



EIGHTY-FIFTH

ANNUAL REPORT

OF THE

FRESHWATER BIOLOGICAL ASSOCIATION

and Accounts for the year ended 31st March 2017

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THE FRESHWATER BIOLOGICAL ASSOCIATION

OFFICERS AND COUNCIL

31st MARCH 2017

President

Professor Sir John R. Beddington, CMG

Vice Presidents

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Dr E. Buttle, CBE
Professor G.P. Harris
Sir Martin Holdgate, CB
Mr J. Jeffery, CBE

Professor Sir William Stewart
Dr J.F. Talling
The Duke of Wellington, OBE, DL
The Duke of Westminster,

Chair of Council

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Honorary Treasurer

Mr R. Middleton

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The Fishmongers' Company – Mr A. Wallace

The Royal Society – Professor R. Battarbee

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*Dr A. Crowden
*Dr E. Dollar

*Dr I.G. Dunn
Professor S.J. Hawkins

* Co-opted Members

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Professor Sir John R. Beddington
Mr G. Bateman (Chair)
Mr R. Middleton

*Ms. F. Bowles
Dr S. Brierley
*Professor C.S. Reynolds

**Mr B. Coupe (Head of Business)

**Mrs G. Stables (Finance Manager)

* Co-opted Members

** Attendees

HONORARY MEMBERS OF THE ASSOCIATION

Dr J.S. Alabaster
P.V. Allen
Dr R.B. Angus
Dr R.G. Bailey
Dr I.A.E. Bayly
J.A. Black
B. Blofield
Prof. R.O. Brinkhurst
V.M. Brown
K.E. Burnand
T. Carrick
Dr J.C. Chubb
Dr D.W. Claridge
Dr D. Cragg-Hine
D.J. Cross
Dr K.W. Cummins
N.P. Cummins
Dr D.H. Dalby
Dr H. Disney
Prof. J.D. Dodge
Dr J.M. Edington
J.H. Elliott

Prof. J.M. Elliott
F.N. Farnham
R.S. Fort
Prof. J.J. George
S. Gibb
Dr D.S. Gibbons
Dr H.L. Golterman
Regents Prof. Emeritus E. Gorham
T.V. Gudjonsson
E.V. Hart
Dr J.M. Hellawell
J. Henderson
J. Hobart
P.H. Holway
Dr J.V. Howarth
Dr A.J. Juniper
Prof. H. Kawanabe
B.M. Kipling
Prof. C.R. Kennedy
Professor T.E.L. Langford
Dr P.H. Langton
Dr J.B. Leeming

Prof. P.S. Maitland
K.F. Mansfield
C.C. McCready
Prof. P.J. Miller
W.A. Mitchell
Prof. C. Nalewajko
Dr T.G. Northcote
L.R. Peart
Prof. G. Power
J. Roskell
Dr D. Scott
Prof. G.G.E. Scudder
O. Simmonite
Dr D. Stevenson
Dr D.W. Sutcliffe
Prof. J.D. Thomas
M. Thompson
Dr R.L. Welcomme
The Duke of Wellington
The Duke of Westminster
W.R. White
F.M. Wiseman

COMPLEMENT AT 31st MARCH 2017

Chief Executive
Personal Assistants to the Chief Executive

Dr Bill Brierley
Sarah Johnson/Julie McNicol

Business Department

Head of Business
Data and Information Manager
Senior Analysts/Programmers
Marketing Manager
Publications Officer
Membership Officer

Bill Coupe
Dr Michael Haft
Nick Bywell/Simon Fox
Emma McColm
Michelle Jordan
Rosalind Maberly

Corporate Services

Finance Manager
Finance and Corporate Services Officers
Administrative Assistants
IT Manager
Team Assistants, East Stoke
Estates Manager
Facilities Manager
Facilities Assistant

Gill Stables
Carolyn Fletcher/Sarah Rigby
Lynda Durrell/Alison Holland
Vanya Gordon
Michelle Stracey/Claire Tozer
Tim Ashberry
Matthew Freeman
Martin Shepherd

Science Department

Principal Scientific Advisor
Project Manager (Pearl Mussel)
Senior Project Officer
Project Officer (Rearing Systems)
Science Manager
Science Officer
Training and Consultancy Manager

John Davy-Bowker
Dr Ceri Gibson
Louise Lavictoire
Eloy Benito-Reyes
Dr Melanie Fletcher
Soraya Alvarez
Simon Pawley

Advisor

Dr Anne Powell

Approximately one third of the staff are employed on part-time contracts

Honorary Posts

Honorary Curator of the Fritsch Collection
Honorary Information Science Fellow

Dr Elizabeth Y. Haworth
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:

FBA Books
FBA News
Freshwater Reviews

Dr Alan Crowden
Dr Jonathan Grey
Professor Colin S. Reynolds

Registered Auditors:

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

Banker:

The Cooperative Bank
147 Church Street
Preston PR1 3UD

Foreword from the President

In my final foreword for this Annual Report 2016/17 I am reflecting on my four years as President of the Freshwater Biological Association and in particular the last very traumatic final year for staff. At the beginning of my term of office there was optimism and an energetic attempt to secure a new platform for the FBA, exploiting the considerable good will, intellectual property and freshwater expertise of staff and Honorary Research Fellows, to improve our operating income and balance the budget. However, this proved unsuccessful and the Council had to set a balanced budget for future years based on the expected income which resulted in the loss of many current staff. To those moving on to other challenges or taking early retirement I offer my grateful thanks for your contribution to the FBA. To those remaining or joining the FBA to rebuild the organisation I offer my very best wishes and fond hope that the lost ground can be recovered. Using the income from increased letting opportunities I am sure the FBA still has an important, unique and valuable contribution to make and I am proud of the achievements of the past and look forward positively to a new generation of improvement and success in freshwater science and research.

A recurring theme of my previous contributions has been the spectre of climate change and global warming that will have a profound effect on freshwaters. We are already experiencing the early signs of stress as more freshwater species become threatened with extinction. This makes the political decision by the USA to row back on the agreements made in Rio all the more disappointing. I urge UK politicians to reject the US position and secure the means of protecting the natural environment of the UK and the wider world as the manner of our exit from Europe is negotiated. This is a time of unprecedented change. The major global trends of population growth, urbanisation and increasing demand for natural resources, complicated by climate change, continue. Our leaders, guided by sound scientific research must make the right decisions for the future of the planet and the FBA has a part to play in this noble ambition.

It is within this global and national context that the FBA will need to stand guard against the excesses of freshwater environmental abuse, to offer solutions where harm has occurred and alternatives to protect freshwaters where required. Our cause is not lost and I believe the challenges faced by our freshwaters can be overcome. The signals in freshwater ecosystems must be heeded; fresh water is an important resource which must be preserved and exploited sustainably.

The FBA will be fit for the future but will need to grow to achieve its ambition and will call upon its supporters and friends to build the new organisation. We have lost a number of eminent scientists and practitioners in the freshwater field this year but their legacy is our hope for the future. Thank you for your friendship and support for the past four years and my very best wishes to members, Honorary Research Fellows and Council of the FBA.

Report from the Chair of the Council

This has been an exceptionally difficult year for the FBA. In my 40 year career I have rarely dealt with a more difficult situation and my heart goes out to all those staff who have lost their jobs, have been faced with reduced hours working or in any way have been touched by the downsizing of the organisation. This has been a necessary consequence of the failure of the 'invest to save' approach attempted just two years ago. However, the action we have taken will secure the future of the FBA and I expect the organisation to build on its strengths and regain any ground lost, supported by increased income from our estate and with the support of its staff, HRF's and many friends in academia and beyond.

I am indebted to the efforts of our Chief Executive and his management team in seeing through the changes in a sensitive and caring manner and to my fellow Council members who have given freely of their time and advice throughout the year.

The FBA Council met three times face to face and held two emergency teleconferences and meetings with staff, together with weekly sub group teleconferences in 2017. The Finance and General Purposes Committee held three meetings to establish the financial situation and closely monitor income and expenditure and the estates group has recently met to lead a review of our estates.

In spite of the difficult personal circumstances the staff of the FBA have continued to maintain services to members including *FBA News*, and *Freshwater Matters*, completion of the annex conversion to holiday lets and delivered the pearl mussel project to time and quality with some significant successes in the breeding programme. In addition the Science Strategy was reviewed then put on hold as the financial situation became clear. I am hopeful that science will continue to underpin all of our work delivering services to members through our publications and training. The Charity Commission approved our new Articles of Association allowing a more flexible and modern approach to charity governance. The changes will enable the FBA to appoint new Directors to the Board, continue the close working across Board and executive and secure the skills needed to rebuild for the future.

I commend this Annual report to you and thank those who have contributed to its content throughout the whole year. It is my ambition for my final year as Chair of the Board that we build closer involvement of HRF's and the many other supporters in order to grow the voluntary input to the intellectual capability of the FBA and concentrate on services to members, high quality publications and we will review and develop our training programmes in freshwater science. The work of the FBA is far too important to the UK and wider freshwater environment not to be the leading advocate and I expect this year to demonstrate our value.

Report of Activities from the Chief Executive

I reported on the significant changes to the Freshwater Biological Association in last year's Annual Report and this year has seen further changes. Having put into place the building blocks for the future in the previous year, the organisation settled into the new structure and roles and we had several positive and significant events during the year.

In May we had a full house for our "Catchments, Connectivity and avoiding Catastrophes" Annual Scientific Meeting (ASM) and on the following day we opened the doors to the public and 130 visitors took part in a range of demonstrations, talks, workshops and tours. Many thanks to all the staff, HRFs and volunteers for all the hard work in organizing and running both events.

Also in May, and after many years of planning, the building contractors arrived on site to start the redevelopment of the Windermere Annexe into holiday lets. The development work will take nearly 12 months and holiday guests will be arriving early in the 2017 season.

Our online membership system went live and immediately we saw the benefits with an increase in the number of members, the details of which are reported below. Further improvements to our membership system, website and online shop are in the planning stages and will be introduced in 2017.

In September 2016 we hosted, on behalf of International Union for Conservation of Nature (IUCN), the launch of their report *River Restoration and Biodiversity* at Windermere. Stuart Brooks, Chair of IUCN UK, and Susan Davies, Chair of Scottish Wildlife Trust, were the keynote speakers. The event was very well attended and visitors toured FBA facilities including the library and the Pearl Mussel Ark.

We developed and introduced many new financial and management systems throughout the year to enable the timely and accurate reporting and tracking of budgets across all activities. Council asked the Executive to report regularly on financial performance against targets and monitor the "invest to save" approach adopted. This was accomplished and financial performance summaries were submitted to Council on a quarterly basis.

After several years of hard work by Geoff Bateman working with a charities legal expert, trustees, staff and myself the new Articles of Association were adopted by members at the AGM in October 2016 and these were then approved by the Charity Commission. Following the approval of the new Articles, Council are now called *The Board* and Trustees are now called *Directors*.

As an eventful and exciting 2016 started drawing to a close it became apparent that many of the income opportunities we had projected in our budget were not going to be realised and our end of year deficit was going to exceed the projected budget figure approved by the Board earlier in the year. An emergency briefing with the Chair was followed quickly by a meeting of the Finance and General Purposes Committee in early December. Emergency meetings of the Board in January and February reviewed comprehensive financial information, projections and options for a future business model. A decision was made to act immediately to reduce the FBA's costs which included significant reductions in staffing costs, the development of a new sustainable business model and plan and a thorough review of our estates and assets. Staff and HRFs were notified as early as possible of changes and were consulted with throughout this period.

From early December 2016 through to March 2017 (and beyond) the executive has worked tirelessly and very closely with our Chair, Honorary Treasurer and Directors to develop a new business plan and the case for change. This period (and the period from March through

to the summer of 2017) has been the most difficult period of my working career and one I would never wish to repeat.

Both the Board and I believe that the changes proposed will be the start of a new chapter of the FBA where we re-focus our activities and effort in delivering our charitable aims.

