gledhill was unable to produce a report due to health reasons.

Patrick Armitage ***Invertebrate Ecology***

I continue to collaborate with University of Loughborough and maintain daily contact with my colleagues in the River Communities Group, QMUL, in an advisory and collaborative role.

This year most of my time has been spent collating data from a survey of the macroinvertebrate fauna of tyre tracks and puddles in woodland, heath and pasture. Some of the results were presented at the FBA Annual Meeting at the River Laboratory in July. Since then the work has been written up and submitted for publication.

Together with a colleague, Jon Bass, we are re-examining the South Winterbourne which was first studied in the early 1970s by River Laboratory staff. The new work was stimulated by a 'rehabilitation' project on the system and the need to determine its effects. The EA has supplied a quantity of data which we will use to help explain any changes in faunal communities over the last 35 years. The work unexpectedly revealed the occurrence of a stonefly new to Britain which is described by Mike Hammett in a forthcoming issue of Entomologists Monthly magazine.

In addition to these two projects I have identified chironomids for University of Loughborough and was approached by Jersey Water Company to provide advice on problems associated with macroinvertebrates occurring in their Rapid Sand Filtration Works. Further chironomid work includes the discovery of a new species of *Chaetocladius* adjacent to a freshwater seepage through slumped chalk in Worbarrow Bay, Dorset. The yearly survey of the Bovington Stream and Frome which was discontinued last year due to financial stringencies at MOD is being continued at a reduced intensity. Queen Mary College are sampling the Frome to maintain continuity of the data set and I am continuing to obtain Spring samples from the Bovington Stream.

I continue to have links with Dorset Wildlife Trust in relation to their Ponds project and work on wet woodlands. I am also involved with Bournemouth University negotiating with the EA to survey wet habitats in their newly acquired land on the River Frome floodplain downstream of the River Laboratory.

J. Malcolm Elliott ***Ecology of freshwater fish and zoobenthos***

I continue to referee papers for different journals and especially Freshwater Biology (I dealt with 17 Manuscripts in 2011 for the latter journal). The rest of my time has been spent on two large papers and these are summarised below.

The first publication is a review of work on medicinal leeches, written with a colleague from Germany, Ulrich Kutschera (Elliott & Kutschera, 2011). After a short introduction to the classification of medicinal leeches, their historical use in phlebotomy (blood-letting) and contemporary use in neurobiology and medicine are summarised. Over-collecting of wild

Hirudo medicinalis in Europe led to reduced populations and the need to import other species, especially the closely related *Hirudo verbana* from Turkey and, more recently, the Caribbean and Asian leech, *Hirudinaria mallinensis*. The limited information on the quantitative ecology of European medicinal leeches is summarised next. They require warm-water ponds with a range of suitable hosts, especially amphibians, to survive and prosper. Medicinal leeches can persist with a low minimum viable population size, which may be typical of rare freshwater invertebrates in isolated habitats, especially species limited by high temperature requirements and specialised food sources. Phylogenetic relationships, using molecular methodology, show that there are at least two independent lineages of medicinal leeches with *Hirudo medicinalis*, *H. verbana* and *Hirudinaria mallinensis* being closely related. The type species, *H. medicinalis*, was once abundant in Europe but is now rare and on the endangered list in several countries. Genetic studies have confirmed the erroneous marketing of *H. verbana* as *H. medicinalis*. It is highly probable that *H. verbana* has already escaped into the wild. Unlike *H. medicinalis*, *H. verbana* has no legal protection. We conclude that the major factor in the decline of medicinal leech populations has been the general loss of wetlands, especially eutrophic ponds and marshes throughout Europe. Destruction of these water bodies has also led to a decline in amphibians that are an important source of blood-meals for the leeches and are crucial for the survival of their juveniles. More quantitative information is required on *H. medicinalis*, and especially *H. verbana*, to facilitate their conservation and management, and to prevent them becoming extinct in the wild.

The second paper compares the relationship between light intensity and feeding ability in brown trout and Arctic charr (Elliott, 2011). Field observations indicate that the ability to feed at different light intensities may differ between brown trout and Arctic charr, and this is the first study to test this experimentally. To establish a background level of feeding in daylight at mid-day, trout and charr in two size groups were kept in tanks (one fish per tank) at three constant temperatures (5.0, 10.8, 13.0 °C) and each fish was offered, one at a time, 50 freshly-killed shrimps (*Gammarus pulex*), the number eaten being recorded. Shrimps could only be taken in the water column because a metal mesh prevented access to dead shrimps on the tank bottom. In a first series of experiments, individual fish were kept at one of 10 natural light intensities (range 0.001 - 50 lx). In a second series, conditions were similar except that the fish tank was covered in black polyethylene and had a light-tight lid with a shutter so that light levels could be kept constant, using artificial illumination. In a third series, the fish were fed in total darkness, but the false bottom was removed, allowing access to dead shrimps on the tank bottom as well as in the water column.

The results of the first and second series differed inter-specifically, but were very similar intra-specifically, with no significant differences between the food intake for the two size-groups or in the experiments at 10.8 and 13.0 °C. Food intake remained fairly constant at light intensities between 50 lx (dusk or dawn) and 0.03 lx, and was similar to that of fish feeding at mid-day. At 10.8 and 13.0 °C, food intake between 0.03 and 50 lx was higher for trout than charr, mean values for shrimps eaten per fish being 39.9 for trout (range 36-44, $n = 100$ fish) and 32.0 for charr (range 28-38, $n = 100$), but at 5.0 °C the situation was reversed with mean values of 15.1 for trout (range 11-18, $n = 50$ fish) and 19.8 for charr (range 17-22, $n = 50$). As light intensity decreased from 0.04 lx to 0.001 lx, feeding rate decreased exponentially but was always higher for charr than trout, with a mean number of shrimps eaten at 0.001 lx of 9.3 for trout (range 5-13, $n = 20$ fish) and 13.6 for charr (range 9-20, $n = 20$) at 10.8 and 13.0 °C, 2.0 for trout (range 1-4, $n = 10$ fish) and 5.5 for charr (range 2-8, $n = 10$) at 5.0 °C. In total darkness (false bottom fitted), none of the 50 shrimps was taken by either species. When the false bottom was removed in the third series, the mean number of shrimps consumed over 24 h was eight for trout (range 3-11, $n = 20$ fish) and 14.9 for charr (range 9-20, $n = 20$) at 10.8 and 13.0 °C, two for trout (range 0-4, $n = 10$ fish) and five for charr (range 3-8, $n = 10$) at 5.0 °C.

