



**EIGHTY-SECOND**

**ANNUAL REPORT**

**OF THE**

**FRESHWATER BIOLOGICAL ASSOCIATION**

and Accounts for the year ended 31st March 2014

A Company Limited by Guarantee  
Registered No. 263162, England

Registered Charity No. 214440

Registered Office:  
The Ferry Landing, Far Sawrey, Ambleside, Cumbria LA22 0LP, UK

Published by the Freshwater Biological Association,  
The Ferry Landing, Far Sawrey, Ambleside, Cumbria LA22 0LP, UK

© Freshwater Biological Association 2014

ISSN 0374-7646

## 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 .....	17
Trustees report for the year ended 31st March 2014 .....	30
Financial Accounts 2013/2014 .....	34
Auditors' Report to the Members of the Freshwater Biological Association .....	43

## THE FRESHWATER BIOLOGICAL ASSOCIATION

### OFFICERS AND COUNCIL

31st MARCH 2014

*President*

Professor Sir John R. Beddington, CMG

*Vice Presidents*

Dr A.D. Berrie

Dr J.W.G. Lund, CBE

Dr E. Buttle, CBE

Professor Sir William Stewart

Professor G.P. Harris

Dr J.F. Talling

Sir Martin Holdgate, CB

The Duke of Wellington, MVO, OBE, MC, DL

Professor Sir Frederick Holliday, CBE

The Duke of Westminster, KG, CB, CVO, OBE, TD, CD, DL

Mr J. Jeffery, CBE

*Chairman of Council*

Dr S. Brierley (Acting Chairman)

*Honorary Treasurer*

Mr P. Andrewes

### REPRESENTATIVE MEMBERS

The Fishmongers' Company – Mr A. Wallace

The Royal Society – Professor R. Battarbee

### ELECTED MEMBERS OF COUNCIL

G. Bateman

Dr E. Dollar

Ms F. Bowles

Dr I.G. Dunn

Dr L. Brown

Professor S. Hawkins

Dr A. Crowden

Dr P. Shaw

### FINANCE AND GENERAL PURPOSES COMMITTEE

Professor Sir John R. Beddington

Ms. F. Bowles

Dr S. Brierley (Acting Chairman)

J. Davy-Bowker

Mr P. Andrewes

\*Professor C.S. Reynolds

\*\*Mr S. Pawley (Business Manager)

\*\*Mrs J. Lomax (Finance Manager)

\* Co-opted Member

\*\* Attendees

### HONORARY MEMBERS OF THE ASSOCIATION

Dr J.S. Alabaster

R.S. Fort

Prof. P.S. Maitland

P.V. Allen

Prof. J.J. George

K.F. Mansfield

Dr R.B. Angus

S. Gibb

C.C. McCready

R.M. Badcock

Dr D.S. Gibbons

Prof. P.J. Miller

Dr R.G. Bailey

Dr H.L. Golterman

W.A. Mitchell

Dr I.A.E. Bayly

Regents Prof. Emeritus E. Gorham

Dr N.C. Morgan

J.A. Black

Prof. J. Green

Prof. C. Nalewajko

B. Blofield

T.V. Gudjonsson

Dr T.G. Northcote

Prof. R.O. Brinkhurst

Dr J.E. Harker

L.R. Peart

V.M. Brown

E.V. Hart

Prof. G. Power

K.E. Burnand

J. Henderson

D.H. Rhodes

T. Carrick

J. Hobart

J. Roskell

Dr J.C. Chubb

P.H. Holway

Dr D. Scott

Dr D.W. Claridge

J.E.M. Horne

Prof. G.G.E. Scudder

Dr D. Cragg-Hine

Dr J.V. Howarth

O. Simmonite

D. Crookes

Prof. Dr U.H. Humpesch

Dr D. Stevenson

D.J. Cross

Dr A.J. Juniper

Dr D.W. Sutcliffe

Dr K.W. Cummins

B.M. Kipling

Prof. J.J.A. Symoens

N.P. Cummins

Prof. C.R. Kennedy

Prof. J.D. Thomas

Dr D.H. Dalby

I. Lane

M. Thompson

Dr H. Disney

Professor T.E.L. Langford

J.F. Turpin

Dr J.M. Edgington

Dr P.H. Langton

The Duke of Wellington

J.H. Elliott

Dr J.B. Leeming

The Duke of Westminster

Prof. J.M. Elliott

Dr R.H. Lowe-McConnell

W.R. White

F.N. Farnham

Prof. A. Macfadyen

F.M. Wiseman

## COMPLEMENT AT 31st MARCH 2014

Acting Director	John Davy-Bowker
Personal Assistants to the Director	Sarah A. Johnson/Julie P. McNicol
Acting Officer in Charge, Windermere	Dr Karen J. Rouen
Business Manager/Training and Journals	Simon Pawley
Finance Manager	Judith Lomax
Finance and Administration Assistants	Carolyn Fletcher/Sarah Rigby
Administration Assistant, Windermere	Lynda Durrell
Administration Assistant, East Stoke	Stephanie Smith
Facilities Management, Windermere	Matthew Freeman
Domestic Assistant, Windermere	Jonathan Freeman
Research and Facilities Manager, East Stoke	John Davy-Bowker
IT Support Manager	Vanya Gordon
Pearl Mussel Project/Journals	Louise Lavictoire
Pearl Mussel Project Officer	Eloy Benito-Reyes
Data and Information Services	
Bioinformatics and Web Development Manager	Dr Michael Haft
Web Developers	Simon Fox/Nick Bywell
Knowledge Transfer	
Science and Publications/Knowledge Transfer Manager	Dr Karen J. Rouen
Training and Education	Dr Melanie Fletcher
Knowledge Transfer Assistant	Rosalind Maberly
Oral History Project Officer/PhD Student	Gary Rushworth
KTP Placement (University of Cumbria)	Thomas Miles
KTP Placement (University of Cumbria)	Irene Parades
Undergraduate Student (University of York)	Theo Leslie
Support Officer (casual appointment)	Soraya Alvarez
<i>Approximately half the staff are employed on part-time contracts</i>	
<i>Honorary Posts</i>	
Honorary Curator of the Fritsch Collection	Dr Elizabeth Y. Haworth
Honorary Information Science Fellow	Ian Pettman
Honorary Research Fellows:	Professor Patrick Armitage
	Professor J. Malcolm Elliott
	Dr D. Glen George
	Terence Gledhill
	Dr Elizabeth Y. Haworth
	Professor Alan G. Hildrew
	Dr Mike Ladle
	Dr Allan Pentecost
	Dr Paul J. Raven
	Professor Colin S. Reynolds
	Dr Roger A. Sweeting
	Dr Ian Wallace
Honorary Editors:	
<i>FBA Books</i>	Dr Alan Crowden
<i>FBA News</i>	Dr Jonathan Grey
<i>Freshwater Reviews</i>	Professor Colin S. Reynolds

### *Registered Auditors:*

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

### *Bankers:*

The Cooperative Bank  
147 Church Street  
Preston PR1 3UD

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

## Foreword from the President

It is arguable that the early decades of the 21st Century are some of the most difficult that humanity has had to face. The 20th Century left a difficult legacy of fast population growth, poverty, over-exploitation of natural resources and significant degradation of the environment.

To an extent the next few decades of the 21st Century are determined in key ways: population will increase by around 1bn in the next 10–15 years; an increasingly large proportion of the world will live in urban environments; and although significant poverty will continue to exist, prosperity of a burgeoning population will place pressure on natural resources. There are real and tangible problems of food, energy and water security. In the context of water alone, analysis indicates a gap between supply and demand of around 40–60% by 2030. Climate change continues and due to the intrinsic time delays in the system will continue for several decades irrespective of any reduction in greenhouse gas emissions, itself an unlikely scenario.

In this context it is essential that organisations such as the FBA provide independent and authoritative advice to policymakers. There are encouraging signs:

- There is a real drive by Council and staff to transform the FBA to fill its niche in the 21<sup>st</sup> Century, strengthening the FBA's visibility and place as a national and international place to go for freshwater information and advice. The FBA's information and advice has been and must continue to be based on sound science. In this way the FBA will be seen as independent, an "honest-broker".
- It is important that FBA will not be a campaigning group, but the hope is that it will become influential at all levels from local fishing clubs to ministers.
- Similarly important is that FBA continues to develop. Key areas of development underway currently include building membership, further development of training and courses, provision of data and information services, review of publications (journal, keys, books, newsletter and digital information) and the marketing of all of our services and developing our membership packages. A new website will be launched in the coming year.

These are just some of the activities that will be taken forward in the forthcoming year; they are both important and exciting. I look forward to being associated in my role as President.

## Report from the Chairman of the Council

*(From the retiring Chairman, Professor Chris Spray)*

This last year has been one of discussion, debate and changes within Council and, as I discussed in my report last year, trustees were then in the process of receiving the initial report from consultants on our strategic future and engaging in consultation and debate with staff and others as to potential options we might consider. A first draft was discussed at the Council meeting in April 2013, and further meetings and debate followed during the year both within Council and with staff, honorary research fellows and others. It is fair to say that while not all of the consultant's report was received favourably, there was and is much to consider in the key messages that were presented – not least those relating to governance, financial sustainability, focus and communication.

Council has had a very busy year, having met at East Stoke in April; in London for a special meeting on the Strategy report in June; Finance and General Purposes Committee (F&GPC) met in Kendal in June; Council met at Windermere on 9th October; the Annual General Meeting (AGM) was held in London on 8th November; F&GPC met at Windermere on 20th

November; Council again in London at the Fishmongers' Company on 15th January; and a final meeting of the year at East Stoke on 12th March 2014. Whilst this lists the meetings, much more activity occurred behind the scenes, and the Chairman also visited both Windermere and East Stoke on other occasions as well, to meet with staff and hear concerns and discuss opportunities for development. Three such meetings included the 50th Anniversary of the River Laboratory in June, a joint meeting with the Association of Rivers Trusts at East Stoke in July and a meeting of FBA staff and partners involved in the Freshwater Pearl Mussel Recovery project at Windermere.

As referred to above, much of Council's business was directed towards consideration of the consultant's report and how we should respond. This though was placed within the context of the developing strategy and the continuing challenge of our financial position. A significant step forward this year has been the restructuring of our financial accounting such that we have much better detail as to costs and value of individual sites and activities. Concern from staff about our future was received and considered, and immediate actions drawn up to respond to each of the recommendations arising from the report and from further debate at the AGM in November. One such early action was to recruit a development manager to ensure we delivered the key outcomes and to support the Acting Director, John Davy-Bowker after the departure in May after some 6 years of our Director, Dr Mike Dobson.

Another departure this year was that of our retiring President Professor Alan Hildrew who stood down in November after 12 years with Council, to be replaced as President by Sir John Beddington. Alan has been a long-standing and much valued servant and leader for the FBA on many fronts and his contribution was recognised by all at the AGM.

Finally, I must thank the staff for their continuing commitment and contribution to the work of the FBA on many fronts, and report my own departure as I stood down as Chairman at the March 2014 meeting. I wish my successor Bill Brierley and the staff every success in steering the FBA to a productive and sustainable future.

## Report of Activities from the Director

This is my first annual report on activities as Acting Director of the Freshwater Biological Association. I have taken up this role at a time of very considerable change for the FBA, as the organisation seeks to implement its recently realigned mission and its strategic objectives, and also seeks to achieve true financial sustainability by eliminating its ongoing operating deficits. These are very significant challenges for any Director, not least one that has recently stepped into the role. I have been most ably assisted in this capacity by Dr Karen Rouen who is our new Acting Officer-in-Charge at our Windermere Headquarters.

