Freshwater Biological Association

78th Annual Report 2010

Freshwater Biological Association

The Freshwater Biological Association (FBA) is an independent membership organisation and a registered Charity. Founded in 1929, our mission is to advance freshwater science and encourage as many people as possible to adopt it as the best way to understand, protect and manage our precious water resources.

We promote freshwater science by:

- **disseminating information through websites, publications, scientific meetings and courses**
- **facilitating innovative and essential research**
- **providing sound independent scientific opinion.**

Supporting Science

The FBA is based on the shore of Windermere, the Lake District in Cumbria and alongside the River Frome, East Stoke in Dorset. In addition to research undertaken by its own staff, it supports scientific work by providing specialist facilities and equipment at these two sites, awarding grants and studentships, and providing a working environment for Honorary Research Fellows - distinguished scientists who have retired from full time employment.

The Association works with other scientific societies, institutions and individuals around the world. It is a partner in the European Federation of Freshwater Sciences (EFFS) and is developing resources for biological recorders. It is also taking a lead in developing 'The Cooperative Research Partnership', a collaborative strategic science programme with direct relevance to industry and the management of freshwater resources.

Library and Information Services

The FBA is an acknowledged leader in the provision of information on freshwater biology through:

Library and Collections - the FBA holds one of the finest freshwater libraries in the world, housing published and unpublished collections, and is the custodian of a variety of long-term datasets from the Lake District, River Frome and other sites of scientific significance.

Freshwater*Life* - an initiative to draw together information on freshwater fauna and flora and make it accessible online.

The Fritsch Collection - an active and growing reference collection containing millions of illustrations, identification notes and taxonomic bibliographic references for algae (www.fritschalgae.info).

Knowledge Transfer

Publications - the FBA is renowned for its range of high quality, authoritative, keys, reference texts and analysis guides. Its titles include the definitive identification guides to much of the freshwater fauna of Britain and Ireland. Its journal *Freshwater Reviews* publishes review articles on all subjects related to fresh waters.

Scientific Meetings and Courses - the Association arranges a variety of national and international meetings (by itself or jointly with others), and runs general and specialist courses in freshwater biology. In addition to its Annual Scientific Meeting and the prestigious international summit series 'FBA conferences in Aquatic Biology', it works with other national European freshwater societies to organise the biennial Symposium for European Freshwater Sciences.

Membership

Membership is open to individuals and organisations who are interested in freshwater science and who wish to support the Association. Our members are drawn from around the world and include professionals working in research, education, and the management and conservation of fresh waters, as well as students and amateur enthusiasts. Members receive a regular Newsletter and are entitled to a generous discount on a range of FBA products and services, including publications, courses and hire of facilities. Members are encouraged to visit the Windermere or East Stoke sites and preference is given to Members for use of the Library.

Annual Membership rates for 2010 are as follows:

Individual Member..... £35
Student Member..... £20
Corporate Membership..... £300
Life Membership is also offered at a single payment of £600 (or £325 at age 60 or over).

All enquiries about the FBA to:

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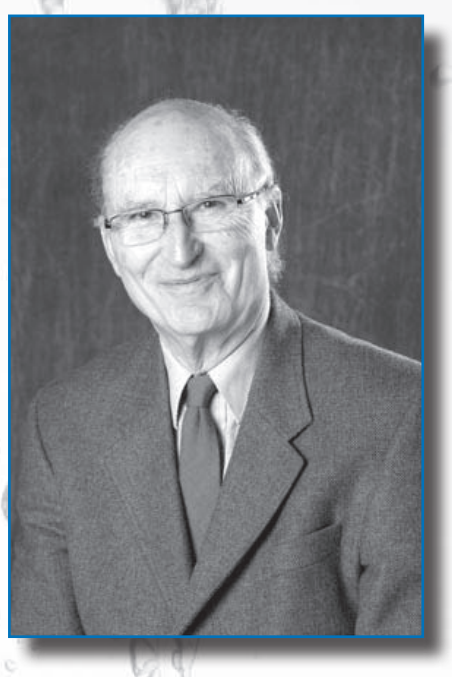
The FBA is a registered charity, number 214440 and a company limited by guarantee, registration number 263162, England.

Contents

Front Cover: Innominate tarn near Hay Stacks, English Lake District. Photo: Simon Pawley (FBA).

REFLECTIONS ON THE PAST - AND THE FUTURE

Sir Martin Holdgate, CB, MA, PhD, Hon.DSc, FIBiol



Sixty three years ago, I first visited the FBA as a schoolboy. My father, who was also my Headmaster and biology teacher, arranged for us to spend a week at Wray Castle so that I could learn something about freshwater life. Dr Winifred Frost suggested we used a paper by Professor H.P. Moon, published in *School Science Review*, as a basis for comparing the faunas of a series of Windermere shores, ranging from the highly exposed rock of Watbarrow Point to the sheltered reedswamps of Pull Wyke Bay.

What I remember of Wray Castle – apart from its glorious architectural eccentricity – was its atmosphere. There were not many staff, but they were all creative and highly skilled, and the place hummed with discovery and fresh thinking. They were also very welcoming to this young student and his mentor. A year or two later, FBA migrated southwards, buying the Ferry Hotel, and when I was there as a visiting Research Student in 1954 it was clear that the expansion in premises and personnel had not diminished the creative atmosphere.

Over the years, the FBA has seen many changes. But, as I come to the end of eight years as President, I sense that something of the old atmosphere is returning. The unique facilities at Windermere and East Stoke are being used for lively science. People are coming for meetings at which state-of-the-art papers are being read. The potential for the FBA as a small but highly-regarded independent scientific body is still there. The last year has seen measurable progress towards balancing the financial books – without which there can be no long-term future – and strengthening the Association's publications, instruction and research. I hand over with confidence of a corner turned, and trust that – as when we progressed from Watbarrow to Pull Wyke – we shall find ourselves moving along a gradient of increasing richness!

May I end this, my last Foreword, by thanking the Association for honouring me with election to your Presidency, and assuring you of my continuing good will and support.

Mission:

The mission of the FBA is to advance freshwater science and encourage as many people as possible to adopt it as the best way to understand, protect and manage our precious water resources.

Freshwater Biological Association

OFFICERS AND COUNCIL at 31st MARCH 2010

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Honorary Treasurer
Dr I.G. Dunn

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Dr C. Askew
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The Duke of Westminster, KG, OBE, TD, DL

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Dr I.G. Dunn
Sir Martin Holdgate
*Prof. C.S. Reynolds
Dr M. Dobson (Director)
**G.A. Freeman (Business Manager)
**C.M. Humphreys (Finance Officer)

* Co-opted Member
** Attendees

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B. Blofield
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Dr J.V. Howarth
Prof. Dr U.H. Humpesch
B.M. Jones
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I. Lane
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C.C. McCready
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D.H. Rhodes
J. Roskell
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O. Simmonite
Dr D. Stevenson
Dr V.M. Stout
Dr D.W. Sutcliffe
Prof. J.J.A. Symoens
Prof. J.D. Thomas
Dr M.P. Thomas
M. Thompson
J.F. Turpin
The Duke of Wellington
The Duke of Westminster
F.M. Wiseman
W.R. White

RESEARCH AS A FOCUS

Prof. Alan Hildrew, PhD

The year has been one of encouraging progress towards our twin aims of stabilising the Association financially and making a stronger impact in the freshwater biological sciences. In Spring 2009, Council set a clear target for reducing the operating deficit, which has dogged us for too long. This target was met and next year we aim to see it very substantially reduced again and then eliminated. Financial conditions remain challenging but I was particularly pleased to see an increase in income of £107k. The River Laboratory at East Stoke is partly responsible for this increase, and it is due to research income gained by John Davy-Bowker who is our new 'man in charge' at East Stoke.

The Director's report details several new initiatives and developments but, strategically, Council is determined that the Association should apply for a greater range of funding, including that for research, and Mike Dobson will be devoting more of his time in that direction. Another development that has made much encouraging progress, both financially and practically, is our 'Ark' project centred on rearing freshwater pearl mussels in the hatchery at Windermere. Mussels from a number of very threatened populations are now being kept there, and thanks to Roger Sweeting and Louise Miles, are doing very well. This is a real example of practical freshwater conservation for which FBA can use its special facilities and expertise.

While there is no room for complacency, the FBA has made real progress and Council is more confident of its future than at any time in the last decade or so. In terms of publications, partnerships with other organisations such as SIL, organisation of meetings and research activity the signals are essentially positive.

I will finish by thanking and congratulating our Director and staff for the sterling work they did in recovering from the catastrophic floods of last winter; this was way beyond the call of duty. It is indeed remarkable then that the spring was among the driest on record in Cumbria and there is now a hosepipe ban in the area!

Strategic objectives:

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

Supporting objectives

- *To maintain a complement of staff and honorary research fellows with the expertise to respond to requests for information or advice.*
- *To adopt a financial strategy which will ensure the FBA's long term sustainability.*

Freshwater Biological Association

COMPLEMENT AT 31st MARCH 2010

Director	Dr Michael Dobson
Personal Assistants to the Director	Sarah A. Johnson / Julie P. McNicol
Business Manager	G. Andrew Freeman
Finance Manager	Catherine M. Humphreys
Finance and Administration Assistants	Carolyn Fletcher
	Sarah Rigby
	Lynda Durrell
Facilities Management, Windermere	Ken Clarke
	Matthew Freeman
Facilities and Research Management, East Stoke	John Davy-Bowker
IT Support	Vanya Gordon
Domestic Assistant, Windermere	Gordon Lancaster
Library and Information Services	Kearon S. McNicol
Library	Hardy Schwamm
Library, East Stoke	Stephanie Smith
Web-developer	Simon Fox
Bioinformatician / Web-developer	Dr Michael Haft
Freshwater*Life* / Journals	Louise Miles
Knowledge Transfer	
Science and Publications	Dr Karen J. Rouen
Training and Education	Dr Melanie Fletcher
	Simon Pawley

The majority of staff are employed on a part-time basis and/or fixed term contracts.

Honorary Posts

Honorary Curator of the Fritsch Collection	Dr Elizabeth Y. Haworth
Honorary Information Science Fellow	Ian Pettman
Honorary Research Fellows:	Prof. Patrick Armitage
	Ken Clarke
	Prof. J. Malcolm Elliott
	Prof. D. Glen George
	Terence Gledhill
	Dr Elizabeth Y. Haworth
	Dr Mike Ladle
	Dr Allan Pentecost
	Prof. Colin S. Reynolds
	Dr Roger A. Sweeting
Honorary Editors:	
Scientific and Special Publications	Dr David W. Sutcliffe
FBA News	Prof. Terry E.L. Langford
Freshwater Reviews	Prof. Colin S. Reynolds

A MOMENTOUS YEAR

Dr Michael Dobson, FLS, MIEEM

The past year was marked by two momentous events. The first, early in the year, was the final departure of the Centre for Ecology and Hydrology (CEH) from the FBA East Stoke site and their replacement with a new set of tenants. Many of the original CEH staff remained at the site, now under the employment of the Game and Wildlife Conservation Trust - for the Salmon & Trout Research Centre - and Queen Mary, University London (QMUL) - for the River Communities Group. To these new tenants we were pleased to add APEM Ltd, a specialist aquatic consultancy that now runs both a freshwater and a marine laboratory on the site, and GT Environmental, a small aquatic consultancy.

The departure of the CEH and transfer of facilities to the new tenants went remarkably smoothly, not least due to the efforts of John Davy-Bowker, appointed as the new manager of the Dorset site. John moved to the FBA from CEH, as did Vanya Gordon, now IT support manager, and the appointment of these two people ensured continuity and relatively little disruption during the transfer. Also worthy of mention is Stephanie Smith, appointed as part-time librarian a few years ago, who, as the FBA took on the administrative responsibilities that had formerly been covered by CEH, extended her activities far beyond the library and is now an integral part of the running of the entire site. That this team of three FBA staff is running a site with around 30 tenant scientists and students is testament to their organisational abilities and their enthusiasm for the job.

The second momentous event was not so positive. On 20 November the Windermere site suffered flooding of its lower-lying buildings. Among the items affected were the stock of publications for sale, many of which were destroyed, and the periodicals collection of the library. A major rescue and clean up operation ensued, dominating activities at the Windermere site for the next four weeks. The entire periodicals collection was relocated in the Pearsall Building, thanks to the efforts of a number of staff and volunteers.

The digitisation of the Fritsch Collection reached its first stage target of 7000 sheets copied, using the funding from the Pilgrim Trust. Unfortunately, however, no further funding has yet been secured to copy the estimated 93 000 remaining sheets, although we hope to make those already copied available online in due course.

On a more positive note, the year was a good one for meetings. Our ASM in Bangor, the first we have ever held in Wales, was a great success (see page 17) and in September another very successful meeting was held jointly with the Institute of Ecology and Environmental Management (IEEM), with whom we signed a Memorandum of Understanding. A small delegation of FBA staff also had a successful attendance at SEFS 6, the 6th Symposium for European Freshwater Sciences, in Romania. Turnout was below what had originally been anticipated, due we presume to the financial squeeze, but ironically the FBA stand made more sales than at almost any previous meeting at which we have been present, probably due to the quality of our products but perhaps because we were one of only three exhibitors at the meeting!

There were some funding successes during the year, of which the most important was undoubtedly the grant awarded by JISC (Joint Information Services Commission) to the FBA and King's College London for the FISHnet project (see page 22). We also had money from the John Spedan Lewis Foundation to support training courses and from the British Phycological Society and Fishmongers' Company for the Fritsch Collection.

The year saw some retirements. Brian Godfrey left in July, after over six years managing the East Stoke site, keeping it viable even when it was empty and thereby creating the conditions that enabled the return of the CEH and eventually the situation that we see today. Brian is still seen occasionally in Dorset, in his role as a self-employed contractor, as his knowledge of the site is second to none. Also gone but still around is Ian Pettman, who retired in November but immediately became an Honorary Information Science Fellow, providing voluntary support to the Library and Information Services (LIS) Team and assisting them in bringing in some income. We said goodbye to Olive Jolly, after 40 years' working in the Windermere library, although she, too, came back temporarily to help sort out the mess caused by the flood and to update the catalogue with the new homes of the relocated items. Elaine Monaghan left after 15 years working with the Fritsch Collection, but managed, before she went, to transfer on to paper a useful proportion of her huge knowledge of the Collection, its workings and its contacts. Rebecca Close, who had been appointed to work on the Pilgrim Trust project, moved on when the project was completed, and is now employed by the South Cumbria Rivers Trust.

There were also a couple of appointments. In addition to John Davy-Bowker and Vanya Gordon at East Stoke, we welcomed Simon Fox on a temporary contract to work on the FISHnet project (see page 22). Finally, mention must be made of Daniel Turner, with us for eight months on the sandwich year placement as part of his degree in Environmental Science at the University of Leeds. Dan's original remit was to work with LIS (see page 22), but he was also incredibly useful as an extra pair of hands for the several weeks that were required cleaning up the flood damage and re-housing the library. As I write, Dan's time here is coming to an end; I wish him well with his future studies and am pleased to report that he is keen to work in freshwater biology in the future.

Supporting Science

Overview

Science is at the heart of FBA activities. Explicit in our vision is a desire to advance freshwater science, as we believe that good understanding and good management can only be achieved if the information at our disposal is of good scientific quality. This philosophy has been at the heart of all our activities, from active research to provision of supporting services.