Therefore, the feeding ability of trout was superior to that of charr when using photopic vision in daylight and mesotopic vision at dusk and dawn, but inferior to that of charr when using scotopic vision at low light intensity. Charr were also superior at low temperatures and when

foraging for food in total darkness. Therefore, as light intensity decreases after dusk in their natural habitat, the advantage in feeding will shift from trout to charr, with the reverse occurring as light intensity increases after dawn.

D.Glen George

Limnology and Zooplankton Ecology

Most of my time is still being devoted to writing papers on the impact of climate change on lakes. A paper on the impact of extreme weather events on Llyn Tegid (Snowdonia) is in preparation and a draft of an earlier paper is being revised.

In June 2011, I presented a Keynote address at the 2nd International Water Association (IWA) Symposium on Lake and Reservoir Management, held in Granada (Spain). The theme was 'Managing Lakes in a Highly Regulated but Uncertain World' and the paper included examples from our long-term studies in the English Lakes. In August, I gave a talk on our ongoing work at Llyn Tegid to undergraduates from Aberystwyth University and in October visited the Institute of Geography Earth Sciences to deliver a lecture on the climatic sensitivity of lakes.

Elizabeth Haworth

Curator of the Fritsch Collection of Algal Illustrations

Fritsch Collection of Algal Illustrations

Most of my time has been spent on the Fritsch Collection this year and I have two voluntary helpers who come occasionally: Brian Godfrey helps with the digital photography and Chris Gibson, an algologist from Northern Ireland, has conveniently retired to Garstang near Lancaster and helps with some of the incoming literature, lately concentrating on some papers about red algal genus *Batrachospermum*.

A Spanish visitor, Soraya Alvarez Codesal, spent some of her time here helping me to check more of the desmid species sheets in preparation and record text for a further photographic session. Corrections to spelling, authorities and other information are made and sheets repaired.

During the summer considerable effort was put into a large grant application to JISC to fund digitizing the whole collection to make it searchable on line. There were over 80 applications and we were unlucky in that they funded some of the smaller ones. However the experience was useful in that we can use this elsewhere when opportunity arises.

In the autumn, I produced another 'Fritsch Calendar' to celebrate the centenary of the Collection, both as a thank you to supporters and users, and as a flyer to advertise both the Collection and the FBA. This was based on example species sheets that related to those much involved in the Collection. Sales at Diatom and Phycological Meetings were good.

Most algal enquiries now come by email, either direct or via Algae-L or Diatom-L. I spent some time assisting Amal Salah in Egypt on diatom species and have worked with Chris Carter, a UK amateur algologist, on *Chaetonea* and in doing so replaced a lost library reprint. Unfortunately the Nordic Journal of Botany was lost from our library in the flood, and I would be grateful to hear from anyone who could help us to replace it.

Diatoms and Palaeoecology

I have continued to collaborate with both Southampton Oceanography and Dr Suzanne McGowan's group at Nottingham University in their studies of Windermere sediments and a paper is in press. The Nottingham group are now exploring some of the smaller tarns of the Windermere catchment that I worked on earlier. One is Blea Tarn, Langdale which was my M.Sc. project in 1965/6 in the days before even carbon¹⁴ dating was readily available, so I look forward to an update.

The revised edition of the book *The Freshwater Algal Flora of the British Isles* finally appeared in the autumn 2011 including a chapter I jointly authored with Martyn Kelly.

In January, the British Phycological Society produced a photographic exhibition at Newcastle Museum based on some of Hilda Canter-Lund's algal photographs combined with those of the prize winners of their Hilda Canter-Lund Photographic Prize. This is on tour and we plan to bring it to the Armit Museum at Ambleside in Spring 2013.

Alan Hildrew

Ecology of Streams and Rivers

My Fellowship took effect in 2011, more or less coinciding with my retirement from full time employment at QMUL on 30th September 2011, after 38 years service. So far, I have noticed almost no difference in my workload, probably because I have been retained at 20% timetable at Queen Mary and also continue to edit *Freshwater Biology* for Wiley-Blackwell. I began editing *Freshwater Biology*, with Colin Townsend, in 1982, when the Editorship moved away from the FBA with the retirement of David Sutcliffe. It is now a big commitment, and the journal is receiving around 700 manuscripts per year. I co-supervise two PhD students at QMUL and am involved in a joint Natural Environment Research Council (NERC) grant with colleagues there. My main efforts have been in completing several publications that are outstanding, now being careful to add the 'FBA badge' to the address line.

As well as my duties as President of FBA, I have also in the last six months chaired the NERC grant panel on BESS (a special programme of research on Biodiversity and Sustainability of Ecosystem Services) and the Awards Committee of the Zoological Society. I serve on the Programme Development Group of NERC's Centre for Ecology and Hydrology (CEH) and continue my work on the UK'S Acid Waters Monitoring Network. I gave an invited paper in honour of Björn Malmqvist at SEFS in Girona in the summer.

My research activities follow three lines. I remain interested in acidification and a major aim is to complete a review on acidification as a kind of long-term ecological experiment. The data in the UK Acid Waters Monitoring Network are a goldmine and I am trying to help in their analysis. Linked to that I continue with a role in the 'Broadstone Stream project', now 40 years old. The stream has now substantially de-acidified and has been invaded by trout. We are examining this and other ecological changes in the food web of Broadstone stream and other streams on the Ashdown Forest. My old data from the 1970s is proving useful in this. Finally, with colleagues Jon Grey and Mark Trimmer at QMUL, and our students, we are examining how methane derived carbon is incorporated particularly in cased caddis larvae. This promises to be a high profile project, suggesting at it does the importance of chemosynthesis in streams food webs, and the role of greenhouse gases in stream ecosystems.