Before reviewing the activities undertaken during the last year, it is important to step back and consider our new strategic direction, and the measures that are being taken to address our financial imperatives.

The FBA's **vision** is to be the leading independent UK organisation for freshwater information and advice. Our **mission** is to promote the sustainable management of freshwater ecosystems and resources, underpinned by the best available science.

To achieve this, we have set four key objectives for the FBA:

- to widen active **membership**
  - extending FBA membership to the general public and amateurs; utilities and industry; academics and societies; policy makers and regulators; rivers trusts; other non-governmental organisations (NGOs); specialist recorders and anglers.
- to provide **evidence and information**
  - building up our classical paper-based and electronic data and information resources, including web based repositories and interactive services for members, as well as library services; publishing; collections; and training, education and conferences.

- to **influence and broaden advocacy**
  - by establishing a broader FBA membership, to build a well informed and supported body of enthusiastic amateurs, and a body of technical experts, scientists and policy makers with the relevant data and information evidence to become better advocates for the interests of fresh waters from the local to the highest political levels.
- to **facilitate the setting of the research agenda**
  - to identify and provide sound scientific evidence to inform the setting of the future research agenda for freshwater sciences.

In addition, we also seek to build **strategic partnerships** where these can help the FBA achieve its strategic objectives, and we seek to remain scientifically active by conducting **targeted research**. In support of these objectives, the FBA will also seek to make fuller use of its estate to generate the necessary supporting funds to achieve these strategic goals.

Beneath these high level objectives, much work has gone on in the last 12 months to align the FBA's current work with these new strategic objectives, and to consider where the FBA needs to further develop its current operations to meet these new challenges. Much of this will be reported at a later date, but suffice to say that work in this area has been intensive.

The second major change noted above is the need for the FBA to achieve true financial sustainability by eliminating its ongoing operating deficits. The FBA has begun work to develop a new business model to address this challenge. This will look into all areas of FBA endeavour, across both its Windermere and River Laboratory sites, to first test and then define a new financially sustainable business model that will stop the organisation running future operating deficits and prevent further erosion of its reserves. Once approved by our trustees, this will form the financial core of a new Business Plan to be developed over the coming months.

Simultaneously rolling out a new strategy and eliminating our operating deficits will, of course, be a major challenge. None of this would be possible without the support from the Chairman, trustees, staff and Honorary Research Fellows, for which I am as ever, most profoundly grateful. You the FBA members have also been a great support and I hope that as we make the changes you will also conclude that the FBA is being re-aligned in a way that better represents your needs.

Finally, before reviewing the activities of the year that has passed, may I also express my thanks and gratitude to Professor Alan Hildrew and Professor Chris Spray for the marvellous support they have given to the FBA in their respective roles as President and Chairman. May I also extend a warm welcome to Sir John Beddington and Dr Bill Brierley who join the FBA as President and Acting Chairman respectively. I would also like to welcome Mr David Beuzeval who was contracted as our Business Development Manager at the end of 2013 to help the organisation realise the changes and development goals that lie ahead.

## Membership

The total number of members as at 31 March 2014 stood at 1204. A breakdown according to category is as follows:

Life members	567
Individual members (full)	499
Individual members (student)	47
Corporate members	7
Honorary members (incl. reciprocal)	82
Founder members	2
Total	<u>1204</u>

Widening an active FBA membership is a core strategic objective for the FBA. Growing the FBA's membership beyond its valued existing supporters will be a priority challenge for the

Association. Work priorities have already been identified to address this, including reviewing membership packages and membership benefits, but much of this will take place in the coming year and cannot be reported at this time.

### **Database and Web-development**

The FBA's database and web-development activities cover a variety of electronic data holdings, including web sites, electronic archives and online digital repositories. Together with our classical paper-based library, our other collections, our publications and our training courses, these activities combined constitute the FBA strategic theme of *Evidence and Information*.

The largest single data project is the work on the DTC (Demonstration Test Catchment) Archive. This substantial project, funded by Defra (Department for Environment, Food and Rural Affairs), is drawing to a close at the end of 2014 and much effort is currently underway to deliver the contract. Monthly progress updates with Defra are being held and a short demonstration of the working system was delivered in March.

A second high profile project that is nearing completion is the web-based Riverfly Partnership Database. This is a very high profile Environment Agency (EA) funded citizen science project that facilitates upload and reporting of citizen-scientist river quality assessments. The Riverfly Partnership has undergone a degree of transition recently due to changes in staffing, but FBA maintains a good working relationship and seeks to strengthen this through ongoing liaison with the Partnership's Board and by promoting FBA expertise in training.

Work with the Defra Catchment Based Approach (CaBA) has also been ongoing. This is an initiative to establish partnerships based on catchment area throughout England and Wales. The FBA was successful in obtaining funding to host various workshops for CaBA, to provide data management expertise to their central support services. Through this, we have developed a strong working relationship with the Rivers Trust and look forward to further collaborations with the Trust as opportunities arise.

At the DISAG (Data and Information Services and Advisory Group) Meeting in March 2013 the discussion was prefaced by a short presentation on changes in the world outside the FBA. In particular the publications of the National Environment White Paper (NEWP), the National Ecosystem Assessment and "Making Space for Nature" by Sir John Lawton were considered together with the increased Defra interest in Ecosystem Services and Citizen Science. Other trends discussed included the increased interaction between science areas (hydrology, ecology, physiology), and between new technologies and freshwater science. The FBA has positioned itself in this space between fresh waters and IT, and this positioning appears to be serving the Association well in responding to these trends.

### **Collections**

A summary of the FBA's collections' activities during the year is provided below. These seek to make collections available digitally, seek open access where possible, prioritise subjects and themes that deliver relevant information to FBA users, seek to provide cross-benefits to other FBA areas of activity, and also help to foster strategic partnerships. The work is integrated with that relating to database and web development, described above.

#### *The FBA Library*

The FBA received a donation of approx. 20 boxes of literature from Professor Gordon McGregor Reid (Director Emeritus Chester Zoo). The boxes contain published material and grey literature. This material will be processed with the help of volunteers under the supervision of Honorary Research Fellow, Roger Sweeting.

### *The FBA Unpublished Collections*

The FBA hosted a visit by staff from the Natural History Museum (NHM), subsequently reciprocated, to discuss among other matters the management of specimen collections. The NHM is happy to advise on curation issues and curators are willing to visit the FBA to support our collections' management. The museum is also keen to renew its freshwater collections, including assembling a genetic collection, and would like to involve the FBA in this work. It is hoped that these discussions will lead towards joint NHM–FBA applications for external funding to build collections.

### *Digitisation projects*

Following two pilot projects in the previous year, a further contract was undertaken for the EA to transfer 3500 EA fisheries reports from the EA's database into the FBA online repository. Digitisation projects were also agreed for the Atlantic Salmon Trust and ASFA (Aquatic Sciences & Fisheries Abstracts), for completion in 2014/15. Together, these initiatives will provide a very substantial collection of freshwater grey literature available online. The collection will be linked semantically to the DTC data via our controlled vocabulary to enable efficient search and retrieval of related items.

Looking ahead, we are working with the EA as lead organisation to prepare a Heritage Lottery Fund (HLF) bid for a project to catalogue and partly digitise grey literature and other information hosted by environmental NGOs in the UK. If successful the project, "Natural Heritage Archives", would comprise a one-year development phase, after which a full bid for a four-year project would be submitted.

### *Oral history*

The FBA's first venture into oral history started in April, with the HLF-funded project "Clear Waters – an oral history of people's understanding of fresh water". Recording the personal recollections of local people and those associated with the FBA, this one-year project examined different and changing perspectives of water bodies in the Windermere catchment. A mobile exhibition about the project was produced, complete with listening station (our thanks go to Cumbria Wildlife Trust for the loan of the equipment) and a website is due to be launched in summer 2014.

## **Publishing**

### *Books*

The *Guide to Freshwater Invertebrates* (FBA Scientific Publication No. 68; the 'Macan' book), first published in 2012, is proving to be a 'best seller', requiring a reprint in October 2013 and representing 42% of all income received from book sales during the year. Another recent best-seller, the *Guide to British Freshwater Macroinvertebrates for Biotic Assessment* (SP67), also continued to sell well. Together, these two volumes have been very successful for the FBA and indicate that there is market potential in diversifying the FBA's series of identification keys to also include more generalist titles.

The FBA also has several revisions to existing book titles in preparation. The manuscript for the next Scientific Publication, a revision of SP40 the key to leeches, has been submitted by the authors Malcolm Elliott and Mike Dobson and is now at the editorial stage. Freshwater biologists and students needing to identify leeches to species and who may be interested in participating in user testing of this key prior to publication, are encouraged to contact the FBA. Further down the line, the first phase of the eagerly awaited new key to stoneflies by Mike Hammett is drawing to a close, work on a revision of the key to caseless caddis larvae (SP53) has started, and the new edition of the gastropod key (SP13) is progressing well.

### *Journals*

The International Society of Limnology (SIL) formally renewed its contract with the FBA for publication of its journal, *Inland Waters*. In June 2013, the journal was awarded its inaugural

Impact Factor of 1.533, placing it 48/100 in the Marine and Freshwater Biology and 9/20 in the Limnology category rankings, a very respectable start for a new journal.

Volume 6 of the FBA's own journal *Freshwater Reviews* was published and thanks are due to the Editor, Colin Reynolds, for his continued dedication. The second issue in the volume was notable in being entirely devoted to a new key to family level Diptera larvae. Freshwater fly larvae have always been one of the more difficult groups to identify, even to family level, and this new key is likely to become an indispensable aid to their identification.

### *Newsletters*

*FBA News* continues to attract a healthy volume of copy with 'bumper' issues becoming the 'norm'. From the summer 2013 issue onwards, the print edition was only sent to those FBA members who opted into it, with the default being an electronic copy. Around 60 percent of members have opted for an electronic copy and this has resulted in a saving on print and postage costs for the hard copy.

Circulation of our popular monthly e-newsletter *Freshwater Matters* also continues, providing a compilation of freshwater news from around the world as well as updates of what is happening at the FBA and ways to get involved. During the year, we were also contracted by SIL to produce their bi-annual members' newsletter *SIL News*, with the first FBA-published issue produced in June 2013.

### **Training**

Training course income, although reduced from the previous year, has made a significant contribution to the incoming resource of the organisation. During the year there has been a high demand for programmed and bespoke courses, as well as significant progress with accreditation, and general freshwater biology teaching.

#### *Programmed courses*

A full schedule of programmed courses was run in 2013/14, a selection of which included:

- Entomology for anglers, Level 1
- Entomology for anglers, Level 2
- Identifying aquatic beetles
- Identifying caddis
- River InVertebrate Prediction and Classification System (RIVPACS)/ River Invertebrate Classification Tool (RICT) bioassessment training.

Very few courses in this period had to be cancelled due to insufficient participant uptake, while in contrast our 'Entomology for Anglers' courses proved very popular, with strong demand and forward bookings extending well into 2014.

#### *Bespoke courses*

Delivery of bespoke courses has continued to grow, and now comprises about half of the FBA's total course bookings. Bespoke courses held included:

- A two-day course on mixed-taxon Diptera analysis for the Scottish Environment Protection Agency (SEPA), held in Scotland and tutored by former FBA Director Mike Dobson.
- A three day family-level invertebrate identification course for the Loughs Agency/SCENE (Scottish Centre for Ecology and the Natural Environment), held at the Loughs Agency in Derry and tutored by FBA staff Simon Pawley, Melanie Fletcher and John Davy-Bowker.
- A two-day 'RIVPACS/RICT and Invertebrate Identification course' for the Northern Ireland Environment Agency (NIEA), at their Water Management Unit in Lisburn and tutored by John Davy-Bowker.