Before reviewing in more detail the activities of the year, I would like to express my sincere thanks to the Directors, Trustees and Honorary Research Fellows for their advice and support through this difficult period and to all of the staff at the FBA for their professional behaviour and actions throughout. I must thank Julie McNicol and Sarah Johnson, my Personal Assistants, for their counsel, utmost professionalism and dedication to the FBA during such a stressful time. Finally I would like to thank, in particular, Geoff Bateman, Chair, Ron Middleton, FBA Honorary Treasurer and Gill Stables, Finance Manager for listening, providing sound advice and being supportive and available for frank and honest discussions day or night throughout this period.

Membership

The total number of members as at 31 March 2017 stood at 1195 (up 4.3% overall on the same period last year). In particular there has been a very significant increase of over 90% for the Student membership, and increases in the other desired categories of Individual and Corporate. A breakdown according to category is as follows:

Membership Category	March 2016	March 2017
Life	550	536
Individual	472	497
Student	41	79
Corporate	6	8
Honorary	75	73
Founder	2	2
Totals	1146	1195

Widening an active FBA membership is a core strategic objective for the Association and growing the FBA's membership beyond its valued existing supporters is a priority action.

We continue to see an increase in new members joining and existing members renewing since we introduced our online membership service, and our numbers have increased in each of our current categories (Individual, Student and Corporate). We are continuing to look into ways we can improve our membership benefits which includes a 'Members only' area, and we have also started a new benefit for students which is a fortnightly email listing upcoming opportunities (such as jobs, PhDs, courses and volunteer posts). We are pleased to say that this new benefit is proving popular amongst our student community.

Social Media

The FBA decided to increase its activity in this area to appeal to current and new audiences and take advantage of the ability to raise its profile as an organisation.

As at 31 March 2017:

Twitter Followers = 2073 an increase of 249

Facebook Likes = 1403 an increase of 345

Using social media to promote our activities, membership, courses, and opportunities with Riverfly Partnership volunteers, freshwater groups meetings etc. has resulted in enquiries, bookings and new members. We will continue to maximise our online presence to present to our membership and the wider freshwater community to advertise courses and publications. Our social engagement includes relevant posts from a network of partners, stakeholders and

enthusiasts as well as providing regular and interesting content. Stories and images that show the work we do help to raise our profile.

Data Services

The Environment Agency (EA) Chrysophytes collection is now open to the public. These images and taxonomic information were already in the digital archive but had been private and accessible only to EA staff. The Agency have now allowed us to make them open to all. We have linked them to our taxonomic listings within the archive so when other content is added for Chrysophytes in the EA collection it will appear alongside them.

Forty three Nitrous Oxide Greenhouse Gas datasets have been published. Defra have funded ADAS to add historic datasets to the FBA's digital archive that were outputs of previous research undertaken by ADAS. The data publication project has been ongoing for several months and is now complete.

Thirty four Eden and 22 Avon Demonstration Test Catchment (DTC) Datasets have also been published. The Eden's DTC consortium has now published all of its phase one data via the Archive, as has the Avon consortium.

Five hundred Grey Literature reports have been published. These reports have been moved to the Archive from a previous EA project's database and are now accessible to anyone.

We have updated the FBA's Image Archive to include more images than were only available in the previous system; the metadata requires further work, but they will make a positive addition to the FBA's public digital collection.

Library and Collections

FBA Annual Scientific Meeting and Open Day 11-12 May 2016

Library staff took part in the Open Day activities in May 2016, by organising tours of the Collections and Library. Books that had been donated to the Library, but were duplicates, were sold during the Open Day. Many of the donated books were inscribed by either their owner or the authors. These copies, of interesting provenance, were retained and replaced the Library's duplicate copies. Again, these were sold at the Annual Scientific Meeting and the Open Day, raising £455.

Preservation

Effort has been made to improve the environmental condition of the Collections, in particular in the basement storage room. In April 2016, following the installation of the biomass boiler, the Relative Humidity (RH) was 72%. It is now stabilised at a much more acceptable RH of 40% and it is regularly monitored and controlled.

Two grant applications for the Collections were submitted in November 2016: Arts Council's Preservation of Industrial and Scientific Material Fund (PRISM) and Bill Pettit Memorial Fund. The Bill Pettit Memorial Fund was not successful. The PRISM fund awarded the FBA £3,500 to preserve the invertebrate collection. This will provide a new entomology cabinet and drawers for the Collection and each jar of wet insects can be emptied and refilled with 75% IMS. Dr Ian Wallace, FBA Honorary Research Fellow, is overseeing the project.

Journal Deduplication

To make space for incoming archives, a programme of deduplication of journals between the two FBA Libraries at the River Laboratory, East Stoke and Windermere was carried out between June and December 2016. After consulting with staff, duplicate journals were discarded, freeing a total of 36 metres of shelving at the River Laboratory and 32 metres of

shelving at the Windermere site. At the River Laboratory, the free shelves were used to house the reprints collection. At Windermere, they were used to house the Atlantic Salmon Trust reprint collection, and have been kept in reserve to house collections which still need cataloguing, such as the Nigel Holmes Collection.

FBA Herbarium

In the summer of 2016, a Spanish work experience volunteer, Carmela González Lamas, listed, repaired, and photographed the FBA herbarium sheets of vascular plants. The listing was undertaken on a preformatted Botanical Society of the British Isles (BSBI) Excel spreadsheet. Carmela continued to volunteer for the FBA from Madrid, uploading all 731 herbarium sheets by mid-December 2016. These are free to view on the FBA digital archive.

In January 2016, volunteer Kathryn Champness listed the Bryophyte Collection and the seaweeds herbarium sheets on the BSBI Excel spreadsheet used to list the vascular plants of the herbarium. The Excel spreadsheet was sent to the BSBI to make them aware of the FBA plant collection.

Library Backlog

Two volunteers have steadily worked through the Library backlog between May 2016 and February 2017:

- Kathryn Champness catalogued reprints from the Rosemary Lowe-McConnell Collection;
- Brian Clarke de-duplicated and alphabetised reports from the Atlantic Salmon Trust (AST) in preparation for their cataloguing.

The FBA would like to thank these three volunteers for their hard work, which has helped to keep the Collections accessible and usable.

International Collaboration, Representation and Agreements

Isabelle Charmantier represented the FBA at the following meetings and events:

- European Botanical and Horticultural Libraries (EBHL) Annual Conference, Royal Botanical Garden Edinburgh, 6-8 April 2016
- Workshop on digitisation, 'What is your digital toolbox?', the Linnean Society, London, 10 October 2016
- Seminar at University of Paris Diderot, 24 February 2017

The FBA was awarded an Aquatic Science and Fisheries Abstract (ASFA) grant in December 2016 to catalogue 1000 grey literature reports from the EA. The task was started by Isabelle Charmantier and has been completed by Ian Pettman, FBA Honorary Information Science Fellow.

Donations

The FBA is grateful to the following for their donations of books and archival material to the FBA Collections:

- Hugh Dawson – Journals;
- Kevin O'Grady - Journals and 2 books;
- Max Thibault - article 'Un probleme d'écohistoire : le saumon dans les contrats de louage, un origine medievale?'
- Jim Leeming - fish scales photos;
- Malcolm Elliott - three published papers for the staff paper archives;
- Trevor Furnass - 11 mounted black and white prints of fieldwork and FBA;
- Catherine Haines - 3 black and white photographs FBA, April 1959;

- Dorabella Northcott (O'Grady) via Mary Morris - Martyshev F. G. 1883. Pond Fisheries; Kirpichnikov V. S. 1981 Genetic Bases of Fish Selection; Biological Journal of the Linnean Society Vol 50 Nos 3&4 1993 and Vol 66 No 4 1999;
- Malcolm Elliott - Books, reprints and reports from his personal collection at Windermere;
- Gordon Copp - around 100 books for the Library, on river restoration, fisheries and invertebrates.

Publications

Books

There are currently three books in production for the FBA: "A guide to adult aquatic species (a companion to Freshwater Invertebrates)", "A key to Stoneflies" (completion expected in late 2017) and "A guide to Gastropods" (due during 2018). We are also looking forward to a new Caddis key.

Journals

The special edition of *Freshwater Reviews* is due in late summer 2017, with a focus on the Water Framework Directive (WFD). The SIL Journal, *Inland Waters* is no longer produced by the FBA.

Newsletters

We would like to thank Professor Jonathan Grey for his contribution as Honorary Editor of *FBA News*. Our popular monthly e-newsletter *Freshwater Matters*, provides a compilation of freshwater news and opportunities from around the world and it continues to attract new subscribers.

Training

Training courses continue to be popular. During the year there has been a steady demand for programmed and bespoke courses, as well as continuation of accreditation, and general freshwater biology teaching.

Programmed Courses

A schedule of programmed FBA courses was run in 2015-2016 and included:

Entomology for Anglers

- Entomology for anglers Level 1
- Entomology for anglers Level 2
- Entomology for anglers Level 3

Introductory Invertebrate Courses

- Sampling and Identifying freshwater invertebrates

Advanced Species Identification

- Identifying caddis flies

Advanced Bioassessment

- River InVertebrate Prediction And Classification System (RIVPACS)/River Invertebrate Classification Tool (RICT) bioassessment training

Freshwater Algae

- Introduction to phytoplankton
- Identifying macroalgae

The new training course programme for 2017 was produced and printed. It is now out and available on Facebook and the FBA website.

Bespoke Courses and Accreditation

FBA's accreditation programme continues to grow with mixed-taxon level invertebrate identification examinations being held for both the EA and Natural Resources Wales, a bespoke intensive three-day WHPT-level invertebrate identification course and exam was delivered for ten participants at the Northern Ireland EA in Lisburn, and an Invertebrate Identification for Biotic Assessment course was run for ten participants at Windermere, including an examination and accreditation.

The FBA in collaboration with Bournemouth University ran a four-day Advanced Species Level Identification Course to a large group of Natural Environment Research Council (NERC) funded PhD students at the River Laboratory. As in previous years this course was oversubscribed and received very positive feedback. The FBA, in collaboration with Bournemouth University, also received notification from NERC of a further two years funding to run advanced training short courses in freshwater taxonomy and field identification skills.

Teaching

FBA science staff contributed to teaching for a number of university departments. The FBA also hosts and contributes to a variety of university visits and courses and it has signed a Memorandum of Understanding (MoU) with the University of Cumbria to contribute to the delivery of their BSc and MSc Aquatic conservation courses.

FBA university teaching, courses and field visits undertaken during the year included:

- Bournemouth University, six undergraduate field courses (River Laboratory)
- Bristol University, School of Earth Sciences, teaching/field trip (Windermere)
- University of Cumbria, undergraduate field trip (Windermere)
- Lancaster University, Lakes Ecology Masters field course (Windermere)
- Manchester Metropolitan University, 3-day undergraduate field trip (Windermere)
- Southampton University, two undergraduate bioassessment courses (River Laboratory)
- Queen Mary University of London, 3-day Masters student field course (River Laboratory)
- Queen Mary University of London, 4-day lake ecology module Masters field trip (Windermere)

The River Laboratory again welcomed a visit from Oxford University students and tutors as part of their MSc Course field trip including a presentation on the work of the FBA and a tour of the Laboratory and its experimental facilities.

Many of these institutions were 'returning customers' and we are encouraged by the steady growth in the number of University departments making a visit to our sites as a regular component of their courses.

The FBA hosted a number of keen and talented individuals through student and work experience placements. We link our placements to the achievement of important FBA goals and to help us deliver particular projects. For example, Jack Coleman (Bournemouth University) worked at the River Laboratory helping Patrick Armitage with ditch sampling and macroinvertebrate identifications, Cameron Little and Grace Gardner (Southampton University) visited the River Laboratory to access the River Frome for their research, and Hannah Prentice (Essex University) made regular visits to work on the global warming mesocosms.

School Visits

The River Laboratory hosted a number of educational visits from local schools including Thomas Hardy School, Lord Wandsworth College and Bridgwater College. These educational visits are very popular with children, students and teachers, and provide an excellent opportunity for young people to learn about biology and the importance of preserving our freshwaters.

Research and Scientific Contracts

Freshwater Pearl Mussel Projects

The Ark was funded by £30,000 from Natural England (NE) again this year. This is the second year which EA has been unable to fund the project however they have provided fish (value £900). Adult and juvenile populations of Freshwater Pearl Mussels still held and maintained at the Hatchery under this funding are from the Rivers Clun, Ehen and Tye.