For the future I have in mind an update for the FBA key to caseless caddis larvae, which I have been discussing with Ian Wallace. I will also be developing ideas for funding for FBA over the next few years.

Mike Ladle

Ecology of Fish

Despite the economic difficulties being experienced by local authorities Dr Stewart Welton and I were again contracted to collaborate successfully on the control of the Blandford Fly (*Simulium posticatum*) for a number of authorities in Dorset. The work was reduced in scope and although the insecticide VectoBac 12AS was applied as usual no monitoring was possible. However the reported low incidence of biting experienced suggests that the application was again extremely successful in reducing the numbers of the species.

I still visit the River Laboratory to liaise with members of the staff of FBA and other organisations. Since my capture of a chub (*Leuciscus cephalus*) from the River Frome, as mentioned in my last annual report, several more of these fish have been observed and caught from the Millstream on FBA grounds, suggesting that the fish are already established and breeding in the River. The subsequent spread, growth, population dynamics and environmental impact of this species, following its apparent recent introduction to such an intensively studied situation, would be of considerable scientific interest.

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

The run of salmon on the Frome was rather better than in recent years (FBA Counter figures) and, as in 2010, catches were substantial and as far as I can ascertain the FBA water at West Holme produced 16 fish, half the catch for the entire River (the fisheries are, of course, valued largely on the basis of numbers caught). All salmon are now returned alive.

I am still responsible for the administration of the FBA fishing at West Holme dealing with the fishermen, fees, fishing rota and reporting on the state of the fishery, its banks and bridges etc.

Allan Pentecost

Limnology and Algology

This year saw the publication of the revised *Freshwater Algal Flora of the British Isles*, to which two revised contributions were made (Oedogoniales and Tetrasporales) entailing additional fieldwork and literature searching. Frequent reference to 'ellipsoidal' cells in this work prompted some research into the reality of this description, the results of which will be revealed in a later report. A review on the subaerial cyanobacteria has been completed with co-author Brian Whitton and will appear in the new edition of the *Ecology of Cyanobacteria* to be published later this year. While examining some springs in the Yorkshire Dales with historian Dr. Tim Laurie, a new site was discovered for the rare red alga *Chroothoece*. The discovery was shared with Brian Whitton, who has been working on the genus in Spain, and a joint research project was undertaken to understand more about the distribution and environmental setting of the alga. This included some water chemistry at the site, phosphatase activity, culturing, and multivariate analysis of the algal communities. The results were presented in a paper read at the British Phycological Society AGM at Newcastle in January 2012.

A paper was also read at the Malham Tarn Research Seminar in November 2011 on the contribution of Mountain Limestone weathering to phosphorus release in the Malham Tarn catchment. The Mountain Limestone contains about 100 ppm phosphorus but the amount released by chemical weathering is not known. Since the majority of weathering occurs under the soil, simulation experiments were performed using a gas phase containing 1% carbon dioxide in equilibrium with clean limestone fragments suspended in water. This level of carbon dioxide has been found in the Malham soils. The gas/water solution dissolved the limestone and the amount of orthophosphate released was measured once equilibrium had been established. The results demonstrated that only a fraction of the contained phosphorus, measured independently with another technique, was released into solution. In addition, the amount of phosphorus in the limestone was significantly correlated with the iron-rich detrital component suggesting that this component, which would also contain detrital apatite was responsible for the release. The Malham catchment and its lake, Malham Tarn are well studied and calculations show that amount of P released from the limestone annually within the catchment could in fact supply all of the necessary P for macrophyte growth within the Tarn. However, few of the phosphorus atoms released from the limestone find their way directly to the lake. Most of them would be quickly sorbed onto soil or sediment particles where they could remain for years before being released or recycled.

Literature studies on phosphorus are continuing with a view to prepare a review on recent findings on P release via rock weathering and its significance in lake catchments. Work has also started on the growth and calcification of the Xanthophyte *Vaucheria*. The first year of fieldwork is now complete and has provided a seasonal growth curve for the alga. In this coming year, a more detailed study over a shorter time span will examine its calcification. The work on *Schizothrix* and the Malham diatoms mentioned in the previous review remains in progress.

Ian Pettman

Data and Information Retrieval

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

The priority for this period has remained the assistance with funding bids in order to consolidate DIS contributions to the future of the FBA. Consultation for DIS staff encompassed the following:

- Continued assistance with regular enquiries for library, unpublished documents, data and samples.
- Assisting with further funding bids to ASFA, JISC, Heritage Lottery Fund and EA, most of which have been successful or are progressing well.
- on-going advice on metadata standards for Defra and other projects.
- Assistance with presentation on Impact Assessment which Hardy Schwamm gave at the UN ASFA Board Meeting in Ecuador.
- Suggestion of Vera Collins' data notebooks etc. as the trial material for the online Archives Hub and checking the 88 entries for the data notebooks;
- support and advice relating to Hardy's role on the Aquatic Commons Board and at the First Meeting of the IODE Steering Group for OceanDocs (International Oceanographic Data and Information Exchange).
- Assisting Hardy in training short term assistants.

Over a three month period I worked with Dr Susan Jones and Olive Jolly on the various large collections stored in the Windermere Annexe (collections of John Lund, Hilda Lund, John Wright, John Hilton, etc). These were assessed, weeded, sorted and catalogued.