- A one-day course on 'Invasive aquatic plant species and common macrophyte identification' for the Westcountry Rivers Trust (WRT), at WRT headquarters in Cornwall and run by FBA Honorary Research Fellow, Allan Pentecost.

The FBA was also awarded a contract with the EA to deliver six training courses on protected species (Great Crested Newts, Crayfish and Water Voles) during the coming year.

The FBA, working with Bournemouth University, was particularly pleased to be awarded funding under the NERC (Natural Environment Research Council) pilot aquatic ecology CPD (Continuous Professional Development) scheme on 'Freshwater Taxonomy and Surveying' in 2013. Whilst funding restricted the number of places that could be offered to 15, the FBA received an overwhelming degree of interest, with selection criteria applied to determine which of the 55 applicants were to be offered a place.

Other training activities included two Riverfly training courses in May/June 2013 and two support evenings, funded by the EA.

#### *Accreditation*

The FBA's own certificate course – the family-level 'Invertebrate identification for biotic assessment (including examination)', was held in October. This complements the EA accreditation scheme (below).

The EA accreditation scheme (which is currently restricted to EA staff) was developed for the EA and has reached a significant milestone with the first tranche of candidates completing their species-level macroinvertebrate modules and examinations at the FBA's two sites. The EA have recently awarded FBA the contract to deliver this scheme to a further 16 candidates in 2014/15.

#### *Teaching*

Provision for teaching to University students is a small but developing area of FBA activity. The FBA are in discussion with the University of Cumbria about FBA involvement in their new BSc course in Aquatic Conservation, which is due to be launched at its re-opened Ambleside campus in 2015. Manchester Metropolitan University (MMU) has agreed to include some of our programmed courses as modules for its MSc and University Certificate in Biological Recording in 2014. Two one-day freshwater bioassessment undergraduate courses for some 50 Southampton University students were tutored by John Davy-Bowker in 2013.

Three universities have also hired out our Windermere facilities for their own training courses:

- Bristol University for an MSc
- Manchester Metropolitan University for an undergraduate course (including some teaching by Melanie Fletcher)
- Lancaster University for a lake ecology field course.

All three institutions were 'returning customers' and we are keen to expand this service to others.

The River Laboratory has also seen continued use for field courses and research by:

- Bournemouth University
- Southampton University
- Queen Mary University of London (QMUL)
- Exeter University.

In addition, the River Laboratory has hosted a range of education events for school groups from several local schools.

## Research and Scientific Contracts

### *Freshwater Pearl Mussels (Ark)*

This project, started in 2007 in partnership with Natural England and the EA, aims to create an 'ark' facility to conserve dwindling populations of the freshwater pearl mussel *Margaritifera margaritifera* from English rivers, and to develop a captive breeding and reintroduction programme. The project this year provided some interesting information, with the drop-off of juvenile mussels from the host fish being delayed in all cases except those from the River Tyne mussels. The reason for the difference in timing of drop-off between different mussel populations is not known. Our regular examination of glochidia (mussel larvae) on fish held at the Kielder Hatchery demonstrated a significant loss of small glochidia from brown trout so that very few reached the size required for independent existence as juveniles in the wild. A good crop of juveniles was secured from several of the other populations that reproduced in 2012.

Experimental exposure of Arctic char to the mussels from the Rivers Irt (Wastwater) and Ehen (Ennerdale) provided large numbers of viable juveniles in 2013 and points to an alternative route of mussel development that existed before the construction of barriers to fish migration in both river systems.

Additional systems to improve survival in juvenile mussels were set up in 2013 following the successful use by other workers of incubator boxes to rear juveniles. After some teething troubles the system looks promising for achieving more rapid, early growth.

### *Other mussel projects*

A short commission from United Utilities concerning environmental issues on the River Ehen was completed, and discussions held about further commissions.

A short Knowledge Transfer Partnership (KTP) with the University of Cumbria and the nuclear industry at Sellafield commenced during the year, aiming to investigate the use of swan mussels in the removal of algae from some of Sellafield's heritage ponds.

The Tyne pearl mussel project has now formally finished, although with some final discussions still to be had with the EA to sign off the project.

### *Macroinvertebrate bio-monitoring*

Three contracts on macroinvertebrate bio-monitoring were delivered/won during the year, making an important financial contribution to the FBA. An R&D project for the EA investigated two separate issues. Firstly, it sought to investigate whether changes had occurred in expected LIFE (Lotic Invertebrate index for Flow Evaluation) scores in moving from RIVPACS III to RIVPACS IV/RICT. This is important because of the potential to affect WFD (Water Framework Directive) and AMP (Asset Management Plan) abstraction licensing decisions being made by EA operational staff using ecological data as the basis for evidence. Secondly, an ongoing issue of the tendency of RIVPACS type models to under-predict at exceptionally rich sites, more specifically chalk streams, was investigated. An assessment of the problem was carried out and it was found that the issue was less significant than had been thought.

John Davy-Bowker was also awarded a contract for the provision of services to upgrade RICT, in conjunction with Ralph Clarke at Bournemouth University. This contract has focussed on developing new routines and algorithms for RICT to estimate uncertainty and biases for the biotic indices WHPT (Whalley Hawkes Paisley Trigg), LIFE and PSI (Proportion of Sediment-sensitive Invertebrates). This award itself is the first of a five-Workstream framework. Like Workstream 1, Workstreams 2–5 will need to be won in open competition.

John Davy-Bowker, Ralph Clarke and Iwan Jones and John Murphy from QMUL have also won a further a further RIVPACS/RICT contract for the Scottish Executive (Workstream 2). This project, led by the FBA, seeks to test the new biotic indices LIFE and PSI against stressor gradients and also develop classification boundaries for these metrics in RICT.

#### *Framework contracts*

Some of the work above was won under the EA's 'Ecological Services Framework Contract'. Of the six Lots that make up the Framework Contract, however, the FBA is currently only eligible for Lot 1 (provision of expert ecological technical advice) and Lot 6 (provision of training). The Framework Contract is the primary means by which the EA contracts out work and as at 31 March was coming up for renewal. At the time of writing, an application for the new Framework Contract (EcSF2) has been submitted in collaboration with Bournemouth University, and we await the outcome.

In January, the FBA also applied for the Wessex Water Framework Contract to supply ecological services. We are yet to hear the outcome of this application.

#### *Audits and laboratory services*

John Davy-Bowker conducted a small amount of external audit work for Wessex Water to check the quality of sample processing and identification performed by one of its existing contractors.

John Davy-Bowker and Simon Pawley also completed a further batch of species-level samples for WRT. Well over 100 samples have now been processed and reported.

#### *Other contracts*

Work continued on a contract with the South Cumbria Rivers Trust (SCRT) to deliver pre- and post-project monitoring for river restoration projects on the River Kent system as part of a Cumbria-wide River Restoration Strategy.

Following the completion of the Algal Bloom Pilot project in 2012/13, further funding from the EA has not been available, although we continue to seek funds from EA and other sources to continue this initiative.

Despite concerns that the contract would stop, West Dorset District Council have again accepted a quotation from the FBA to conduct the Blandford Fly control contract in 2014. This work was managed by John Davy-Bowker and carried out by Mike Ladle and Stewart Welton as sub-contractors.

#### *Long-term monitoring*

John Davy-Bowker has continued to collect macroinvertebrate and diatom samples and matched flow and temperature data from the Frome and Piddle in Dorset. Having monitored through a considerable variety of meteorological events in recent years, the 'River Lab Long Term Monitoring project', now in its seventh year, is beginning to constitute a reasonable long term dataset.

#### *Hire of specialist facilities*

Discussions are currently underway with QinetiQ's underwater research group at Winfrith to use the Fluvarium at the River Laboratory, with FBA staff support, for research and development work.

### **Studentships and FBA Grants**

The Association supported six PhD students during the year. Helen Rosenkranz (University of Bristol) had successfully defended her thesis the previous year and was writing up

corrections as well as some research papers. Fiona Bracken (University of Durham), Felicity Shelley (QMUL) and Gary Rushworth (University of Leeds, hosted by the FBA) completed their practical work and are writing up their theses. Clare Gray (QMUL) entered the second year of her studentship, and Louise Lavictoire (a member of FBA staff) continued her part-time studies on the freshwater pearl mussel with the University of Cumbria.

The 2013 Hugh Cary Gilson Memorial Award was made to Sara Rassner (Aberystwyth University), for a project on “CRYOCHYTRID: are fungi the missing links in High Arctic freshwater food webs?” An interim progress report was published in the autumn/winter 2013/14 issue of *FBA News* and a final report will be published on the FBA website later in the year. For 2014, the award was re-named the ‘Gilson Le Cren Memorial Award’ following a generous contribution from the family of David Le Cren, a former Director of the FBA, the previous year. The Grants & Awards Committee met in January 2014 and agreed to recommend that the Award be offered to Iliana Bista (Bangor University), for her application “Understanding the ecological relevance and temporal persistence of community freshwater environmental DNA in a natural lake ecosystem”. This recommendation was then formally endorsed by FBA Council.

### **Profile Enhancement and Promotion of Science**

Continuing our tradition of close involvement with the biennial Symposium for European Freshwater Sciences (SEFS), FBA staff promoted the Association as part of the trade exhibition at SEFS8 in Germany. Attendance at the SIL Congress in Budapest, 4th–9th August, to help with the *Inland Waters* editorial office, similarly afforded an opportunity to promote the FBA to an international audience. Staff also participated in the Insect Festival in York, on 7th July.

Links with other societies at a national level have also been strengthened, with Melanie Fletcher taking on the role of co-secretary of the recently ‘re-booted’ Aquatic Ecology Group of the British Ecological Society. Guy Woodward from Imperial College London is the other co-secretary.

### **Site Development**

Our programme to maximise the income generated from our estate continued during the year, with the refurbishment of the former farmhouse at the River Laboratory. This is now available for letting and a local estate agent has been engaged to pursue this. At Windermere, FBA Council approved the development of the Annexe Building into an apartment for sale and holiday lets, planning permission for this having already been secured. This development will start once the necessary legalities have been completed.

### **Personnel**

As referred to in the Chairman’s report, the year began with the Director, Mike Dobson, leaving the FBA in May 2013 to take up a post with the consultants APEM. We are indebted to Mike for steering the Association through some very difficult times and for his tremendous support for staff, fellows, students, volunteers, trustees and members. We wish him the very best for the future.

The year ended with the departure of the FBA Collections Manager, Hardy Schwamm, in mid March 2014. We wish Hardy all the very best in his new role at Lancaster University. The recruitment of a new Collections Manager began in March, and although strictly speaking outside this reporting period, it is with great pleasure that I can report that a new Collections Manager, Tamsin Vicary has now been appointed. May I extend a very warm welcome to Tamsin who steps into a very important role within the FBA.

Faith Hillier, the Project Officer for the Oral History project, left the FBA in December 2013. We wish Faith well in new role at the Wildfowl & Wetlands Trust. Gary Rushworth was appointed as new Project Officer for the remaining three months of the project, starting in February and finishing at the end of April 2014. I must extend a really big thank you to Gary

for his continued support for this project, which has in fact extended beyond his contractual obligations to the FBA and the project.

Soraya Alvarez has once again assisted as a casual appointee, working on the latest EA archives project. Anne Powell continued to support the Association both as a volunteer and consultant, and Brenda Leese as a volunteer with the Fritsch Collection. We thank Soraya, Anne and Brenda for their continued help with these valuable areas of our work. We were sorry to say 'goodbye', however, to Lawrence Dobson after six years as a volunteer. We thank Lawrence for his help in site maintenance and wish him the very best for the future.