After several years during which direct scientific research activities dwindled until only the Honorary Research Fellows were active in this area, we are gradually rebuilding our own research capacity, to complement that of collaborators in universities and research institutes and of the tenants on our sites. To reflect this revival and to demonstrate the emphasis that is being placed on research, in this Annual Report we have brought together the various research activities in which the FBA is involved, whether as an active participant, a funder or a provider of facilities.

In this emphasis on direct science-related activities, it is important not to overlook the fact that many of the other activities in which we are engaged, and which are highlighted later in this Report, also make a contribution towards research. Training courses are used by many to enhance their research capability, conferences to keep up to date with developments and of course publications are often crucial tools in effective research. The Library and Information Services team provides information needed to inform good research, not least of which is the Library itself, but is also involved in research-related activities, such as projects aiming to improve access to and sharing of data among different research groups.

FBA Staff Research

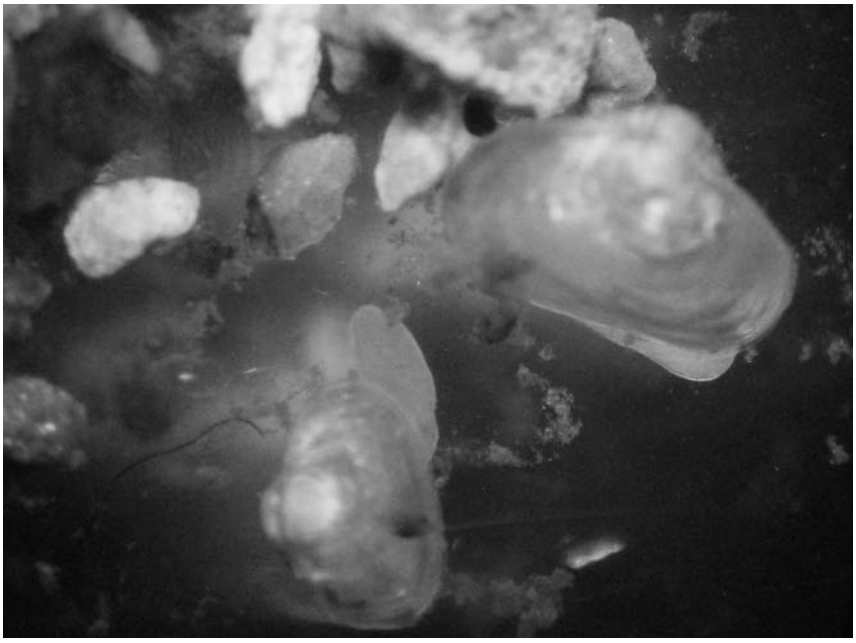
The River Invertebrate Classification Tool

The FBA was awarded a research and development contract from the Environment Agency to undertake preliminary work to develop an extension to the River Invertebrate Classification Tool (RICT) to improve the Water Framework Directive (WFD) assessment of deep rivers.

The FBA is also collaborating with CEH on a new project to further develop the RICT tool. This SNIFFER (Scotland and Northern Ireland Forum for Environmental Research) funded project will enhance the RIVPACS (River InVertebrate Prediction and Classification System) models in RICT by removing predictive variables that are themselves affected by stressors. The aim is to construct new models that only use stressor independent variables. This project will also include work to test several of the WFD reporting indices, notably the Acid Waters Indicator Community (AWIC) Index, the Lotic-invertebrate Index for Flow Evaluation (LIFE) index and the Walley Hawkes Paisley Trigg (WHPT) index.

Freshwater Pearl Mussel Ark Project

The Freshwater Pearl Mussel Ark Project is a collaborative project between the FBA, Natural England and the Environment Agency which aims to conserve populations of the freshwater pearl mussel, *Margaritifera margaritifera*, and captive breed from them for the purposes of reintroduction. The life cycle of *M. margaritifera* includes a parasitic stage on the gills of a salmonid host. Larvae known as glochidia are released from the females in late spring/early summer where they must encounter a host fish to continue their development. They parasitise the fish for around nine months before dropping off and burying in the river bed to continue their growth. More information on the biology and life history of the freshwater pearl mussel can be found on the FBA website at www.fba.org.uk/index/projects.html.



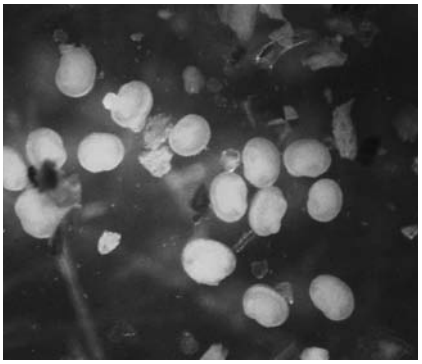
Juveniles from the first cohort of mussels reared in the captive-breeding facilities. The individual on the left is 1.6 mm long and the individual on the right is 3.4 mm long. Photo: Louise Miles (FBA).

The project commenced formally in April 2007 and now holds populations of the freshwater pearl mussel from eight English rivers. Juvenile mussels have been successfully reared from most of the populations and will be grown for approximately five years in a specially-designed environment mimicking natural conditions, until they are old enough for reintroduction. The project has two main aims:

- to create an ark for all English pearl mussel populations to safeguard against further local extinctions;
- to breed from the captive individuals in order to release juveniles back into the wild.

It is anticipated that remedial work on the source-rivers will take place whilst the project is progressing. For some rivers with particularly complex issues, it may not be possible to restore these fully in the time-frame of this project and alternative reintroduction sites may be sought from within the same catchment.

Juveniles from the first cohort of mussels to be reared, released in spring 2008,



Juveniles from the second cohort of mussels, released in 2009/10. Photo: Louise Miles (FBA).

are showing good growth with a range of sizes observed. The differences in growth rates between individuals are consistent with those reported from wild populations, indicating that it is not a result of rearing in a captive environment. The second cohort of juvenile mussels to be reared were released during 2009/10.

During the past year, four out of the seven populations of mussels held at the time reproduced successfully on their preferred host fish. Experimental trials showed that different mussel populations preferred different species of host fish; although the exact relationships are still unclear, these trials will improve the effectiveness of the project in future years. The main priority for the coming year is to continue captive breeding activities whilst attempting to maximise the survival of juvenile mussels. Investigations looking into ways to increase juvenile survival will take place as part of Louise Miles' PhD research into the species.

Grants & Awards

The FBA awards an annual grant of £4000 for scientific research into freshwater biology. The grant – the Hugh Cary Gilson Memorial Award – is in memory of a former Director of the FBA and is open to all current FBA members. In 2009 it was awarded to Suzanne McGowan for her proposal entitled 'Comparing limnological and palaeolimnological records at Windermere'. The award funded the collection, dating and pigment analysis of sediment cores from the north and south basins of Windermere, to compare with the phytoplankton monitoring records collected since 1945 by the FBA and CEH Lancaster. Her progress report is presented on page 9.

In 2007, the Association re-launched its postgraduate studentships, awarding two part-funded PhD studentships for a period of three years, with a further PhD award in 2008. All three studentships have utilised FBA facilities and services at Windermere and East Stoke. An update on these and other awards is provided below along with a report from Julia Reger, whose PhD at the University of Sheffield includes the FBA as a sponsor. Looking ahead, a joint PhD studentship between the FBA and the University of Leeds on 'Macroinvertebrate community structure and functional development in reed swamp habitat', supervised by Mike Dobson (FBA) and Lee Brown (Leeds), has been approved and is due to start in October 2010.

The administration of the FBA's grants and awards is the responsibility of the Grants & Awards committee, which reports to FBA Council. Composition of the Grants & Awards Committee as at 31 March 2010 was: Ian Winfield (Chair), Roland Fleck, Graham Proudlove and Karen Rouen (FBA staff).

Part-funded PhD Studentships

Helen Rosenkranz has now successfully completed the first year of her PhD at the University of Bristol, jointly funded by the FBA and the Lady Emily Smythe Agricultural Research Station (LESARS). Her PhD, entitled 'Biofilm dynamics: biodiversity, architecture and functioning in response to agrochemical gradients', is an interdisciplinary project supervised by Marian Yallop, Alex Anesio (both University of Bristol) and Martyn Kelly (Bowburn Consultancy, Durham). The aims of the project are to: (i) quantify the microbial biofilms in terms of their bacteria, viruses and eukaryotes along a gradient of anthropogenic stress (nutrients and herbicides); (ii) improve our understanding of the functioning of the biofilms by quantification of the balance between autotrophic and heterotrophic processes along the gradient of degradation; and (iii) investigate the role of viruses in controlling biofilm formation and activity in 'stressed' versus 'pristine' communities under experimental conditions.

Outdoor mesocosm experiment conducted by Helen Rosenkranz at East Stoke, June 2009. Photo: H. Rosenkranz.

During the first year of her PhD, Helen conducted experiments in the artificial stream channels as well as in outdoor circulating mesocosms at the FBA's East Stoke site. The impact of a reduced level of phosphorus on developing biofilms and the subsequent impact of the pesticide glyphosphate on these biofilms was investigated. She also set up indoor mescosm experiments under controlled laboratory conditions. She isolated clonal cultures of a number of species from the biofilms gowing in the River Frome which are being used for these experiments.

Brian Foley is now in the final year of his PhD, in a collaborative project between the University of Ulster at Coleraine (UCC) and CEH Lancaster. Supervised by Brian Rippey (UCC) and Ian Jones and Stephen Maberly (CEH), his PhD is entitled 'Controls and consequences of oxygen depletion in lakes'. Brian is investigating the interacting effects of climate change and nutrient load on dissolved oxygen (DO) depletion in lakes, and the relationship between mixed layer primary production and DO depletion, as well as assessing some of the consequences of DO depletion in terms of the habitat available to fish and phosphorus release from sediments.

Brian spent the second year of his PhD based at CEH Lancaster, returning to UCC for his final year. This placement allowed him the opportunity to analyse long-term data from Blelham Tarn and the south basin of Windermere. Results indicated that the increasing duration of stratification over the period 1968 to 2008, due to warming of the lakes, exacerbated hypolimnetic DO depletion and led to a greater extent and duration of hypoxic conditions. Analysis of data from the FBA's experimental enclosures ('Lund tubes'), which operated in Bleham Tarn between 1971 and 1983, emphasised the important contribution of the sediment to overall DO depletion in the hypolimnion. Brian assisted CEH in their installation of a winch and attached DO–temperature probe to the permanent monitoring buoy at Esthwaite Water, the results from which he will analyse during his final year. Using field data collected at lakes in Northern Ireland during his first year, Brian has examined vertical DO transport in the hypolimnion of a stratified lake, the results indicating that this was not an influential factor in terms of the observed hypolimnetic DO depletion rates. The addition of data contributed by other workers from Sweden, Wales and Northern Ireland has allowed the continued development of the statistical model based on the relationship between hypolimnetic DO and both chlorophyll and total phosphorus. Brian recently presented some of his findings at the scientific meeting organised by CEH Lancaster to celebrate 65 years of monitoring in the Windermere catchment, and also intends to present at the International Society of Limnology (SIL) conference in South Africa in August.

Julia Reger sampling *Daphnia* from a pond. Photo: J. Reger.

Following the withdrawal of Angela Gooderham due to illness at the end of the first year of her PhD at the University of Durham, her supervisors Martyn Lucas and Rus Hoelzel have appointed a new student, **Fiona Bracken**. Fiona will continue the project on 'Behavioural and evolutionary ecology of lampreys – jawless archetypes in a 21st century landscape', with the University securing replacement funding for her first year.

CASE PhD Studentship

Julia Reger is in the second year of her PhD at the University of Sheffield, supervised by Andrew Beckerman, Jon Slate (University of Sheffield) and the FBA Director, Mike Dobson. Her project 'Mapping the geography and genetics of fear – adaptation in a predator-prey system' is focused on elucidating the genetic basis of predator induced phenotypic plasticity using the clonal microcrustacean *Daphnia pulex*. It is an excellent system in which to unravel this complexity as *D. pulex* faces vertebrate (*Gasterosteus aculeatus*) and invertebrate (*Chaoborus flavicans*) predators and responds to the chemical signals from each of these predators with a set of behavioural, life historical and morphological traits.

Julia has sampled *D. pulex* from 25 ponds across a north-south gradient in the UK, including ponds near the FBA Windermere centre and in the vicinity of the FBA East Stoke, Dorset. Combining bioassays of life history and morphology under predation risk and some of the most advanced molecular and genomic tools available, Julia is investigating the genomic and genetic basis of the predator induced phenotypic plasticity associated with adaptation to different predators. Additionally, using the molecular data, she aims to identify the underlying genes or genomic regions associated with predator specific adaptations.

Hugh Cary Gilson Award Report

Linking Limnology and Palaeolimnology using Algal Pigments at Windermere

Suzanne McGowan (University of Nottingham)

Windermere has a special place in the development of limnology and palaeolimnology (the study of lake sediment cores). The lake has been continuously monitored for phytoplankton since 1945 and is the site of some of the earliest palaeolimnological studies. Sixty-five years later, the simultaneous accretion of sedimentary and algal records, coupled with the development of new palaeolimnological techniques, means that Windermere can give us unprecedented insights into the causes and consequences of lake eutrophication. Windermere has a long history of human disturbance and enrichment, including the development of tourism and agriculture in its catchment over the last two centuries. The intensity of eutrophication varies among basins, with the North basin less severely enriched than the South. This project aimed to build on this extraordinary history, firstly to compare sedimentary records with phytoplankton collected from the water column and secondly to extend the history of algal change in both basins of Windermere using the longer records provided by sediment cores.

Suzanne McGowan (Gilson Award winner 2009) with a 'mini-Mackereth' sediment core from the South basin of Windermere. Photo: S. McGowan.

We took sediment cores from the North and South basins of Windermere to reconstruct past communities of algae using chlorophyll and carotenoid pigment biomarkers. Cores measuring approximately 80 cm in length were retrieved by a team from Lancaster University (Phil Barker, Andy Quin and Paul Williams). Dating of sediments by Jackie Pates of Lancaster University using 210Pb isotopes showed that the sediments dated back approximately 200–300 years. Interestingly, we found some fragments of coke close to the bottom of one of the North basin cores, which we think was probably deposited from the steamers that used to cross the lake, and provided an independent means of constraining the age of the sediments. The chlorophyll and carotenoid pigments were extracted at half-centimetre intervals down the sediment cores, in organic solvents. Pigment extracts are usually yellowish-orange or greenish in colour (Fig. 1). This colour derives from the mixture of chlorophylls (which are green), carotenoids (orange in colour) and chlorophyll derivatives (usually yellow). Carotenoids can vary in hue; for example fucoxanthin from siliceous algae is orange-yellow whilst oscillaxanthin from Cyanobacteria is orange-red. The specific combination and abundance of each pigment determine the colour of the extract. Characterisation of pigments down the sediment core is achieved using high-performance liquid chromatography (HPLC) separation, and then diagnostic marker pigments are used to quantify changes in different algal groups.

We correlated sedimentary pigments and phytoplankton datasets to provide a long-term validation of the use of palaeo-pigment records. The phytoplankton dataset from Windermere is now stored by CEH, where Stephen Maberly and Heidrun Feuchtmayr were responsible for collating the dataset for comparison with the sedimentary record. Comparisons between the two records agreed well, although the strength of correlations varied among pigments, providing insights into how pigments can provide records of different features of the phytoplankton in the lake. For example, phytoplankton samples provide a record of communities in the upper waters whereas pigments integrate algal production from the entire basin and so can provide records of deep-water blooms. Because we sampled replicate cores in lakes of high (South) and low (North) productivity, we will be able to assess how sediment burial rate and lake trophic status influence the formation of palaeolimnological records.