The information retrieval work in this period has been limited by the work above, but the following was carried out:

- Initial work has been done with Hardy Schwamm and Mike Haft in relation to the "vocabularies" required in the Defra DTC contract. This work is ongoing.
- Consideration has been given to the merging or mapping of two subject thesauri for the ASFA Indexing and Retrieval System and this will be developed further for a discussion document to be presented at the ASFA Board Meeting in June 2012.
- Discussions have taken place with the ASFA Board relating to further work on the Geographic authority tools but this has been slowed by staff changes in the ASFA Secretariat. This will also be an item for the ASFA Board Meeting in June 2012.

Paul Raven

River Ecology and Morphology

My first six months have been spent drawing up plans for continuing my research interest in the links between fluvial geomorphology and river ecology. This is an important subject area for conserving rivers of high ecological quality and identifying effective rehabilitation measures for degraded rivers. The morphological and biological consequences of historical changes in climate and river channel use will be particular aspects that I will be investigating. There is a wide range of historical and recent information that potentially could be useful, but the data vary in quality and have been collected for a variety of different purposes. Therefore my analytical approach needs very careful preparation and testing, particularly given the complicated spatial and temporal interactions involved. Preliminary conclusions on the most promising approach will be included in my contribution to the course programme 'Organisms and their environment: an introduction to freshwater ecology' scheduled for 23rd October 2012.

I have been using my FBA affiliation to promote the importance of freshwater biology in the British Ecological Society (BES) to which I was recently elected a member of Council. This is particularly timely in relation to the BES centenary year in 2013 and BES long-term priorities thereafter.

Colin S. Reynolds***Ecology of Phytoplankton***

As an honorary fellow, I have been able to continue my interests in the work of the FBA, mainly in the field of freshwater phytoplankton ecology. Self-evidently, I remain grateful for the interest that this opportunity embodies, although its major fulfilment these days comes as honorary editor of the FBA Journal, *Freshwater Reviews*. This is time-consuming work, yet it is a pleasure to interact with authors to develop worthwhile, accessible and scientifically interesting reviews. Contributors plainly know their fields – very little is rejected. The articles are peer-reviewed and attract constructive criticism (to which, we find, authors generally react favourably and promptly). My task is generally to ensure that finished articles are readily assimilable by non-specialists; I am vain enough to think we succeed in this task but I have to be very grateful to Karen Rouen for her meticulous copy-editing of accepted manuscripts, to Louise Lavictoire for attractive laying out of the final copy and to a group of proof readers who, together, make sure the final publications comply with the high standards that the FBA sets. My one disappointment is that, in these times of restraint, we have not won more subscriptions; nevertheless, the release of individual articles through BioOne has greatly assisted the profile of our journal, as there are now many more literature citations of articles published in *Freshwater Reviews*.

The year has seen one or two activities drop from my time schedule. One is the direct participation in the FBA's European Ambitions: these I helped to pioneer in 1997, and which activities culminated in the first SEFS in Antwerp and the formation of the European Federation, which has now grown into an association of 13 national societies. The EFFS Constitution demands that I stood down from the role of being its convener (a role now fulfilled, by popular vote, by Luigi Naselli-Flores of the Associazione Italiana di Oceanologia e Limnologia). My direct involvement in the routine Lakes monitoring programme also receded - for the first year since 1966, I counted no phytoplankton.

However, it has been pleasurable to collaborate with former colleagues, all now with CEH based at the Lancaster Environment Centre, on publishing a contribution on the phytoplankton dynamics of Grasmere, where the effects of a series of attempts to control the biological effects of treated sewage on the lake have been tempered by the huge rainfall-driven variability in its instantaneous hydraulic discharge. The publication is included in a Special Issue of *Freshwater Biology* (Vol. 57, 2) that marks 65 years of long-term studies in the Windermere Catchment. It is also satisfying to have maintained my contacts with phytoplankton ecologists in South America. I am currently working with an enthusiastic group at the Universidad Nacional in Bogotá to publish some research on a fascinating high-altitude (2935 m above sea level) meromictic lake in the Colombian Andes (5°N). Laguna Guatavita is where the pre-Columbian Muisca people venerated their rulers and which was central to the conquistadores' "El Dorado" but, I regret to report, we have not recovered enough gold to pay even for the field work. Further to the south, colleagues in Argentina have put together a synthesis of reviews of studies conducted on the phytoplankton in the country's varied inland waters, and which is currently in press. Finally, I can report a publication that I neglected to mention last year: it is under the first authorship of my former MSc student from the Universidad de la Republica, in Montevideo, Uruguay. I contributed some of the background text; other co-authors include her PhD supervisory group at the University of Wageningen, Netherlands.

Roger Sweeting***Water Quality and Fish Biology***

The FBA's Windermere hatchery as an ark for pearl mussels continues to be my major area of interest. During 2011 we added a further population to the Ark from the River Lune, so there are now nine different English populations present at the hatchery. Our main aim is to maintain these populations and enable them to produce viable offspring which we will rear until the restoration of their parent river catchments is sufficiently complete to allow restocking to be carried out.

Over the last two years I reported that some populations only complete their larval stage on salmon and others only on brown trout. The mussels from the River Clun formed glochidia on both brown trout and salmon and both groups successfully excysted last summer. Surprisingly we have also had successful culture of mussels on arctic charr, which raises lots of interesting questions about the interactions when charr were more widely distributed.

The continued extremes of weather (and water temperature) experienced over the last two 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 over four years since release from the host fish and is 15mm in length.

We have continued improving the hatchery facilities this year with the refurbishment of one 3-phase pump and the construction of a flood-defence wall around the pump-cell capable of withstanding another 1000 year flood!

The Tyne project has been extended by three months until the end of the 2012 calendar year with a grant from Northumbrian Water: this will enable the completion of a full second season of habitat sampling; our findings to date have persuaded us that only the River Rede is capable of being practically restored for pearl mussels and we have taken this to the Tyne Restoration Steering Group.

Once again thanks are due to Louise Lavictoire for her hard work on the project and also to our post-doctoral researcher, Marie-Pierre Gosselin. Support from Matt Freeman continues to be irreplaceable.