The Restoring Freshwater Mussel Rivers in England, (funded by Biffa Award) successfully achieved ratification to year 2 for delivery this year. This funding supports the River Irt, Esk, and Dubbs Beck populations currently held at the Ark along with salary and overheads to facilitate the project. The project has picked up pace now that all project officers are established in post. Biffa Award remain more than satisfied with our reporting process and our delivery of the Biffa Project.

The first ENTRUST audit was successfully completed in June 2016. A final, end of project audit is due for December 2018.

Work from these projects was presented at the Pearls in Peril EU Life Conference May 2016.

Exhaustive sampling of juveniles confirm that the River Irt population remain our strongest population with 3,582 juveniles counted from the 2014 cohort. Half of these are now filter feeding and therefore have a high probability of survival. The 2008 River Irt cohort has been transferred to a flume ready for reintroduction to the river next year.

The installation of spray bars in the juvenile rearing facility has noticeably improved water quality and flow through the system further increasing survival rate of the most vulnerable stage of the lifecycle.

Freshwater Biodiversity

Following on from last year when we presented an initial proposal to the Heritage Lottery Fund for a project to reverse biodiversity loss for a number of freshwater invertebrates, further work on stoneflies to demonstrate the possibility of conducting complete life cycle rearing in captivity has been undertaken. In early March John Davy-Bowker also re-discovered the stonefly *Isogenus nubecula* on the River Dee in North Wales. This species is critically endangered internationally and was presumed extinct in the UK having been last recorded 22 years ago.

Freshwater Macroinvertebrate Biomonitoring

FBA work on the ongoing development of RICT continued this year. RICT is the standard tool used to set targets for macroinvertebrate quality for WFD assessments of streams and rivers, and as such, RICT is widely used by the EA, Scottish Environment Protection Agency (SEPA), Natural Resources Wales (NRW), and the Northern Ireland Environment Agency (NIEA).

To address concerns about the accuracy of some of the software coding in RICT, the FBA and Ralph Clarke were contracted by the EA to develop independently coded versions of the models outside RICT, and to then test for any variance between RICT and these independently developed models. Phase II of this project has now been delivered with only minor issues having been found so far. One or more further projects are planned to test the remaining elements of the RICT software.

The FBA and Ralph Clarke were also contracted to build a new hydromorphology-independent RIVPACS model for the EA. This work was completed in March with the delivery of a new model (Model 37) which was free of all predictor variables that could be affected by alterations in stream flow, stream width or depth, or stream substratum composition.

Also in March, a further RIVPACS Project on assessing uncertainty in biological indices was completed for SEPA. This work assessed variability in these two indices and paved the way towards their incorporation into RICT as full classification metrics.

All of the recent RIVPACS research and development work and associated reports are on the FBA website: www.fba.org.uk/river-invertebrate-classification-tool-riect-and-rivpacs.

Scientific Consultancy Services

A study of the impact of the invasive New Zealand Pigmyweed *Crassula helmsii* was carried out for the South Cumbria River Trust (SCRT) on Overwater Tarn, a meso-eutrophic lake designated a Site of Special Scientific Interest (SSSI) due to its high aquatic plant biodiversity. Although *Crassula* is becoming established in the Tarn, the lake is still very rich in aquatic plants with sixty-nine species being found. The survey also included an assessment of the population of the rare freshwater crustacean *Ilyocryptus acutifrons*. *Ilyocryptus* was successfully found in the lake, these being the first records in the Tarn since 1955. The rediscovery of *Ilyocryptus acutifrons* was reported in *FBA News* and in the latest Cladocera Interest Group Newsletter. The Overwater Tarn survey provides a strong baseline dataset against which to assess future changes in this important water body due to the invasive New Zealand Pigmyweed.

The FBA has carried out further survey work with Bournemouth University/BUG Global Environmental Solutions as part of their framework contract with the Forestry Commission. The FBA undertook freshwater macroinvertebrate surveys in the New Forest to assess the ecological recovery associated with a variety of approaches to New Forest river restorations. The FBA have now reported the results of these surveys and look forward to ongoing involvement in the bioassessment of these important freshwater habitats.

Building on our meeting with the National Trust (NT) in Dorset in 2016, where interest focused on FBA involvement in freshwater monitoring at the NT's Studland National Nature Reserve, the FBA took freshwater invertebrate samples at twenty locations across the Little Sea Lake and wider Studland reserve in the summer of 2016. The NT is now seeking funding for the FBA to process these samples to establish a current baseline ecological survey of Studland's freshwater habitats.

An ongoing contract was also awarded to the FBA by West Dorset District Council to control the nuisance Blandford Fly (*Simulium posticatum*) in the River Stour. The Blandford Fly first came to notoriety in the 1960s and 1970s when numerous people reported bites in the Dorset town of Blandford. Bites from *Simulium posticatum* are a public health problem causing pain, itching and swelling that can sometimes require hospital treatment. The FBA continue the control of this species using a highly targeted bacterial pesticide *Bacillus thuringiensis* var. *israelensis* which grows in the highly alkaline gut of the Blandford Fly larvae, whilst minimising effects on non-target species.

Long-Term Monitoring

The River Laboratory Long-Term Monitoring (RLLTM) project seeks to understand the effects of climate on stream invertebrate communities. Macroinvertebrate and diatom samples together with macrophyte cover and substrate composition estimates were collected in April, July and October from the Rivers Frome and Piddle in Dorset with assistance from students and volunteers. Linked to these samples, the FBA also collect water temperature data and collate EA river flow and chemistry data.

The FBA continued its ongoing long-term daily surface water temperature monitoring and lake level and rainfall monitoring of Lake Windermere. These data, with their very long run of continuous measurements, going back to 1931, grow in importance as we attempt to understand how climate change will affect our standing waters.

Studentships and Grants

Louise Lavictoire was awarded her PhD (supported through working at FBA) - 'Juvenile biology and captive rearing of the freshwater pearl mussel, *Margaritifera margaritifera*' with the University of Cumbria in January 2016.

Gilson Le Cren Memorial Award

The FBA Grants & Awards Committee met in January 2016 and agreed that no Award for 2016 be offered and that it would be re-advertised again later in 2016. This recommendation was then formally endorsed by FBA Council

This was advertised later in 2016 and the Grants and Awards committee awarded with the 2016 grant to Rosetta Blackman, a PhD student at the University of Hull for her proposal entitled '*Environmental DNA – a non-invasive method for target taxa: passive vs targeted detection*'. The funding will be used to develop and rigorously test an eDNA sampling method and assays for detection target invasive alien species (IAS) in flowing water.

The FBA contributed to an initiative of the European Federation of Freshwater Sciences (EFFS) to fund a collaborative European Freshwater Science Project for Young Researchers. The primary aim was to encourage young freshwater researchers across Europe to create synergistic interactions that lead to new knowledge, promote networking among young European Limnologists and offer experience in generating research ideas, acquiring funding, planning and carrying out a collaborative international scientific project. The first call was very successful with 5 proposals of a very high standard and the successful project was submitted by Katrin Attermeyer and Pascal Bodmer and entitled 'Assessing CO₂ Fluxes from European Running Waters – EuroRun'.

Profile enhancement and attendance at Conferences, Workshops and Events

In October the FBA presented our findings of the *Crassula* and Cladocera survey of Overwater Tarn at the Lakes Forum meeting at Lancaster University. The Lakes Forum meeting also provided the backdrop to our FBA Annual General Meeting with many FBA members in attendance. Themed around non-native invasive species, the North East and Yorkshire Freshwater Group Meeting in December was supported by the FBA and also included a presentation on *Crassula helmsii*.

British Science Week was strongly supported by the FBA where we joined organisations across Cumbria at the Tullie House Museum in Carlisle for a 'Nature Explorers' weekend. Attended by over 800 visitors the FBA exhibits proved very popular and helped raise awareness of the importance of freshwaters to this large audience of Science Week visitors.

As a founder member of the European Federation of Freshwater Sciences (EFFS), we continued our involvement by receiving applications from UK-based students for the best European PhD dissertation in freshwater sciences. The prize consisted of a diploma and a grant to attend the next Symposium for European Freshwater Sciences (SEFS) Meeting to be held in Olomouc in the Czech Republic in July 2017.

Society Links

At a national level, the FBA has continued to have strong links, partnership or involvement with other organisations and societies, including co-secretary of the Aquatic Ecology Group of the British Ecological Society (BES) and as a Board Member and Steering Group Member for the Riverfly Partnership, a Trustee of the National Biodiversity Network (NBN), a Steering Group Member for the Keeping Rivers Cool project and a guest steering group member of the UK WFD Technical Advisory Group (Freshwater Task Team Invertebrate Sub-group).

Links between the FBA and Riverfly Partnership have strengthened considerably this year. In particular the FBA was delighted to take over hosting of the Riverfly Partnership. This is in addition to its ongoing hosting of the Riverfly database. This deeper involvement brings a new group of some 2,500 Riverfly Partnership Monitors closer to the work of the FBA and presents a number of opportunities to promote closer working between FBA staff and members, and this large group of Riverfly Partnership citizen scientists. The FBA also assists the Riverfly Partnership with training, and is closely involved in several local hubs in the North West and North East of England. Bill Brierley made a presentation on “The power of Freshwater Communities” at the 4th National Riverfly Conference in November 2016.

The FBA and Dorset Wildlife Trust continued their development work on the new Riverfly Extended Groups Scheme allowing established Riverfly Monitors to record 28 groups of freshwater invertebrates. Initial feedback on the draft system from Riverfly Monitors in Dorset has been positive and future plans include testing across a wider geographical area. A poster on the new scheme was presented at the Riverfly Conference in November and a small print run of a new identification chart was funded by Wessex Water.

Site Development – Windermere Annexe

Piningtons were appointed to undertake the redevelopment work on the Annexe and started work on site in May. Initial external work progressed well however the discovery of the remnants of an old boat house below floor level added extra work to prepare the foundations ready for the new floor. Following the devastating floods in Cumbria in December 2015 – the design had been updated to raise the floor to a level well above both the 2009 and 2015 flood levels. Flood resilience measures were also incorporated into redevelopment work. The redevelopment work progressed with several other minor problems and delays occurring. The launch date has been delayed and we have booked our first holiday guests in May 2017.

Personnel

We were sorry to say goodbye to Steph Vallins who retired from the River Lab in October 2016 after 22 years of working for the Institute of Freshwater Ecology (IFE), Centre for Ecology and Hydrology (CEH) and latterly the FBA. We also very sad to say goodbye to Dr Isabelle Charmantier, our Information Scientist, who had been with us for just over a year but made significant impacts and inroads into our library and publicising and developing our collections. Isabelle has taken up the role of Deputy Collections Manager at the Linnean Society. Both Steph and Isabelle will be greatly missed.

We were very pleased to welcome several new members of staff during the year. Martin

Shepherd joined us in July as the Facilities Assistant at Windermere. Mark Penny joined the Pearl Mussel team on a one year placement funded by the Sir John Fisher Foundation and is undertaking a project on Pearl Mussel feeding. In October we welcomed Emma McColm who joined us as our new Marketing Manager. Claire Tozer joined us in October at the River lab as an Admin Assistant.

FBA Fellows and Volunteers

We would also like to acknowledge and thank our FBA Honorary Research and Information Fellows for their ongoing help and support, without which much of our work would not have been possible:

Professor Patrick Armitage	Dr Allan Pentecost
Professor Malcolm Elliott	Ian Pettman
Dr Glen George	Dr Paul Raven
Terence Gledhill	Professor Colin Reynolds
Dr Elizabeth Haworth	Dr Roger Sweeting
Professor Alan Hildrew	Dr Ian Wallace
Dr Mike Ladle	

We would also like to thank the volunteers that have given so freely of their time to help the Association, in particular Brenda Leese, Anna Callaghan who have helped tremendously with the cataloguing and photography of the Fritsch Collection and Kathryn Champness and Brian Clarke who assisted Isabelle Charmantier with cataloguing in the Library.