The pigment records at Windermere have extended our knowledge of algal changes in the lake back to the late 18th century. Perhaps the most interesting finding of this work is the discovery that the establishment of the towns of Bowness and Windermere on the shores of the South basin after 1847 coincided with a marked increase in Cyanobacteria (blue-green algae) in the lake. Although Victorian tourism has long been implicated in having a detrimental impact on the lake, this work illustrates a fundamental shift in the primary producers of the lake, as sewage loading on the basin increased in the absence of adequate systems of sewage treatment. We are further investigating the impact of these early changes on carbon and nitrogen cycling using stable isotopes in the sediments analysed by Peter Leavitt (University of Regina). The final part of the jigsaw is to build up information on as many potential drivers of change in the Windermere catchment as possible. Elizabeth Haworth (FBA) has been especially helpful in this regard because of her expertise in working with sediments from Windermere and her knowledge of local changes. Therefore, we have been collating data from various sources including agricultural census records, fertiliser application rates, local council records on changes in sewerage and sewage treatment, climate data, and old press articles and archives in the FBA's Unpublished Collection documenting local observations on the lake. We would like to hear from anyone with other historical sources that may be helpful in reconstructing the picture of change in Windermere over the last few centuries.

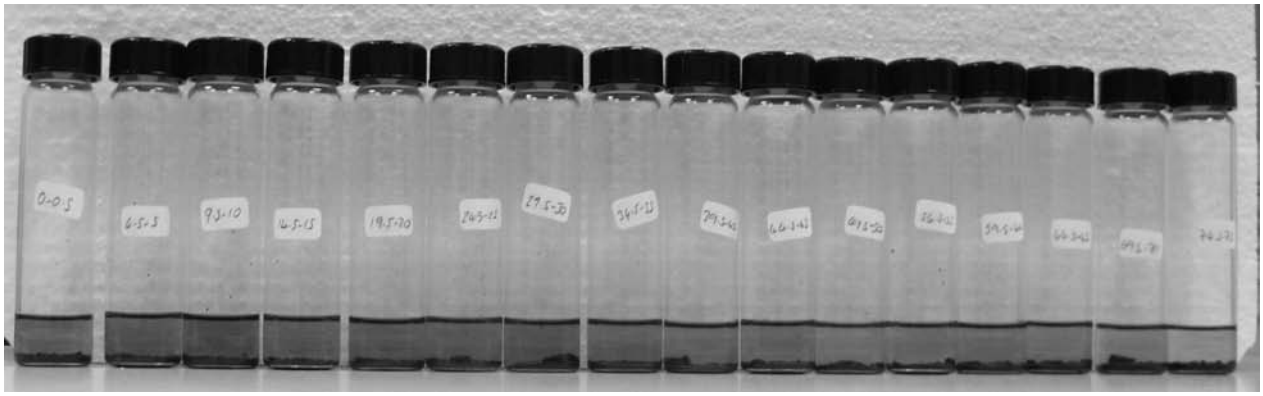


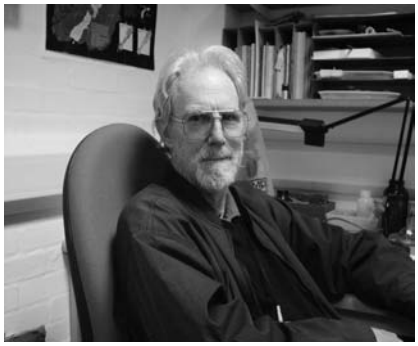
Figure 1. Extracts of chlorophyll and carotenoid pigments from the Windermere South basin core. Photo: S. McGowan.

Reports from the Honorary Research Fellows

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

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

Patrick Armitage
Applied Invertebrate Ecology



Patrick Armitage

I have contributed to work on the response of perennial and temporary headwater stream invertebrate communities to hydrological extremes with the University of Loughborough (Stubbington et al., 2010). Extreme summer flooding provided the opportunity to examine the response of aquatic invertebrates to unseasonal spate flows at both perennial and temporary sites, and the subsequent drying of temporary headwater sites, on the karstic River Lathkill (Derbyshire, UK). Also in collaboration with University of Loughborough we examined the use of Chironomidae in characterising the palaeoflow regime of a large mid-late Holocene floodplain palaeochannel of the River Trent (Derbyshire, UK).

The survey of a small acid stream draining an SSSI-designated area of heathland has been completed and the work is now published (Hawczak et al., 2009). The Oakers Stream exhibits a high degree of habitat diversity from the pools of the upper reaches through the 'semi-natural' sites in woodland to the modified lower reaches. It is this variability (largely anthropogenic) which accounts for the relatively high numbers of taxa (108) recorded for a stream of this type.

A new study in 2009 has examined the faunal communities of pools, seepages and two small streams in an area of fen adjacent to FBA East Stoke. Data will take the form of taxa lists and will be made available to Dorset Wildlife Trust and prepared for publication.

My work on the small streams of the River Frome catchment and adjacent areas continues and I have written a paper looking at the relationship between catchment characteristics and faunal communities using the data from nine streams collected over the last 10 years. This paper together with four others examining the effects of land use on streams and rivers forms part of a special issue of *Freshwater Forum* (to be listed in next year's Annual Report).

I have also collaborated with Terry Langford (University of Southampton) and John Davy-Bowker (FBA) on a chapter on aquatic macroinvertebrates of the New Forest.

Ken Clarke
Electron microscopy

Ken Clarke

During my 23 years at the Ferry House laboratory I have produced an archive of around 17 000 negative images, all of which illustrate aspects of cell shape, ultrastructure, association and function, and all relate to aquatic microbial life. Rationalisation of this archive was commenced in 2008 and continues to progress with currently irrelevant images being discarded from the bulk and associated image data adjusted accordingly. As this proceeds, Bland Finlay, Genoveva Esteban and I are considering the selection of unique, educational and high resolution and quality images from the archive for possible publication in book form, aimed at the aquatic microbiological student, researcher and the interested lay-person.

Three projects involving electron microscopy are in various stages of completion:

- Possible undescribed Cyanobacteria (blue-green micro-algae) species from extreme (saline) environments have been prepared for examination in the refurbished transmission EM (CEH Lancaster).
- A protozoan ciliate living in intimate association with other microbes has been fixed and sectioned and is now ready for transmission EM examination (QMUL).
- An extraordinarily intense infestation of glocidia (early life-stage of the pearl mussel, *Margaritifera margaritifera*) has occurred on the gills of host fish under controlled condition in the FBA hatchery. Infected fish gills were removed and processed ready for scanning EM examination. The investigation is part of Roger Sweeting's ecological, life and conservation study of populations of the freshwater pearl mussel.

It is likely that in the coming year my involvement with these three projects will continue, together with ongoing site maintenance and development, as the FBA's Windermere laboratory site and its science programme continues to evolve and develop.

The last year has seen a continuation of my role in educational demonstration of EM instrumentation, techniques and application, with both instruments demonstrated to a number of students and FBA visitors and members.

J. Malcolm Elliott

Ecology of Freshwater Fish and Zoobenthos

Malcolm Elliott

My first product of the year was a paper on the number of larval instars in British populations of 24 species of stoneflies (Plecoptera) (Elliott, 2009a). Ontogenetic changes during the life cycle of aquatic insects are important not only in life-history studies but also in evaluating food-web structure. They require information on the growth and number of larval instars but such data are lacking for many species, including Plecoptera. Of the 34 species of Plecoptera recorded from Britain, two are probably extinct and four are rare. Quantitative information on egg development is now available for British populations of the remaining 28 species, chiefly due to my own work in the past. In contrast, information on instar number was available for only four species. Therefore, the chief objectives were to determine inter- and intra-specific differences in the number of larval instars in British populations of 24 species, to test Dyar's hypothesis that growth followed a geometric progression, and to synthesise this information with previously published values for four British species.

The relationship between the geometric mean length of each instar and instar number was well described by an exponential equation, thus supporting Dyar's hypothesis. Only one species, *Brachyptera risi*, had the same number of instars for males and females (12–13). For the other 15 herbivorous species and the four smaller carnivorous ones, the number of instars was higher for females than males (range 11–16 for males, 12–17 for females); the larger size of the females was due to their additional instars, not a sex difference in growth rates. In contrast, there was a clear growth separation of the sexes after the ninth or tenth instar for the four largest carnivores; the number of instars was highest for these four species (16–19 for males, 18–23 for females), and females were much larger than males. This study and four previous ones provide a sound basis for ontogenetic studies on 28 species of Plecoptera and their role in aquatic ecosystems.

My second product was on the validation and implications of a growth model for brown trout, using data from a 34-year study of juvenile sea-trout (Elliott, 2009b). The objectives were: (i) to check the validity of a growth model; (ii) to examine the relationship between population density and both mean mass and mean growth rate and (iii) to discover if compensatory growth occurred.

A growth model was used to estimate the mean mass of the trout over the two years spent in fresh water. The variation in mean mass among year-classes was small for newly-emerged fry (CV = 6.2 %), maximum at the start of the first summer of the life cycle (CV = 38.1 %), and then decreased gradually for successive life-stages to a low value for pre-smolts (CV = 10.8 %). Mean mass was not related to population density and, therefore, mean growth rate was density-independent. Growth in the first, but not the second, winter of the life cycle was lower than model prediction, but when it was assumed in the model that there was no first-winter growth, there was good agreement in most year-classes between model estimated values and observed mean mass. Exceptions were lower than expected mean masses and growth rates for 0+ trout after four summer droughts, but compensatory growth followed, so that observed and expected masses were similar for 1+ trout.

Pre-smolt mean mass on 30 April measured total growth achieved in the freshwater phase of the life cycle. This was significantly related to mean mass at the end of the first and second summers of the life cycle, but not to the emergence date and mean mass of emerging fry. These juvenile sea-trout were growing at their maximum potential in most year-classes, but when this was not achieved, compensatory growth soon restored their mass to values expected from the model. This ensured a low variation in the mean mass of pre-smolts just before they migrated to the sea. However, the latter mass was higher in more recent year-classes (1987–1998) than in previous year-classes (1967–1986), demonstrating the effects of slightly higher stream temperature. This study has shown the importance of developing realistic growth models in order to detect departure from maximum potential growth, and the more subtle effects of temperature change, possibly due to the effects of climate change.

D. Glen George

Zooplankton

Glen George

A significant proportion of my time in 2009 was spent on technical tasks connected with the publication of the book on climate change of which I was editor (see publications page 15). These included preparing the front matter, checking the index and circulating and checking proofs. The book was published in January and a complimentary copy deposited in the FBA library.

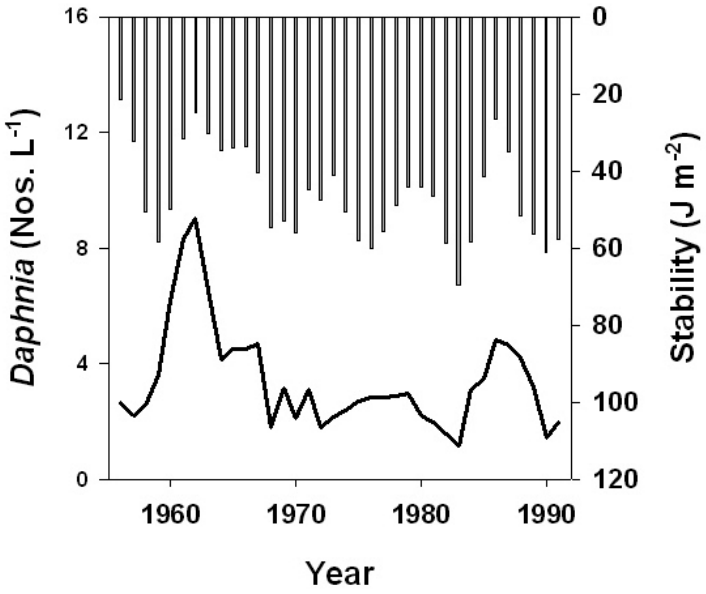


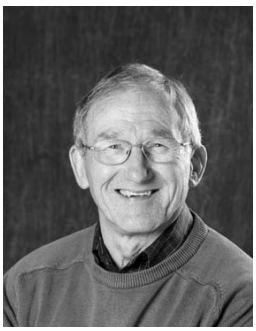
Figure 1. Year to year variation in the stability of the water column in Esthwaite Water (vertical bars) and summer abundance of *Daphnia* (line graph). Image: D. Glen George.

My work on the automatic monitoring of Llyn Tegid continues and a poster describing some of these results was presented at the annual meeting of the Countryside Council for Wales (CCW).

In July 2009, I delivered a public lecture at the first FBA meeting to be held in Wales on the topic 'Lakes in History, Legend and Literature'. The lecture was delivered in Welsh with simultaneous translation. A paper on the impact of extreme weather events was presented at the same meeting using data acquired by the monitoring station on Llyn Tegid. In November 2009, I attended a workshop at the Malham Field Centre and presented a paper on the factors influencing the development of ice on Windermere.

My main activity towards the end of the year was analysis of some of the long term data jointly owned by FBA and CEH to look at the effects of the weather on the abundance of *Daphnia* in Esthwaite Water. The analysis of the population data collated for this site between 1956 and 1990 demonstrates that the key factor influencing the summer abundance of *Daphnia* is the physical stability of the water column (Fig. 1, page 11). In warm summers with less intense wind-mixing, large inedible species of phytoplankton dominate the plankton and there is a marked reduction in the numbers of grazing *Daphnia*. This work was written up for presentation at a conference on long term datasets and for publication.

Terry Gledhill
Invertebrate Taxonomy



Terry Gledhill

Work continues on the second volume of the collaborative 'key' to water mite species of central and north-western Europe (Chelicerata:Acari II), dealing with two large superfamilies – Hydryphantoidea and Lebertioidea (with 9 families, 9 subfamilies, 33 genera, 20 subgenera and 178 species). Keys and diagnoses are provided at superfamily, family, subfamily, genus and subgenus level. Keys to species are followed by species descriptions with information on similar species, preadult stages, habitat and biology and distribution. Work on the final volume, which also deals with two large superfamilies, has already commenced.

I have examined and identified water mites collected by David Pryce (University of Stirling) during a survey of the hyporheic (interstitial) habitat of 20 Scottish rivers. Although 59 samples contained water mites the numbers found from each were low. Nevertheless some true interstitial species were found but no additions to those found in a survey in 1972 (Gledhill, 1982).

The subterranean amphipod, *Microniphargus leruthi* Schellenberg is recorded from Belgium, Germany and Luxembourg. Recently, Lee Knight collected specimens apparently of this species from Ireland. In view of the disjunct distribution it was deemed appropriate to compare type material (on loan from the Natural History Museum, Berlin) with the specimens collected in Ireland. I concluded that the Irish specimens agreed in gross morphology with the type material and that this species does indeed occur there.

Elizabeth Haworth
Diatoms and Palaeolimnology
Honorary Curator of the Fritsch Collection

Elizabeth Haworth

The second edition of the *British Algal Flora* is currently being published and will include an updated chapter on the diatoms (Bacillariophyta), prepared by Martyn Kelly and myself.

Following the recent visit of Suzanne McGowan of Nottingham University, who holds a Hugh Cary Gilson Memorial Award, I continue to take an interest in the algal records in the sediments of Windermere and in the recent studies by Southampton Ocean Sciences on the considerable depth of glacial material.