Two KTP associates, both from the University of Cumbria, were placed with the FBA during the year. Tom Miles started in June 2013, working first on the Riverfly Partnership Database and subsequently on a number of other areas, including the use of social media by the FBA staff and members. This has resulted in a clearer picture of how social media can be used to further the aims of the Association. The second associate, Irene Paredes, started in June 2013, working on the swan mussel project.

An industrial placement student from the University of York, Theo Leslie, began work on the Pearl Mussel Ark project in July 2013 and proved both willing and highly capable in taking on board some of the expert maintenance and rearing in the hatchery. He finished in June 2014 and we wish him well in his future career.

Biliana Ivanova, who had temporarily provided maternity cover for Sarah Rigby, left the FBA in November 2013, just prior to Sarah's return in January 2014. Louise Lavictoire and Melanie Fletcher both left us temporarily to begin their maternity leave, in August 2013 and January 2014 respectively. Thanks are due to Eloy Benito Reyes, Rosalind Maberly, Simon Pawley and other staff for providing maternity cover during this period, and also to Jon Grey who has kindly agreed to expand his editorial responsibilities for *FBA News*.

## Reports from Honorary Research Fellows

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

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

### **Patrick Armitage**

#### ***Invertebrate Ecology***

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

The project started last year with Bournemouth University (funded by the EA), to provide baseline information on the biodiversity of aquatic organisms in 20 ha of the Frome Floodplain adjacent to the River Laboratory, has now finished. My involvement was with macroinvertebrate communities in seeps, ditches, and ponds. A total of 173 taxa were recorded with Coleoptera and Diptera comprising over 50% of the total taxa. The highest mean number of taxa was recorded in August and the lowest in March. The Conservation 'value', assessed with the Community Conservation Index, was 'high' for the majority of sites. Eleven Rare to Notable taxa were found including eight Coleoptera and three Diptera. As a result of this work specific recommendations for the management of the sites were proposed.

The work on the South Winterbourne Stream near Dorchester with Jon Bass, which was stimulated by a 'rehabilitation' project on the system and the need to determine its effects, has now been published. A total of 122 taxa in 63 families was found in samples collected at the eight sites. The greatest number of taxa was found at the permanently flowing sites (mean 61, range 57–69), compared with the intermittent sites (mean 32, range 22–38). These intermittently flowing sites contained rare winterbourne species such as the mayfly *Paraleptophlebia werneri* and the blackfly *Metacnephia amphora*. In addition the stonefly *Nemoura lacustris*, known mainly from southern Europe, was found for the first time in Britain. The Conservation value of most sites was found to be 'high' to 'very high' due to the occurrence of Red Data Book 'notable' species. There has been little change in the faunal communities of the South Winterbourne over four decades but there are indications that biodiversity may have increased slightly. The longer term consequences of recent stream rehabilitation on the South Winterbourne reaches remain uncertain as the macroinvertebrates have also been exposed to exceptional drought and flood events (2011–2013). Because of these extreme conditions we re-examined some of the sites in 2013 to investigate the effects of the abnormally wet conditions which have cancelled the normal dry period associated with winterbourne streams. These data are being processed.

As part of my ongoing work on the small streams of the River Frome catchment and adjacent areas I have started a further investigation with Jon Bass of the Sherford River. We have taken samples in three seasons at six sites and are currently processing these data. In addition I am examining seven small streams entering Poole Harbour. This work was stimulated by my involvement with the Frome and Piddle Catchment Initiative Task Group whose aim is to develop catchment management plans which meet the needs of both European and UK legislation as well as the needs of local people, businesses and wildlife.

In addition to these I continue assisting staff from QMUL who are now handling the yearly survey of the Bovington Stream which drains the MOD tank training range. I am also involved with Frome, Piddle, Poole and Purbeck WFD Measures Group and the Avon Monitoring Group. I continue to have links with Dorset Wildlife Trust. I have supervised volunteer students here at the River Laboratory and examined a PhD thesis from University of Christchurch, New Zealand.

### **J. Malcolm Elliott**

#### ***Ecology of freshwater fish and zoobenthos***

To celebrate its 100th birthday in 2013, the British Ecological Society produced a book of newly-written abstracts for the 100 influential papers published in 100 years of the Society Journals. I am pleased to report that one of my publications was included in this book, namely a paper on the energetics of feeding, metabolism and growth of brown trout. I also noted that I am one of the few authors who are still alive!

Although there is a huge amount of information in this field, there is still a need for detailed quantitative studies, especially those leading to the development of predictive models. Most of my work is aimed at fulfilling this need. However, I have also retained an interest in the natural history of freshwater animals, including the publication of monographs in the FBA series of scientific publications. Two papers have been produced in the past year, both published in international, peer-reviewed, journals.

The first answered the question: "Do mudskippers and lungfishes elucidate the early evolution of four-limbed vertebrates?" and was published in the journal *Evolution: Education and Outreach* (Kutschera & Elliott, 2013). This journal is aimed at students and the general reader, rather than specialists. Recently, the origin of four-limbed vertebrates (tetrapods) has been re-assessed, based on footprints and track-ways that were made by early land animals almost 400 million years (my) ago. That is 18 my earlier than the oldest known tetrapod body fossils such as *Acanthostega* and *Ichthyostega* from Greenland, and 10 my older than the earliest 'tetrapodomorph fishes' (*Panderichthys*, *Tiktaalik* etc). These and other facts suggest that the first tetrapods may have thrived in the marine intertidal and/or lagoon zone as well as in brackish and freshwater environments associated with land vegetation, as previously thought. In our paper, we discussed the controversial question of whether or not extant air-breathing fishes such as mudskippers, amphibious gobioids that inhabit mangrove swamps, can be interpreted as living model organisms, with reference to the earliest land plants. In addition, recent developmental and behavioural studies on lungfishes (Dipnoi) were summarised and evaluated. We concluded that mudskipping 'walking fishes' (*Periophthalmus* sp.) and Dipnoi (*Protopterus* sp.) shed light on the gradual evolutionary transition of ancient fishes to early tetrapods that occurred during the Devonian in muddy, salty waters. However, they are not the ancestors of tetrapods, because extant organisms cannot be progenitors of other living beings.

My co-author for the second paper was the late Derek Allonby (Elliott & Allonby, 2013). Derek was in charge of the supply department of the FBA for many years. When this was closed, he then worked with me and proved to be excellent at maintaining fish for experimental studies. The paper describes the temperature preferences of brown trout, *Salmo trutta*, and tests the hypothesis that these vary in relation to: (i) fish mass and hence their age (0+, 1+, 2+, 3+); (ii) the season (spring, summer, autumn) and hence the acclimation temperature; and (iii) whether or not the fish are fed. The experiments were in a 3 m-long section of an outdoor artificial stream (water depth 0.28m). An immersion heater at one end raised the temperature to 25°C and an ice bag at the other end lowered the temperature to 0°C, thus creating a horizontal temperature gradient.

Experiments were for 0+ trout in May and for 0+, 1+, 2+ and 3+ trout in August and November. In each month, five trout of the same age were not fed for two days and then one fish was placed in the section at noon and left for 24h habituation. The next day, starting at noon, the position of the fish was noted every 2h over 24h, and the temperature at

this position was measured ( $n = 13$  readings). This procedure was repeated for each of the five fish ( $n = 65$  readings for trout of the same age in each month), and then with five continuously fed trout of the same age as the unfed trout. For all trout, there was a diel variation in recorded temperatures at the observed positions with the lowest values in the day and the highest at night. This diel variation was slight for 0+ trout, but more marked for older trout, especially 2+ and 3+ fish. The overall mean preferred temperature decreased markedly with trout mass and age from 16.3°C for 0+ unfed fish to 12.0°C for 3+ unfed fish, and from 14.5°C for 0+ fed fish to 9.5°C for 3+ fed fish. The mean preferred temperature was always lower for fed trout than for unfed trout. There was also an ontogenetic increase in the variation in individual temperature preferences around the mean value for both unfed and fed trout (CV% increased with fish mass and age). Neither the season (spring, summer, autumn) nor the acclimation temperature had any obvious effect on the mean preferred temperature.

Therefore, the temperature preferences of brown trout were not constant but varied ontogenetically and whether or not the fish were fed. We concluded from comparisons with earlier studies that the temperature preferences for fed juveniles (0+, 1+) were similar to their optimum temperature for growth rate, whereas the lower values for older fed trout were similar to their temperature for maximum conversion efficiency of energy intake to growth, thereby optimising growth efficiency rather than growth rate.

The rest of my time has been spent on refereeing papers for different journals, and revising the FBA Scientific Publication on freshwater leeches. An account of the latter will appear in my Annual Report for 2015.

#### **D. Glen George**

##### ***Limnology and zooplankton ecology***

In 2013, my studies were again focussed on the impact of climate change on the dynamics of lakes. These included:

- contributions to a new EU funded project (NETLAKE)
- an assessment of the impact of climate change on a number of lakes in Wales
- an analysis of the effects of short-term changes in the weather on the dynamics of Llyn Tegid in Snowdonia.

##### *The EU 'NETLAKE' project*

NETLAKE is a four-year project funded by the EU to promote the wider use of automatic monitoring systems in lake research. I am a member of the project's Management Committee and also serve as the co-coordinator of a Working Group on 'Informing policy and management using lake sensor data'. The project includes partners from more than twenty European countries and will use a combination of field studies, workshops and web-based tools to meet a series of defined objectives.

##### *The impact of climate change on the lakes of Wales*

Progress with the proposed book on the 'Lakes of Wales' has been limited by the merger of three organisations to form 'Natural Resources Wales'. In the meantime, I have spent time processing some data that had already been collated and assembling material for the proposed chapter on the impact of climate change on Welsh lakes. This chapter will include sections on the winter effects associated with the North Atlantic Oscillation and an account of the likely consequences of the recent shift in the position of the Atlantic Jet Stream.

##### *The impact of extreme weather events on the dynamics of Llyn Tegid (Snowdonia)*

The automatic monitoring station deployed on Llyn Tegid has now been in operation for more than seven years and has produced a very detailed record of the lake's response to some changes in the weather. A paper on the impact of extreme events on the seasonal dynamics of the lake is in preparation and will be completed when the data acquired in 2013 have been processed.

**Terry Gledhill*****Invertebrate Taxonomy***

In my report last year (2013), I was over optimistic about the completion date of the manuscript of the third (final) volume of the collaborative key to the European water mites. My collaboration in this project continues but I am now somewhat reluctant to forecast when the manuscript will be completed – the two remaining superfamilies comprising this volume together have 22 genera and many species, with some revisions required in both taxonomic groups. However, all collaborating are determined that this project will be completed.

I have commenced a revision of the check-list of freshwater mites recorded from Great Britain and Ireland (Gledhill & Viets, 1976). This new check-list is based on the species we have accepted in the 'European' keys, commencing with those in the two currently published volumes (Davids et al., 2007, and Di Sabatino et al., 2010).

I am also working on a unionicolid water mite found in a bivalve mollusc, *Egeria radiata* (Lamarck, 1804) from Nigeria. *Unionicola* is a genus of freshwater mites of which many are free-swimming occupants of rivers and lakes. Some, however, are found in freshwater mussels and snails, still retaining their larval parasitic stage on adult chironomids (non-biting midges) before returning to the host mussel to complete development to the adult mite. (Additionally, mussels also have their own complex life-history). The host bivalve belongs in the family Donacidae and, as far as I can tell, there have not been any reports of unionicolid mites in this bivalve family.

I continue to identify or confirm identifications of material for FBA colleagues.