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 HRFs 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, Queen Mary University of London (QMUL) in an advisory and collaborative role.

As part of a continuing series of studies on small Dorset streams and as a contribution to the Poole Harbour Catchment Initiative, the environmental quality of seven streams entering Poole Harbour from the south and the west was assessed in the period 2013-2014 using macroinvertebrate data applied in the national water quality assessment system, RICT. In addition seasonal changes in a subset of streams were followed between 2013 and 2015. This work is now published. One hundred and 30 taxa were recorded from the complete set of samples though none of these were rare. The particular combination of stream size, altitude, slope, and substratum make this set of stream sites unusual and under-represented in the RICT database, as a result, assessment of environmental quality should be viewed with caution. Most streams were classified as poor in quality with only one, the Corfe, classified as good. The reasons for this are discussed and include the possibility that this is the natural state of these small slightly acidic streams or is the result of historical activities in the catchment, or lack of habitat diversity at the sampled sites.

In October 2015 a Higher Level Stewardship scheme was implemented in the floodplain adjacent to the River Laboratory. This involved the dredging of several ditches including one which was surveyed by me in 1998. This, together with other data collected from the floodplain provided an opportunity to investigate recovery from dredging and to compare with historical data and assess the efficacy of the NNE policies and inform future management decisions. Samples were taken between November 2015 and September 2016 with the help of a colleague, Jon Bass, and an MSc student (Jack Coleman) from the University of Bournemouth. The data are currently being processed for publication. Despite efforts to obtain funding for this work none was forthcoming. I was however able to provide some advice to NE regarding the dredging and management of a neglected old meander pond.

We have also collected macroinvertebrate samples from the River Win, a local stream susceptible to high sediment loads. This stream was the subject of a survey in 1993 and again we have the opportunity to compare current with historical data but despite a lot of enthusiasm from stakeholders no funding appeared. Wessex Water are however funding the chemical analyses of monthly water samples collected by Jon Bass and myself. We will retain the faunal samples until funding becomes available.

I attend the Bovington Conservation Group meetings and continue work with staff from QMUL who are now handling the yearly survey of the Bovington Stream which drains the Ministry of Defence tank training range and two sites on the River Frome. The run of data now covers the period 1998 to the present and as such will provide a valuable assessment of long-term changes in macroinvertebrate faunal communities in this lowland chalkstream.

I continue to provide general help at the River Laboratory sorting library stock and showing visitors around the site.

J. Malcolm Elliott

Ecology of freshwater fish and zoobenthos

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

As I will be 77 this year, I decided to vacate my place at the Windermere Laboratory of the FBA toward the end of 2016 after a residence of 51 years. Therefore, I spent some time dealing with my possessions. My extensive reprint collection was donated to the FBA together with the original drawings for FBA Scientific Publications. In my 2016 Report to Council, I noted that I had written my last book (FBA SP69 Freshwater Leeches - available from www.fba.org.uk/shop) and my last single author paper which was also the last to be published on the juvenile sea-trout population in Black Brows Beck. I also mentioned that I hoped to continue to publish co-authored papers, and three of these appeared in 2016.

The first of these is an article in Nature (Thackeray et al., 2016) and compares phenological sensitivity to climate across taxa and trophic levels. A Climate Sensitivity Profile approach was applied to 10,003 terrestrial and aquatic data sets to quantify variation in climate sensitivity. Despite the variability in the data, there was systematic variation in the direction and magnitude of phenological climate sensitivity, and this is described in detail in the paper. One of the best examples, illustrated in the paper, was my data on long-term changes in the emergence patterns of Alder flies (*Sialis lutaria*) in Windermere.

The second paper is with colleagues from Norway and uses my growth model to assess the suboptimal growth of juvenile Atlantic salmon in a subarctic river (Sanchez-Hernandez, Gabler, Elliott & Amundsen, 2016). Their growth rates in the River Reisa (north Norway) were suboptimal, being lower than values predicted from the model, but values for observed and predicted body mass were not significantly different in five of twelve comparisons. Hence, the parr were sometimes unable to grow according to the optimal baseline set by the temperature regime. This study demonstrates how growth predictions based on mathematical models may be employed by fish ecologists to identify growth deficiencies in wild fish populations.

The third paper, also with colleagues from Norway, examines major factors affecting the diversity of aquatic insects in thirteen streams with contrasting riparian vegetation in the river Tana, north Norway (Falkegård, Elliott & Klemetsen, 2016). This is the largest river in northern Europe and part of it forms the border between Norway and Finland. It supports the largest fishery of Atlantic salmon in Europe, with a mean annual catch of 200 metric tonnes in the river and a further annual commercial catch of 299 metric tonnes in the fjord. Our previous studies have shown that the production of juvenile salmon varied considerably between different tributaries in the river system. Because of their high importance as food for these juveniles, stream invertebrates, predominantly insect larvae, were sampled in August and October 2000, 2001, 2002 at three sites in each of 13 streams (total 39 sites). These were used to: (i) classify the species/taxa into groups according to their occurrence; (ii) compare species/taxa richness and biodiversity across all sites; (iii) detect environmental variables responsible for differences between sites. Multivariate analysis separated 49 taxa into benthic assemblages flowing through: (i) willow forest; (ii) non-forested alpine habitat; (iii) birch (October only); (iv) birch and mixed birch-pine (August only); (v) mixed birch-pine habitat (October only). Multiple regression evaluated the relationships between 12 environmental variables and: (i) the residuals from a power function relating benthic density and variation in number of taxa among sites; (ii) Simpson and Shannon-Wiener diversity

indices. Overhanging cover and stream width affected positively the larger number of species/taxa and diversity in August, with diversity also affected positively by moss cover. In both months, instream cover had a positive, and water velocity a negative, effect on species/taxa richness, whilst their effects on diversity were the exact opposite. The importance of instream cover in this study has shown that enhancing riparian vegetation should always be an important factor in stream restoration and conservation projects. The latter paper is my opus 237 and is probably my last publication.

D. Glen George

Limnology and zooplankton ecology

Glen George is also a visiting professor at University College London and Aberystwyth University. In 2016, his main activities were:

1. Completing a book (in Welsh) on the early history of Northern Britain.
2. Using a Gaussian model developed in an earlier study to explore the effect of long-term changes in the weather on the growth of phytoplankton.
3. Contributing to a multi-author publication on the automatic monitoring of lakes.

A book (in Welsh) on the early history of Cumbria and Southern Scotland is now in press. In Wales, these areas are commonly described as the 'Old North' since they remained in Brittonic hands for several centuries after the collapse of the Roman Empire. The first poems in Welsh were composed in the area and there was a Welsh speaking dynasty in Strathclyde in the eleventh century. The main focus of the book is on the literary sources but some attention was also paid to the palaeolimnological and genetic evidence of regional coherence.

In an earlier publication (George and Hurley, 2004) I used a family of Gaussian based models to test the effectiveness of different sampling strategies in lakes. In 2016, the same approach was used to explore the effects of year to year changes in the weather on the seasonal dynamics of phytoplankton. The analyses for the North Basin of Windermere and Esthwaite Water are now complete and a paper prepared for publication.

NETLAKE was a four year project funded by the EU to promote the increased use of automatic systems for monitoring lakes. Some of the systems used were based on those developed at Windermere in the 1990's and I was responsible for providing some of the applications described. A multi-author paper entitled 'Automatic High-frequency Monitoring for Improved Lake and Reservoir Management' (Marcé *et al.*, 2016) is in press and should help to promote the wider application of these new techniques.

The most significant 'personal' activity of the year was the end of the EU funded NETLAKE project. I had looked forward to further collaborative work in Europe but that now looks increasingly unlikely. 'Anger' does not come close to describing my response to the Brexit vote and sadly it will be the most ardent 'Leavers' who will suffer. Over the years, I was privileged to lead four major EU projects with each project generating between 1 and 2 million Euros over a three year period.

Terry Gledhill

Invertebrate Taxonomy

The final volume of the key to the water mites of central and north-western Europe was published in early summer of 2016. In addition to the Keys the three volumes provide information on pre-adult stages, habitat, distribution, biology and taxonomy of the species.

Work on a revised and annotated check-list of British and fresh water mite species continues.

Elizabeth Haworth***Fritsch Collection***

Towards the online version of the Fritsch Collection, Anna Callaghan (volunteer) and I continue to check the Fritsch Collection sheets and build the databases. Anna has completed 2/3rds of our Chrysophyte records (>2100 sheets). I continue to update the records of the first half of the Desmid species (c.7000 sheets), a slow job that includes repairs and some replacement images to correct errors and improved images. Brenda Leese (volunteer) and I continue to build our store of images. Completing the 1200 Charophyte sheets was announced to the Charophyte algologists via their newsletter. This means we now have over 10,000 images available. A grant application is now being made for a website so that they can go online. With the records we now have we can ensure that sheets containing type figures and diagnoses are flagged.

I continue to respond to algal queries where possible and have been grateful to the European and Botanical Horticultural Libraries Group Members who have supplied reprints or page requests when I need to make repairs to the Fritsch Collection sheets; these sometimes enable me to replace the pages that Professor Fritsch cut out of reprints now in the library.

There have been several requests to buy Fritsch Collection Notelets and one to buy one of the few remaining Fritsch Centenary Calendars!

The maximum room temperature recommended for Archives is 19°C. Once the new boilers were running the Fritsch Collection room became far too warm and I am very grateful that boiler room work and keeping our door open has lowered it to <23°C, more acceptable but still high. We monitor this as we feel that this could mean more time consuming sheet repairs. Mercifully much of Professor Fritsch's own glues remain tight.

Collating a diatom species list for publication with Allan Pentecost of Cumbrian Algae has proved a bigger task since name changes have spiralled with the use of the scanning electron microscope and genetic studies. I am conscious how the names used have varied even over my 50 years and many of my records predate computing.

I have been asked to write the Winifred Tutin memorial for the Royal Society, but have so far made slow progress.

Alan Hildrew***Ecology of Streams and Rivers***

This has been a mixed year, with some projects coming to fulfilment while others remain frustratingly unfinished. In terms of publications, my work comparing the longitudinal distribution of hydropsychid caddis larvae (Trichoptera) in the Rivers Usk and Loire from contemporary and historical data (in the case of the Usk incorporating collections from 1968/69!) is now published (Hildrew et al., 2016). Reconstructions of river temperature show modest increases over the period of the record but these have not brought about the anticipated upstream shift in the distribution of the various species (as cool-adapted headwater species retreated further into the uplands). It may be less easy for species to shift their longitudinal distribution in the face of increasing temperature if other important environmental factors, possibly hydraulic, do not also change. Further analyses of the now extensive data series from the Upland (formerly Acid) Waters Monitoring Network revealed a continued lack of ecological recovery from acidification, despite now overwhelming evidence of chemical amelioration (Gray et al., 2016). This lack of ecological recovery is a phenomenon that seems widespread in areas formerly affected by acidification, and could be due to residual effects of water chemistry (such as acidic episodes), ecological inertia caused by indirect species interactions, or possibly climatic effects (or combinations of all three). Whatever, the assumption of a simple biological reversal of acidification effects seems increasingly unlikely to be met. Work on a modification of algal assemblages growing on the galleries (fixed retreats) of psychomyiid caddis larvae (in the littoral zone of lakes in the English lake District) was also published (Ings et al., 2016), and shows a shift towards

diatoms characteristic of more eutrophic conditions than those on the surrounding stone surfaces. The larvae seem to recycle excreted nitrogen into algae growing on their retreats, which thus function as a 'garden', and then consume the fertilized 'crops'. A further paper on methane oxidation in the stream benthos, as a process producing biomass based on chemotrophy (and thus an alternative to biomass from photosynthesisers) is in review in *Limnology and Oceanography*. If accepted this could be an important paper in the fast-moving field addressing the environmental fate and role of this important greenhouse gas.

