

76th
Annual
Report
2008



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. It supports scientific work at these and several other sites through providing specialist facilities and equipment. The research programme is also promoted by awarding grants and studentships to young scientists and FBA Members and by providing a working environment for Honorary Research Fellows - distinguished scientists who have retired from full time employment.

The FBA is taking a lead in an initiative to rejuvenate the UK freshwater research community by 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Library and Collections - the FBA holds one of the finest freshwater libraries in the world, housing published and unpublished collections, and is the custodian of a variety of long-term datasets from the Lake District, River Frome and other sites of scientific significance.

FreshwaterLife - an initiative to draw together information on freshwater fauna and flora and make it accessible via the Worldwide Web (www.freshwaterlife.org).

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

Publications - the FBA publishes a range of high quality, scientifically accurate, keys, reference texts and analysis guides. Members are entitled to a 25% discount on all publications.

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. It holds a highly respected Annual Scientific Meeting each year and along with other national European freshwater societies, organises 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. Members receive a regular Newsletter and free on-line access to the Association's journal *Freshwater Reviews*. They are entitled to a generous discount on FBA Scientific Meetings, on Scientific, Occasional and Special Publications, and on Library and Information Services. Members are encouraged to visit the Windermere or East Stoke sites and preference is given to Members for use of the scientific facilities and the Library.

Annual Membership rates for 2008 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:

The Freshwater Biological Association,
 The Ferry Landing, Far Sawrey, Ambleside,
 Cumbria, LA22 0LP, UK.

Tel: +44 (0) 1539 442468.
 E-mail: info@fba.org.uk, Web: www.fba.org.uk

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

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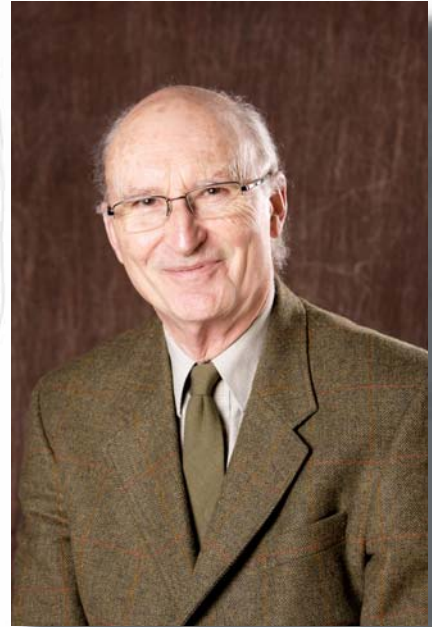
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THE PLANET WATER

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



“How absurd it is”, goes the familiar comment, “to call this planet Earth when 70% of its surface is water!”

Of course most of that water is saline. But the dependence of ecosystems and human communities on the water cycle is obvious. And this year the tragic impact of a tropical cyclone on the villages and rice fields of the Irawaddy delta has once more demonstrated how vulnerable people are to violent manifestations of that cycle. More insidious, but no less devastating, is the impact of worldwide shortages of rice – a crop that depends on good water management for its production and is the staple food grain of much of the tropical world.

For decades, hydrologists and ecologists have been predicting that fresh water is likely to emerge as the limiting environmental resource in many parts of the world. There have been dire warnings of the dependence of irrigated agriculture, in places as far apart as Saudi Arabia and the United States, on subterranean aquifers whose ‘fossil’ water is not replenished when it is pumped out. There have also been object lessons of how critical the good management of freshwater ecosystems is to the many human communities that depend on them.

This year the FBA is to convene the first of what we hope will be a regular series of ‘summit meetings’ for leaders in freshwater

ecology. It will look at how the many sources of stress on those ecosystems interact, to the detriment of ecological health and productivity. The Council believes that the FBA, as one of the world’s longest-established and best-respected organizations in its field, is the natural convener of such high-level scientific meetings. We hope and trust that the resulting publications will be landmarks, giving authoritative overviews of the state of knowledge of subjects crucial to the future of both humanity and biodiversity in a changing world.

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.