**References (other than in list of Publications below):**

- Davids, C., Di Sabatino, A., Gerecke, R., Gledhill, T., Smit, H. & Van der Hammen, H. (2007). Acari: Hydrachnidia. In: *Chelicerata: Araneae, Acari I* (ed. R. Gerecke). Susswasserfauna von Mitteleuropa 7/2-1, 241-376. Elsevier Spektrum Akademischer Verlag, München.
- Gledhill, T. & Viets, K.O. (1976). *A Synonymic and Bibliographic Check-list of the Freshwater Mites (Hydrachnellae and Limnohalacaridae) recorded from Great Britain and Ireland*. Occasional Publication No. 1. Freshwater Biological Association, Ambleside. 59 pp.
- Di Sabatino, A., Gerecke, R., Gledhill, T. & Smit, H. (2010). Hydrachnidia, Hydryphantoidea and Lebertioidea. In: *Chelicerata: Acari II* (ed. R. Gerecke). Susswasserfauna von Mitteleuropa **7/2-2**, 1-234. Spektrum Akademischer Verlag, Heidelberg.

**Elizabeth Haworth*****Fritsch Collection***

With the voluntary assistance of Brenda Leese, we continue to add taxonomic information, mainly from *Diatom Research* and the *European Journal of Phycology*. Papers are also added to the Fritsch Collection's own library as we continue to beg for reprints; these are included in our Author index.

We continue to slowly digitise the Sheets of the Fritsch Collection and completed a project covering the diatom genus *Fragilaria* and related genera. We have filed records for 388 species names, 206 type figures, 160 diagnoses and 720 digital photographs. Considerable use was made of the library in checking the data. In mid-September, a report was given to the *Fragilaria* workshop at the European Diatom Meeting at 'Thonon les Bains', near Geneva. The interest is in checking on the type species now that early diatom collections are more accessible. Currently there is a problem in establishing the true identity of a form that has, since 1913, been mistakenly ascribed to *Fragilaria pinnata* described by Ehrenberg in 1845. The type is now found to belong to a quite different genus and this leaves a problem of the numerous species lists of many localities and palaeolimnological records! The author list of our own project has indicated that earlier authors used another name, later considered a synonym but now also seen to be a different species! A paper has been submitted for publication.

I took myself on a local photography course to improve our use of the modern digital camera and we have been testing various alternative settings. Now that we have a suitable format, any requests can be answered by email while adding to our digital store; this has aided a PhD student with some identifications. The digitised images of the sheets now need a suitable website to go online.

Dr István Grigorszky, from Hungary, visited the Fritsch Collection in preparation for a dinoflagellate survey, so we hope for future collaboration when he can get the funding to revisit. He, too, found the library a mine of information.

I continue correspondence with algologists via email. Sadly several well known people died this year and I have added obituaries to our Obituaries file.

David Williamson the desmid expert delivered four boxes of location and desmid species records, and added further desmid illustrations to the Williamson Desmid collection. These were filed by volunteers. We now have his poster of the Okavango desmids, copies of which have been advertised for sale.

I contributed to the FBA's recent 'Clear Waters' Oral History project, and gave two lectures to the British Diatom Meeting in October.

### **Alan Hildrew**

#### ***Ecology of Streams and Rivers***

The last year has again been very busy, much of it taken up by editing the ever-growing *Freshwater Biology*, whose latest impact factor (a whisker short of 4.00) confirms it as the leading general journal in freshwater ecology/biology. I have also been working on the book I have been asked to write as part of the International Ecology Institute prize (awarded in 2012). These two tasks have taken up most of my research time, although I have continued to play a part in the UK's Acid Waters Monitoring Network (now the Uplands Waters Monitoring Network), being responsible for the macroinvertebrate monitoring. I have also now transcribed my old (1969–1971!) daily maximum–minimum stream temperature data for five sites on the River Usk and its headwaters from paper to electronic form. Along with modern logging data at the same sites (working with Dr Isabelle Durance at Cardiff), we hope to model temperature changes over the intervening 45 years. I am also involved in a project (jointly with Gareth Jenkins, a QMUL PhD student) to measure cellulolytic decomposition at the Uplands Waters Monitoring Network sites, following our finding the decomposition had accelerated over >30 years at formerly acidified streams in the Ashdown Forest.

As adjunct tasks, I am on the Scientific Advisory Committee of Natural England (NESAC), whose main task is to scrutinise the evidence produced by Natural England. I chair the Awards Committee of the Zoological Society and sit on the Advisory Boards of the Cardiff School of Biosciences and of the NERC-funded DURESS programme, also at Cardiff. I have also been asked for advice on promotions at several UK and overseas Universities, and review papers for other journals (mainly *Global Change Biology* and *Ecosystems*).

In 2013, I attended (and gave talks at) the SEFS meeting in Münster and the SIL meeting in Budapest. I represented FBA at the meeting of 'EFFS' (European Federation of Freshwater Societies) in Münster, and took part in tasks with representatives of 'NABS' (now the Society for Freshwater Sciences [SfFS], from the USA). As you may tell from this blizzard of similar acronyms, the ball is in play for territory among the freshwater societies! A big change for this year was that I retired as FBA President, and therefore no longer serve on Council, though I continue to represent FBA, along with Karen Rouen, on EFFS.

In terms of my Honorary Fellowship, I now give my FBA address (jointly with Queen Mary, where I am Emeritus Professor) on publications and conference talks and seminars (this year at Kings College, Geography Dept), and continue to give informal advice and generally to promote the FBA wherever possible.

**Mike Ladle*****Ecology of Fish***

In 2013 Dr Stewart Welton and I were again contracted by North Dorset District Council, under the auspices of the FBA, to control the Blandford Fly. The reduced monitoring of recent years continued and seems to be adequate. The effective *Bti* formulation of VectoBac 12AS was applied at selected sites, on the basis of EA discharge data, to achieve a concentration of 0.8 ppm for no more than 10 minutes.

I still visit the River Laboratory to liaise with members of the staff of FBA and other organisations.

I have continued as advisor to the River Allen Association.

The run of salmon on the Frome in 2013 was again poor (FBA Counter figures) but catches were similar to those in 2012. Six salmon and one pike were landed at East Stoke and 15 salmon (+1 out of season), 4 pike, 20 seatrout, 40 brown trout, and 13 grayling were landed at West Holme. All salmon and many seatrout were again returned alive.

I am responsible for the administration of the FBA fishing at West Holme dealing with the fishermen, fees, fishing rota and reporting on the state of the fishery, its banks and bridges etc. Repair work has now been carried out on all bridges at East Stoke. The one usable bridge at West Holme needs new steps at the south end if access to the north bank fishing is to be sustained. I already have new anglers requesting fishing at West Holme in 2014.

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

**Allan Pentecost*****Limnology and Algology***

There has been plenty of teaching and research activity over the last year. This included a number of meetings early in the year connected with the FBA's 'algal bloom' project plus discussion on the report write-up and analysis. I also attended the Loweswater monitoring meeting where there were discussions on the control of blue-green algal blooms over the next three years. In March, I attended the 'big dive' on Windermere which was organised originally as a 'clean-up' exercise in the Bowness area. Over 300 divers arrived and it was an opportunity to test some sampling methods for collecting recently deposited sediments from the surfaces of discarded objects. Unfortunately few samples were obtained but several lessons were learned concerning the sampling of fine sediments by diving teams and it is hoped to develop the method further with the Kendal Diving Club. This work was supplemented with a transect along the length of the North Basin where, with Melanie Fletcher and Simon Pawley, we sampled a series of surface sediments and analysed them for their total phosphorus content and algal flora. The P content was high but variable and we hope to transect the South Basin in 2014. This will form part of a more comprehensive study of the P contents and algae of the Windermere sediments. Contract work included a course on aquatic macrophytes that was given to the Westcountry Rivers Trust in Cornwall and a visit to Foulshaw Moss was made to assess the possibility of monitoring the recently flooded pools there. I have also been involved in the Oral History project at the FBA with Faith Hillier and attended the Dales Rivers Biodiversity Action Plan meeting at Skipton College, held in November, as FBA representative.

This year a detailed study of *Vaucheria* calcification was completed using material collected close to the River Kent in Cumbria. With colleagues Roy Merritt and Chris Carter we managed to follow the growth of this alga through an entire season and measure its calcification rate. Although much is known about calcification in other algal phyla, virtually nothing was known about the Xanthophyta. We are about to submit the paper to the *European Journal of Phycology*. As part of the John Lund centenary celebration, two articles were submitted to the British Phycological Society to be published in the *Phycologist* and papers were also published from research described in the 2013 report. A paper on the

Malham Tarn charophytes was presented at the Tarn Research Seminar in November which was well attended and it is hoped to publish this work in the coming year. A new course on limnology started at Malham Tarn Field Centre and was also well attended and is likely to run again in 2014.

Work on the subaerial Cyanobacteria also continues with several visits to the high Lake District tarns plus Red Pike where an unsuccessful search for Mountain Dulse (*Gloeocapsa montana*) was made. On several of these trips samples containing water mites were also collected for Terry Gledhill.

### **Ian Pettman**

#### ***Data and Information Retrieval***

In this 12 month period, I have continued to encourage and assist Hardy Schwamm in gaining and completing relevant contracts.

#### *Aquatic Sciences and Fisheries Abstracts (Food and Agriculture Organization of the United Nations)*

Having successfully completed the previous "Historic input" contract by April 2013, Hardy and I began work on preparing a new bid to be presented to the ASFA Board. We changed the emphasis and prepared a "report digitisation" bid for the ASFA Board Meeting held at the Instituto del Mar de Peru, 23rd to 27th September 2013. This bid was successful and work was scheduled to start in January/February 2014.

I also encouraged Hardy to give another presentation to the Board on the FBA's Data Services work. The presentation was well received.

#### *Environment Agency Reports contracts*

Hardy continues to develop these contracts and the regular work now needs little input from me.

Hardy and I did have extensive discussions, however, on the best way to organise and develop the geospatial aspects of the Vocabulary being prepared mostly under the DTC project (see below). This vocabulary is also used in the preparation of the metadata for the EA reports and needed a more detailed approach to catchments than that required just for the DTC project. Our schema and one new vocabulary relationship were agreed by the FBA's Data and Information Services Advisory Group meeting in September 2013 and subsequently implemented in the Vocabulary.

#### *Defra DTC project*

The work the FBA is doing on the Vocabulary structure for this project and the EA one above is important in information retrieval research. All existing vocabulary tools have been developed for the retrieval of documents/text only. The FBA Vocabulary is being developed for the retrieval of documents, text, specimens, data sets and data from data sets. We have not yet found any other vocabulary designed to retrieve data sets or data from data sets.

Our emphasis during this reporting period has been to understand how we should structure "measurements" and "measurands"; handle concepts such as "central tendency measurements"; and how to indicate "preferred units" for any measurand whilst leaving flexibility and choice. An initial schema has been implemented in the Vocabulary. This may need further refinement when we reach the user interface testing phase of the project.

#### *'Clear Waters' Oral History Project*

Some further assistance was given to Faith Hillier and Hardy on this project – testing interview techniques, lists of potential interview candidates, techniques for exhibition design, etc.

### *Collections*

Hardy now needs only occasional advice and support with queries relating to the library and unpublished collections. However, one query did highlight again the importance of the FBA's previous contract reports in relation to new contracts. This particular problem was partially resolved in the end but one report remains missing. Effort needs to be made to ensure that a paper copy of all FBA Contract Reports is found and that the ensuing collection is then digitised and the digital copy resides on more than one platform.

### **Paul Raven**

#### ***River Ecology and Morphology***

My research interest in fluvial morphology and freshwater ecology continues on several fronts and has an added historical dimension as a result of collecting material for the forthcoming book I am co-authoring with Nigel Holmes. This has involved a desk study on the recolonisation of Britain's rivers after the last ice age, using published work on palaeogeography and fish genetics to reconstruct possible sequences of events in the early Holocene. Fluvial morphological change and the ecological consequences of river management over the past 2000 years has been another subject area covered.