I attended the International Society of Limnology (SIL) meeting in Turin in the summer, where I gave a paper, and gave invited seminars at the University of Birmingham and the Max Planck Institute for Evolutionary Biology at Plön (Germany). I continue to serve as (one of two) FBA representatives on the 'Committee' of the European Federation for Freshwater Sciences (EFFS). I was on the Scientific Committee of the SIL meeting and am an invited member of that for the upcoming Symposium for European Freshwater Sciences (SEFS) meeting in 2017 in the Czech Republic. The latter part of 2016 and to-date was unfortunately disrupted by health problems and a period in hospital, but I am now well on the mend and putting the final touches to a (delayed) book for the International Ecology Institute (probable title 'From natural history to environmental policy – and back again').

Mike Ladle

Ecology of Fish

In 2016 Dr Stewart Welton and I were again contracted by North Dorset District Council, under the auspices of the FBA, to control the Blandford Fly. Although monitoring has been reduced in recent years, the treatment appears still to be very effective. The *Bfl* formulation - **VectoBac 12AS** - was successfully 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. Owing to prospective changes in the terms for regulating the pesticide it was believed that it would not be possible to apply Vectobac in 2017. However, after prolonged negotiations involving the North Dorset District Council, the suppliers of Vectobac 12AS, HSE and ourselves it looks as though treatment in March-April may be possible. Owing to these negotiations no further progress has been made on the possible introduction of a longer term (c. 5 year) plan for treatment.

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

My role as advisor to the River Allen Association continues, although the major problems with the River (abstraction, pollution, lack of weed growth) seem to have abated.

I continue to be 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.

The bridge at West Holme has not yet been repaired. Hopefully this situation will be remedied as soon as conditions permit in 2017.

The run of salmon on the Frome in 2016 was down on last year; the following table shows that the change is probably within the normal expected variation. Low water conditions in late Summer and early Autumn probably did not help. There were a few three sea-winter salmon as anticipated but less than I expected after last season's good catches of two sea-winter fish.

Total for 2014	16 Salmon 52 seatrout
Total for 2015	58 Salmon, 56 Seatrout, 28 other trout, 67 grayling, 2 Pike, 2 Sea Lamprey,
Total for 2016	21 Salmon to 19lb, 5 out of season salmon, 41 seatrout to 8lb, 27 trout, 60 grayling to 3lb, 2 pike to 8lb

Despite the reduction in catches and the unrepaired bridge the fishing at West Holme is likely to be fully booked in 2017. My own observations seem to suggest that there has been a dramatic reduction in the numbers of pike and dace in the River Frome in recent years.

I continue to do a number of public lectures to local groups on topics relating to aquatic biology including fish research and the Blandford Fly.

Allan Pentecost

Limnology and Algology

Another active year with a range of projects, courses and editorial work undertaken. A detailed study of a population of *Nostoc* started in January with regular sampling for growth rates, cytology and water chemistry. The first year of results looks very promising. The course on phytoplankton was given at the FBA Windermere Laboratory in September and the Macroalgae Course was again given with Martyn Kelly in May. Both remain popular and were well received. I have also been helping the Chief Executive to develop a phytoplankton proficiency test and this will continue well into 2017. In August, I attended the 20th Cyanobacteria Research Symposium at Innsbruck, Austria and gave a keynote paper in Session 4, 'biocalcification and related topics'. A paper on *Cyanobacteria-calcite-phosphate interactions* has been submitted for publication in *Hydrobiologia* where a Symposium volume is in preparation. I have agreed to be Assistant Editor for this project. The Symposium attracted over 50 scientists from all over the world and it was a good opportunity to highlight some of the research that is undertaken at the FBA. The Manuscript on ellipsoidal algae mentioned in the previous report has been submitted for publication in *Algological Studies*. A new book on Cave Biology in the British Isles is being prepared by Lee Knight and I agreed to write up the green plant section in the book. This includes a large number of algae and a series of field trips were undertaken to obtain more records of cave algae from England. Many new records were added to the list and several of my previous papers on this topic reviewed. The book should be ready for publication later this year.

During the period August-September, I was involved in a survey of Overwater with Dr Melanie Fletcher and Soraya Alvarez-Codesal. We undertook a detailed macrophyte survey, re-finding most of the plants previously recorded and made a few additions. The main purpose was to survey the spread of *Crassula* and to find a rare member of the Crustacea. Both were successful and the report has been submitted. A phytoplankton survey was also undertaken.

A survey of UK sulphur springs has continued with two more sites visited, microbial samples taken and waters analysed. Several more springs have yet to be visited when time and weather allows. The Freshwater Algae of Cumbria is also well advanced but still needs the diatoms to be added. Martyn Kelly has kindly allowed his many new diatom records to be added. Once published, this work will be the first comprehensive account of the freshwater algae of the Lake District and is long overdue.

Work on the Phosphorus book/article has continued with the addition of notes from further papers and rearrangement of the text.

Ian Pettman

Data and Information Retrieval

Throughout this reporting year I spent some time in assisting and training Isabelle Charmantier – this included vocabulary work for AEDA; ASFA Input; information queries; collection policy and collection weeding.

However, I mainly concentrated on completion of all of FBA's outstanding historical obligations to Aquatic Sciences and Fisheries Abstracts (ASFA) as well as continuing to meet all the necessary ASFA requirements for 2016. I also secured an ASFA Trust Fund contract for the FBA, to be undertaken from January to July 2017.

ASFA Work

The main work and outputs were:

Subject Thesaurus

Approximately 800 new terms were considered by myself and a small working group. Agreement was reached on 609 terms to be added; 63 orphan terms to be linked; and 3,216 new relationships to be incorporated. I then produced the new thesaurus file incorporating these changes and the twelve different output formats to suit the various different applications.

Geographic Indexing terms

The existing 24,000 geographic indexing strings were all reviewed and corrected and 1,000 new strings were added. A new Geographic Authority List was produced. The "Guidelines for Indexing" (ASFIS 5) were re-written to incorporate the new rules and principles.

Taxonomic Indexing Terms

I revised and extended the Taxonomic Pick List (Latin name with English, French and Spanish common names where applicable) - it now stands at just over 70,000 entries (an increase of 58,000)

Impact Evaluation

I chaired the Working Group in Viet Nam and followed up with some further discussion documents. Negotiations are being pursued between the working group and Dalhousie University for a PhD student to take this further.

Data Sets

I produced a process for incorporating metadata for Data Sets within the existing ASFA metadata structure and demonstrated it with five data sets from AEDA.

Regular Input

I have also provided the FBA's 2016 input of 525 records to the ASFA database.

Preparation of Contract Bid

I drafted, presented and secured a bid for the ASFA Trust Fund. This will involve uploading 500 EA Reports from the old FreshwaterLife site to AEDA and preparing ASFA records for these and another 500 EA reports (1000 in total). I am now working to complete this contract – aiming for completion by the end of March 2017 (3 months early)

Representing FBA

I represented the FBA in its role of National Centre – producing the UK National Report for the 2016 Board Meeting.

I acted as Chair for the UN FAO ASFA Board Meeting, Hanoi, Viet Nam for the 5 days of 12 – 16 September 2016. I remain Chair of the Board until 2018.

Paul Raven***River Ecology and Morphology***

My main focus this year has been helping to coordinate revision of the European Committee for Standardization (CEN) guidance standard on assessing the hydro-morphological features of rivers. River Habitat Survey (RHS) was an important component in developing a field survey component of the original standard published in 2004. Understanding how fluvial features of rivers have changed over time is vital, but the original standard contained little in the way of guidance on this matter. The intervening years have seen major advances in data availability (e.g. Google Map, web-based access to historical maps and European river datasets), survey methods (e.g. drones) and knowledge (notably European projects such as REFORM), so there is plenty of scope for a major revision to the 2004 guidance standard.

After an initial scoping workshop in Edinburgh (23-24th February 2016), a Technical Working Group meeting, chaired by Phil Boon (Scottish Natural Heritage(SNH)), was held in Rome on 10-11 November 2016. Nine European countries are actively involved and much progress has been made using scale-related fluvial geomorphological features and processes to help assess why rivers look and behave how they do. Professor Angela Gurnell (QMUL) is the technical lead and when completed the new standard should help to provide a consistent way of describing the physical character and flow of rivers, taking account of the consequences of catchment as well as reach-related natural and

anthropogenic change over time. This will be a great improvement on a channel-based 'snapshot' assessment of rivers. The next workshop will be held in Paris on 3- 4 May 2017.

The annual RHS training course in Poland that Peter Scarlett (CEH) and I help with did not take place in 2016 but the University of Poznan has been commissioned by the Polish Government to develop a hydro-morphological survey programme for the country. As part of this work Peter and I have been asked by our University of Poznan colleagues to advise them about how to use the Polish RHS database to develop a sampling strategy, calibrate aerial surveillance imagery, and also how current revisions to the CEN guidance standard can be used and tested. Training will be an important component of the work programme. I can therefore continue to represent the FBA through this Poland connection and maintain my HRF interest linking fluvial morphology and river ecology.

Colin S. Reynolds

Ecology of Phytoplankton

I have had an interesting year. A highlight was to attend the Cumbrian Lakes Research Forum in October 2016, organised this year at the superb new Training Rooms at the Lancaster Environment Centre (LEC) on the campus at Lancaster University. A series of presentations, organised by Dr Ellie Mackay, of CEH, covered a range of topics, including a new overview of the Lakes Tour by Professor Stephen Maberly. The history of these periodic samplings began in the early days of the Ferry House, as annual summer visits to each of the major Lake-District lakes. In 1978, I was instrumental in the introduction of the current strategy of undertaking four seasonal samples from each of the twenty sites, every fifth year. The logic of so doing was two-fold: observations were not confined to a small part of the year; systematic surveys undertaken at approximately the same times of the year provided results that were mutually more directly comparable, while the five-year was better suited to the detection of trends in long-term environmental change. So, it has proved: the overviews that Professor Maberly and colleagues have been able to consolidate and analyse are demonstrably sensitive responses to climate change (temperature, rainfall intensity), land use variations and pollution trends.

In August, I was able to re-visit a series of mere- and moss- sites in Shropshire and Cheshire. The visit was partly prompted by nostalgia, it being just beyond the fiftieth anniversary of the initiation on my PhD project on Crose Mere and other meres. It was interesting to see how much plant succession had changed some locations, yet equally how little altered were others. The urge to return was not purely out of curiosity. I had not long before responded to an invitation from Tom and Gisèle Wall to contribute a couple of chapters to their new book on Rostherne Mere National Nature Reserve, where, in Nature Conservancy days, Tom was Warden Naturalist. The Reserve's main interest, now and at the time of its declaration, lies in its ornithology; it is known for the prolific numbers of aquatic residents it supports, also for the abundance of seasonal migrants to which the lake is host. Moreover, the importance of Rostherne Mere as a productive freshwater location had long been recognised – this site was once studied by W.H. Pearsall. The origin of the mere- and moss-basins, their hydrology and present hydrochemistry are now rather better known and understood, as is their supposed links to events of the Late-Glacial (Dimlingtonian) period. An updated review is certainly due. The illustrative materials that Tom and Gisèle have prepared promise to make a most valuable addition to the modern literature.

We have, however, made some progress with the preparation of the proposed special issue of *Freshwater Reviews*, focusing on the outcomes of the European Water Framework Directive. Several titles have been submitted to Guest Editor, David Baxter, and at least one of these has now been peer-reviewed. It is pleasing to record that this project is under way!

I am grateful to the current and past staff at the FBA for their work on the journal. Particular thanks are due to Michelle Jordan, recently drafted into the Publications team

Roger Sweeting

Water Quality and Fish Biology

2016-2017 was the second year of the Biffa Award to FBA as the lead partner of five in the three-year £1.5M project. It is the 10th year of work on pearl mussels since my retirement as CEO in early 2007. In that time the project has brought in over £1.7M and employed 7 people in one capacity or another. It has also established the practicality of captive breeding of pearl mussels as well as new information for science on this threatened species. FBA is now recognised as a focus of expertise in the conservation of the freshwater pearl mussel.

2016 has been spent preparing some of the small 10 year old mussels for return to their native river. Since they dropped off the fish in 2007 they, and subsequent cohorts from several populations, have been maintained in fine gravels in the converted salmon egg trays in the Gas House with relatively small flows (<5l/minute) of filtered (to 15µm) lake water for provision of oxygen and food particles. In order to prepare them for life in the river we have constructed a flume, from parts of the original FBA flumes in the Hatchery Compound, through which we are pushing water, filtered to 20µm, at a gradually increasing rate until May when, following tagging, they will be released into a previously monitored section of their home river.