The Spring Quillwort has now been maintained for United Utilities (UU) for 18 months while carrying out changes to a reservoir, and is growing, albeit slowly: when UU has the changes completed we anticipate replanting the plants in the original site in West Cumbria. It has been a useful exercise that has provided FBA with some experience of keeping aquatic macrophytes.

Over the last year Andrew Freeman and I have developed a scheme for the conversion of the Annexe. This is now at the planning application stage and, if successful, in the longer term it will provide a continuous income stream for the FBA.

Nationally I work as an examiner for the Institute of Fisheries Management and this year have carried out a number of health examinations on fish under section 30 of the Salmon and Freshwater Fisheries Act (1975). Locally I am vice-chair of the South Cumbria Rivers Trust which has funding to restore reedbeds on Windermere from the EA via its Windermere Reflections programme; this is linking in well with Gary Rushworth's PhD project. Both of the organisations referred to above provide the much needed link to practical conservation science.

I continue to participate in the development of standard methods in the British Standards Institution (BSI) and the European Committee for Standardisation particularly with reference to the Water Framework Directive.

In the next few months I am stepping back from some of my practical involvement because of personal circumstances: my practical efforts will be replaced by Eloy Benito Reyes who spent last summer as a Leonardo Da Vinci scholar working with the pearl mussels in the hatchery. We have succeeded in finding sufficient funds for his employment for six months so that the mussel project work is adequately supported. I anticipate being able, during this interval, to spend some time and effort planning the next stage of the pearl mussel work together with its funding prior to resuming the more practical aspects of life at FBA.

Ian Wallace***Taxonomy and Distribution of Trichoptera***

I am continuing to edit the UK Trichoptera Recording Scheme database which now stands at 245,000 entries. The intention is that this will be submitted to the National Biodiversity Network 'Gateway' later in 2012 and then be generally available on-line. An 'Atlas' is also planned for the following year, and work at the FBA library has proved, and will prove, invaluable in assembling the diverse biological information on each species that will accompany the distribution maps. In assembling the database, most significant museum holdings have already been examined. These had not included the Castle Museum Norwich, an omission which was remedied in February, resulting in 500 useful records.

Detailed action plans for the rarest Biodiversity Action Plan species were written last year and are available via the 'Buglife' website. Attention is now turning to the next tier of rarest caddis. A draft action plan has been written for *Agrypnetes crassiconis* McLachlan which has a single known UK population at Malham Tarn, with its nearest neighbours being in Swedish Lapland. Evidence is suggesting this species is declining at Malham and a survey is planned in collaboration with Field Studies Council students there this summer.

The appearance of the Royal Entomological Society Key to Adult Caddis (written by Peter Barnard and Emma Ross) will enable a significant promotion of adult recording, particularly by moth recorders. This will involve recruiting regional validators and to support them county check-lists are being prepared.

The natural history recording scene is dynamic but increasingly complex. Much of this activity is taking place with beginners, starting identification to a group, family or genus level. How to make use of such data, develop recorders, and maintain the quality of data bases is challenging. This democratisation of recording is to be welcomed. I am looking forward to working with the FBA to see how it can be most effective in the freshwater recording scene. With a view to developing recorders, I contributed to a meeting in London exploring setting up a Pond Surveillance Network, and a meeting of the Riverfly Partnership in Shrewsbury. I also attended the FBA Data management workshop in London.

In developing beginners, the FBA, has usefully published the *Guide to British Freshwater Macroinvertebrates for Biotic Assessment*", and will publish soon a more detailed book on the subject – a replacement for the famous *A Guide to Freshwater Invertebrate Animals* by T.T. Macan. I wrote a review of the former for the *Entomologists' Monthly Magazine* and it is in press.

Accurate species level identification relies on good keys and I am collecting material this year to hopefully improve some of the difficult separations in the caddis larvae, for new editions of the FBA keys in future years. A "shopping list" has been prepared and field work commenced.

Whilst not Trichoptera, I am adapting a key to Lepidoptera caterpillars found in aquatic samples, that I wrote for the EA two years ago. I hope this can be published in some format by the FBA.

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 2012**

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 2012.

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 2011 to 31st March 2012 are listed on page 28 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 2012
(Continued)**

Objectives of the Charity

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

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

Review of Activities

The Statement of Financial Activities and the Balance Sheet show that the resources available to the Association have decreased, with a negative net movement of funds totalling £340,894 giving a closing fund balance of £4,879,627. The decrease in the value of members' funds has arisen from realised and unrealised losses on the Association's investments of £27,750, added to an operating deficit of £313,144.

This year has seen an increase in the financial deficit from £219,055 to £313,144. The deficit on the Income and Expenditure account has arisen as a result primarily of the Association's charitable activities and the activities it undertakes to generate funds. Investment income increased to £87,369. During the year the Association withdrew £230,000 from the Investec (formerly Rensburg Sheppards) holdings in order to cover its financial commitments.

The key activity within Data and Information Services continues to be the Defra contract to create the Archive for the Demonstration Test Catchment projects. This contract contributed £87,000 to income during the financial year. The JISC-funded FISH.Link project was completed in July 2011 and contributed nearly £11,000 to income during the financial year. The library secured funding from the Environment Agency (EA) worth over £12,000 to digitise and catalogue 100 EA grey literature reports.

The *Guide to British Freshwater Macroinvertebrates for Biotic Assessment*, the FBA's Scientific Publication No. 67 proved a popular publication and sales to the end of the financial year were in excess of £8,000. *Inland Waters*, the on-line journal produced on behalf of the International Society of Limnology, raised £39,000 of income for the financial year. *Freshwater Reviews* continues to be run at a net cost, although the link with Bio-One, a non-profit online distributor of independent titles has proved to be useful, resulting in a little over £4,000 income during the year.

There was another net reduction in Membership during the year and membership income was reduced from over £30,000 to £28,500.

Research income included £80,000 from the EA for the North Tyne Restoration Project, along with over £40,000 for the Freshwater Pearl Mussel Ark Project, £24,000 for the Upstream Thinking Project for Westcountry Rivers Trust, and nearly £10,000 from North Dorset District Council for the Blandford Fly Project.