My curation of the Fritsch Collection once again dominated my time. Following the digital copying of half the desmid section of the Fritsch Collection, c.7000 images are now stored and considerable effort has been put into validating much of the information to accompany them, including correcting the species authorities which are so often misquoted. I also coordinated production of a manual outlining all the procedures for digitisation and a further manual describing procedures for managing and accessing the collection.

Caroline Cotgrove, a National Trust conservator, provided some useful training on conservation processes to ensure proper repairs of the sheets where tears have occurred or insertions have become unstuck.

Allan Pentecost
Algal Ecology

Allan Pentecost

This year saw the publication of a review of Britain's marl lakes entailing a summer field season sampling a wide range of marl lakes in England and Ireland (Pentecost, 2009). Lake sediments were collected and analysed for total iron and phosphorus content to further our understanding of phosphorus transformations between sediment and water in these interesting waterbodies. The study concluded that many British marl lakes continue to be threatened by eutrophication, invasive plants and animals (especially *Dreissena*) and flooding as sea levels rise, but some of the more remote Scottish lakes remain in good condition at present. Another field study was undertaken with Professors Whitton and John in the fresh waters of South Uist in the Outer Hebrides. Marl lakes were again the focus of attention but on this occasion we concentrated on the phytoplankton. Previous work indicated a rich cyanobacterium flora in some of the machair marl lakes where further investigation was called for. About 10 lakes were sampled, including a few acidic lochs in the eastern hills. Some basic water analysis was undertaken and a large list of Cyanobacteria was obtained plus a species of *Zygnema* (Chlorophyceae) new to Britain. The results will be incorporated into the revised *Freshwater Algal Flora of the British Isles* to be published later in 2010. The new flora includes a substantially revised section on the Volvocales and a new plate of illustrations.

A third field trip was organised to Ben Eigh

in the Highlands of Scotland to sample subaerial colonies of the cyanobacterium *Gloeocapsa magma*. This organism is one of a handful of Cyanobacteria possessing a vernacular name - the Mountain Dulse - said to have been used by the highlanders as a salve in former times. The dulse is a spectacular alga on Ben Eighe where it forms huge deep red jelly-like colonies on damp quartzite gravel that in place must make a significant contribution to the phototrophic biomass. It appears to be much less common than formerly and I have yet to see it in the Lake District or Welsh mountains. Samples of dulse and associated seepage waters were removed for analysis and a report was written for Scottish Natural Heritage. This study was undertaken as part of a review of the subaerial Cyanobacteria being written jointly with Brian Whitton for the new edition of the *Ecology of Cyanobacteria*. Little is known of the subaerial Cyanobacteria (those inhabiting surfaces above the soil) and the review has entailed a considerable amount of original field research including surveys of Cyanobacteria growing on bryophytes, trees, painted walls, overhangs and cave walls (surveys of White Scar and Ingleborough Caves).

Further surveys of rock seepages were undertaken in the early summer of 2009 in the Yorkshire Dales. This project concerns the Cyanobacterium genus *Schizothrix*, characteristic of calcareous seeps, soils and streams. The aim was to collect from a wide range of sites to explore the variability of microscopic characters in this currently taxonomically confusing genus. About 30 samples were examined before the wet weather made sampling difficult and the work will be continued next summer. During the course of the study a rare desmid *Mesotaenium kramstai* was discovered which prompted a short write-up with David Williamson that will be published later in 2010.

Colin Reynolds

Ecology and Modelling of Phytoplankton

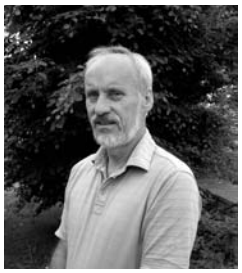
Colin Reynolds

Microorganisms, especially the pigmented ones, are astonishingly beautiful organisms. Their compactness and physiological sophistication have enormous appeal. Of particular interest is the shortness of the generations on real time scales. These are ideal subjects for observing the principles of ecosystemic ecology in action. In my work, I have applied knowledge of phytoplankton function, growth and death rates, to reconstruct ('model') the processes of community assembly, succession and diversity, and to formulate the 'game rules' by which complex communities emerge from disparate fractions. As I reported last year, I have become interested in 'thresholds' in the supply of materials and primary energy, and the boundaries set by the components of carbon availability and nutrient fluxes, culminating in a publication that has already attracted several citations. The question about how they react to disturbance by external forcing remains an absorbing one and I have just had published a paper applying theory to the effects of natural disasters.

Over the past twelve months, my major scientific activity has been to collaborate on two review papers, with my former colleagues of the 'Algal Modelling Unit' at CEH, one explaining how our most successful model of natural phytoplankton dynamics (PROTECH) may be applied to detailed and realistic water-quality responses to quite subtle variations in the inputs from their catchments, the other showing the effects of the same factors on one of the Lake-District lakes (Grasmere) over the past 40 years.

Roger Sweeting

Water Quality and Fish Biology



Roger Sweeting

The development of the hatchery as an ark for pearl mussels continues to be my major area of work. Our main aim is to maintain populations and enable them to produce viable offspring which we will rear until the restoration of their parent river catchments is sufficiently complete to allow restocking to be carried out. To date we have juvenile mussels from at least one year for all eight established populations, and up to three years for some populations.

We have discovered that some populations will only complete their larval stage on salmon and others only on brown trout. These do not necessarily coincide with the existing dominant salmonid species from the parent river, which raises important issues about our historic changes to watercourses and their effects on the native fish community. The known genetic relationships between the different mussel populations in Britain also provide little assistance in this matter.

We had hoped to determine more precisely the timings for critical events in the mussel life cycle by monitoring reproductive events in relation to degree days experienced. With some glochidial larvae leaving their fish hosts four months ahead of expectations this year (January rather than the following June) we were obviously far too simplistic in our assumptions. Having thousands of unexpected blessings long before this year's nursery was ready is a firm reminder of Donald Rumsfeld's major contribution to our understanding of knowledge (we don't know what we don't know).

Growth of juvenile mussels in our mesotrophic filtered lake water is good (up to 3.5 mm in 30 months), survival is poor (thousands survive their first year out of hundreds of thousands leaving the fish hosts) and still we are not sure of the food preferences of these stages. In the next year some of these questions will be further addressed.

Several presentations have been made to local, national and international audiences, the most significant one this year being in Sweden at a meeting sponsored through an EU Life bid and WWF. The FBA hosted a meeting of mussel culturists and experts at the end of the financial year.

FBA Facilities and Sites

FBA sites: East Stoke (Left) and Windermere (Right). Photos: FBA (Left M. Dobson, Right S. Pawley).

The Windermere and East Stoke sites are key to the science activities of the FBA's operations. Whereas in the earlier years of the FBA's development these were held and used by the FBA's own scientific staff, the facilities are now widely used by a mix of tenants and FBA staff.

At East Stoke the Game and Wildlife Conservation Trust, APEM Ltd and GT Environmental are now firmly established on-site, and QMUL have significantly expanded their operations in terms of both staff based there and the facilities and space occupied. Soil Mechanics Ltd continue to lease the farmhouse, and of the two cottages onsite, one is now tenanted and the other is available for students to use. Towards the end of the financial year improvements were made to the students' cottage, which had not been upgraded for some years. John Davy-Bowker, with Mike Ladle, has updated the local arrangements with the fishermen we authorise to access the FBA's River Frome fishing rights.

At Windermere, work to improve the hatchery facility has continued and Roger Sweeting has been instrumental in obtaining significant funding for this work as part of his management of the pearl mussel project. A second rotary filter was installed in Spring 2009 (with thanks to the Environment Agency) and there will shortly be an emergency oxygenation system (courtesy of Natural England).

Discussion continued during 2009/10 to agree terms with the National Trust for the sale of the Station Cottage compound. Work to decommission the old sand filters was completed and planning approval was sought to relocate the sand filter shed within the hatchery, where it will house a basic wet laboratory.

In November 2009 a record rise in the level of Windermere, following the well-publicised rainfall in the area, resulted in the Annexe building, Gas House and boat shed being flooded to a depth of around one metre, with significant damage to materials stored in the Annexe. This is now part of an ongoing insurance claim. Flood levels were close to causing serious damage to the underground pump cell supplying water to the Hatchery. Investigations are ongoing to determine what additional flood prevention works might be needed.

The contrast between the two sites – East Stoke in the south west chalk area of England and Windermere in the English Lakes - adds to the scientific value of the FBA's offering to UK science. The aim is to provide facilities at reasonable cost, open to all scientific users, and to provide an environment where UK freshwater science is fostered and encouraged.

Potential users are welcome to contact the FBA's Director (Michael Dobson) or the FBA's Research and Facilities Manager at East Stoke (John Davy-Bowker) to discuss any ideas they have for scientific projects. The FBA is 'open for business', and new users are most welcome.

Visitors

Many of the FBA facilities are available for short term use, including the Windermere meeting room, which hosted the 2009 AGM of the British Trout Association, and the Dorset meeting room, which, in addition to scientific users such as GWCT, is widely used for community activities in the area. More commonly, however, meeting rooms are combined with laboratories for practical activities. Several universities took advantage of these combined facilities for field courses during 2009, including Birmingham and QMUL at East Stoke, and Aberystwyth, Lancaster and Bristol at Windermere. Full details of these courses and their experiences were reported in *FBA News* No. 48, and we are pleased to report that several of them, plus Manchester Metropolitan University, are coming back again this year.

In October 2009 we were pleased to host the annual meeting of the British Diatomists' Society, the fifth such meeting to have been organised by Elizabeth Haworth. The Windermere site hosted the formal conference presentations for this meeting and then, for those that wished, provided access to the Library and of course the Fritsch Collection, along with the laboratory to allow examination and comparison of specimens.

An important element of our science provision is providing resources for external users, including individuals on sabbatical who wish to take advantage of the infrastructure and facilities on our sites. We hosted two such visits during the year. Haifa Jaweir from the University of Baghdad spent most of 2009 enhancing her understanding of freshwater oligochaetes and producing a large series of photographs as the basis of a future identification guide. Susanne McGowan from the University of Nottingham spent several weeks early in 2010 working particularly with the unpublished collection relating to sediment cores from Windermere.

Publications by FBA Staff and Honorary Research Fellows

Armitage:

Hawczak, A., **Armitage, P.D.** & Blackburn, J.H. (2009). The macroinvertebrate fauna and environmental quality of the Oakers Stream, a small tributary of the River Frome (Dorset). *Proceedings of the Dorset Natural History and Archaeological Society* **130**, 17-24.

Ledger, M.E., Harris, R.M.L., **Armitage, P.D.** & Milner, A.M. (2009). Realism of model ecosystems: an evaluation of physicochemistry and macroinvertebrate assemblages in artificial streams. *Hydrobiologia* **617**, 91-99.

Stubbington, R., Greenwood, A.M., Wood, P.J., **Armitage P.D.**, Gunn, J. & Robertson, A.L. (2009). The response of perennial and temporary headwater stream invertebrate communities to hydrological extremes. *Hydrobiologia* **630**, 299-312.

Clarke:

Clarke, K.J. (2009). The Brunskill family; Victorian commercial photographers of Sedbergh and Bowness-upon-Windermere: an end to operations. *Sedbergh Historian* **5**, 44-46. (Completing the history of the photographers responsible for the recording of the 1885 icing of Windermere with their images held in the FBA's archives. See Annual Report 2008).

Esteban, G.F., Finlay, B.J. & **Clarke, K.J.** (2009). Sequestered organelles sustain aerobic life in anoxic environments. *Environmental Microbiology* **11**, 544-550.

Davy-Bowker:

Davies, C. & **Davy-Bowker, J.** (2009). Guide to the National Invertebrate Database (NID). Centre for Ecology & Hydrology report, September 2009. 29 pp. & 11 appendices.

Jones, J.I., **Davy-Bowker, J.**, Murphy, J.F. & Pretty, J.L. (2010). Ecological monitoring and assessment of pollution. In: *Ecology of Industrial Pollution* (eds L.C. Batty & K.B. Hallberg), pp. 126-146. Cambridge University Press, Cambridge.

Riipinen, M., **Davy-Bowker, J.** & Dobson, M. (2009). Comparison of structural and functional stream assessment methods to detect changes in riparian vegetation and water pH. *Freshwater Biology* **54**, 2127-2138.

Dobson:

Dobson, M. & Frid, C. (2009). *Ecology of Aquatic Systems*. 2nd Edition. Oxford University Press, Oxford.

Dobson M., Naura, M. & McElhone, M. (2009). Welsh rivers under threat: physical factors. In: *The Rivers of Wales* (eds C. Duigan D.D. Williams), pp. 205-222. Backhuys, Leiden.

Mathooko, J.M., M'Erimba, C.M., Kipkemboi, J. & **Dobson M.** (2009). Conservation of highland streams in Kenya: the importance of the socio-economic dimension in effective management of resources. *Freshwater Reviews* **2**, 153-165.

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Knowledge Transfer

Scientific Meetings and Publications

The FBA's programme of scientific meetings, publications and training activities is integral to our aim of promoting science.

Scientific meetings include the Association's Annual Scientific Meeting, the prestigious international summit series 'FBA Conferences in Aquatic Biology', and regional meetings in the north-east of England to complement independent groups in other regions of the country. We also work with other national freshwater societies in Europe to organise the biennial Symposium for European Freshwater Sciences (SEFS), and from time to time hold joint meetings with other scientific societies.

The Association is an established publisher of scientific texts on freshwater science. We are particularly well known for our keys to identifying freshwater organisms and in 2008 launched a new, peer-reviewed international journal *Freshwater Reviews*. In 2010 we are due to launch a further journal *Inland Waters* on behalf of SIL, the International Society of Limnology.

Our programme of courses is now in its third year of development and we have taken the first steps towards establishing systems of accreditation. We are also involved in various outreach activities, promoting freshwater biology in the wider community.

Minister Jane Davidson, with FBA President Sir Martin Holdgate at the Annual Scientific Meeting. Photo: Louise Miles (FBA).

Delegates at the Annual Scientific Meeting enjoy the evening reception held in the Museum at the Environment Centre Wales. Photo © Catherine Duigan.

Scientific Meetings

Annual Scientific Meeting

The FBA Annual Scientific Meeting was held on 7–9 July 2009 in association with the Countryside Council for Wales (CCW) and Bangor University, College of Natural Sciences. Our host was the recently formed Environment Centre Wales (ECW) – a partnership venture between CEH and Bangor University.

This was the first scientific meeting that the FBA has held in Wales in its 80 year history, attracting around 80 delegates from all over the UK and from five other countries. Prof. Glen George, an FBA Honorary Research Fellow, opened the meeting with a public lecture in Welsh on 'Lakes in History, Legend and Literature'. We were also honoured to have, as a keynote speaker, Jane Davidson AM, Minister for Environment, Sustainability and Housing in the Welsh Assembly Government, who spoke about how freshwater science should guide and influence policy. The prizes for the best student presentations were awarded to Alice Ramsay (Bangor University) for her talk on tracing the geographical origin of trout using scale microchemistry, and Chloe Onoufriou (University of Bristol) for a poster on indicators of ecological status in restored gravel pit lakes.

The optional tours to sites of scientific interest were a great success, delegates visiting Electric Mountain at Llanberis, Valley wetlands on the Isle of Anglesey, the Ogwen River Restoration Project in the Nant Ffrancon Valley and Llyn Idwal, a classic Welsh oligotrophic mountain lake.

The event closed with the FBA Annual General Meeting on Thursday 9 July.

In 2010 the FBA is not having an Annual Scientific Meeting of its own but instead will be celebrating the contribution made by regional freshwater groups in the UK. As part of this, our AGM will be held during the autumn meeting of the FBA North East and Yorkshire Freshwater Group (see overleaf).