The book is called 'Rivers' and is the third of the *British Wildlife Collection Series*, and is due to be published in the summer of 2014. It aims to inform general natural history readers and to encourage young scientists to get involved in freshwater biology. The library at East Stoke has provided a good source of references for the book and I will use my FBA affiliation as part of the authors' citation.

Book writing has restricted fieldwork but in September, Peter Scarlett (CEH) and I provided tuition at a River Habitat Survey training course organised by the University of Poznan. This annual event enabled me to promote the work of the FBA.

As a British Ecological Society Council member, I peer reviewed the BES publication *The ecological consequences of extreme events in fresh waters*, drafted the executive summary document and represented the FBA at its launch at a Parliamentary reception on 25th June 2013. The importance of this subject area has been highlighted by recent flooding in southern England.

### **Colin S. Reynolds**

#### ***Ecology of Phytoplankton***

I have been adequately occupied in tasks that comply with the conditions of FBA Fellowship. I have worked at some length with Dr Alex Elliott at CEH to complete, submit and re-submit to the *Journal of Great Lakes Research*, a generic paper on modelling phytoplankton dynamics on the basis purely of the morphological and physiological traits of the organisms. This concluded a series of steps that I initiated at the FBA's Jubilee Symposium, in 1979, when I presented an analysis intended to show that the dynamics of phytoplankton in lakes are strongly related to morphological analogies among species but which supersede phylogenetic affinities. Two well-cited papers, published respectively in 1980 and 1984, attempted to formalise the patterns, which eventually fed into papers about prediction (1989), to the first attempts to work this into a simulation model (PROTECH, in its various marques) and my profitable collaboration with Drs Anthony Irish and, later, with Dr J. Alex Elliott to develop the approach. I am hopeful that the new paper (using examples drawn from 25 years' modelling experience) will confirm the validity of the underpinning theory.

I am grateful to my colleague and past collaborator, Professor Dr Judit Padisák, now of the University of Pannonia, Hungary, for taking on the task of updating my contribution to the *Encyclopedia of Biodiversity* (2001) (ed. Simon Levin) but insisted I still be first author!

My other publishing venture was a happy challenge, to write what was intended as a celebration of the 100<sup>th</sup> birthday of John Lund, my inspiration and guide in my student years (and for long thereafter). The account of "what it was like to be supervised by John Lund?"

appeared in *FBA News*. I must say that the one of my greatest delights this year was to see his generous reaction and to hear again his well-reputed laughter on being reminded of so many amusing events we shared in the 1960s and 70s.

## **Roger Sweeting**

### ***Water Quality and Fish Biology***

The list of my activities seems to get longer, so for this report I have attempted to make it more digestible and present it as bullet points, the majority of which relate to the securing and delivery of funded projects:

- Pearl Mussel Ark project 2007–2015 supported by the EA and Natural England: funding issues and increased costs in 2013 resulted in a year of uncertainty for the continuation of the project. Although not totally resolved the project now looks to have a more secure future. Most importantly we have several surviving cohorts of juveniles from 2008 to the present. Our major effort is going into the improvement of juvenile survival.
- Negotiations with Lune Rivers Trust for the return of the adult mussels to stretches of the upper Lune have been completed and the adult mussels have been returned to the Lune.
- River Ehen Pearl Mussel project: a short contract was carried out in June 2013 for United Utilities following a mortality resulting from low river levels – observations suggest that more extreme weather events influencing river channel morphology may be an important component of this. Negotiations for further work involving the use of the FBA flume and further evaluations of historic catchment change are in progress.
- The EA archive project continued with some advice on fisheries, conservation, water quality records held by the Agency. This is now being developed further as part of a Heritage Lottery Fund application.
- A similar project with the Atlantic Salmon Trust (AST) will result in FBA hosting a major part of AST's library in electronic format, with improved accessibility for those interested in its work on salmonid fisheries.
- Fish examinations for compliance with Section 30 of the Salmon and Freshwater Fisheries Act 1975 have continued throughout 2013/14, providing a small but steady income for FBA as well as some interesting data on parasites in freshwater fisheries in the UK.
- A short KTP project with the University of Cumbria and the nuclear industry at Sellafield investigated the use of swan mussels in removal of algae from some of Sellafield's heritage ponds. A 46 week project demonstrated the practicality of this concept. This project may lead to longer term projects as well as some intellectual property rights.
- The redevelopment concept developed for the Annexe over the last 8 years, following an earlier decision in 2005, has progressed with planning permission secured: detailed practical development and financing are being considered for a 2014 start.
- The Windermere Restoration Plan is an ambitious concept in the early stages of negotiation with several partners, based on earlier joint work with South Cumbria Rivers Trust for the Lake District National Park on reed beds and the Heritage Lottery funded 'Windermere Reflections' project. Several applications for further funding are being considered.

I continue my involvement with the development of standard methods for WFD as chairman of relevant BSi (British Standards Institution) and CEN (European Committee for Standardisation) committees. Current standards being developed include pearl mussel environmental quality requirements, assessment of hydromorphological change in lakes, and methods of hyporheic sampling. One measure of success for this work is that an amending directive is before the European Parliament for inclusion of 20 standards in annex 5 of the WFD.

## Ian Wallace

### ***Taxonomy and Distribution of Trichoptera***

This year has seen consolidation of work begun in previous years.

#### *Caddis database work*

The UK National Caddis database is now live on the National Biodiversity Network 'Gateway' web site, <https://data.nbn.org.uk/Datasets/GA000158>. The *Distribution Atlas of European Trichoptera* which incorporates caddis scheme data is also live <http://atlas.freshwaterbiodiversity.eu/>. The database continues to accumulate records and now stands at 258,000 entries; it is intended to place a revised, to end of 2013 database, on the 'Gateway' once records from that year have stopped being submitted. Many records are arriving directly at the 'Gateway' via iRECORD, and I verify them before they are accepted; I also verify data for Trichoptera held by the local record centres based in Cheshire, Merseyside, North Wales and Cumbria. I also identify a large number of, mainly adult, caddis from recorders.

The first of the Trichoptera county check-lists based around the database has now been published (Wallace, 2012). This forms a model, and check-lists for North East England, Cumbria, Derbyshire, Nottinghamshire, Isle of Man, and the area of operation of the Lancashire & Cheshire Entomological Society, have all be commissioned and are in varying stages of completion.

I am also working with Dr Jim O'Connor, Emeritus Entomologist of the National Museum of Ireland, to publish an *Atlas of British and Irish Caddis* in the next year or so. This will provide a snapshot in time for future reference.

#### *Caddis taxonomic work*

This continues to focus on the UK 'Caseless' caddis larvae. Periods of intensive collecting, assisted by family members, managed to produce first and second instar larvae of at least one member of most genera of 'caseless' caddis. Wallace et al. (2003) used a setal character to recognise and dump any caddis larva at first instar, but it is hoped that other characters can be found to enable identification of caseless caddis larvae to family or genus. Generic separation certainly seems possible at instar 2 but species separation is not possible for most at that instar. Obtaining these small larvae by rearing from the egg was successful for some. For others it was by looking at rock and moss 'scrubbings' passed through a coarse net to exclude large debris then through a zooplankton net. The family Polycentropodidae remains the biggest challenge as gravid females would rather die than lay in a variety of set-ups offered. Crevice layers such as many *Tinodes* and *Lype* also proved troublesome. Instar 2 was the most difficult instar to collect for *Diplectronea felix*. This suggested that there is a constant recruitment to instar 1 by hatching but that they pass quickly to instar 3 where the larvae begin building up resources.

Concurrently I am also building collections of larvae in critical genera, such as *Rhyacophila* and *Tinodes*.

Work on the revised key has started, with a critical analysis of the effectiveness of the characters used in the current FBA Caseless Caddis Larva Key, to separate larvae of *Lype phaeopa* and *Lype reducta*. The characters separate two 'taxa'; one is *Lype phaeopa* the other is *Lype phaeopa / reducta* confirming a long-held suspicion that *Lype reducta* is significantly over-recorded, and the former consequently under-recorded.

I continue to work with FBA staff to develop the training modules for EA staff.

#### *Meetings attended and courses delivered*

I participated in the AGM. I also attended two board meetings of the Riverfly Partnership where my focus was on developing the scope of monitoring. In November I gave a talk about the FBA at the annual meeting of the Cumbria Biological Records Centre. I assisted FBA at a meeting between staff and those of the Natural History Museum, which took place at Windermere. I delivered one of the FBA Courses, on Trichoptera, at Windermere in June.

*The coming year*

In addition to advancing the caseless caddis keys, I hope to collaborate with Dr Ben Price of the Natural History Museum (NHM) and Stuart Crofts of the Adult Caddis Occurrence Scheme in DNA bar-coding some of the UK caddis. The NHM also has a whole insect drawer photography set-up that will be used to see if some of the wing-pattern characters used to identify adult caddis, can be refined.

*References (other than in list of Publications below):*

Wallace, I.D., Wallace, B. & the late Philipson, G.N. (2003). *Keys to the Case-bearing Caddis Larvae of Britain and Ireland*. FBA Scientific Publication **61**, Freshwater Biological Association. 259 pp.

## Publications by FBA Staff and Honorary Research Fellows

- Armitage, P.D** & Bass, J.A.B. (2013). Long-term resilience and short-term vulnerability of South Winterbourne macroinvertebrates. *Proceedings of the Dorset Natural History and Archaeological Society* **134**, 43-55.
- Elliott, J.M.** & Allonby, J.D. (2013). An experimental study of ontogenetic and seasonal changes in the temperature preferences of unfed and fed brown trout, *Salmo trutta*. *Freshwater Biology* **58**, 1840-1848.
- Jenkins, G.B., Woodward, G. & **Hildrew, A.G.** (2013). Long-term amelioration of acidity accelerates decomposition in headwater streams. *Global Change Biology* **19**, 1100-1106.
- Kutschera, U. & **Elliott, J.M.** (2013). Do mudskippers and lungfishes elucidate the early evolution of four-limbed vertebrates? *Evolution: Education and Outreach* **6(8)**, 1-8.
- Ladle, M.** (2013–2014). Monthly features for *Sea Angler* magazine published by Bauer Media.
- Ladle, M.** & Pitts, S. (2013). *Operation Sea Angler – The Second Wave*. Bloomsbury Press. 203 pp.
- Lauridsen, R.B., Edwards, F.K., Cross, W.F., Woodward, G., **Hildrew, A.G.** & Jones, J. I. (2014). Consequences of inferring diet from feeding guilds when estimating and interpreting consumer-resource stoichiometry. *Freshwater Biology* **59**, 1497-1508.
- Ledger, M.E., Harris, R.M.L., **Armitage, P.D.** & Milner, A.M. (2012). Climate change impacts on community resilience: evidence from a drought disturbance experiment. *Advances in Ecological Research* **46**, 211-258. [Omitted from list published in *FBA Annual Report 2013*]
- Murphy, J.F., Winterbottom, J.H., Orton, S., Simpson, G.L., Shilland, E. M. & **Hildrew, A.G.** (2014). Evidence of recovery from acidification in the macroinvertebrate assemblages of UK fresh waters: a 20-year time series. *Ecological Indicators* **37**, 330-340.
- Pentecost, A.** (2013). Seasonal changes in the abundance of freshwater algae in a small humic pool in Southern England. *Phycologist* **85**, 43-36.
- Pentecost, A.** & Williamson, D.B. (2013). Rediscovery of *Cosmarium dovreense* Nordst. in the British Isles. *Queckett Journal of Microscopy* **42**, 19-24.
- Pentecost, A.**, Coletta, P. & **Haworth, E.Y.** (2013). Recent changes in the Holocene diatom flora of a karstic lake: Malham Tarn, North Yorkshire, UK. *Cave & Karst Science* **40**, 56-61.
- Pentecost, A.**, Whitton, B.A. & Carter, C. (2013). Ecology and morphology of the freshwater red alga *Chroothoece* in the British Isles. *Algological Studies* **143**, 51-63.
- Pretty, J., Murphy, J.F., Jones, J.I., Tapia, G. & **Armitage, P.D.** (2014). Macroinvertebrate surveys of the Bovington Stream and River Frome. Report commissioned by Debut Services (South West) Ltd on behalf of the Ministry of Defence.
- Reynolds, C.** [S.] (2013). Scientist extraordinaire; respected teacher; inspirational colleague. John Walter Guerrier Lund, CBE, FRS. *FBA News* **59**, 17-18.
- Reynolds, C.S.** & Padisák, J. (2013). Plankton, status and role of. In: *Encyclopedia of Biodiversity* (ed. S.A. Levin), Vol. **6**, second edition, pp. 24-38. Academic Press, Waltham MA.