The 10 year old mussels are up to 45mm in length and are being carefully observed in order that we are as confident as we can be that they will survive the flow regimes of the natural river sites. They have been marked with numbered tags stuck to their shells: more sophisticated Passively Induced Transponder (PIT) tags being too large for their current size.

One of the partners in the Biffa Award, the Devon Wildlife Trust, has started its own version of the FBA Ark and in 2016 we (Eloy Benito-Reyes and I) took three of our circular tanks to one of their local trout farms and set up an independent unit for rearing the young for release into tributaries of the local River Torridge. Conditions of culture for the host fish are less than ideal and we (Dr Ceri Gibson and I) have brought seventy five fish carrying glochidia back to the FBA to support this part of the work and anticipate rearing the young mussels at the FBA as a back-up for the Devon work.

There are several initiatives that we are currently developing to augment our existing work: e-DNA for locating relic mussel populations in rivers known to have contained them, age-estimation using shells of dead adult mussels, use of hatchery facilities at both FBA sites to support endangered bivalve populations and improvement of our own facilities and techniques to make the breeding process in captivity more effective. Over the next year there will be a similar range of activities involving myself and colleagues in the Pearl Mussel Team. Our intention is to produce further scientific papers and seek funds for pearl mussel related projects, as well as improving the juvenile survival rates.

I continue to carry out examinations of fish under Section 30 of the 1975 Salmon and Freshwater Fisheries Act prior to movement between inland waters - these provide a small income which I donate to a fund within FBA. Ten examinations have been completed so far in 2017.

I continue to Chair the SCRT, one of the partners in the Biffa Award project. SCRT is also a partner with FBA in the reed restoration project at Mitchell Wyke.

In 2017 the Working Group that I Chair in Comité Européen de Normalisation (CEN) that develops methods of assessment for our fresh and coastal waters produced a standard for pearl mussel waters. This is the first of a new type of standard in support of the Habitats Directive and has taken experts from all over Europe six years to agree the detailed criteria. There is a certain irony in the timing of this ground-breaking environmental standard. Locally, I Chair the British Standards Institute (BSi) Mirror Committee.

Publications, posters and presentations

BS-EN 16859 2017 Water quality – Guidance standard on monitoring freshwater pearl mussel (*Margaritifera margaritifera*) populations and their environment

Ian Wallace

Taxonomy and Distribution of Trichoptera

Many aspects of caddis recording have been my principal freshwater work during the year and the National Trichoptera Record Data Base currently has 403,000 entries. The NBN is the main outlet for this work and an update of the current public data set is planned for later in 2017. The NBN 'Gateway' site is changing on 1 April 2017 to a new platform called the "Atlas" and I am involved in discussions to make this as useful as possible to enquirers and to overcome some of the issues that have be-devilled the 'Gateway'. I have written species accounts for all 200 UK caddis for the 'Atlas', and these will be also used to support other outlets. FBA Library work is invaluable in preparing these.

I am making progress with developing a regional recording structure and modelled a possible approach, for Worcestershire, with the assistance of the Wyre Forest Study Group. This involved delivering a one-day course on caddis, production of a regional check-list for publication on-line and on paper and a talk at a general recorder's day. I was very pleased when the FBA supported a meeting I chaired at Windermere for Riverfly Recorders. This initial meeting attracted a small number of people from conservation organisations, statutory agencies and just committed volunteers. It is leading to other study and survey events. The day was linked to the FBA annual meeting at which I spoke and demonstrated, and a demonstration day for the FBA at Wray Castle.

I delivered the annual two-day FBA caddis course at Windermere. A suite of training materials for all levels are essential for these and I have had discussions with Stuart Crofts who is writing an adult caddis key for the FBA. Outlets to keep keys up-to-date are required and I have prepared some for my FBA Cased Caddis Key; how to distribute these is to be decided.

Field work has been limited this year but highlights were a survey, for Natural Resources Wales, of the four well-localised historic Welsh sites for the endangered caddis *Adicella filicornis* (Pictet), which located it at all of them; less successful was a survey of the only welsh site, on Anglesey, for the endangered caddis *Limnephilus tauricus* Schmid, which failed to re-find it.

A highlight of my work with the FBA was assisting the librarian Isabelle Charmantier successfully bid for a PRISM grant to support the specimen collections. The possible extractable DNA content of the fluid material is of interest. Being preserved, as they are, in Industrial Methylated Spirit solution, has up to recently been regarded as making extraction impossible. Natural History Museum (NHM) staff believe they may have found a way of overcoming this barrier and are working now with a range of IMS preserved caddis of varying ages from the World Museum Liverpool collections. Dependent upon the results will suggest if I select material for study whilst undertaking the PRISM funded re-bottling exercise.

Publications by FBA Staff and Honorary Research Fellows

- Pretty J, et al (2016). *Macroinvertebrate surveys of the Bovington Stream and River Frome*. Report Commissioned by Debut Services (South West) Ltd on behalf of the Ministry of Defence.
- Wood, P.J., **Armitage, P.D.**, Hill, M.J., Mathers, K.L. & Millett, J. (2016). Faunal response to fine sediment deposition in urban rivers. In *River Science: Research and Management for the 21st Century*, (Eds David J. Gilvear, Malcolm T. Greenwood, Martin C. Thoms and Paul J. Wood.) pp 223-238. John Wiley & Sons, Ltd.
- Armitage, P.D.**, Murphy, J.F., & Pretty, J.L. (2016). The macroinvertebrate fauna and environmental assessment of seven streams entering Poole Harbour *Proceedings of the Dorset Natural History and Archaeological Society* **137**: 105-117.
- Sánchez-Hernández, J., Gabler, H.-M., **Elliott, J.M.** & Amundsen, P.-A. (2016). Use of a growth model to assess the suboptimal growth of Atlantic salmon parr in a subarctic river. *Ecology of Freshwater Fish*, **25**, 518-526.
- Thackeray, S.J., Henrys, P.A., Hemming, D., Bell, J.R., Botham, M.S., Burthe, S., Helaouet, P., Johns, D.G., Jones, I.D., Leech, D.I., Mackay, E.B., Massimino, D., Atkinson, S., Bacon, P.J., Breerton, T.M., Carvalho, L., Clutton-Brock, T.H., Duck, C., Edwards, M., **Elliott, J.M.**, Hall, S.J.G., Harrington, R., Pearce-Higgins, J.W., Høye, T.T., Kruuk, L.E.B., Pemberton, J.M., Sparks, T.H., Thompson, P.M., White, I., Winfield, I.J. & Wanless, S. (2016). Phenological sensitivity to climate across taxa and trophic levels. *Nature*, **535**, 241-245.
- Falkegård, M., **Elliott, J.M.** & Klemetsen, A. (2016). Major factors affecting the diversity of aquatic insects in 13 streams with contrasting riparian vegetation in the river Tana, North Norway. *Norwegian Journal of Entomology*, **63**, 140-158.
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- George, D.G.** & Hurley, M.A. (2004) The influence of sampling frequency on the detection of long-term change in three lakes in the English Lake District. *Aquatic Systems Health and Management*, **7**, 1-14.
- Marcé, R., **George, D.G.** and twenty four others (2016) Automatic High Frequency Monitoring for Improved Lake and Reservoir Management. *Environmental Science and Technology (In Press)*.
- Hildrew, A.G.**, Durance, I. & Statzner, B. (2016). Persistent longitudinal distribution of stream insects in the face of climate change: a tale of two rivers. *Science of the Total Environment*. DOI 10.1016/j.scitotenv.2016.07.212.
- Gray, C., **Hildrew, A.G.**, Lu, X., Ma, A., McElroy, D., Monteith, D., O’Gorman, E., Shilland, E. & Woodward, G. (2016). Recovery and non-recovery of freshwater food webs from the effects of acidification. *Advances in Ecological Research*. Doi.org/10.1016/bs.aecr.2016.08.009.
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- Welton, J.S., **Ladle, M.** & Bowker J.D. (2016). An experimental treatment of *Simulium posticatum* with *Bti* at selected sites on the River Stour, Dorset. **Report to North Dorset District Council**, 10pp.
- Ladle M. (2016-2017) Monthly features for Sea Angler magazine published by Bauer Media
- Ladle M.** & Rigden D. (2016) *Fishing for Ghosts*. Medlar Press 228pp.
- Pettman**
- 1) ASFA (*In Press*). Aquatic Sciences and Fisheries Thesaurus: Descriptors used in the Aquatic Sciences and Fisheries Information System. ASFIS Reference Series, No 6, Revision 4, 350 pp.
 - 2) ASFA (*In Press*). Geographic Authority List. ASFIS Reference Series, No 7, Revision 3, 120 pp.
 - 3) ASFA (*In Press*). Guidelines for Indexing. ASFIS Reference Series, No 5, Revision 3, 80 pp.

**THE FRESHWATER BIOLOGICAL ASSOCIATION
(A COMPANY LIMITED BY GUARANTEE)
TRUSTEES' REPORT FOR THE YEAR ENDED 31ST MARCH 2017**

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 2017 which are also prepared to meet the requirements for a Director's Report and Accounts for Companies Act purposes.

The financial statements comply with the Charities Act 2011, the Companies Act 2006, the memorandum and Articles of Association, and Accounting and Reporting by Charities: Statement of Recommended Practice applicable to charities preparing their accounts in accordance with the Financial Reporting Standard applicable in the UK and Republic of Ireland (FRS 102) (effective 1 January 2015).

Trustees

The Trustees of the Freshwater Biological Association during the period 1st April 2016 to 31st March 2017 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 clause 9 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 Chief Executive (Dr Bill Brierley). 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 Chief Executive, 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 Chief Executive is also reviewed by the Council of Trustees.

**THE FRESHWATER BIOLOGICAL ASSOCIATION
TRUSTEES' REPORT FOR THE YEAR ENDED 31ST MARCH 2017
(Continued)**

Objectives of the Charity

The objects of the Association, as defined by its Memorandum, are to promote the understanding and 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 review of governance was completed in 2016 with the adoption by special resolution of the new Articles of Association at the Annual General Meeting on 13 October 2016. The Articles were subsequently approved by the Charity Commission. There are changes in names/titles between the old and new articles with Trustees now being called Directors and Council are now called the Board.

With regard to the capital projects, the biomass heating plant has been completed, and the building work for the conversion for the Ferry House Annexe is nearing completion for letting from May 2017.

Following the implementation of the Business Plan and detailed scrutiny by the new senior management team, the setting of budgets and strict financial monitoring was in operation by quarter 2 of 2017. Tracking of the Income and Expenditure against the budget led to the realisation that the latter fell substantially below the forecast and the F&GPC met in December 2016 and recommended an Emergency meeting of the Council which was held in January 2017. At a further meeting of the Council in February 2017 the decision was made to reduce expenditure and to undertake a review of staff, activities and the estate. The Council discussed and decided that a change in the Associations Objects was not required. The Executive was asked to develop a new business model and plan that delivered sustainable income and ensured eliminating the operating deficit. The Executive developed a draft plan that focussed activities on the Associations core activities of membership, publications and information and training. Other activities which include science and data services would be reduced or stopped. The activities continuing are core to delivering the charitable objects. The Business plan and case for change including a transition plan were discussed and approved at the Council Meeting in March 2017 and the executive were tasked with delivering this with immediate effect including significant reductions in staff costs. The strategic aims as outlined above remain unchanged. A detailed transition plan, with timescales for change and success criteria will be developed early in the new financial year.

The operating deficit before net gain on investments (£199,269) (2016 net loss on investments £107,131) is £694,698 (2016 £308,659). Cash flow was funded by the withdrawal of £1,548,368 from the Investment portfolio. The annexe conversion began in May 2016 and accounts for the significant increase in capital expenditure along with the expenditure related to the completion of the biomass boiler installation. Additional funds were required to supplement the working capital requirements of the organisation.