OFFICERS AND COUNCIL at 31st MARCH 2008

President

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

Chairman of Council

Professor A.G. Hildrew, PhD

Honorary Treasurer

Dr I.G. Dunn, MIBiol

Representative Members

The Fishmongers' Company
Sir Matthew Farrer
Royal Society
Prof. B. Finlay

Elected Members of Council

Dr M.J. Burgis, Independent
Dr S.J. Clarke, Natural England
Dr D. Evans, Environment Agency
Dr J.I. Jones, Centre for Ecology and Hydrology
Dr S.M. Kett, Middlesex University
Prof. T.E.L. Langford, University of Southampton
Prof. B. Okamura, Natural History Museum
Prof. C.S. Reynolds, Freshwater Biological Association
Dr A.L. Robertson, Roehampton University
Dr C.J. Spray, Scottish Environment Protection Agency
Prof. B. Whitton, Durham University

Vice Presidents

Dr A.D. Berrie, CBiol, FIBiol
Dr E. Buttle, CBE, CBiol, FIBiol
Sir John Gray, ScD, MB, CBiol, FIBiol, FRCP, FRS
Prof. Sir F.G.T. Holliday, CBE, DSc, FIBiol, FRSE
Prof. C.T. Ingold, CMG, DSc, DLitt, DCL
J. Jeffery, CBE, MSc, FCIWEM, FRIPH
E.D. Le Cren, MA, MS, CBiol, FIBiol, FIFM
Dr J.W.G. Lund, CBE, DSc, CBiol, FIBiol, FCIWEM, FRS
Prof. C.H. Mortimer, DrPhil, DSc, FRS
Prof. Sir W.D.P. Stewart, DSc, CBiol, FIBiol, FRSE, FRS
Dr J.F. Talling, DSc, FRS
The Duke of Wellington, MVO, OBE, MC, DL
The Duke of Westminster, KG, OBE, TD, DL

Finance and General Purposes Committee

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

* Co-opted Member

** Attendees

Honorary Members of the Association

The Countess of Albermarle
P.V. Allen
R.M. Badcock
Dr T.B. Bagenal
J.A. Black
Prof. R.O. Brinkhurst
A.J. Brook
V.M. Brown
K.E. Burnand
T. Carrick
Dr J.C. Chubb
D. Crookes
D.J. Cross
Dr D.H. Dalby
Dr M.R. Droop
Dr B.H. Dussart
J.H. Elliott
Prof. J.M. Elliott
Prof. D.W. Ewer
R.S. Fort

Prof. J. Green
T.V. Gudjonsson
D. Harding
Dr J.E. Harker
E.V. Hart
Dr R. Hartland-Rowe
J. Henderson
J. Hobart
P.H. Holway
J.E.M. Horne
Dr H.B.N. Hynes
M. Irving
B.M. Jones
Dr A.J. Juniper
B.M. Kipling
I. Lane
G.H. Lauff
Dr R.H. Lowe-McConnell
Prof. M. Macfadyen
Dr P.S. Maitland

K.F. Mansfield
C.C. McCready
W.A. Mitchell
L.R. Peart
D.H. Rhodes
J. Roskell
Dr D. Scott
D. Stevenson
Dr V.M. Stout
Dr D.W. Sutcliffe
Prof. J.J.A. Symoens
O. Simmonite
Dr H.I.S. Thirlaway
Dr M.P. Thomas
M. Thompson
J.F. Turpin
Dr M.E. Varley
The Duke of Wellington
The Duke of Westminster
F. M. Wiseman

Towards A Sustainable Future

Prof. Alan Hildrew, PhD



Last year I hoped that the long run of excessively 'difficult' years for the FBA might be coming to an end - and so it has proved to some extent. Mike Dobson's first complete year as our Director has seen the Association moving forward in the strategic direction that Council and staff have determined.

The turmoil of sales and refurbishments of the estate and other fixed assets has finally subsided. The Pearsall building, Windermere, has proved an excellent site for our new 'HQ' and the physical and intellectual transformation of the East Stoke site, now pretty much full, is bearing fruit. Information about freshwater ecosystems is our core currency and the key to our plans. I include meetings, publications,

conferences, and training courses under this heading. Council has approved a number of initiatives in this area, of which the high profile 'FBA conferences in aquatic biology' and the online production of a new review journal - *Freshwater Reviews* - are just two of the most obvious. Council is also thinking more strategically across the whole range of publication activities at the FBA - particularly important since the world of science publishing is changing so quickly.

Council is anxious that FBA makes best use of its research infrastructure, by attracting grants and researchers to work at our key, long-term sites. Again, progress is promising, with new research underway on the Frome Catchment (with partner organisations) and the use of the heated

pond mesocosms at East Stoke being perhaps the most prominent. This is set in the context of further progress towards our objective of promoting a national Cooperative Research Partnership in freshwater ecology.