FBA Conferences in Aquatic Biology

Essentially 'summits' of the world's pre-eminent leaders in the field, this series of prestigious, international workshops are intended to be a platform for the free exchange of ideas at the frontiers of aquatic research.

Papers from the inaugural 2008 conference, focusing on multiple stressors in aquatic ecosystems, have now been published in a special online-only issue of *Freshwater Biology*, guest-edited by Prof. Steve Ormerod, with free access to all (http://www3.interscience.wiley.com/journal/123243237/issue). We thank the

publishers of *Freshwater Biology*, Wiley-Blackwell, for their support in publishing this special issue.

Following the success of the first conference, Prof. Graham Harris took up the mantle of guest convenor/editor for the second conference of the series, on the theme 'Achieving ecological outcomes: aquatic ecological responses to catchment management'. Supported again by *Freshwater Biology*, the conference was held in April 2010 and will be reported fully in next year's Annual Report.

Regional Freshwater Groups

The North-East and Yorkshire Freshwater Group, re-established in 2007 under the auspices of the FBA, complements the other independent freshwater groups around Great Britain – in London, the West Midlands & North-West England, and Scotland – all of which provide a local forum for the exchange of information across disciplines and across the various sectors of the freshwater community. The NE and Yorkshire group met on 16 December 2009 at the Environment Agency's offices in Newcastle, organised by Andrew Goodman, with a topical title to address 'Crunch time for monitoring? Freshwater monitoring and the economic downturn'.

Following our Annual Scientific Meeting in Bangor, a proposal was put forward to establish a Welsh regional group of the FBA ('FBA Cymru'). Anyone interested in getting involved should contact Rosanna Robinson at Bangor University: fbacymru@bangor.ac.uk.

SEFS

Sinaia, Romania, was the venue for SEFS6 'Changes and Opportunities for Freshwater Sciences in a Changing Climate', held on 17–21 August 2009. The FBA was represented on the Organising Committee by Colin Reynolds and Mike Dobson. Prof. Reynolds convenes the European Federation for Freshwater Sciences (EFFS), a collaboration of European societies which promotes the cooperation of European freshwater scientists and is responsible for organising the SEFS series as a whole. The next SEFS will be in Girona, Spain, 27 June to 1 July 2011.

Joint Conference with IEEM

A joint conference with IEEM (The Institute of Ecology and Environmental Management) on 'The Future of Fresh Waters' was held at the University of Warwick, 16–17 September 2009. The idea of Simon James, a member and staunch supporter of both organisations, the meeting aimed to put into context the many issues facing our freshwater environments, the legislative framework within which managers must now work, and the research needs for the future. With sessions on pressures, policy and on training needs and development, the meeting concluded with a discussion about the FBA-led initiative to develop a Cooperative Research Partnership. Attended by over 130 delegates, the conference was also a fitting event for the two organisations, FBA and IEEM, to cement their relationship by the signing of a Memorandum of Understanding.

Sir Martin Holdgate and Prof. Steve Ormerod display the MoU at the joint FBA/IEEM conference. Photo: Simon Pawley (FBA).

MEMORANDUM OF UNDERSTANDING

THE PARTIES

The Institute of Ecology and Environmental Management (IEEM)
and
The Freshwater Biological Association (FBA)

THE UNDERSTANDING

The Parties realise the advantages which may be gained by their respective professional bodies in continuing to work closely together on matters of common understanding in the environmental field and specifically with respect to fresh waters.

Accordingly the two organisations agree:

1. to work together in the public interest for the benefit of the environment as a whole, for understanding and management of fresh waters in particular and for the conservation of freshwater biodiversity;
2. to publish joint publications where appropriate;
3. to exchange publications where appropriate;
4. to convene joint meetings, workshops and conferences where appropriate;
5. to provide links on each others' websites;
6. to maintain good communications and working relationships between the two organisations together with any regional organisations and special interest groups;
7. to encourage close working between the Parties in the interest of best practice and professional standards;
8. to promote knowledge transfer between our two bodies.

This Memorandum is not intended to create legally binding obligations but to record some commonly held intentions, based on mutual respect and support, which is appropriate between two organisations.

SIGNED on behalf of IEEM
Prof Steve Ormerod, President, IEEM

SIGNED on behalf of FBA
Sir Martin Holdgate, President, FBA

16 September 2009

Memorandum of Understanding between the FBA and IEEM.

Publications

Scientific, Occasional & Special Publications

The latest addition to the FBA Scientific Publication series (No. 66) was published in March 2010: *Mayfly Larvae (Ephemeroptera) of Britain and Ireland: a Key and a Review of their Ecology*, by Malcolm Elliott and Uwe Humpesch. Produced in a new, larger format and with the addition of colour photographs of live larvae, it replaces the earlier key by the same authors, published in 1988 (FBA Scientific Publication 49). The new and updated keys to families and species incorporate three additional species recorded in Britain since 1988 as well as changes to familiar names and other recent advances in classification and taxonomy. The wealth of information on the ecology of mayflies, citing more than 500 references, is a testament to the authors' unrivalled practical knowledge of the mayfly fauna of northwestern Europe. As with previous publications in this series, we are most grateful to the Environment Agency for their financial support for this new key. Work on the next two publications – a guide to British freshwater macroinvertebrates for biotic assessment and a guide to freshwater invertebrates, the latter intended as a tribute to T.T. Macan – are well under way, with publication due in 2010/11.

With the publication of the new mayfly key, David Sutcliffe retires from his position as editor of FBA Scientific, Occasional and Special Publications and is replaced by

Alan Crowden, who will be supported by an Editorial Board. We owe Dr Sutcliffe a great debt of gratitude for his meticulous editing and careful stewardship of what, to many, are the 'flagships' of the FBA.

Journals and Members' Publications

It is now well over two years since we launched our new, international peer-reviewed journal *Freshwater Reviews*, with four issues published by the end of 2009/10. The journal is an 'online first' service, with papers published online as they are ready (www.fba.org.uk/journals) and then subsequently in print in two biannual issues. Since January 2010, *Freshwater Reviews* has also been available through BioOne (www.bioone.org/loi.fer), a not-for-profit collaborative venture involving over 120 independent publishers, which provides access to journal articles for individuals (on a pay-per-view basis) and institutions (as part of journal 'bundles'). Participation in BioOne increases our readership to almost 400 institutions worldwide and also facilitates access to developing countries via philanthropic programmes such as AGORA (Access to Global Online Research in Agriculture) that allow users in these countries to access *Freshwater Reviews* for free or at significantly discounted rates. It is still too early for a formal impact factor, but citations to date and feedback from readers are encouraging. We are grateful to the Editorial Board, the peer reviewers, our volunteer copy editors, and not least our Editor, Colin Reynolds, for their continued support.

Building on our journal software development, we have joined forces with SIL (the International Society of Limnology) to publish their new journal Inland Waters, which will replace the SIL proceedings. The new, peer-reviewed journal will be produced in a partnership between SIL and the FBA, with SIL being responsible for editing, peer review and copy editing as well as collecting subscription income, and the FBA responsible for layout, publication and (by agreement with SIL) marketing. The journal is to be edited by Jack Jones and will be available primarily online, with an option for printed copies (four issues per year). The intention is to remain as faithful as possible to the niche that SIL occupies, with encouragement of a worldwide set of authors and short (except for papers arising from named and plenary talks at Congresses), rapidly published papers. The journal will be launched and open for submissions at the SIL Congress in Cape Town, South Africa, in August 2010. We look forward to working with SIL on this exciting new venture, which complements *Freshwater Reviews*.

During the year, a special issue of *Freshwater Forum* (Vol. 28) was also prepared, guest-edited by Patrick Armitage and focusing on catchment land-use. *Freshwater Forum* was replaced by *Freshwater Reviews* as the FBA Members' journal in March 2008, but the series was retained as an occasional vehicle for special thematic issues and conference proceedings. This volume will form the first of these occasional issues, which will be published primarily online (free to members), with a limited print-run. The articles from Vol. 28 have now been published online and in print (May and June 2010, respectively).

Also available free to FBA members, our newsletter *FBA News* was published quarterly during 2009/10, and continues to carry articles and news on a range of freshwater topics, news of FBA members, and updates on FBA activities. We welcome contributions from FBA members and others, whether an article, a note on the natural history of a particular organism or habitat, a report from a conference, an item to add to the 'Diary of Events', or a thought-provoking letter to promote debate.

Training, Education and Outreach

Course participants getting practical experience of electrofishing in Dorset. Photo: Melanie Fletcher (FBA).

Courses and Accreditation

During spring and summer 2009, the FBA built on the success of courses in the previous year and extended the range of one- and two-day courses available (see box) to include the 'Chironomid Pupal Exuvial Technique (CPET)' with Les Ruse who developed the technique, and an 'Introduction to Electrofishing' with Bill Beaumont, who wrote the manual on electrofishing techniques for the Environment Agency. The courses were well attended with participants coming from a wide range of backgrounds. Tutored by some of the top experts in their fields, the aim of the courses is to equip participants with the techniques, skills and confidence to sample and identify freshwater organisms to a level appropriate to the individual, and to provide key field and laboratory experience. The programme has continued to develop for 2010.

Following the investments made last year in high quality laboratory equipment, the focus of this year has been on improving the collections of invertebrate specimens available to course participants. The FBA are particularly grateful to Ian Wallace of National Museums Liverpool for his help in enhancing the caddis teaching collection.

As well as running training courses at both the FBA sites, we have continued our collaboration with the Scottish Centre for Ecology and the Natural Environment (SCENE) (University of Glasgow), on Loch Lomond. This is an outstanding location to run field courses and we hope to maintain our links with the Centre following refurbishment of their teaching facilities to match the state-of-the-art research block.

Collecting chironomid exuviae with Les Ruse on the CPET course. Photo: Melanie Fletcher (FBA).

FBA Training Courses run in 2009-2010

Identifying freshwater invertebrates with a specialist mayfly and stonefly day
31 March –1 April 2009, SCENE, University of Glasgow, Loch Lomond.
Tutor: Mike Dobson.

Identifying freshwater invertebrates
28–29 April 2009, FBA East Stoke
Tutor: John Davy-Bowker.

Introduction to identifying freshwater beetles
30 April 2009, FBA East Stoke. Tutor: David Bilton.

Identifying aquatic beetles
20–21 May 2009, FBA Windermere.
Tutor: Garth Foster.

Entomology for anglers
30 May 2009, FBA Windermere.
Tutors: Stuart Crofts & Andrew Dixon.

Identifying caddis
4–5 June 2009, FBA Windermere.
Tutor: Ian Wallace.

Introduction to electric fishing techniques
2 July 2009, FBA East Stoke.
Tutor: Bill Beaumont.

The Chironomid Pupal Exuvial Technique (CPET)
30-31 July 2009, FBA Windermere.
Tutor: Les Ruse.

Investigations have continued into an accreditation process for the identification of aquatic invertebrates. Following on from the two one-day pilot training courses run in March 2009 with the Environment Agency, two exams for Agency staff were held at FBA Windermere in February 2010. These pilot assessments covered the species identification of flatworms and leeches, and caddis larvae. We are currently in the process of assessing the viability of extending this initiative to a wider audience.

The FBA National Insect Week stall at the Royal Entomological Society insect exhibition held in York in July 2009. Photo: Melanie Fletcher (FBA).

Participants enjoying the 'What Lies Beneath, What Flies Above?' event organised by the FBA. Photo: Simon Pawley (FBA).

Public Engagement with Science

The pond constructed on site in 2008 with the support of the Big Lottery Fund's 'Breathing Places' campaign has thrived. Regular monitoring has revealed that a diverse invertebrate fauna has colonised the pond. Additional funding was secured in Phase Four of the Big Lottery Fund's 'Breathing Places' initiative to run public and community focused events to promote the use and understanding of the pond and its ecology. Three events were held over the course of the summer.

On 6 June the pond was officially launched, in conjunction with the BBC Springwatch 'Dirty Weekend', which encouraged the public around the UK to get involved with nature and take part in wildlife-themed activities. The day was entitled 'What Lies Beneath?' and included pond and lake dipping, a wildlife treasure hunt, and a lake dipping quiz. Pond creation information was also available, as well as a display to encourage the public to look in their own garden ponds. This was followed by two further events later in the summer with a similar theme.

Following on from the success of last year's moth and adult aquatic insect night, held in conjunction with National Moth Night, the FBA held another public event entitled 'What Lies Beneath, What Flies Above?' Although the focus of the evening was moths, we took the opportunity to record adult aquatic insects and detect bats. The event attracted a mixed audience, including many families, and will be repeated again next year.

National Insect Week is a bi-annual event which aims to promote wider awareness and understanding of the importance and fascination of insects. This year was not one with an organised festival, but in July the Royal Entomological Society instead held an insect exhibition in York and the FBA were invited to attend. The FBA stall included a fascinating facts exhibition on insects and specimens for the public to examine under the microscope, and proved particularly popular with the younger members of the audience.

Education

The FBA is one of over 60 organisations who make up the Riverfly Partnership, an initiative which brings together a wide constituency with the aim of conserving and protecting waterways and associated wildlife. This year, the FBA became a local training hub for the Anglers Monitoring Initiative (AMI), where participants learn to identify eight target groups of freshwater invertebrates in order to monitor their local waterways and spot potential pollution problems. As part of this initiative the FBA hosted an AMI training course in May 2009 with Cyril Bennett of the Riverfly Partnership.

In October, Melanie Fletcher taught on a Manchester Metropolitan University undergraduate field course based at Ambleside Youth Hostel. The aim was to introduce geographers to the history, geology and ecology of Windermere.

Official launch of the FBA Windermere pond funded by the Big Lottery Fund's 'Breathing Places' campaign. Photo: Peter Notley.

Library and Information Services

Improving Discovery and Access to Freshwater Information

Improving the accessibility and exchange of freshwater information underlies the charitable objectives of the FBA. Much published literature is relatively easy to access, at least for university academics. However, a vast amount of important information is available in the grey literature, unpublished material and smaller, less well-known publications. The contents of these lesser-known sources can be valuable and digitisation projects to make them more freely available are important to ensure that work is not repeated or replicated unnecessarily. The FBA has a number of digitisation projects ongoing, or in preparation, and is discussing with other holders of grey literature (such as Government agencies) how this work can be funded and progressed.

In May 2009 the FBA held a valuable workshop, 'Working towards better freshwater information sharing', and the follow up in early April 2010 'Improving the quality of freshwater information'. These workshops addressed the issues that restrict effective data sharing, such as copyright, technological barriers, fear over potential loss of control and income, and simple lack of resources. They were attended by Government bodies such as the Environment Agency (EA) and Natural England, university researchers and a wide variety of NGOs (non-governmental organisations) such as the National Biodiversity Network, Buglife, Pond Conservation and the Riverfly Partnership. Through these workshops and subsequent work programmes, the FBA has a better understanding of what data organisations hold, what they need and the barriers to sharing that information.

FISHnet

At the workshop in May 2009 the need for better and easier facilities for data management and sharing was identified. The FBA was tasked with addressing this issue, following on from which we have recently been successful in our bid, with the Centre for e-Research, King's College London, for funding from JISC (Joint Information Services Committee) for a freshwater information-sharing network project (FISHnet).