- Stockdale, A., Tipping, E., Fjellheim, A., Garmo, Ø. A., **Hildrew, A.G.**, Lofts, S., Monteith, D.T., Ormerod, S.J. & Shilland, E.M. (2014). Recovery of macroinvertebrate species richness in acidified upland waters assessed with a field toxicity model. *Ecological Indicators* **37**, 341-350.
- Verberk, W.C.E.P., van Noordwijk, C.G.E & **Hildrew, A.G.** (2013). Delivering on a promise: integrating species traits to transform descriptive community ecology into a predictive science. *Freshwater Science* **32**, 531-547.
- Wallace, I.** [D.] (2012). Checklist of Bedfordshire (VC 30) caddis. *Bedfordshire Naturalist* **67**(1), 86-89. [Omitted from previous FBA Annual Reports]
- Welton, J.S. & **Ladle, M.** (2013). An experimental treatment of *Simulium posticatum* with *Bti* at selected sites on the River Stour, Dorset. Report to North Dorset District Council (unpublished). 10pp.
- Whitton, B.A. & **Pentecost, A.** (2013). Freshwater *Rivularia* in the British Isles. *Phycologist* **85**, 32-33.

**THE FRESHWATER BIOLOGICAL ASSOCIATION  
(A COMPANY LIMITED BY GUARANTEE)  
TRUSTEES' REPORT FOR THE YEAR ENDED 31ST MARCH 2014**

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 2014.

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 2013 to 31st March 2014 are listed on page 33 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 is periodically undertaken and this is 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. A review of Trustees' skills is periodically undertaken and this is used to inform the nomination process for prospective Trustees.

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 (more frequently when necessary) 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 2014  
(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 are:

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

**Review of Activities**

The operating deficit before net gain on investments fell for the second successive year, dropping from £188,616 in 2013 to £160,659 in 2014. During the year the Association withdrew £160,000 from the Investec holdings in order to cover its financial commitments.

The total incoming resource for the organisation was slightly reduced at £884,827 compared with £906,374 in the previous year, but was more than offset by a reduction in expenditure.

Incoming resource from generated funds showed a slight reduction in total at £301,986 compared to a prior year total of £305,406, with rental income increasing but donations and investment income decreasing.

Total incoming resource from charitable activities was also slightly reduced year on year, as was the associated expenditure.

Income from training courses and meetings made a significant contribution at £64,468 for the year. Although less than in 2013, this remained much higher than in the preceding years, largely due to the introduction of bespoke training provision. Expenditure increased slightly, in part due to the apportionment of overhead costs, but was within the normal year-to-year variation expected. No conferences were held during the year.

Science and Research continues to generate a significant proportion of incoming resource for the organisation, although it was less than in 2013. The largest single source of income was £66,000 for the continuation of the Freshwater Pearl Mussel Ark Project, with further income generated by projects on biotic assessment of rivers, control of Blandford Fly, fish examinations, and the impact of abstraction. Science and Research represents the largest area of expenditure for the organisation.

In the Data and Information Services department (including the Library), the Defra-funded Demonstration Test Catchment Archive project continued for a further year, along with further income from the Environment Agency to continue with cataloguing grey literature and create an archive, and a new oral history project ("Clear Waters") funded by the Heritage Lottery Fund. Although year-on-year income was lower, this was balanced by a reduction in expenditure.

Income from book sales (Scientific & Special Publications) reduced slightly from £28,078 to £25,624, although was still markedly higher than the years preceding this. The reduction was offset by a significant decrease in expenditure of over £31,000, with no new titles published during the year and a concomitant reduction in staffing resource. Scientific Publication No. 68 the *Guide to Freshwater Invertebrates* continued to sell well, generating income of £10,718. Journal income increased over the year, partially due to an adjustment in the accounting treatment of *Inland Waters*, the journal produced on behalf of the International Society of Limnology, and the growth of this journal. Although there was an increase in associated expenditure on journals, this was more than balanced by the increase in income.

There was a small reduction in Membership numbers during the year and Membership income decreased slightly from £27,882 to £26,942. This was more than offset, however, by a reduction in expenditure of over £14,000.

Rental income at East Stoke increased to £203,783, but with reduced expenditure producing a net surplus of over £40,000 for this activity during the year. Training and Scientific income was also generated from the site, and is accounted for in the relevant activities.

**THE FRESHWATER BIOLOGICAL ASSOCIATION**  
**TRUSTEES' REPORT FOR THE YEAR ENDED 31ST MARCH 2014**  
**(Continued)**

At Windermere, rental income was largely unchanged, but expenditure reduced, resulting in a net surplus. Net income from rental activity at both sites showed a healthy return on resource expended during the year.

There was a slight increase in expenditure on governance, attributable to the greater frequency of Council meetings, and the engagement of two consultants in developing the organisation's new strategy and business plan. This was offset to some extent by the lack of a full-time permanent Director for the majority of the year.

The award of grants costing £10,506 is considered by the Trustees to be a major contribution towards the FBA's compliance with the Public Benefit Test as laid out in The Charities Act 2011. The various public activities including educational outreach, speaking at conferences and running subsidised training courses, also add to this compliance, as does support for students on placements at FBA sites.

#### **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 (39% by value at 31st March 2014) is managed by Investec and is considered by the Trustees to be satisfactorily managed. The Investment Policy was reviewed by the Trustees in March 2009 and no changes were made.

#### **Plans for Future Periods**

The strategic review of the Association, started in the previous year to address the continuing operational deficits, was a major activity during the year. An external report was commissioned and a freelance business development manager subsequently engaged to work with Council and staff to build a sustainable business model for the future. The new business model and plan resulting from this process will be presented to Council at its meeting in October 2014. During the year, both the Director and the Chairman of the Association stepped down from their positions, and were replaced by an Acting Director (from May 2013) and an Acting Chairman (from March 2014). An election for Chairman will take place at the Annual General Meeting in October 2014; at the close of the financial year, a decision on the appointment of a permanent Director had yet to be taken.

#### **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 2014  
(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 (to November 2013)  
Prof. Sir John R. Beddington CMG (from November 2013)

Chairman of Council

Prof. C.J. Spray MBE (to March 2014)  
Dr S. Brierley\* (co-opted from March 2014)

Honorary Treasurer

Mr P.M. Andrewes

Representative Members

The Fishmongers' Company	Mr A. Wallace
Royal Society	Prof. R. Battarbee FRS

Elected Members

Mr G.R. Bateman OBE (from November 2013)	Dr I.G. Dunn
Ms F. Bowles	Prof. S.J. Hawkins (from November 2013)
Dr S. Brierley (to November 2013)	Mr C. Mainstone (to November 2013)
Dr L. Brown	Prof. L. Maltby (to November 2013)
Dr A. Crowden	Dr P. Shaw
Dr E. Dollar	

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 7th July 2014  
By Order of the Council

Dr S. Brierley  
Acting Chairman of Council

\* Acting Chairman of Council

**THE FRESHWATER BIOLOGICAL ASSOCIATION**  
**STATEMENT OF FINANCIAL ACTIVITIES**  
**(INCLUDING INCOME AND EXPENDITURE ACCOUNT)**  
**FOR THE YEAR ENDED 31ST MARCH 2014**

<b>Incoming Resources</b>		Unrestricted Funds		Total	Total
<b>Incoming resources from generated funds</b>	Note	<u>General</u>	<u>Other</u>	<u>2014</u>	<u>2013</u>
		£	£	£	£
<u>Voluntary income:</u>					
Awards and donations	4	1,288	-	1,288	17,005
Activities for generating funds	5	238,196	-	238,196	218,544
Investment income & bank interest	6	60,046	2,456	62,502	69,857
		-----	-----	-----	-----
		299,530	2,456	301,986	305,406
<b>Incoming resources from charitable activities:</b>					
	7				
Membership services		26,942	-	26,942	27,882
Scientific publications and journals		87,166	-	87,166	75,368
Scientific research & activity		168,392	-	168,392	224,790
FBA Library/Data & Information Services		235,873	-	235,873	179,542
Training courses & meetings		64,468	-	64,468	93,386
		-----	-----	-----	-----
		582,841	-	582,841	600,968
		-----	-----	-----	-----
<b>Total incoming resources</b>		<b>882,371</b>	<b>2,456</b>	<b>884,827</b>	<b>906,374</b>
		-----	-----	-----	-----
<b>Resources expended</b>					
Cost of generating funds	8	179,040	-	179,040	219,914
<u>Costs of charitable activities:</u>					
	9				
Membership services		31,248	-	31,248	46,096
Scientific publications and journals		85,189	-	85,189	106,378
Scientific research & activity		306,253	10,994	317,247	353,226
FBA library/Data & Information Services		275,313	77	275,390	223,422
Training courses and meetings		89,157	-	89,157	82,470
		-----	-----	-----	-----
Governance costs	10	68,215	-	68,215	63,484
		-----	-----	-----	-----
<b>Total resources expended</b>		<b>1,034,415</b>	<b>11,071</b>	<b>1,045,486</b>	<b>1,094,990</b>
		-----	-----	-----	-----
Net (expenditure) for the year before transfers and other recognised gains/(losses)		(152,044)	(8,615)	(160,659)	(188,616)
Transfer between funds	17	(11,000)	11,000	-	-
Net gain/(loss) on investments	13b	200,979	66,116	267,095	367,992
		-----	-----	-----	-----
<b>Net movement of funds in year</b>		<b>37,935</b>	<b>68,501</b>	<b>106,436</b>	<b>179,376</b>
<b>Reconciliation of funds</b>					
Total funds brought forward 2013		2,535,726	2,523,277	5,059,003	4,879,627
		-----	-----	-----	-----
Total funds carried forward 2014		2,573,661	2,591,778	5,165,439	5,059,003
		=====	=====	=====	=====

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

The total net gain on investments of £267,095 (2013: total net gain of £367,992) includes realised losses of £42,955 (2013: realised losses of £3,319) attributable wholly to the General Fund Account.