Income from Scientific projects includes the Biffa awarded £1.46 million three year Pearl Mussel project, involving 5 partners in England The project commenced in March 2015 and had one year to run, it has, however, been extended to December 2018. The Freshwater Pearl Mussel ARK Project continues with support from Natural England (NE).

Total income from training courses and meetings showed an increase with the additional income from both biotic assessments and the Annual Scientific Meeting (ASM) held in May 2016.

Income from Data and Information projects included Defra, ADAS & ASFA. Membership numbers showed an increase with a significant rise following the introduction of a student membership during the year and the success of Annual Membership being offered online from the date of application. A small decrease in the Publications income reflects the fact that there have been no new publications since 2015. There are currently new publications in production.

**THE FRESHWATER BIOLOGICAL ASSOCIATION
TRUSTEES' REPORT FOR THE YEAR ENDED 31ST MARCH 2017
(Continued)**

An increase in the amount of rental and facilities income was generated from the East Stoke site, with two new lettings of offices in the Farmhouse. The planning permission for potential changes from offices was granted and is available for implementation if required in the future. The Windermere Ferry was back to full service this year however changes made by Cumbria County Council have substantially reduced the cash turnover and therefore the commission. The River Laboratory at East Stoke is the main area of activity for generating funds through the rental of facilities, both long and short term.

Expenditure continued to show an increase during 2017 and includes the additional costs related to the ASM. The organisational change, with related financial controls, was fully implemented from the last quarter of 2015-2016. The significant increase in expenditure is on salaries, which are attributable to these changes to the organisation.

The scientific research activity and funding of grants 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 total level of reserves (£4,225,269), as reflected in the Unrestricted General Fund Account (£1,246,324), and including the revaluation reserve (£361,001), is represented by tangible assets, net current assets and a liquid investment asset reserve. The remaining unrestricted designated funds (£2,617,944) can only be realised by disposing of tangible fixed assets. These reserves are considered appropriate 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 Trustees 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 Investment Policy was reviewed by the Trustees in March 2009 and no changes were made.

Plans for Future Periods

Towards the end of 2016 the financial position that the FBA found itself in, including the level of its reserves, meant that significant action needed to be taken to stabilise, recover and remedy the position with immediate effect.

At an emergency meeting of Council in January 2017, detailed financial information of the FBA's position, including valuations of the estate, financial out-turn and projections, was presented together with options for the way forward. The Board made the decision that immediate and dramatic reduction in costs were required to ensure that the Association continues to operate and maintains its desired level of reserves. The Board instructed the Executive to take immediate action to develop and adopt a new business plan. The new plan and case for change must have a reduced cost base and involves:

- reducing the cost base as quickly as possible including significant reduction in staff costs.
- reviewing the Estates - this will provide various options on the future of the assets. In the short term the FBA will maximise income from Windermere and River lab sites. Both actions will stabilise the financial position of the organisation.
- developing and introducing a new sustainable business model where income needs to be maintained and increased to balance expenditure.
- diversifying income streams and applying for grants and sponsorship.
- maximising income from the estate including rental/leases, holiday let income or from the disposal of assets.

**THE FRESHWATER BIOLOGICAL ASSOCIATION
TRUSTEES' REPORT FOR THE YEAR ENDED 31ST MARCH 2017
(Continued)**

The Board believes that the FBA can stabilise the financial position and deliver the membership services, publications and training and accreditation that allow us to continue to deliver our Charitable Objectives. The FBA will continue to use our heritage and reputation, unique and valued services and our remaining assets which include our staff, HRFs and members and their scientific knowledge and estate to achieve financial sustainability and ensure long-term viability.

The development of the Annexe at Windermere is due to be completed in 2017 and brings added rental income from May 2017.

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 approved by the Council of Trustees 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.

Trustees

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

President

Prof. Sir John R. Beddington CMG

Chairman of Council

Mr G.R. Bateman OBE

Honorary Treasurer

Mr R. A. W. Middleton

Representative Members

The Fishmongers' Company
Royal Society

Mr A. Wallace
Prof. R. Battarbee FRS

Elected Members

* Ms F. Bowles
* Dr A. Crowden
* Dr E. Dollar
* Dr I.G. Dunn

Prof. S.J. Hawkins
Dr P. Shaw (to October 2016)

* Co-opted members.

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 21st September 2017
By Order of the Council

Mr G.R. Bateman OBE
Chairman of Council

THE FRESHWATER BIOLOGICAL ASSOCIATION
STATEMENT OF FINANCIAL ACTIVITIES
(INCLUDING INCOME AND EXPENDITURE ACCOUNT)
FOR THE YEAR ENDED 31ST MARCH 2017

	Note	Unrestricted Funds General	Other	Total 2017	Total 2016
		£	£	£	£
Income:					
Awards and donations	4	5,542	-	5,542	292,701
Activities for generating funds	5	221,731	-	221,731	180,236
Investment income & bank interest	6	28,922	-	28,922	44,610
		-----	-----	-----	-----
		256,195	-	256,195	517,547
Income from charitable activities:	7				
Membership services		26,128	-	26,128	25,023
Scientific publications and journals		77,704	-	77,704	80,099
Scientific research & activity		635,260	494	635,754	472,329
FBA Library/Data & Information Services		50,302	-	50,302	25,326
Training courses & meetings		47,540	-	47,540	29,542
		-----	-----	-----	-----
		836,934	494	837,428	632,319
		-----	-----	-----	-----
Total income		1,093,129	494	1,093,623	1,149,866
		-----	-----	-----	-----
Expenditure:					
Cost of generating funds	8	482,306	-	482,306	310,436
<u>Costs of charitable activities:</u>	9				
Membership services		44,976	-	44,976	71,431
Scientific publications and journals		75,645	-	75,645	94,864
Scientific research activity and Grants		678,274	4,000	682,274	529,711
FBA library/Data & Information Services		174,800	-	174,800	169,834
Training courses and meetings		94,610	-	94,610	89,464
Support costs	10	233,710	-	233,710	192,785
		-----	-----	-----	-----
Total resources expended		1,784,321	4,000	1,788,321	1,458,525
		-----	-----	-----	-----
Net (expenditure) for the year before transfers and other recognised gains/(losses)		(691,192)	(3,506)	(694,698)	(308,659)
Transfer between funds	17	(3,506)	3,506	-	-
Net gain/(loss) on investments	13b	199,269	-	199,269	(107,131)
		-----	-----	-----	-----
Net movement of funds in year		(495,429)	-	(495,429)	(415,790)
Reconciliation of funds					
Total funds brought forward 2016		2,102,754	2,617,944	4,720,698	5,136,488
		-----	-----	-----	-----
Total funds carried forward 2017		1,607,325	2,617,944	4,225,269	4,720,698
		=====	=====	=====	=====

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 FRESHWATER BIOLOGICAL ASSOCIATION
BALANCE SHEET AS AT 31ST MARCH 2017
COMPANY NUMBER 263162

	Note	2017		2016
		£	£	£
Fixed Assets				
Tangible	13a		3,184,047	2,361,763
Investments	13b		949,069	2,300,563
			-----	-----
			4,133,116	4,662,326
Current Assets				
Debtors and Prepayments	14	195,222		139,499
Cash at Bank and in Hand		160,359		199,498
		-----		-----
		355,581		338,997
Less Current Liabilities				
Creditors (due within 1 year)	15	(263,428)		(280,625)
		-----		-----
Net Current Assets			92,153	58,372
			-----	-----
Total Assets Less Current Liabilities			£ 4,225,269	£ 4,720,698
			=====	=====
Representing Members' Funds				
Unrestricted				
General Fund	16		1,246,324	1,734,243
Designated Funds	17		2,617,944	2,617,944
Revaluation Reserve	18		361,001	368,511
			-----	-----
Total Charity Funds			£ 4,225,269	£ 4,720,698
			=====	=====

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 Mr G. R. Bateman OBE Chair 21st September 2017

THE FRESHWATER BIOLOGICAL ASSOCIATION
CASH FLOW STATEMENT
FOR THE YEAR ENDED 31ST MARCH 2017

	2017 £	2016 £
Net cash used in operating activities (See below)	(741,940)	(233,021)
Cash flow from investing activities:		
Investment income and bank Interest	28,922	44,610
Purchase of fixed assets	(874,489)	(393,778)
Proceeds from sale of investments	1,548,368	696,352
Change in cash and cash equivalent in the year	(39,139)	114,163
Cash and cash equivalent brought forward	199,498	85,335
Cash and cash equivalent carried forward	£ 160,359	£ 199,498

Reconciliation of net movement in funds to net cash flow from operating activities

	2017 £	2016 £
Net movement in funds	(495,429)	(415,790)
Add back depreciation charge	52,205	37,202
Add back Investment Management fees	2,395	7,648
Deduct Investment Income and bank interest	(28,922)	(44,610)
Deduct (gains)/add back losses on Investments	(199,269)	107,131
(Increase)/decrease in debtors	(55,723)	(11,201)
(Decrease)/increase in creditors	(17,197)	86,599
Net cash used in operating activities	£ (741,940)	£ (233,021)

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) Basis of Preparation

The financial statements have been prepared in accordance with Accounting and Reporting by Charities: Statement of Recommended Practice applicable to charities preparing their accounts in accordance with the Financial Reporting Standard applicable in the UK and Republic of Ireland (FRS 102) (effective 1 January 2015) – (Charities SORP (FRS 102)), the Financial Reporting Standard applicable in the UK and Republic of Ireland (FRS 102) and the Companies Act 2006.

The Freshwater Biological Association meets the definition of a public benefit entity under FRS 102. Assets and liabilities are initially recognised at historical cost or transaction value unless otherwise stated in the relevant accounting policy notes.

The company's functional and presentation currency is sterling rounded to the nearest pound.

(b) Reconciliation with previous Generally Accepted Accounting Practice

In preparing the accounts, the Trustees have considered whether in applying the accounting policies required by FRS102 and the Charities SORP FRS102 the restatement of comparative items at the transitional date 1st April 2015 was required. No transitional adjustments were required.

(c) Preparation of the accounts on a going concern basis

The Association has an operating deficit of £694,698 for the year. At an emergency meeting in January 2017, the Board made the decision that immediate action to develop and adopt a new business plan was needed. This new business plan will reduce operating costs and together with the current level of surplus Charity Funds, the Board consider that The Freshwater Biological Association is a going concern.

(d) 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.

(e) 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.

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

(f) Tangible Assets and Depreciation

Freehold property at Windermere and East Stoke is included at the revaluation undertaken during the year ended 31st March 2015 using an 'existing use' basis, in line with the then FRS15. Depreciation is charged 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
 Plant and Machinery over 5 – 20 years
 Computer and Other Equipment (including Annexe furnishings) over 4 years
 Scientific Equipment over 5-10 years

(g) 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.

(h) Investments

Investments are a form of basic financial instrument and are initially recognised at their transaction value and subsequently measured at their fair value as at the balance sheet date using the closing quoted market price. The statement of financial activities includes the net gains and losses arising on revaluation and disposals throughout the year.

The Association does not acquire put options, derivatives or other complex financial instruments.

The main form of financial risk faced by the Association is that of volatility in equity markets and investment markets due to wider economic conditions, the attitude of investors to investment risk, and changes in sentiment concerning equities and within particular sectors or sub sectors.

(i) Realised Gains and Losses

All gains and losses are taken to the Statement of Financial Activities as they arise. Realised gains and losses on investments are calculated as the difference between sales proceeds and their opening carrying value or their purchase value if acquired subsequent to the first day of the financial year. Unrealised gains and losses are calculated as the difference between the fair value at the year end and their carrying value. realised and unrealised investment gains and losses are combined in the Statement of Financial Activities.

(j) Pensions

The Association participates in Universities Superannuation Scheme. With effect from 1st October 2016, the scheme changed from a defined benefit only pension scheme to a hybrid pension scheme, providing defined benefits (for all members), as well as defined contribution benefits. The assets of the scheme are held in a separate trustee-administered fund. Because of the mutual nature of the scheme, the assets are not attributed to individual institutions and a scheme-wide contribution rate 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 Section 28 of FRS 102 'Employee benefits', the Association therefore accounts for the scheme as if it were a wholly defined contribution scheme. As a result, the amount charged to the profit and loss account represents the contributions payable to the scheme.