FBA Council and staff continue the uphill but vital struggle to bring income and expenditure into balance, and this takes up much of our discussions at meetings - our troubles are by no means over! The tradeoff between moving quickly to balance the books on our day-to-day business, and looking to raise income through strategic investments, is indeed difficult but one we are determined to get right.

Strategy:

- *Disseminating accurate, timely and reliable information through websites, publications, scientific meetings and training courses*
- *Facilitating innovative and essential research through the provision of specialist scientific facilities and the giving of grants and scholarships*
- *Providing sound, independent scientific opinion to government, industry and the scientific community and acting as the advocate for freshwater biology*
- *Engendering an enthusiasm for the science of freshwater biology through promotional activities and fostering an active membership of the Association*

COMPLEMENT AT 31st MARCH 2008

Director	Dr Michael Dobson
Personal Assistants to the Director	Sarah A. Johnson / Julie P. McNicol
Business Manager	G. Andrew Freeman
Finance Officer	Catherine M. Humphreys
Finance and Administration Assistants	Carolyn Fletcher / Sarah Rigby
Science and Publications Officer	Dr Karen J. Rouen
Marketing and Communications	Christian E. Ripley
Facilities Management, Windermere	Ken Clarke / Matthew Freeman
Facilities Management, East Stoke	Brian Godfrey
	Russell Smith
Domestic Assistant, Windermere	Gordon Lancaster
Library and Information Services	Kearon S. McNicol
Library	Ian Pettman
Library Assistant, Windermere	Olive Jolly
Library Assistant, East Stoke	Stephanie Smith
Freshwater <i>Life</i>	Dr Anne M. Powell
	Salman Elahi
	Dr Melanie Fletcher
	Louise Miles
	Simon Pawley
Fritsch Collection	Lynda Durrell
	Elaine Monaghan

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 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
<i>FBA News</i>	Prof. Terry E.L. Langford
<i>Freshwater Reviews</i>	Prof. Colin S. Reynolds

Registered Auditors:

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

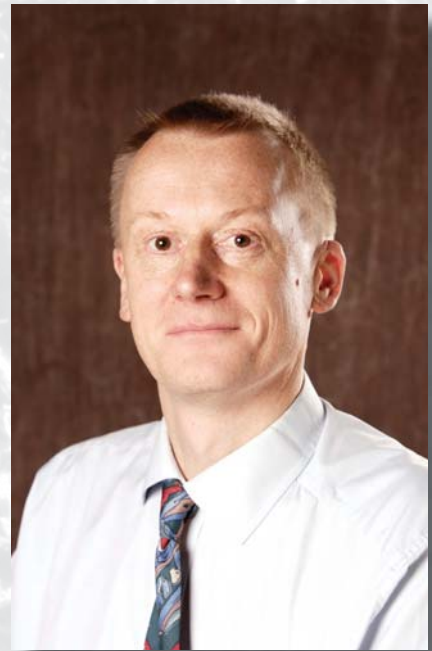
Bankers:

The Cooperative Bank
147 Church Street
Preston PR1 3UD

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

A New Direction for the FBA

Dr Michael Dobson, FLS, MIEEM



The FBA has entered a new and optimistic phase of its history with renewed vigour and a number of key strengths from which to build a forward looking and robust strategic role:

- A loyal and well informed membership, keen to be involved in the running of the Association
- Facilities for indoor and outdoor study and research at its two centres, backed by a wealth of data from field sites
- An international reputation for its historical activities as a research organisation
- Publications, including the definitive British identification keys for the groups of organisms that they cover
- One of the most comprehensive freshwater libraries in the world, and a major historical archive of older and grey literature
- The unpublished collection, a major resource for historical information and for identifying long term or repeated data runs
- The Fritsch Collection of Algal Illustrations, a major resource for taxonomic, biogeographical and historical research
- Repute as a publisher, including expertise in using electronic media for publication and dissemination.
- Property owned outright, forming a very valuable set of assets

- A knowledgeable and committed staff, including those able to provide specialist skills associated with the facilities and those employed to administer and manage the Association.
- Healthy financial assets, allowing it to invest where appropriate in activities that may ultimately boost its income

The new era of the FBA began in October 2006, with the transfer of Windermere staff to the newly refurbished Pearsall Building. It is effectively a new business, albeit one with many decades of history. The challenge now is to find a niche for the FBA, one which optimises use of its resources to provide services that end users need.