Time and effort are often a problem with the long-term curation of datasets. We also know that, for many researchers, data management and infrastructure can be an issue and support is not always available from their institutions. Furthermore, the freshwater science community is spread across institutions, so there appear to be many potential benefits of having a network of properly and effectively managed data made available to those working in this field. The project aims to understand the needs of freshwater scientists with regard to sharing data, and to explore ways to facilitate this sharing. It involves gathering information from freshwater researchers about how they use and manage data, and their concerns over data protection, copyright and access control. This information is being used to design tools that will address these concerns and make it easier to share and manage data in a way that fits the researchers' needs. The project has a relatively short timescale of 18 months, running until the end of March 2011.

LIS Projects

The FBA has been awarded a grant by the Aquatic Sciences and Fisheries Abstracts board (ASFA), to update and enhance their Geographic Authorities List. The List is essential to correctly identify the geographic areas to which an article refers, and to therefore enable effective search and retrieval. This work, which will be completed by the end of September 2010, will produce a revised Authority List document including 20 000 geographical strings for indexing purposes and an initial thesaurus of aquatic geographical terms and relationships.

In a project funded by the Environment Agency for England and Wales (EA), images of different chrysophyte species have been collected and deposited in the Freshwater*Life* Image Archive for identification purposes. Information to aid identification has been gathered and will be presented as individual species pages to accompany the images. There are currently over 70 chrysophyte images in the image archive with detailed metadata and 43 species pages. Subsequent stages of the project will extend the range of taxa with in-depth information, fill gaps identified in the availability of images, and improve the web interface based on feedback from this first stage. This work has been carried out in collaboration with chrysophyte experts around Europe.

About the Library

The library is one of the largest and most comprehensive sources of published and unpublished material on fresh waters in the world (2.2 kilometres of shelving, 400 000+ catalogued items). It is mainly situated at Windermere (approximately 80 %), with a satellite library at East Stoke.

This world class resource is global in its coverage, with hard to find publications from Eastern Europe, Russia and China being of particular importance. It is a major international collection and historical archive covering freshwater biology, taxonomy and ecology from 1930 to 2005, and its unique catalogue includes book chapters from multi-authored books as well as individual journal articles from over 2500 journal titles and the wide range of grey literature in its holdings.

The EA Projects database is now available online at www.freshwaterlife.org/projects. This database brings together information on all projects funded by the EA that relate to freshwater ecology. Users can access the full PDF reports (where available) of the projects listed, as well as view the associated metadata. The work demonstrates the value of such a system to organisations where staff have restricted access to hard copies and where electronic versions of reports are difficult to find.

Collections and Archives

Collectively referred to as the Unpublished Collection, the FBA has a number of collections of specimens, museum pieces, historic data and archives covering many of the most prominent freshwater scientists and the development of freshwater science. During the year, these collections have been maintained, catalogued and augmented.

There have also been some issues which are being addressed, including the discovery of book lice in some of the collections. In the coming years, it is intended to complete a condition audit and put all of the collections in good order. The FBA now sits on the steering committee of the Cumbria Archives Forum and it is hoped that this new forum will provide a mechanism for sharing expertise, resources and common objectives.

The John Lund Collection comprises roughly 10 000 reprints, 5000 items of correspondence and other papers, 300 books, various journal runs, 100 notebooks and several indices on algal taxonomy, ecology and physiology, and freshwater science. The collection also includes the original plankton records relating to John's long-term (33 year) monitoring of Windermere, Esthwaite, Blelham and other Lake District lakes, and to the 'Blelham tube' experiments, gathered mainly during his scientific career at the FBA and later as an Honorary Research Fellow. Work has begun on cataloguing John's books and reprints to add to the Library's holdings. His correspondence is being catalogued as part of the FBA's Unpublished Collections.

Due to the remarkable size of John's Collections, this work is expected to take some time.

The FBA received a valuable collection from Margaret Varley. The donation, which comprises eight archive boxes of reprints, one box of fish scales and one box of correspondence relating to the River Frome, will be added to the FBA holdings at East Stoke in Dorset. We would like to thank Mary Burgis for her help in acquiring this valuable collection.

Ralph Brinkhurst donated a small but valuable collection of books, mainly studies of lakes.

Library

With changes to the FBA and the freshwater research landscape, it has become timely and appropriate to revise our understanding of the potential audiences for this world-class library and to redefine its purpose and how the FBA can best meet the needs of that audience. Changes in institutions and funding priorities have led to the continuing demise of large institutions and departments specialising in freshwater science. These factors, combined with developments in information technology, mean that the FBA now has to reach a disparate audience, distributed around the world. The mechanics of how this can be achieved are complex and being developed, but understanding the current situation allows us to plan a strategy to take this asset forward and meet the challenges appropriately.

One of the ways that we are addressing the changing situation is by revising the FBA's Collections Policy. Although currently defined in detail for the library, much of the Collections Policy is relevant to the Unpublished Collection. The complete policy document, giving more detail, is available by request but the main points are:

- Re-emphasising a focus on the core subject areas of freshwater biology and ecology.
- Minimal accessions to the physical collections, with the following exceptions:
  - Items that fill in gaps in current material.
  - Items that are more difficult to obtain, such as those from mall publishers obtained via our library exchange programme with aquatic libraries around the world.
  - Core subject areas and key publications.
- Actively developing our 'electronic' library, based on the same subject areas, with an emphasis on:
  - Publications with either open access or less restrictive copyright.
  - Items that are less easy to find and access.

The FBA's holdings will be supplemented by partnerships with other aquatic libraries and academic departments around the world to provide access to a wider range of material and mainstream literature, to ensure the FBA can provide a comprehensive Library and Information Service.

The FBA successfully put an application to the ASFA board to assess the FBA's library holdings with a view to identifying duplicates and items clearly outside the new Collections Policy. More than 80 boxes of journals and other publications were identified and will be offered to African aquatic libraries at the next ASFA board meeting.

On 19 and 20 November 2009, following the highest rainfall ever recorded in England on the top of the Cumbrian fells, the lakes into which they drain reached

About the Unpublished Collection

The FBA has a number of collections of specimens, museum pieces, historic data and archives covering many of the most prominent freshwater scientists and the development of freshwater science, collectively referred to as the Unpublished Collection (for example the water samples below were taken from Lake Titicaca in 1937). Thanks to generous donations of well known researchers such as Frost, Jenkin, Macan, Pearsall and Reynolds, the Collection contains a large number of field notebooks, unpublished data, correspondence, drawings, photographs, specimens and samples. Currently the Collection comprises 16 four-drawer filing cabinets, four plan chests, 650 standard size archive boxes, 300 slightly smaller correspondence boxes and 20 metres of reference samples on shelving. The Collection also houses the corporate archive of the FBA.

unprecedented heights and flooded the land along their shores. Among these lakes was Windermere, and among the victims was the FBA's Ferry Landing site. The level reached by the lake water – over two metres above its normal height, is considerably higher than the previous maximum in the 76 years that the level has been recorded and is the highest for the past few hundred years at least.

Water filled the ground floor of the Annexe building to a depth of 40 cm, including rooms that were acting as temporary storage for the periodicals and were due to be emptied shortly. The bottom two tiers of journals – around 80 m of shelving – were directly water damaged.

Waterlogged stock was removed by a specialist document recovery company and frozen while decisions were carefully weighed. Periodicals were prioritised according to the Collections Policy, ease of replacement, cost of replacement and degree of water damage. High priority items were professionally restored, while lower priority items were assessed on the degree of damage and ease of treatment by FBA staff.

Those holdings not directly immersed in the water were, however, damaged by exposure to damp conditions. These were processed on-site in several stages, including spreading items individually in low-humidity rooms with constant, high-rate air-flow (in many ways similar to a dry wind-tunnel), while they were monitored for moisture and signs of potential problems, such as mould.

Most of the periodicals have now been successfully processed and are re-housed in space allocated in the Pearsall building. Though unfortunate, the floods have accelerated the audit of the collections using the new Collections Policy and we are confident that, once some holes have been filled through generous donations offered by other institutions, the integrity of this renowned library will be intact.

People

LIS staff authored and contributed to several publications during the year and were involved in a number of international meetings, including:

- Trait-based Ecological Risk Assessment (TERA) - Realising the potential of ecoinformatics approaches in ecotoxicology. Workshop at the Canada Centre for Inland Waters in Burlington, Ontario, Canada.
- Aquatic Sciences and Fisheries Abstracts (ASFA) Advisory Board Meeting, Goa, India.

At the end of October Ian Pettman retired from the FBA, after 38 years with the Library and Information Service. Ian first arrived at Ferry House on 1 June 1971 to take up a position of Assistant Librarian. Becoming the Head of Library and Information Services in the early 1980s, he continued to build the Library's international reputation and was a co-founder of the European Group of Aquatic Librarians in 1988 as well as undertaking consultancy work in Angola, Uganda, Kenya, Tanzania and Malawi. He has also worked closely with colleagues in the Food and Agriculture Organisation of the United Nations to assist in the development of a range of fisheries information services.

At the October Council Meeting, it was agreed that Ian should become an Honorary FBA Information Science Fellow. Ian will continue to represent the FBA through international research and development. This will involve improvements in information retrieval tools and systems for the aquatic sciences, with particular emphasis on subject terminology tools, geographic retrieval methodologies and taxonomic retrieval systems.

Daniel Turner joined the LIS team in September, for nine months, as part of his year in industry for his Environmental Science degree at the University of Leeds. Dan helped in many sections in the FBA, including working on the Freshwater*Life* website and producing electronic identifiaction keys. He was heavily involved in the relocation of the periodicals following the floods. Inge Bristow joined the FBA for a three-week work placement in January as part of her postgraduate course in Information and Library Management at Liverpool John Moores University. During her placement she was involved in a variety of tasks, such as processing and shelving new journals, and cataloguing and classifying books and reprints.

What is Freshwater*Life*?

The FBA's Freshwater*Life* programme is a collaborative initiative in partnership with NGOs, government agencies, industry and individuals with an interest in fresh waters. Freshwater*Life* promotes easy access to the world's information on freshwater organisms and their habitats. The aims of Freshwater*Life* are:

1. To support the information needs of those with an interest in freshwater biology.
2. To encourage communication and information sharing throughout the freshwater interest community.
3. To promote an appreciation and understanding of freshwater ecosystems.

The objectives of the Freshwater*Life* project are met partly through the website www.freshwaterlife.org, which encourages users to contribute information in order to build a better resource for all.

About FBA Datasets

The FBA looks after more than 60 historical datasets, from many parts of the UK and across the world, in which data collection continued over at least three years. There are also numerous snapshot surveys, such as those from historic African expeditions.

In order to understand environmental changes and their impacts upon living organisms and ecological systems, we depend upon the availability of good data. Particularly valuable are historic datasets that present a reliable snapshot of a period in time, and those that cover long periods. Long-term datasets allow changes to be identified and tracked over time. Unfortunately, funding for data collection is usually over short periods of time and until recently the value of routine monitoring was not fully appreciated, so few such datasets exist.

The FBA is custodian of long-term datasets which are internationally important. These include some ongoing series of data, notably the Windermere surface temperature and lake level data collected since 1931, and those held jointly with CEH, covering zooplankton, phytoplankton, fish and water chemistry from Windermere, Grasmere, Esthwaite Water and Blelham Tarn, collected in some cases since the 1940s. There are further datasets from the River Frome in Dorset and counts of wildfowl from Windermere compiled since the 1960s.

Membership

Maintaining a thriving membership organisation, in which those committed to freshwater biology can share common interests, is a core stragegic objective of the Association. Our members are drawn from around the world and include professionals working in research, education, and the management of fresh waters, as well as students and amateur enthusiasts. Membership is open to anyone who is interested in freshwater science and wishes to support the aims of the Association.

Benefits for Individual Members include:

- Free newsletter *FBA News*
- Discounted subscription to FBA journal *Freshwater Reviews*
- 25% discount on FBA Scientific, Special and Occasional Publications
- Discounted registration fees for FBA scientific meetings and training courses, including extra discounts for students
- Priority use of the FBA Library and Collections
- Reduced rates for hire of FBA conference rooms, use of scientific equipment and facilities
- Eligibility to apply for the Hugh Cary Gilson Memorial Award.

In addition to the benefits above, Corporate Members also benefit from:

- Complimentary copy of each new FBA Scientific, Special and Occasional Publication
- Reduced rates for advertisements in *FBA News*
- Free listings of relevant company-sponsored events in the Diary section of *FBA News* / FBA website
- Job vacancies listings on FBA website / *FBA News*.

Tailored Corporate Membership with additional benefits are also available.

Membership has remained remarkably stable over the past year, despite the financial pinch that so many people and organisations were feeling. Around 80 people resigned their membership or allowed it to lapse, but these were almost cancelled out by the number of new members that we attracted over the year, so the net effect was a drop in number of members relative to the previous year by two, to 1516.

Members continue to cite two things as being important in their decision to retain their membership: the discount on products and services and the high quality of *FBA News*. For a small subset of the membership, the ability to apply for the Hugh Cary Gilson Award is also seen as extremely important, and in 2009/10 there were a record number of applicants. Other membership privileges, such as the ability to access the library, were little used but of course very important to those who did take advantage of them, so we will take this into account in any revision of membership benefits in the future.

We have a small but loyal group of Corporate Members (mainly UK statutory authorities and research institutions), who continue to receive benefits such as discounts on hire of facilities and attendance at meetings, and whose membership includes a subscription to *Freshwater Reviews*.

An important area of activity that went on behind the scenes over the year was a rewrite of the Memorandum and Articles of Association. These were first written 80 years ago and, despite some minor modifications over the years, have remained more or less the same ever since. In 2009, with several parts identified as needing an update, Council decided to attempt a complete redrafting, under the capable guidance of our President, Sir Martin Holdgate. Towards the end of the year, both Council and the Charity Commission expressed their satisfaction that the rewritten Memorandum and Articles were ready to be put before the membership for its opinion, and this will be happening during 2010.

Consultation and Advice

Electrofishing the outlet of Scoat Tarn for the Acid Waters Monitoring Network. Photo: South Cumbria Rivers Trust.

An important element of the FBA's mission is the provision of advice and opinion. We are always keen, therefore, to interact with like-minded organisations in furthering the adoption of good science in understanding and managing our fresh waters.

To this end, Mike Dobson sits on the Board of the Riverfly Partnership (www.riverflies.org), an important initiative to involve the wider community, and particularly anglers, in understanding the role of aquatic invertebrates in both ensuring and recording the health of the rivers in which they live. He is also a member of the Rivers Biodiversity Integration Group (BIG), whose aim is to coordinate the delivery of conservation targets for priority species and habitats in England; Anne Powell represents the FBA on the Lake and Ponds BIG.

Mike Dobson completed his first year as external examiner for the BSc programmes in Environmental Biology and Marine and Freshwater Biology and the MSc in Managing the Environment at Aberystwyth University, and also visited Dublin to examine a PhD student at Trinity College. In June he flew to China with a delegation including representatives from CEH and QMUL. This visit was arranged and funded by Innovation China UK to open communication about research opportunities with scientists at the Institute of Hydrobiology in Wuhan. He represented both the FBA and the Society of Biology in the NERC/ERFF skills review, a nationwide consultation on the postgraduate training requirements for environmental science.

Roger Sweeting continues to work with CEN (Comité Européen de Normalisation) on standardisation particularly with reference to the Water Framework Directive: this involves close collaboration with BSI (British Standards Institute) as well as colleagues in environmental institutes across Europe. He also works as an examiner for the Institute of Fisheries Management. Both of these organisations provide a much needed link with the practical application of the aquatic sciences.