The River Laboratory at East Stoke remains financially viable in the medium term, with the majority of the tenants having been established at the site for some time. The combination of income and FBA scientific activity at the River Laboratory ensure that it continues to be central to the achievement of the Association's strategic and charitable objectives. We continue to explore ways that the facilities at Windermere can be put to greater use, including the Windermere Annexe.

The continued funding of PhD studentships and award of the Hugh Cary Gilson Fund, totalling £38,320, is considered by the Trustees to be a major contribution towards its compliance with the Public Benefit Test as laid out in The Charities Act 2011. Training courses continue to require some subsidy in order to keep them affordable to individual participants, and other public outreach activities continue to be fully funded by the FBA, further adding to this compliance.

THE FRESHWATER BIOLOGICAL ASSOCIATION
TRUSTEES' REPORT FOR THE YEAR ENDED 31ST MARCH 2012
(Continued)

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 (49% by value at 31st March 2012) are managed by Investec (formerly Rensburg Sheppard) and are considered by the Trustees to be satisfactorily managed. The Investment Policy was reviewed by the Trustees in March 2009 and no changes were made.

Plans for Future Periods

At the last meeting of Council a new strategy for the FBA was approved, keeping very much in mind the need to address the ongoing unsustainable deficit. The strategy objectives that were agreed are:

- To widen active membership
- To provide evidence and information
- To influence and broaden advocacy
- To facilitate the setting of the research agenda

In the coming months a business plan will be developed from these objectives, which will be presented to Council in early October 2012. It remains the Association's aim to bring income and expenditure into balance during future periods, through a combination of expanding its income generating activities in line with its charitable objectives and continued rigorous control of expenditure.

Risk Management

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

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 2012
(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	Dr C. Askew (to March 2012)
	Mr A. Wallace (from March 2012)
Royal Society	Prof. B. Finlay (to March 2012)
	Prof. R. Battarbee (from March 2012)

Elected Members

Ms F. Bowles	Mr S. James (from July 2011 to March 2012)*
Dr S. Brierley	Dr J.I. Jones (to July 2011)
Dr L. Brown	Mr C. Mainstone
Dr A. Crowden (from July 2011)	Prof. L. Maltby
Dr E. Dollar (from July 2011)	Prof. B. Whitton (to July 2011)
Ms G.L. Douglas	Dr I.J. Winfield
Dr I.G. Dunn	

*Deceased

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 13th June 2012
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 2012

Incoming Resources		Unrestricted Funds		Total	Total
Incoming resources from generated funds	Note	<u>General</u>	<u>Other</u>	<u>2012</u>	<u>2011</u>
		£	£	£	£
<u>Voluntary income:</u>					
Awards and donations	4	21,118	-	21,118	15,799
Activities for generating funds	5	209,672	-	209,672	212,040
Investment income & bank interest	6	87,369	-	87,369	78,492
		-----	-----	-----	-----
		318,159	-	318,159	306,331
Incoming resources from charitable activities:					
	7				
Membership services		28,530	-	28,530	30,109
Scientific and special publications		19,864	-	19,864	13,616
Journals (including <i>Freshwater Reviews</i>)		49,273	-	49,273	7,910
Scientific research & activity		310,684	-	310,684	244,606
Information & collections		16,133	-	16,133	23,004
Knowledge transfer activities		18,415	-	18,415	18,416
		-----	-----	-----	-----
		442,899	-	442,899	442,742
		-----	-----	-----	-----
Total incoming resources		761,058	-	761,058	749,073
Resources expended					
Cost of generating funds	8	183,649	-	183,649	348,970
<u>Costs of charitable activities:</u>					
	9				
Membership services		52,994	-	52,994	47,006
Scientific publications and journals		100,815	-	100,815	73,582
Scientific research & activity		354,268	38,230	392,498	253,586
Information & collections		-	3,019	3,019	9,134
FBA library		123,593	-	123,593	79,484
Knowledge transfer activities		106,192	-	106,192	34,030
		-----	-----	-----	-----
Governance costs	10	111,442	-	111,442	122,336
		-----	-----	-----	-----
Total resources expended		1,032,953	41,249	1,074,202	968,128
		-----	-----	-----	-----
Net (outgoing)/incoming resources before transfers and other recognised gains/(losses)		(271,895)	(41,249)	(313,144)	(219,055)
Net(loss)/gain on investments	13b	(21,544)	(6,206)	(27,750)	205,279
		-----	-----	-----	-----
Net movement of funds in year		(293,439)	(47,455)	(340,894)	(13,776)
Reconciliation of funds					
Total funds brought forward 2011		2,687,897	2,532,624	5,220,521	5,234,297
		-----	-----	-----	-----
Total funds carried forward 2012		2,394,458	2,485,169	4,879,627	5,220,521
		=====	=====	=====	=====

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 loss on investments of £27,750 (2011: total net gain of £205,279) includes realised gains of £6,361 (2011: realised gains of £22,158) attributable wholly to the General Fund Account.