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.*

Achieving the Strategic Objectives

The FBA today

The FBA acknowledges its past as a research organisation and recognises that its current activities are complementary to those of the major research organisations today, providing facilities and services to support research. For many years it was closely associated with academic and contract research, but it is now able to reach out again to a much wider constituency covering practitioners, managers, educators, legislators, recreational users and enthusiasts. In short, the FBA strives to provide services for all those with an interest in freshwater biology and a desire to understand freshwater habitats and maintain their integrity. This is highlighted in our mission: 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.

The Structure of the FBA

The structure of the FBA is enshrined in its Business Plan, available from the website at www.fba.org.uk/index/about/strategy.html. This states that the key activities are divisible into three key strands: meeting information needs, research facilitation and membership services.

Meeting information needs

The FBA has major information holdings. A key objective over the coming period is to make these holdings more accessible to users and to link them closely to knowledge transfer in order to optimise their value. Management of information is subdivided into two components.

Information resources include the Library, unpublished collections, Fritsch Collection of Algal Illustrations, FreshwaterLife web portal and many datasets, including the hugely valuable long term data on the Windermere catchment jointly owned with CEH. The aim is to create an integrated information resource which provides effective support for research, training and independent expert opinion.

Knowledge transfer activities with which the FBA has expertise include publication, training and conference organisation. Each of these has expanded during the past 12 months. The expertise

in publishing has been augmented by development of e-publication skills through *Freshwater Reviews*, an online first journal. Training expertise has benefited from a wide range of identification training courses that the FBA is now able to offer. Conferences include the programme of FBA Conferences in Aquatic Biology, in addition to the Annual Scientific Meetings and SEFS (Symposium for European Freshwater Sciences) meetings. The aim is to ensure that the FBA is recognised as a centre of expertise in disseminating knowledge related to fresh waters.

Research facilitation

This covers several currently disparate activities and assets, which will be more closely integrated with each other, and also with the FBA's role of meeting information needs.

Research facilities include the large outdoor hatchery facility, indoor aquarium, field site access with boats and the electron microscope suite at Windermere, along with the experimental stream channels and fluvium at East Stoke and purpose built laboratories at both centres. The aim is to ensure that these continue to be used for high quality research in a financially sustainable manner.

Currently there are no research staff employed by the FBA, although there are ten honorary research fellows (HRFs), carrying out research and publishing in the Association's name. The aim is to ensure that FBA centres are home to active communities of research scientists, and this is currently being achieved at East Stoke, which currently hosts research scientists from CEH, Queen Mary University of London and Plymouth University, along with HRFs.

Grants and awards are seen as a key mechanism by which the FBA can support research. Currently it offers the annual Hugh Cary Gilson award for small research projects, along with various initiatives to assist in training: half studentship grants for PhDs, MSc bursaries and CASE partnerships. The aim is to ensure that the FBA is identified as a source of regular research awards for studentships and specific projects.

The Cooperative Research Partnership is a proposal to bring together freshwater researchers, clients and research facilities across the UK. The FBA is playing a key role in coordinating its development.

Membership

An active membership is a key requirement for the success of the FBA. Its members are its single greatest resource, and many are committed to active involvement in the Association. The aim is to ensure an active membership benefiting from the activities of the FBA.

Outlook

By organising itself in the ways outlined here, the FBA will be able to maintain the activities for which it has been historically famous and at the same time fill an important niche as a facilitator of research and understanding.

Over the coming years, staff will actively develop those activities for which there is a clear demand, in order to improve the prospects for understanding and managing our fresh waters sustainably into the future. A key element in the success of this approach will be partnership, providing individuals and organisations with the resources for which the FBA has clear strengths and always working in a spirit of cooperation rather than competition.

Michael Dobson
Director



Aerial photograph of the FBA Peninsula with the Ferry House (centre), Pearsall Building (centre left) and Hatchery within the wooded area (top left).



Front entrance to the Pearsall Building.

The FBA has occupied the peninsula site on the west shore of Windermere since 1950. After the sale of The Ferry House the FBA's laboratories, conference facilities and administrative offices are now housed in the adjacent Pearsall Building.



View across experimental mesocosms to the main laboratory complex at FBA East Stoke.



Fish counter and flow gauging weir across the River Frome at FBA East Stoke.

The FBA site at East Stoke in Dorset was purpose-built as a river laboratory in the 1960s. In 2007 it became the base for scientists from CEH, the Environment Agency, Queen Mary University of London and Plymouth University.