**THE FRESHWATER BIOLOGICAL ASSOCIATION**  
**BALANCE SHEET AS AT 31ST MARCH 2014**  
**COMPANY NUMBER 263162**

	Note	2014		2013
		£	£	£
<b>Fixed Assets</b>				
Tangible	13a		1,893,985	1,917,283
Investments	13b		3,215,407	3,108,312
			-----	-----
			5,109,392	5,025,595
<b>Current Assets</b>				
Debtors and Prepayments	14	177,295		109,544
Cash at Bank and in Hand		71,381		101,446
			-----	-----
		248,676		210,990
<b>Less Current Liabilities</b>				
Creditors (due within 1 year)	15	(192,629)		(177,582)
			-----	-----
<b>Net Current Assets</b>			56,047	33,408
			-----	-----
<b>Total Assets Less Current Liabilities</b>			£ 5,165,439	£ 5,059,003
			=====	=====
<b>Representing Members' Funds</b>				
<b>Unrestricted</b>				
General Fund	16		2,309,866	2,265,137
Designated Funds	17		2,591,778	2,523,277
Revaluation Reserve	18		263,795	270,589
			-----	-----
			£ 5,165,439	£ 5,059,003
			=====	=====

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

Dr S. Brierley, Acting Chairman 7th July 2014

**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 based on the relative proportion of space occupied and staffing 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 and Other 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>2014</u>	<u>2013</u>
	£	£
Depreciation	39,376	39,362
Auditors' remuneration	2,900	2,800
	=====	=====

	Unrestricted Funds		<u>2014</u>	<u>2013</u>
Incoming Resources	General	Other	£	£
	£	£		
<b>4. Awards and Donations</b>				
Membership donations	10	-	10	8,591
Legacies and other donations	528	-	528	7,664
Gift Aid	750	-	750	750
	-----	-----	-----	-----
	1,288	-	1,288	17,005
	-----	-----	-----	-----
<b>5. Activities for generating funds</b>				
Land and building income:				
Windermere	11,350	-	11,350	11,185
East Stoke	203,783	-	203,783	180,138
Windermere ferry contract	20,083	-	20,083	20,418
Miscellaneous income	2,980	-	2,980	6,803
	-----	-----	-----	-----
	238,196	-	238,196	218,544
	-----	-----	-----	-----
<b>6. Investment income</b>				
Bank deposit interest	204	-	204	58
Investment Income	59,842	2,456	62,298	69,799
	-----	-----	-----	-----
	60,046	2,456	62,502	69,857
	-----	-----	-----	-----
<b>7. Charitable activities</b>				
Membership services	26,942	-	26,942	27,882
Scientific and special publications	25,624	-	25,624	28,078
Journals	61,542	-	61,542	47,290
Research contracts	102,392	-	102,392	71,011
Scientific research & activity, direct funding and grants	66,000	-	66,000	153,779
Data & Information Services	208,610	-	208,610	118,810
FBA Library	27,263	-	27,263	60,732
Training courses and meetings	64,468	-	64,468	93,386
	-----	-----	-----	-----
	582,841	-	582,841	600,968
	-----	-----	-----	-----

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

<u>Resources Expended</u>	Unrestricted Funds		<u>2014</u> £	<u>2013</u> £
	<u>General</u> £	<u>Other</u> £		
<b>8. Cost of generating funds</b>				
Land and buildings:				
Windermere	5,197	-	5,197	13,457
East Stoke	162,313	-	162,313	189,372
Windermere ferry contract	11,530	-	11,530	17,085
	-----	-----	-----	-----
	179,040	-	179,040	219,914
	-----	-----	-----	-----
<b>9. Cost of charitable activities</b>				
Membership services	31,248	-	31,248	46,096
Scientific and special publications	48,412	-	48,412	79,677
Journals	36,777	-	36,777	26,701
Research Contracts	257,581	-	257,581	55,666
Scientific research activity, direct funding and grants	48,672	10,994	59,666	297,560
Data & Information Services	165,911	77	165,988	129,548
The FBA library	109,402	-	109,402	93,874
Training courses and meetings	89,157	-	89,157	82,470
	-----	-----	-----	-----
	787,160	11,071	798,231	811,592
	-----	-----	-----	-----
<b>10. Governance Costs</b>				
Council meetings and reimbursements to Trustees	14,204	-	14,204	6,145
Other costs – direct and indirect:				
Audit fees	2,900	-	2,900	2,800
Other professional fees	16,489	-	16,489	6,452
Staff costs	29,232	-	29,232	38,336
Irrecoverable VAT	5,390	-	5,390	9,751
	-----	-----	-----	-----
	68,215	-	68,215	63,484
	-----	-----	-----	-----

**11. Staff**

Average number of employees was 23 (18 FTE) paid employees (2013: 23 (18 FTE)) during the year to 31st March 2014.

Total Staff Costs in the year were:	<u>2014</u> £	<u>2013</u> £
Salaries	496,260	502,517
Employer's National Insurance Contributions	22,930	37,093
Employer's Pension contributions	51,732	55,501
	-----	-----
Total	570,922	595,111
	=====	=====

There were no employees in the remuneration band £60,000 to £69,999, or above (2013: none).

**12. Trustee Remuneration**

No members of Council received any remuneration during the year. One member of Council received an honorarium of £800 for services as FBA Books Editor, unrelated to his/her position as Trustee. Travel costs and Council expenses amounting to £14,204 (2013: £6,145) were paid for or reimbursed to 11 (2013: 11) members of Council.

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

**13. Fixed Assets**

(a) Tangible

	<u>Freehold Land &amp; Buildings</u>	<u>Computer and other Equipment</u>	<u>Scientific Equipment</u>	<u>Total</u>
	£	£	£	£
Cost or Valuation				
At 1st April 2013	1,955,000	121,830	26,034	2,102,864
Additions	-	16,078	-	16,078
Disposals	-	-	-	-
	-----	-----	-----	-----
At 31st March 2014	1,955,000	137,908	26,034	2,118,942
	-----	-----	-----	-----
Accumulated Depreciation				
As at 1st April 2013	68,412	101,547	15,622	185,581
Charge for the year	22,804	13,968	2,604	39,376
	-----	-----	-----	-----
At 31st March 2013	91,216	115,515	18,226	224,957
	-----	-----	-----	-----
Net book value				
At 31st March 2014	1,863,784	22,393	7,808	1,893,985
	=====	=====	=====	=====
At 31st March 2013	1,886,588	20,283	10,412	1,917,283
	=====	=====	=====	=====

The historical cost of Freehold Land & Buildings is £1,334,148 (2013: £1,334,148).

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

(b) Investments

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

	£	<u>Quoted Investments</u>
		£
Market Value at 1st April 2013		3,108,312
Additions/(Disposals)		(148,503)
Investment Management fees		(11,497)
Net Investment Gains:		
Attributed to General Fund Account (Note 16)	200,979	
Gain on revaluation attributed to the Frost Bequest (Note 17)	66,116	
	-----	
		267,095
		-----
Market Value at 31st March 2014		3,215,407
		=====

During the year, £160,000 of capital has been transferred from the account held at Investec (2013: £173,000) to assist with working capital requirements.

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

**13. Fixed Assets (Cont)**

	<u>Quoted Investments</u> £
Acquisition Values	2,120,408
Represented by:	
Investments held on UK Stock Exchange	3,113,237
Cash held as part of Portfolio	102,170
	-----
	3,215,407
	=====

The principal investments at 31st March 2014 were:

	<u>Market Value</u> £	<u>% of Total</u> %
<u>M &amp; G Charifund</u>		
19,366 Income Units	281,299	8.7
6,026 Accumulation Units	1,109,534	34.5
<u>J P Morgan Asset Management Ltd</u>		
193,848 Bond Units – A & B Funds	249,227	7.8
112,407 UK Equity Fund Units	317,267	9.9
	-----	----
	1,957,327	60.9
	=====	====

The accumulated units received during the year that were reinvested for capital growth had a cash value equivalent of £61,034 (2013: £55,879).

**14. Debtors**

	<u>2014</u> £	<u>2013</u> £
Trade Debtors	54,186	38,377
Other Debtors	84,870	54,542
Prepayments	38,239	16,625
	-----	-----
	177,295	109,544
	=====	=====

**15. Creditors**

PAYE, NIC and pension	12,871	15,940
Trade Creditors	33,734	27,901
Other Creditors and Accruals	58,871	29,309
Deferred income	57,361	69,979
VAT creditor	29,792	34,453
	-----	-----
	192,629	177,582
	=====	=====

**16. General Fund Account**

	<u>2014</u> £	<u>2013</u> £
<u>General Fund Account</u>		
Balance brought forward	2,265,137	2,117,075
Net movement in funds before transfers and other recognised gains	(160,659)	(188,616)
	-----	-----
	2,104,478	1,928,459
Transfer net movement to Other Funds (Notes 4 to 10)	8,615	17,736
Unrealised gain arising from revaluation of Investments (Note 13b)	200,979	312,148
Transfer from Revaluation Reserve (Note 18)	6,794	6,794
Transfer between Funds (Note 17)	(11,000)	-
	-----	-----
	2,309,866	2,265,137
	=====	=====

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

**17. Other Funds**

	<u>31.3.2013</u>	<u>Income</u>	<u>Expenditure</u>	<u>Transfers</u>	<u>31.3.2014</u>
	£	£	£	£	£
<u>Unrestricted Designated</u>					
Fritsch Fund	100	-	(77)	-	23
Frost Bequest	519,237	66,116*	-	(588)	584,765
Frost Exhibition	-	2,456	(3,044)	588	-
Gilson Le Cren Fund	3,940	-	(7,950)	11,000	6,990
Freshwater Science Fund	2,000,000	-	-	-	2,000,000
	-----	-----	-----	-----	-----
<u>Total</u>	<u>2,523,277</u>	<u>68,572</u>	<u>(11,071)</u>	<u>11,000</u>	<u>2,591,778</u>
	=====	=====	=====	=====	=====

\*Gain on revaluation of investments (note 13b)

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

	<u>31.3.2014</u>	<u>31.3.2013</u>
	£	£
Tangible Fixed and Current Assets	76,280	73,895
Quoted Investments	2,515,498	2,449,382
	-----	-----
	<u>2,591,778</u>	<u>2,523,277</u>
	=====	=====

Unrestricted Designated Funds represents sums bequeathed, donated, or established by Council to the Association for the furtherance of its charitable activities by means of specific sponsorship, but expendable at the discretion of the Trustees. Briefly:

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

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

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

Gilson Le Cren Memorial Fund – Formerly Hugh Cary Gilson Fund, renamed in 2013 following the bequest of £11,000 in 2012 from the estate of former FBA Director, David Le Cren. The fund provides a yearly award to support the freshwater research activities of members, irrespective of their organisation or status.

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

**18. Revaluation Reserve**

	£
Balance brought forward at 01.04.2013	270,589
Transfer to general fund – difference on historical cost depreciation charge and actual depreciation charge on the revalued amount	(6,794)
	-----
Balance carried forward at 31.03.2014	<u>263,795</u>
	=====

**19. Capital Commitments and Contingent Liabilities**

There were no capital commitments or contingent liabilities at 31st March 2014.

**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. Because of the mutual nature of the scheme, the scheme's assets are not hypothecated to individual institutions and a scheme wide contribution is set. The Association is therefore exposed to actuarial risks associated with other institutions' employees and is unable to identify its share of the underlying assets and liabilities of the scheme on a consistent and reasonable basis as required by FRS 17 and it therefore accounts for the scheme as if it were a defined contribution scheme. The amount charged to the income and expenditure account represents the contributions payable to the scheme in respect of the accounting period.

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

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

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

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

The total pension cost for the Association for the year to 31st March 2014 was £51,731 (2013:£55,501) which was 16% of pensionable salaries for the USS Pension and 9% of pensionable salaries for the Scottish Widows Pension.

Outstanding Pension contributions as at 31 March 2014 were £5,008 (2013: £6,827).

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

We have audited the financial statements of The Freshwater Biological Association for the year ended 31st March 2014 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 30, 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 and to identify any information that is apparently materially incorrect based on, or materially inconsistent with, the knowledge acquired by us in the course of performing the audit. 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 2014 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  
7th July 2014

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