THE FRESHWATER BIOLOGICAL ASSOCIATION
BALANCE SHEET AS AT 31ST MARCH 2012
COMPANY NUMBER 263162

	Note	2012		2011
		£	£	£
Fixed Assets				
Tangible	13a		1,956,645	2,000,952
Investments	13b		2,913,320	3,171,070
			-----	-----
			4,869,965	5,172,022
Current Assets				
Debtors and Prepayments	14	95,647		189,527
Cash at Bank and in Hand		69,132		93,496
		-----		-----
		164,779		283,023
Less Current Liabilities				
Creditors (due within 1 year)	15	(155,117)		(234,524)
		-----		-----
Net Current Assets/(Liabilities)			9,662	48,499
			-----	-----
Total Assets Less Current Liabilities			£ 4,879,627	£ 5,220,521
			=====	=====
Representing Members' Funds				
Unrestricted				
General Fund	16		2,117,075	2,396,926
Designated Funds	17		2,485,169	2,532,624
Revaluation Reserve	18		277,383	290,971
			-----	-----
			£4,879,627	£ 5,220,521
			=====	=====

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

: Chairman 13th June 2012

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>2012</u>	<u>2011</u>
	£	£
Depreciation	48,282	47,532
Auditors' remuneration	2,700	2,600
	<u>50,982</u>	<u>50,132</u>

	Unrestricted Funds		<u>2012</u>	<u>2011</u>
Incoming Resources	General	Other	£	£
	£	£		
4. Awards and Donations				
Membership donations	905	-	905	11,096
Legacies and other donations	19,136	-	19,136	-
Gift Aid	1,077	-	1,077	4,703
	-----	-----	-----	-----
	21,118	-	21,118	15,799
	-----	-----	-----	-----
5. Activities for generating funds				
Land and building income:				
Windermere	16,225	-	16,225	18,700
East Stoke	167,570	-	167,570	164,770
Windermere ferry contract	21,884	-	21,884	19,832
Miscellaneous income	3,993	-	3,993	8,738
	-----	-----	-----	-----
	209,672	-	209,672	212,040
	-----	-----	-----	-----
6. Investment income				
Bank deposit interest	182	-	182	114
Investment Income	87,187	-	87,187	78,378
	-----	-----	-----	-----
	87,369	-	87,369	78,492
	-----	-----	-----	-----
7. Charitable activities				
Membership services	28,530	-	28,530	30,109
Scientific and special publications	19,864	-	19,864	13,616
Journals (including <i>Freshwater Reviews</i>)	49,273	-	49,273	7,910
Research contract	139,721	-	139,721	105,081
Scientific research & activity	115,163	-	115,163	192,356
Direct funding and grants	55,800	-	55,800	52,250
FBA Library	16,133	-	16,133	23,004
Training courses and meetings	18,415	-	18,415	18,416
	-----	-----	-----	-----
	442,899	-	442,899	442,742
	-----	-----	-----	-----

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

<u>Resources Expended</u>	Unrestricted Funds		<u>2012</u>	<u>2011</u>
	<u>General</u>	<u>Other</u>		
	£	£	£	£
8. Cost of generating funds				
Land and buildings:				
Windermere	17,282	-	17,282	119,721
East Stoke	155,670	-	155,670	219,082
Windermere ferry contract	10,697	-	10,697	10,167
	-----	-----	-----	-----
	183,649	-	183,649	348,970
	-----	-----	-----	-----
9. Cost of charitable activities				
Membership services	52,994	-	52,994	47,006
Scientific and special publications	69,365	-	69,365	49,806
Journals (including <i>Freshwater Reviews</i>)	31,450	-	31,450	23,776
Scientific research activity and awards	249,589	38,230	287,819	211,358
Research contract	104,679	-	104,679	42,228
FreshwaterLife programme	-	-	-	5,952
Fritsch	-	3,019	3,019	3,182
The FBA library	123,593	-	123,593	79,484
Knowledge transfer	106,192	-	106,192	34,030
	-----	-----	-----	-----
	737,862	41,249	779,111	496,822
	-----	-----	-----	-----
10. Governance Costs				
Council meetings and reimbursements to Trustees	7,119	-	7,119	5,954
Other costs – direct and indirect:				
Audit fees	2,700	-	2,700	2,600
Other fees	35,710	-	35,710	23,040
Staff costs	57,407	-	57,407	73,022
Irrecoverable VAT	8,506	-	8,506	17,720
	-----	-----	-----	-----
	111,442	-	111,442	122,336
	-----	-----	-----	-----
11. Staff				

Average number of employees was 24 (18 FTE) paid employees (2011: 23) during the year to 31st March 2012.

Total Staff Costs in the year were:	<u>2012</u>	<u>2011</u>
	£	£
Salaries	491,951	455,933
Employer's National Insurance Contributions	37,189	28,472
Employer's Pension contributions	57,110	56,791
	-----	-----
Total	586,250	541,196
	=====	=====

There were no employees in the remuneration band £60,000 to £69,999, or above (2011: none).

12. Trustee Remuneration

No members of Council received any remuneration during the year. Travel costs and Council expenses amounting to £7,119 (2011: £5,954) were paid to 12 (2011: 13) 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 2011	1,955,000	117,855	26,034	2,098,889
Additions	-	3,975	-	3,975
Disposals	-	-	-	-
	-----	-----	-----	-----
At 31st March 2012	1,955,000	121,830	26,034	2,102,864
	-----	-----	-----	-----
Accumulated Depreciation				
As at 1st April 2011	22,804	64,718	10,415	97,937
Charge for the year	22,804	22,875	2,603	48,282
	-----	-----	-----	-----
At 31st March 2012	45,608	87,593	13,018	146,219
	-----	-----	-----	-----
Net book value				
At 31st March 2012	1,909,392	34,237	13,016	1,956,645
	=====	=====	=====	=====
At 31st March 2011	1,932,196	53,137	15,619	2,000,952
	=====	=====	=====	=====

The historical cost of Freehold Land & Building is £1,334,148 (2011: £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 Piell 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 2011		3,171,070
Additions/(Disposals)		(216,415)
Investment Management fees		(13,585)
Net Investment Losses:		
Attributed to General Fund Account (Note 16)	(21,544)	
Loss on revaluation attributed to the Frost Bequest (Note 17)	(6,206)	

		(27,750)

Market Value at 31st March 2012		2,913,320
		=====

During the year, £230,000 of capital has been transferred from the account held at Investec (formerly Rensburg Sheppard) (2011: £105,000) 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	2,311,585
Represented by:	
Investments held on UK Stock Exchange	2,833,529
Cash held as part of Portfolio	79,791

	<u>2,913,320</u>

The principal investments at 31st March 2012 were:

	<u>Market Value</u> £	<u>% of Total</u> %
<u>M & G Charifund</u>		
19,366 Income Units	221,032	7.6
6,026 Accumulation Units	789,755	27.1
<u>J P Morgan Asset Management Ltd</u>		
153,977 Bond Units	236,566	8.1
94,223 UK Equity Fund Units	231,807	8.0
	-----	-----
	<u>1,479,160</u>	<u>50.8</u>

The accumulated units received during the year that were reinvested for capital growth had a cash value equivalent of £49,791 (2011: £48,988).