Locally, Mike Dobson and Roger Sweeting continue to represent the FBA on the Lake District Still Waters Partnership (LDSWP), which brings together the main land and water managers, statutory authorities and research organisations in the Lake District to ensure a coordinated scientifically based approach to management of the regions lakes. This year's annual liaison meeting, in which the LDSWP encourages awareness and involvement amongst the wider community, was a very successful conference and workshop on implementing the Water Framework Directive in the region. Mike Ladle maintains his role in fisheries management in Dorset through chairing the River Frome Conservation Trust and advising the River Allen Association. Roger Sweeting is vice chair of the South Cumbria Rivers Trust and also the Environment Agency's North West Region Regional Fisheries, Environment and Recreation Advisory Group (RFERAC).

Various members of staff and Honorary Research Fellows were involved in consultations and small investigations for external clients. Patrick Armitage is involved with the 'Purbeck Important Ponds Project' in an advisory role; he also contributed to a UK conservation agencies' review of guidance on conservation objectives for rivers and a review of the effects of agriculturally derived sediment on stream biota. Mike Ladle continues to run the Blandford Fly control scheme on the River Stour on behalf of North Dorset District Council. Elizabeth Haworth made a brief survey of Thurstonfield Lough near Carlisle on behalf of its owner, who was concerned that it was becoming choked with macrophytes and therefore unsuitable for fishing and boating activities; current clearance is by a drag line to create a small open channel, which is unsatisfactory for the owner, but this is a typically senescent lake within the good lowland farmland of the Solway coastal plain and is a fine example of the difficulties of halting the inevitable. Allan Pentecost investigated a eutrophication problem in Hampshire, which was identified as being phosphorus-related. Mike Dobson provided feedback, on behalf of the FBA, to the Forestry Commission's proposed new Forestry and Water Guidelines.

The FBA was contracted to undertake a survey of Scoat Tarn as part of the Acid Waters Monitoring Network, which was established in 1988 to monitor the ecological impact of acid deposition in areas of the UK believed to be sensitive to acidification. Melanie Fletcher and Simon Pawley undertook the fish survey component in the outflow stream of Scoat Tarn, which runs into Wastwater.

Finally, special mention must be made to Colin Reynolds, who continues to represent FBA interests on the European Federation for Freshwater Sciences in addition to his role as editor of *Freshwater Reviews*, and to Malcolm Elliott, who has been elected an Honorary Life Member of the Fisheries Society of the British Isles.

Trustees' Report

for the year ended 31st March 2009

The members of the Council of the Freshwater Biological Association (the Association), acting as Trustees of the Association submit their Annual Report and audited Accounts for the year ended March 31st 2010.

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

Trustees

The Trustees of the Freshwater Biological Association during the period April 1st 2009 to March 31st 2010 are listed on page 29 of the Trustees Report. The majority of the members of the Council of Trustees are nominated by either the Council or the general membership and proposed for election at the AGM. These appointments are for four years and Council Trustees cannot be elected for a further term until one year has elapsed since the end of their previous term of office. A further two Trustees are nominated by The Royal Society and the Fishmongers' Company. A review of Trustees skills has been previously undertaken and this has been used to inform the nomination process for prospective Trustees.

Statement of Trustees Responsibilities

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

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

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

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

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

Status

The Association is a Company Limited by Guarantee (registered number 263162) and a registered Charity (registered number 214440). The Council of Trustees have no interests in the Association as defined by the Companies Act 2006 and receive no remuneration for their services to the Association. The Association's Trustees do receive reimbursement of travel and subsistence costs necessarily incurred in the performance of their duties. The liability of the Members is laid out in clauses 7 and 8 of the Articles of Association and limits the liability of the members to 50 pence each.

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

Objectives of the Charity

The principal strategic objectives and activities of the Association, as defined by its Memorandum, are to promote the investigation of the biology (in the widest interpretation of the word) of the animals and plants found in fresh (including brackish) waters. The current Business Plan has refined the strategic objectives, with the focus on:

- Meeting the information needs of all those involved with freshwater research or management, whether professionally or as an amateur
- Supporting research through the provision of grants and awards and use of the Association's research facilities
- Maintaining a thriving membership

Review of Activities

The Statement of Financial Activities (SOFA) and the Balance Sheet show that the resources available to the Association have increased significantly, with a positive net movement of funds totalling £1,110,364 giving a closing fund balance of £5,234,297. The increase in the fund value has arisen from:

- Realised and unrealised gains on the Association's investments of £987,418
- The impact of the revaluation of the Association's property assets

This year has seen a significant reduction in the financial deficit from £445,397 to £282,331, a reduction of over £163,000; the reduction has arisen as a result of the combined effect of an increase in income of £112,489 and the continuing downward pressure on expenditure, resulting in a reduction of £50,577.

The deficit on the Income and Expenditure account has arisen as a result primarily of the Association's charitable activities and the activities it undertakes to generate funds. There continue to be improvements in the analysis and reporting of the direct and indirect costs in these accounts, which should provide Members with greater clarity about the true impact on the Association's resources of activities undertaken. The improvement in the overall

global financial market has benefited the Association with a reversal of the previous year's significant write down in the value of investment assets. This has resulted in net investment gains of £987,418, which, together with the increase in the value of the Association's property assets, has increased the level of resources available to the Association with which to carry out its charitable and strategic objectives.

The East Stoke site remains both financially and scientifically viable in the medium term; this year saw a complete change in tenants at the site as the Centre for Ecology and Hydrology withdrew at the end of June 2009 with the new tenants, APEM, GT Environmental and the Game and Wildlife Conservation Trust, plus a significant new number of staff of Queen Mary, University of London, arriving from July 2009 onwards. The income figures for the East Stoke site represent rental income plus research and contract income for the site. Expenditure has increased primarily as a result of alterations to the main building to accommodate the new tenants, plus continued improvements to the site to ensure the facilities are able to meet the requirements of today's scientific needs. This brings to an end the major refurbishments at the site and going forwards, expenditure levels are expected to be much lower. Use of the Association's student accommodation has remained high throughout the year and the Trustees are pleased that the ongoing science projects at the site are attracting young scientists. The East Stoke site continues to be central to the achievement of the Association's strategic and charitable objectives.

The situation at the Windermere site remains much the same as in previous years, with many of the entirely charitable activities of the Association undertaken from this site, which presents the Trustees with many challenges in the drive forward to bring the Association into financial balance. The Association was significantly affected by the flooding which devastated parts of Cumbria in November 2009; some sections of the Library, which were stored in the Annexe building, were seriously damaged by flood water, which rose several feet as Windermere reached its highest level since the mid 1980s. The insurance claim for this and other losses to the stock of publications is still under negotiation and, therefore, no figure has been included in these accounts.

The number of members has reduced slightly within the year. The cost to the Association of providing the membership service has reduced to £11,700 from the previous net cost of £28,500. This is due in part to the improved analysis of direct and indirect costs within the Accounts as well as a general improvement in the efficiency with which the Membership is managed. The total Membership income of £45,114 includes the Technical Service Agreement with the Environment Agency. The Trustees continue to take the view that by keeping the membership fee low the Association will continue to attract students and a broader spectrum of freshwater enthusiasts to its membership base. This is in line with the Association's charitable objectives as well as continuing to ensure that access to the Association is not financially prohibitive. The training course programme continues to be successful, with significant levels of demand. The courses are subsidised by the Association in order to attract amateur enthusiasts in freshwater ecology, which achieves one of the key objectives of the Freshwater Biological Association and contributes to the Association's compliance with the Public Benefit Test as laid out in section 4 of The Charities Act 2006.

The Pearl Mussel Ark Project continues to be successful as a partnership project. The partners in the project, Natural England and the Environment Agency have continued with their funding commitment, which amounted to just under £35,000 during the year and is reported in the income figures under Scientific Research. In February 2010, the Environment Agency and the Freshwater Biological Association signed an agreement that secured funding for an additional project. The agreement covers the period to September 2013 and provides additional funding of £202,000. Some of this funding was received in February 2010 and has been carried forward into 2010-2011 in deferred income.

The Trustees remain committed to the Association's journal, *Freshwater Reviews*. They recognise that the costs associated with this commitment will continue to exceed income for the foreseeable future and the impact of this on the Association's resources is currently being reviewed. The expenditure on the journal relates almost entirely to salary costs as the planned reduction in printing costs materialised during 2009-2010.

The second half of the Pilgrim Trust grant for the digitisation pilot of part of the Fritsch Collection was received during the year and this project has now been completed. The Association has received a further significant grant of £90,000 from the Esmée Fairbairn Foundation in order to re-write T.T. Macan's 'Guide to Freshwater Invertebrate Animals' which will provide a good introduction to the Association's more specialist publications and will have a wider appeal to scientists and non-scientists who have an interest in freshwater invertebrates; part of the grant has been deferred into 2010-2011 as the expected publication date is January 2011. There have been further successes in securing additional income during the year. In terms of Information Science, the Association has successfully won a bid jointly with King's College London to undertake a project into research data management.

The Library continues to be a significant net expense for the Association, accounting for over 25% of the deficit on the Income and Expenditure account. There has been some rationalisation of the Library holdings, which has led to a reduction in the space occupied and consequently a reduction in the overall expenditure on the Library. This year has seen some Library income through the receipt of funding from the ASFA organisation as well as the second half of the John Lund donation. The Trustees continue to actively consider options for the future of the Library and recognise that the current levels of support are not viable in the medium term.

The Association continues to fund PhD studentships and has made a number of smaller awards in the year from the Hugh Cary Gilson Fund, the Frost Fund and the Freshwater Science Fund, totalling £25,477 plus a small salary cost to cover administration. The Trustees consider the provision of grant awards to be a major contribution towards its compliance with the Public Benefit Test.

Whilst the improvement in the global financial markets has benefitted the Association in terms of the realised and unrealised gains in the value of its investment portfolio, the continuing difficult economic climate has led to a reduction in dividend income to the Association of over £32,000. In addition, the reduction in cash holdings has resulted in the significant drop in bank deposit interest. During the year the Association withdrew £315,500 from the Rensburg Sheppards holdings in order to cover its financial commitments.

The Director, on behalf of the Trustees, completed a Strategic Options Appraisal during the year. This has been used to inform the deficit reduction process which the Trustees expect to be completed within three years in order to bring the Association into financial balance. The Trustees recognise that whilst salaries and estate costs are significant, they are also areas of expenditure which are key to achieving the Association's objectives.

The reduction in Governance costs has been achieved in part due to a technical change to the VAT treatment of rent income which has resulted in an increase

in the amount of VAT the Association can reclaim on its expenditure. In addition the continued improvement in the analysis of expenditure costs in the Accounts and the reapportionment of more costs across activities, has contributed to the reduction in Governance costs.

Financial Reserves Policy

The purpose of the Association's reserves is to provide sufficient protection for the Association against changing financial circumstances and to maintain the long term viability of the Association in order to promote its principal charitable objectives. The level of reserves, as reflected in the Unrestricted General Fund Account, is represented by Tangible Assets, including the revaluation reserve, net current assets and a liquid investment asset reserve. The remaining unrestricted designated funds are made up entirely of liquid investment assets, currently invested on the UK Stock Exchange. The liquid asset balance in the General Fund Account currently reflects an amount of just over £542,000, which is considered sufficient for the Association to meet its short to medium term expenditure obligations.

Investment Policy

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

The majority of the Association's investments (57%) are managed by Rensburg Sheppards and are considered to be satisfactorily managed by the Trustees. The Investment Policy was reviewed by the Trustees in March 2009 and no changes were made.

Plans for Future Periods

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

Risk Management

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

Public Benefit Test

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

Trustees

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

President
Sir Martin Holdgate, CB, MA, PhD, Hon.DsC, FIBiol

Chairman of Council
Prof. A.G. Hildrew, PhD

Honorary Treasurer
Dr I.G. Dunn, MBiol

Representative Members
The Fishmongers' Company
Dr C. Askew
Royal Society
Professor. B. Finlay, FRS

Elected Members
Mr P.M. Andrewes
Dr S. Brierley (from 09.07.09)
Dr M.J. Burgis
Dr S.J. Clarke (to 09.07.09)
Ms G.L. Douglas
Dr D. Evans
Dr J.I. Jones
Mr C. Mainstone (from 09.07.09)
Prof. L. Maltby (from 09.07.09)
Prof. C.J. Spray
Prof. B. Okamura (to 09.07.09)
Prof. C.S. Reynolds (to 09.07.09)
Prof. B. Whitton
Dr I.J. Winfield

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

Dated this 21st July 2010
By Order of the Council

Professor A.G. Hildrew
Chairman of Council

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

THE FRESHWATER BIOLOGICAL ASSOCIATION
STATEMENT OF FINANCIAL ACTIVITIES
(INCLUDING INCOME AND EXPENDITURE ACCOUNT)
FOR THE YEAR ENDED 31st MARCH 2010

Incoming Resources		Unrestricted Funds		Total	Total
Incoming resources from generated funds	**Note**	General £	Other £	2010 £	2009 £
Voluntary income:					
Awards and donations	4	45,052	5,000	50,052	24,326
Activities for generating funds	5	252,756	-	252,756	213,841
Investment income & bank interest	6	90,861	-	90,861	131,428
		388,669	5,000	393,669	369,595
Incoming resources from charitable activities:	7				
Membership services		45,114	-	45,114	46,414
Scientific Research & activity		71,460	-	71,460	62,606
Information & Collections		29,025	14,175	43,200	35,175
Knowledge Transfer activities		124,366	-	124,366	51,530
		269,965	14,175	284,140	195,725
Total incoming resources		**658,634**	**19,175**	**677,809**	**565,320**
Resources expended					
Cost of generating funds:					
Cost of generating voluntary income					
Cost of generating funds	8	416,627	-	416,627	299,427
Costs of charitable activities:	9				
Membership Services		56,804	-	56,804	74,995
Scientific Research & activity		117,940	25,477	143,417	140,709
Information & Collections		40,299	14,340	54,639	141,707
FBA Library		95,064	-	95,064	104,427
Knowledge Transfer activities		68,716	-	68,716	119,262
Governance costs	10	124,873	-	124,873	130,190
Total resources expended		**920,323**	**39,817**	**960,140**	**1,010,717**
Net (outgoing)/incoming resources before transfers and other recognised gain/(loss)		(261,689)	(20,642)	(282,331)	(445,397)
Gain on the revaluation of Tangible Assets		405,277	-	405,277	-
Net gain/(loss) on investments	13b	893,015	94,403	987,418	(1,204,511)
Net movement of funds in year		**1,036,603**	**73,761**	**1,110,364**	**(1,649,908)**
Reconciliation of funds					
Total funds brought forward 2009		1,669,149	2,454,784	4,123,933	5,773,841
Total funds carried forward 2010		2,705,752	2,528,545	5,234,297	4,123,933

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 2010

	Note	2010		2009
		£	£	£
Fixed Assets				
Tangible	13a		2,129,820	1,745,695
Investments	13b		3,070,791	2,398,873
			5,200,611	4,144,568
Current Assets				
Debtors and Prepayments	14	130,617		64,366
Cash at Bank and in Hand		67,926		68,810
		198,543		133,176
Less Current Liabilities				
Creditors (due within 1 year)	15	164,857		153,811
Net Current Assets/(Liabilities)			33,686	(20,635)
Total Assets Less Current Liabilities			£ 5,234,297	£ 4,123,933
Representing Members' Funds				
Unrestricted				
General Fund	16		2,300,475	1,669,149
Designated Funds	17		2,528,545	2,454,784
Revaluation reserve	13(a)		405,277	-
			£ 5,234,297	£ 4,123,933

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

Approved on behalf of Council by Professor A.G. Hildrew: Chairman 21st July 2010

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 50 pence per Member.