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

3. Net (outgoing) resources for the year

This is stated after charging:

	<u>2017</u>	<u>2016</u>
	£	£
Depreciation	52,205	37,202
Auditors' remuneration	3,500	3,100
	=====	=====

	Unrestricted Funds		<u>2017</u>	<u>2016</u>
Incoming Resources	General	Other	£	£
	£	£		
4. Awards and Donations				
Membership donations	225	-	225	361
Legacies and other donations	2,949	-	2,949	288,733
Gift Aid	2,368	-	2,368	3,607
	-----	-----	-----	-----
	5,542	-	5,542	292,701
	-----	-----	-----	-----
5. Activities for generating funds				
Land and building income:				
Windermere	27,667	-	27,667	30,040
East Stoke	165,527	-	165,527	131,312
Windermere ferry contract	25,674	-	25,674	17,652
Miscellaneous income	2,863	-	2,863	1,232
	-----	-----	-----	-----
	221,731	-	221,731	180,236
	-----	-----	-----	-----
6. Investment income				
Bank deposit interest	603	-	603	207
Investment Income	28,319	-	29,658	44,403
	-----	-----	-----	-----
	28,922	-	30,261	44,610
	-----	-----	-----	-----
7. Charitable activities				
Membership services	26,128	-	26,128	25,023
Scientific and special publications	21,937	-	21,937	24,421
Journals	55,767	-	55,767	55,678
Research contracts	30,385	-	30,385	63,226
Scientific research & activity, direct funding and grants	604,875	494	605,369	409,103
Data & Information Services	47,062	-	47,062	15,940
FBA Library	3,240	-	3,240	9,386
Training courses and meetings	47,540	-	47,540	29,542
	-----	-----	-----	-----
	836,934	494	837,428	632,319
	-----	-----	-----	-----

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

<u>Resources Expended</u>	Unrestricted Funds		<u>2017</u>	<u>2016</u>
	<u>General</u>	<u>Other</u>		
	£	£	£	£
8. Cost of generating funds				
Land and buildings:				
Windermere	198,391	-	198,391	19,817
East Stoke	266,242	-	266,242	275,174
Windermere ferry contract	17,673	-	17,673	15,445
	-----	-----	-----	-----
	482,306	-	482,306	310,436
	-----	-----	-----	-----
9. Cost of charitable activities				
Membership services	44,976	-	44,976	71,431
Scientific and special publications	68,731	-	68,731	37,362
Journals	6,914	-	6,914	57,502
Research Contracts	5,257	-	5,257	60,718
Scientific research activity, direct funding and grants	673,017	4,000	677,017	468,993
Data & Information Services	166,717	-	166,717	142,076
The FBA library	8,083	-	8,083	27,758
Training courses and meetings	94,610	-	94,610	89,464
	-----	-----	-----	-----
	1,068,305	4,000	1,072,305	955,304
	-----	-----	-----	-----
10. Support Costs				
Council meetings and reimbursements to Trustees	10,317	-	10,317	10,966
Other costs – direct and indirect:				
Audit fees	3,500	-	3,500	3,100
Other professional fees	40,167	-	40,167	79,424
Staff costs	157,931	-	157,931	60,083
Irrecoverable VAT	21,795	-	21,795	39,212
	-----	-----	-----	-----
	233,710	-	233,710	192,785
	-----	-----	-----	-----
11. Staff				

Average number of employees was 33 (25 FTE) paid employees (2016: 26 (19 FTE)) during the year to 31st March 2017.

Total Staff Costs in the year were:	<u>2017</u>	<u>2016</u>
	£	£
Salaries	731,215	638,954
Employer's National Insurance Contributions	66,870	51,104
Employer's Pension contributions	47,499	42,999
	-----	-----
Total	845,584	733,057
	=====	=====

There were no employees in the remuneration band £60,000 to £69,999, or above (2016: none).

12. Trustee Remuneration

No members of Council received any remuneration during the year. One member of Council received an honorarium of £800 (2016: £800) for services as FBA Books Editor, unrelated to his/her position as Trustee. Travel costs and Council expenses amounting to £10,317 (2016: £10,966) were paid for or reimbursed to 9 (2016: 8) members of Council.

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

13. Fixed Assets

(a) Tangible

	<u>Freehold Land & Buildings</u>	<u>Plant & Machinery</u>	<u>Computer and other Equipment</u>	<u>Scientific Equipment</u>	<u>Total</u>
	£	£	£	£	£
<u>Cost or Valuation</u>					
At 1st April 2016	2,037,647	316,131	147,360	26,034	2,527,172
Additions	816,517	30,940	27,032	-	874,489
Disposals	-	-	-	-	-
	-----	-----	-----	-----	-----
At 31st March 2017	2,854,164	347,071	174,392	26,034	3,401,661
	-----	-----	-----	-----	-----
<u>Accumulated Depreciation</u>					
As at 1st April 2016	23,520	-	118,457	23,432	165,409
Charge for the year	24,162	17,354	8,087	2,602	52,205
	-----	-----	-----	-----	-----
At 31st March 2017	47,682	17,354	126,544	26,034	217,614
	-----	-----	-----	-----	-----
Net book value					
At 31st March 2017	2,806,482	329,717	47,848	-	3,184,047
	=====	=====	=====	=====	=====
At 31st March 2016	2,014,127	316,131	28,903	2,602	2,361,763
	=====	=====	=====	=====	=====

The historical cost of Freehold Land & Buildings is £2,228,312 (2016: £1,411,795).

The Association revalued its Freehold Land and Buildings in line with the then FRS15 and adopted the revaluation of this class of assets at March 31st 2015. The valuations were carried out by external Independent Chartered Surveyors on a 'fair value' 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 2015 on an 'existing use' or 'fair value' basis.

(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 2016		2,300,563
Additions/(Disposals)		(1,548,368)
Investment Management fees		(2,395)
Net Investment (gains):		
Attributed to General Fund Account (Note 16)	199,269	

		199,269

Market Value at 31st March 2017		949,069
		=====

During the year, £1,548,368 of capital has been raised by disposing of part of the M&G Charifund Accumulation Fund and the entire JP Morgan Bond and UK Equity Fund Units (2016: £704,000 from Investec) to assist with working capital requirements and the capital expenditure on the conversion of the Annexe.

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

13. Fixed Assets (Cont.)

	<u>Quoted</u> <u>Investments</u> £
Represented by:	
Investments held on UK Stock Exchange	912,553
Cash held as part of Portfolio	36,516

	949,069
	=====

The accumulated units received during the year that were reinvested for capital growth had a cash value equivalent of £49,449 (2016: £71,077).

14. Debtors

	<u>2017</u> £	<u>2016</u> £
Trade Debtors	102,201	27,399
Other Debtors	20,127	64,859
Prepayments	19,286	28,865
VAT Debtor	53,608	18,376
	-----	-----
	195,222	139,499
	=====	=====

15. Creditors

PAYE, NIC and pension	26,502	22,453
Trade Creditors	162,833	138,962
Other Creditors and Accruals	48,134	44,991
Deferred income	25,959	74,219
	-----	-----
	263,428	280,625
	=====	=====

16. General Fund Account

	<u>2017</u> £	<u>2016</u> £
<u>General Fund Account</u>		
Balance brought forward	1,734,243	2,128,520
Net movement in funds before transfers and other recognised gains	(694,698)	(308,659)
	-----	-----
	1,039,545	1,819,861
Transfer net movement to Other Funds (Notes 4 to 10)	3,506	1,806
Unrealised gain/(loss) arising from revaluation of Investments (Note 13b)	199,269	(93,976)
Transfer from Revaluation Reserve (Note 18)	7,510	7,510
Transfer between Funds (Note 17)	(3,506)	(958)
	-----	-----
	1,246,324	1,734,243
	=====	=====

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

17. Other Funds

	<u>31.3.2016</u>	<u>Income</u>	<u>Expenditure</u>	<u>Transfers</u>	<u>31.3.2017</u>
	£	£	£	£	£
<u>Unrestricted Designated</u>					
Fritsch Fund	40	-	-	-	40
Frost Bequest	614,208	-	-	-	614,208
Frost Exhibition	3,696	-	-	-	3,696
Gilson Le Cren Fund	-	494	4,000	3,506	-
Freshwater Science Fund	2,000,000	-	-	-	2,000,000
	-----	-----	-----	-----	-----
<u>Total</u>	2,617,944	494	4,000	3,506	2,617,944
	=====	=====	=====	=====	=====

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 01.04.2016	368,511
Surplus on revaluation	-
Transfer to general fund – difference on historical cost depreciation charge and actual depreciation charge on the revalued amount	(7,510)

Balance carried forward at 31.03.2017	361,001
	=====

19. Capital Commitments and Contingent Liabilities

There were capital commitments of approximately £131,000 (2016: £850,000) for the conversion of the Ferry House Annexe and no contingent liabilities at 31st March 2017.

20. Taxation Status

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

21. Related Party Transactions

there are no related party transactions.

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

22. Pension Costs

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 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 cost charged to the profit and loss account is £47,499 (2016: £42,999) as shown in note 11.

The latest available full actuarial valuation of the USS Scheme was at 31st March 2014 (the valuation date), which was carried out using the projected unit method. The valuation as at 31st March 2017 is underway.

Since the Association cannot identify its share of scheme assets and liabilities, the following disclosures reflect those relevant for the scheme as a whole.

The 2014 valuation was the third valuation for USS under the scheme-specific funding regime introduced by the Pensions Act 2004, which requires schemes to adopt a statutory funding objective, which is to have sufficient and appropriate assets to cover their technical provisions. At the valuation date, the value of the assets of the scheme was £41.6 billion and the value of the scheme's technical provisions was £46.9 billion indicating a shortfall of £5.3 billion. The assets therefore were sufficient to cover 89% of the benefits which had accrued to members after allowing for expected future increases in earnings.

Defined benefit liability numbers for the scheme have been produced using the following assumptions:

	2017	2016
Discount rate	2.57%	3.6%
Pensionable salary growth	n/a	n/a
Pensions increases (CPI)	2.41%	2.2%

The main demographic assumption used relates to the mortality assumptions. Mortality in retirement is assumed to be in line with the Continuous Mortality Investigation's (CMI) S1NA tables as follows:

Male members' mortality	98% of S1NA ("light") YoB tables- No age rating
Female member's mortality	99% of S1NA ("light") YoB tables- rated down 1 year

Use of these mortality tables reasonably reflects the actual USS experience. To allow for further improvements in mortality rate the CMI 2014 projections with a 1.5% pa long term rate were also adopted. The current life expectancies on retirement at age 65 are:

	2017	2016
Males currently aged 65 (years)	24.4	24.3
Females currently aged 65 (years)	26.6	26.5
Males currently aged 45 (years)	26.5	26.4
Females currently aged 45 (years)	29.0	28.8
	2017	2016
Scheme assets	£60.0bn	£49.8bn
Total scheme liabilities	£77.5bn	£ 58.3bn
FRS 102 total scheme deficit	£17.5bn	£8.5bn
FRS 102 total funding level	77%	85%

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 2017 which comprise the Statement of Financial Activities, the Balance Sheet, the Cash Flow Statement 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) including FRS 102 'The Financial Reporting Standard applicable in the UK and Republic of Ireland'.

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

A description of the scope of an audit of financial statements is provided on the Financial Reporting Council's website at www.frc.org.uk/auditscopeukprivate.

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 2017 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; and
- have been prepared in accordance with the Companies Act 2006.

Opinion on other matter prescribed by the Companies Act 2006

In our opinion based on the work undertaken in the course of the audit:

- the information given in the Trustees' Annual Report for the financial year for which the financial statements are prepared is consistent with the financial statements; and
- the Trustees Annual Report has been prepared in accordance with applicable legal requirements.

Matters on which we are required to report by exception

In the light of our knowledge and understanding of the company and its environment obtained in the course of the audit, we have not identified material misstatements in the Trustees Annual Report.

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 and from the requirement to prepare a Strategic Report.

91 Gower Street
London
WC1E 6AB
September 2017

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