14. Debtors

	<u>2012</u> £	<u>2011</u> £
Trade Debtors	24,675	102,166
Other Debtors	59,972	62,690
Prepayments	11,000	24,671
	-----	-----
	<u>95,647</u>	<u>189,527</u>

15. Creditors

PAYE, NIC and pension	18,493	25,651
Trade Creditors	22,831	36,321
Other Creditors and Accruals	12,642	13,156
Deferred income	88,340	152,668
VAT creditor	12,811	6,728
	-----	-----
	<u>155,117</u>	<u>234,524</u>

16. General Fund Account

	<u>2012</u> £	<u>2011</u> £
<u>General Fund Account</u>		
Balance brought forward	2,396,926	2,300,475
Net movement in funds before transfers and other recognised gains	(313,144)	(219,055)
	-----	-----
	2,083,782	2,081,420
Transfer net movement to Other Funds (Notes 4 to 10)	41,249	27,097
Unrealised (loss)/gain arising from revaluation of Investments (Note 13b)	(21,544)	174,103
Realised gain on the sale of Station Cottage	-	114,306
Transfer from Revaluation Reserve (Note 18)	13,588	-
	-----	-----
	<u>2,117,075</u>	<u>2,396,926</u>

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

17. Other Funds

	<u>31.3.2011</u>	<u>Income</u>	<u>Expenditure</u>	<u>Transfers</u>	<u>31.3.2012</u>
	£	£	£	£	£
<u>Unrestricted Designated</u>					
Fritsch Fund	3,120	-	(3,019)	-	101
Frost Bequest	485,020	(6,206)*	-	-	478,814
Frost Exhibition	32,919	-	(30,605)	-	2,314
Hugh Cary Gilson Fund	11,565	-	(7,625)	-	3,940
Freshwater Science Fund	2,000,000	-	-	-	2,000,000
	-----	-----	-----	-----	-----
<u>Total</u>	<u>2,532,624</u>	<u>(6,206)</u>	<u>(41,249)</u>	<u>-</u>	<u>2,485,169</u>

* Loss 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>31.3.2012</u>	<u>31.3.2011</u>
	£	£
Tangible Fixed and Current Assets	91,631	132,880
Quoted Investments	2,393,538	2,399,744
	-----	-----
	<u>2,485,169</u>	<u>2,532,624</u>

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

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

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

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

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

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

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

18. Revaluation Reserve

	£
Balance brought forward at 01.04.2011	290,971
Transfer to general fund – difference on historical cost depreciation charge and actual depreciation charge on the revalued amount	13,588

Balance carried forward at 31.03.2012	<u>277,383</u>

19. Capital Commitments and Contingent Liabilities

There were no capital commitments or contingent liabilities at 31st March 2012.

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 latest triennial actuarial valuation for the scheme was scheduled for 31st March 2011. The most recent actuarial valuation was carried out as at 31 March 2008. This was the Scheme's first actuarial valuation under the Statutory Funding Objective (SFO) regulations. The 2008 actuarial valuation has been updated to reflect changes in market conditions and actual investment return over the period to 31 March 2010. The calculations are approximate and intended to give a broad indication of the trend in the Scheme's financial position over time. The calculations are done on a simplified basis that does not fully reflect changes in the Scheme's membership profile and does not take account of all aspects of the Scheme's experience. 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 updated valuation date (March 2010), the market value of the assets of the scheme was £29,738.4 million and the value of the scheme's technical provisions was £32,751.5 million indicating a deficit of £3,013.1 million. The funding level was 91% of the benefits which had accrued to members after allowing for expected future increases in earnings. The Trustee estimates that if the liabilities were valued using a basis consistent with the Company's accounting results under the accounting standard FRS17, the Scheme would have a funding level of approximately 81% equating to a deficit of £7,112.1 million as at 31 March 2010.

At the 31 March 2008 valuation date, USS was adequately funded against its technical provisions such that no recovery plan was implemented as part of the 2008 valuation. The position has deteriorated since that time and if it were to be decided to put a recovery plan in place, then the assumptions for the deficit recovery plan as well as the length of the recovery plan would need to be agreed and documented. The key aspect is whether the recovery plan assumptions could or should be different to the assumptions adopted for determining the technical provisions. The Pension Regulator's guidance refers to using "appropriate" assumptions for the scheme. A ten year period is a natural length for consideration, as this is the Regulator's trigger point when assessing the length of recovery plans. That does not preclude the Trustee agreeing a shorter or longer recovery plan period.

The Trustee believes that over the long-term equity investment and investment in selected alternative asset classes will provide superior returns to other investment classes. The Trustee aims to expose the fund to equities that are diversified both geographically and by sector and recognises that it would be possible to select investments that provide income flows broadly similar to estimated cash liabilities. The strong positive cash flow of the scheme means that it is currently not necessary to realise investments to meet liabilities and the actuary has confirmed that cash flows are expected to remain positive for the next ten years.

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 2012 was £57,110 (2011:£56,791) which was 16% (£49,250) of pensionable salaries for the USS Pension and 9% (£7,860) of pensionable salaries for the Scottish Widows Pension.

**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 2012 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 25, 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 2012 and of its incoming resources and application of resources, including its income and expenditure, for the year then ended;
- have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice applicable to Smaller Entities; and
- have been properly prepared in accordance with the Companies Act 2006.

Opinion on other matter prescribed by the Companies Act 2006

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

Matters on which we are required to report by exception

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

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

91 Gower Street
London
WC1E 6AB
15 June 2012

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