An elected Council of Trustees who constitute honorary directors of the Company for Companies Act purposes manages the affairs of the Association. Details of the Council Members are given in the Trustees Report.

2. Accounting Policies

(a) Accounting Convention

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

(b) Fund Accounting

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

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

(c) Incoming Resources and Resources Expended

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

(d) Tangible Assets and Depreciation

Freehold property at Windermere and East Stoke was revalued during the year ended 31st March 2010 using an 'existing use' basis, in line with FRS15. The Freshwater Biological Association has adopted FRS15 and will formally revalue its property class of tangible assets every five years. Depreciation will be charged in future years on the buildings element only, which represents 65% 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 – no depreciation charged during 2009/2010
Computer Equipment over 4 years
Scientific Equipment over 5-10 years

Previously no depreciation has been charged on buildings.

(e) Library and Stocks

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

(f) Cash Flow

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

(g) Investments

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

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

This is stated after charging:

	2010 £	2009 £
Depreciation	21,152	19,187
Auditors remuneration	2,781	2,500

Incoming Resources	Unrestricted Funds General £	Other £	2010 £	2009 £
4. Awards and Donations				
Membership donations	37,682	5,000	42,682	14,366
Legacies and other donations	-	-	-	8,589
Gift Aid	7,370	-	7,370	1,371
	45,052	5,000	50,052	24,326
5. Activities for generating funds				
Scientific and special publications	12,732	-	12,732	13,948
Freshwater Reviews	5,088	-	5,088	4,964
Land and building income:				
Windermere	20,236	-	20,236	15,578
East Stoke	160,242	-	160,242	161,627
Research contract	36,905	-	36,905	-
Windermere ferry contract	15,465	-	15,465	16,382
Miscellaneous income	2,088	-	2,088	1,342
	252,756	-	252,756	213,841
6. Investment income				
Bank deposit interest	138	-	138	8,403
Investment Income	90,723	-	90,723	123,025
	90,861	-	90,861	131,428
7. Charitable activities				
Membership services	25,114	-	25,114	26,414
Technical service agreements	20,000	-	20,000	20,000
Scientific research & activity	71,460	-	71,460	62,606
Freshwater*Life* programme	10,000	-	10,000	21,000
Direct funding and grants	75,000	14,175	89,175	14,175
FBA Library	19,025	-	19,025	-
Training courses and meetings	49,366	-	49,366	51,530
	269,965	14,175	284,140	195,725

Resources Expended	Unrestricted Funds General £	Other £	2010 £	2009 £
8. Cost of generating funds				
Scientific and special publications	60,940	-	60,940	37,396
Freshwater Reviews	31,027	-	31,027	37,734
Land and Buildings:				
Windermere	81,737	-	81,737	78,536
East Stoke	220,458	-	220,458	137,259
Research contract	14,600	-	14,600	-
Windermere ferry contract	7,865	-	7,865	8,502
	416,627	-	416,627	299,427
9. Cost of charitable activities				
Membership services	56,804	-	56,804	74,995
Scientific research activity and Awards	117,940	25,477	143,417	140,709
Freshwater*Life* programme	40,299	-	40,299	99,639
Fritsch	-	14,340	14,340	42,068
The FBA Library	95,064	-	95,064	104,427
Training courses and meetings	68,716	-	68,716	119,262
	378,823	39,817	418,640	581,100
10. Governance Costs				
Council Meetings and reimbursements to Trustees	6,864	-	6,864	4,274
Other costs – direct and indirect:				
Audit Fees	2,781	-	2,781	2,500
Other fees	13,873	-	13,873	5,303
Staff costs	90,282	-	90,282	96,413
Irrecoverable VAT	11,073	-	11,073	21,700
	124,873	-	124,873	130,190

11. Staff

There were 22 paid employees, Full Time Equivalent (FTE) of 17, (2009:26, FTE of 21) of the Association at 31st March 2010.

Total Staff Costs in the year were:	2010 £	2009 £
Salaries	430,552	450,899
Employer's National Insurance Contributions	28,122	30,489
Employer's Pension contributions	49,645	44,996
Total	508,320	526,384

There were no employees in the remuneration band £60,000 to £69,999, or above (2009: none).

12. Trustee Remuneration

No members of Council received any remuneration during the year. Travel costs and Council expenses amounting to £6,864 (2009: £4,274) were paid to 15 (2009: 15) members of Council.

13. Fixed Assets

(a) Tangible

	Freehold Land & Buildings £	Computer Equipment £	Scientific Equipment £	Total £
Cost or Valuation				
At 1st April 2009	1,674,723	74,191	26,034	1,774,948
Additions	-	-	-	-
Disposals	-	-	-	-
Revaluation	405,277	-	-	405,277
At 31st March 2010	2,080,000	74,191	26,034	2,180,225
Accumulated Depreciation				
As at 1st April 2009	-	24,045	5,208	29,253
Charge for the year	-	18,549	2,603	21,152
Disposals	-	-	-	-
At 31st March 2010	-	42,594	7,811	50,405
Net book value				
At 31st March 2010	2,080,000	31,597	18,223	2,129,820
At 31st March 2009	1,674,723	50,146	20,826	1,745,695

The historical cost of Freehold Land & Building is £1,344,842 (2009: £1,344,842).

The Association has revalued its Freehold Land and Buildings in line with FRS15 and has adopted the revaluation of this class of assets at March 31st 2010, with no depreciation charged in the year. The valuations have been carried out by external Independent Chartered Surveyors on an 'existing use' basis and undertaken by Piell and Co. for the land and buildings at the Windermere site and by Powis Hughes for the site at East Stoke in Dorset.

(b) Investments

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

	£	Quoted Investments £
Market Value at 1st April 2009		2,398,873
Additions/(Disposals)		(302,302)
Investment Management fees		(13,198)
Net Investment Gains:		
Attributed to General Fund Account (Note 16)	893,015	
Gain on revaluation attributed to the Frost Bequest (Note 17)	94,403	
		987,418
Market Value at 31st March 2010		3,070,791

During the year, £315,500 of capital has been transferred from the account held at Rensburg Sheppards (2008:£200,000) to assist with working capital requirements.

13. Fixed Assets (Cont)

	Quoted Investments £
Acquisition Values	2,549,981
Represented by:	
Investments held on UK Stock Exchange	2,964,394
Cash held as part of Portfolio	106,397
	3,070,791

The principal investments at 31st March 2010 were:

	Market Value £	% of Total %
M & G Charifund		
19,366 Income Units	214,407	7.0
6,026 Accumulation Units	691,560	22.5
J P Morgan Asset Management Ltd		
153,977 Bond Units	204,983	6.7
94,223 UK Equity Fund Units	218,936	7.1
	1,329,886	43.3

The accumulated units received during the year that were reinvested for capital growth had a cash value equivalent of £44,910 (2009: £53,453).

14. Debtors

	2010 £	2009 £
Trade Debtors	83,105	8,466
Other Debtors	29,186	44,896
VAT repayment	-	2,421
Prepayments	18,326	8,583
	130,617	64,366

15. Creditors

PAYE, NIC and pension	9,330	15,138
Trade Creditors	21,241	38,362
Other Creditors and Accruals	14,879	11,549
Deferred income	116,609	88,762
VAT creditor	2,798	-
	164,857	153,811

16. General Fund Account

	2010 £	2009 £
General Fund Account		
Balance brought forward	1,669,149	3,179,549
Net movement in funds before transfers and other recognised gains	(282,331)	(445,397)
	1,386,818	2,734,152
Transfer net movement to Other Funds (Notes 4 to 10)	20,642	26,371
Unrealised gain arising from revaluation of Investments (Note 13b)	893,015	(1,091,374)
	2,300,475	1,669,149

17. Other Funds

	31.3.2009	Income	Expenditure	Transfers	31.3.2010
	£	£	£	£	£
Unrestricted Designated					
Fritsch Fund	1,467	19,175	(14,340)	-	6,302
Frost Bequest	396,833	94,403*	-	(17,477)	473,759
Frost Exhibition	32,919	-	-	-	32,919
Hugh Cary Gilson Fund	20,045	-	(4,480)	-	15,565
Freshwater Science Fund	2,003,520	-	(20,997)	17,477	2,000,000
Total	2,454,784	113,578	(39,817)	-	2,528,545

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

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

	31.3.2009	31.3.2010
	£	£
Tangible Fixed and Current Assets	180,619	159,977
Quoted Investments	2,274,165	2,368,568
	2,454,784	2,528,545

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

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

Fritsch Fund – fund established to support the scientific collection of algal illustrations together with taxonomic references.
Frost Bequest – the fund was established from a bequest from the estate of Winifred Frost. The purpose of the fund is to provide income and interest to the Frost Exhibition Fund and represents the original capital sum and accumulated capital growth.
Frost Exhibition – this fund represents the income and interest received from the investments associated with the Frost Bequest. The purpose of this fund is to support studentships and fellowships in freshwater biology and limnology and in particular, studies associated with freshwater fish.
Hugh Cary Gilson – this bequest from Hugh Cary Gilson provides a yearly award to support Members' research activities irrespective of their organisation or status.
Freshwater Science Fund – this fund was established by Council in order to support the attainment of the FBA's core charitable activities. This represents a long term commitment by the Association to the promotion of freshwater science. It has been decided in the short-term that the Fund will be kept constant.

18. Capital Commitments and Contingent Liabilities

There were no capital commitments or contingent liabilities at 31st March 2010.

19. Taxation Status

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

20. FRS 17 Retirement Benefits

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

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

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

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

The total pension cost for the Association for the year to 31st March 2010 was £49,645 (2009:£44,996) which was 14% of pensionable salaries until September 30th 2009 and 16% from October 1st 2009. The pension benefits of presently retired and seconded staff of the Association are administered by the Natural Environment Research Council.

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

We have audited the financial statements of The Freshwater Biological Association for the year ended 31st March 2010, on pages 30 to 38, which comprise the Statement of Financial Activities, the Income and Expenditure Account, the Balance Sheet and the related notes. These financial statements have been prepared under the historical cost convention as modified by the revaluation of certain fixed assets and the accounting policies set out on page 32.

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 the Association's Members as a body, for our audit work, for this Report, or for the opinions we have formed.

Respective responsibilities of the Council and Auditors
The Council's Members (who are also the directors of the company for the purposes of company law) responsibilities for preparing the Trustee's Annual Report and the financial statements in accordance with applicable law and United Kingdom Accounting Standards (United Kingdom Generally Accepted Accounting Practice) and for being satisfied that the financial statements give a true and fair view are set out in the Statement of Trustee's Responsibilities.

Our responsibility is to audit the financial statements in accordance with relevant legal and regulatory requirements and International Standards on Auditing (UK and Ireland).

We report to you our opinion as to whether the financial statements give a true and fair view, have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice and the Companies Act 2006 and our opinion as to whether the information given in the Trustee's' Report is consistent with the financial statements. We also report to you if, in our opinion, the Association has not kept proper accounting records, if we have not received all of the information and explanations we require for our audit, or if information specified by law regarding Council's remuneration and transactions with the Association is not disclosed.

We read the Statutory Report of the Council, and consider the implications for our report if we become aware of any apparent misstatements within it.

Basis of audit opinion
We conducted our audit in accordance with International Standards on Auditing (UK and Ireland) issued by the Auditing Practices Board. An audit includes examination, on a test basis, of evidence relevant to the amounts and disclosures in the financial statements. It also includes an assessment of the significant estimates and judgements made by the Council in the preparation of the financial statements, and of whether the accounting policies are appropriate to the Association's circumstances, consistently applied and adequately disclosed.

We planned and performed our audit so as to obtain all the information and explanations which we considered necessary in order to provide us with sufficient evidence to give reasonable assurance that the financial statements are free from material misstatement, whether caused by fraud or other irregularity or error. In forming our opinion we also evaluated the overall adequacy of the presentation of information in the financial statements.

Opinion
In our opinion:

- the financial statements give a true and fair view, of the state of the Association's affairs as at 31st March 2010 and of its incoming resources and application of resources, including its income and expenditure, for the year then ended;
- the financial statements have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice applicable to Smaller Entities;
- the financial statements have been properly prepared in accordance with the Companies Act 2006; and
- the information given in the Statutory Report of the Council is consistent with the financial statements.

91 Gower Street
London
WC1E 6AB

21 July 2010

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

Leave a lasting legacy for the future of freshwater biology

Remember the FBA in your will

Leaving a legacy to the Freshwater Biological Association will make a real difference to continuing the work of the Association in future years.

Our scientists and supporters have always had foresight. Legacy giving is one way for the FBA to continue to be able to look far into the future. For the donor, legacy giving is a way of making sure that lifetime interests continue.

Gifts from legacies to the FBA are used to fund fellowships and studentships, to maintain the library and information services, to host meetings and courses, to safeguard our historical assets and to inspire ideas, people and facilities for future generations.

Legacies already make a real contribution to the Association's work, through, for example, bequests from the fish biologist Winifred Frost and from the FBA's former Director, Hugh Gilson. The Hugh Cary Gilson Award is an annual grant given to an FBA member to help fund new and novel research into any aspect of freshwater science. The Frost bequest is given to help fund research, specifically into fish biology.

Why legacies are important

For nearly 80 years, the FBA has promoted freshwater biology through research, publications, education and independent opinion. At our laboratories on the shores of Windermere and on the banks of the River Frome in Dorset, the FBA works to understand the life of fresh waters worldwide. We publish identification keys to freshwater organisms and other specialist volumes and have one of the finest freshwater libraries in the world. Long-term records of lakes and rivers started by the FBA are some of the longest in existence and are invaluable to the future of the freshwater environment.

The FBA is an independent Registered Charity and membership organisation. We receive no direct Government funding and rely on legacies, grants, subscriptions and donations to support the furtherance of our Charitable Objectives.

How your gift could be remembered

A significant legacy can be marked in some way, for example, to name a research grant. Or you may prefer to help secure the future of key activities of the FBA by asking the Trustees to use your legacy for a specific purpose. These could include support to:

Science – for research projects, provision of equipment, support for training

Information – for the library, maintaining the archive, support for publication and digital information services

Fritsch – for the curation of a unique collection of algal illustrations

General – for furthering the FBA's mission and vision.

How to leave a legacy

Making a gift to the FBA in a will is straightforward (though we'd always advise seeking a solicitor's advice).

A leaflet is available from the FBA (or can be downloaded from the website) which provides an outline form of words to include in a new will or as a codicil to an existing will. Your solicitor can also advise on how to complete an 'Expression of Wishes' so that the Trustees can take into account your views in using any monies received most effectively.

Because the FBA is a charity, leaving a legacy to the FBA is free of inheritance tax.

If you have already included the FBA in your will, please let us know so that we can acknowledge your generosity. If you would like the legacy marked in some way, for example, to name a research grant, please contact the Director for a confidential discussion. All intentions will be honoured, provided there is no conflict with the charitable objectives of the FBA.

For specific legacies (such as property, equipment, books etc), for gifts during your lifetime, or for gifts in memory of someone else, please contact the Director.

Contact Information

Your instructions will be treated with respect and discretion.

For further information please contact:

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The Freshwater Biological Association
A Company Limited by Guarantee
Reg No. 263162, England
Registered Charity No. 214440

For general information about legacy giving go to www.rememberacharity.org.uk

Photo: Matthew Whittam, Myerscough College.

Seventy-eighth Annual Report of the Freshwater Biological Association, Ambleside 2010

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