Circular tanks in the Hatchery at FBA Windermere.



A pearl mussel filter feeding.

The Hatchery at Windermere is fed by water pumped from Windermere. In 2007 the last of the fish associated with CEH departed this facility, but it welcomed several populations of pearl mussels and their associated salmon as part of an endangered species breeding programme funded by the Environment Agency and Natural England.

Report of Activities 2007/08

The Director's Report

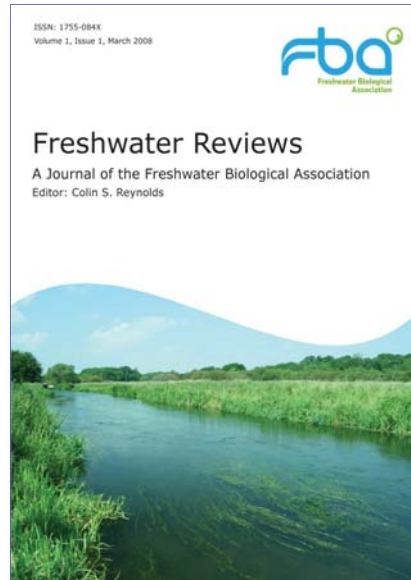
As the year about which I am reporting was my first with the FBA, I must start by thanking its entire staff for their support, and for their dedication to the Association during this period of transition. I started at a time when the staff at Windermere had just gone through the upheaval of vacating Ferry House for the Annexe, and then the Annexe for the Pearsall Building a few months later; in Dorset, meanwhile, the single FBA staff member on site was working almost non-stop to prepare the site for the return of research scientists. I owe them all a great deal for their professionalism in overcoming obstacles and yet still finding time to answer my constant questions.

Once physical upheavals had ceased, major initiatives continued with the preparation of documents that are crucial to the effective running of a business; we now have a Business Plan for the next five years, an Institutional Risk Assessment, a Health, Safety and Security Handbook, and an Operational Management Plan for East Stoke. As part of the development of the Business Plan, organisational changes have taken place, including the complete incorporation of *FreshwaterLife* into the FBA and the re-organisation of the FBA's activities, with an emphasis on our strengths in meeting information needs (outlined on the preceding pages).

Meeting information needs

For the first time for many years, the FBA ran identification training courses on a trial basis. The response was so positive that we put together a full programme of courses to be run in 2008. We are grateful to the Esmée Fairbairn Foundation, through its funding of the Recorders and Schemes Project, for facilitating development of this training course programme.

The year saw the launch of two new books: *Keys to the Adult Male Chironomidae of Britain and Ireland*, by Peter Langton & Clive Pinder, and *The World of Lakes: Lakes of the World*, by Mary Burgis & Pat Morris. It also saw the publication in December of the first papers to appear in *Freshwater Reviews*, our new online first journal. The interest in this journal has been better than expected, with many authors willing to contribute their work to what was an unknown quantity; the coming years will determine interest from subscribers, but its widespread distribution is assured, as online subscription is a



benefit of FBA membership.

The Annual Scientific Meeting (ASM) in September was well attended and blessed with perfect weather for the evening cruise on Windermere. The quality of presentations was high and we were particularly pleased to welcome so many students, practitioners and enthusiasts; the aim of the ASM is to be an informal environment where all stakeholders in our fresh waters feel comfortable contributing to the meeting. We were also involved in the joint meeting, on Change in Aquatic Ecosystems, with the Marine Biological Association and Scottish Association for Marine Sciences, in Plymouth in early July, followed by the Symposium for European Freshwater Sciences (SEFS) in Sicily the following week. The FBA was instrumental in setting up the North East Freshwater Group, which ran two successful meetings during the year.

Supporting research

In June 2007 the FBA welcomed staff from the Centre for Ecology and Hydrology (CEH), Environment Agency, Plymouth University and Queen Mary University of London to our site in Dorset. Once again, this is a venue for innovative research, and the presence of scientists from different institutions is encouraging exciting synergies. The FBA is committed to maintaining a strong research presence at East Stoke, of which this is a major first step. The success of scientists from these organisations working together

LEFT. In 2007 the FBA launched its new journal, *Freshwater Reviews*. The scope of the journal has clearly filled a niche, as evidenced by the number of manuscripts it received for consideration in its first few months of existence. Its mode of dissemination, as a printed journal but with an 'online first' mechanism of publication, gives it great flexibility.

when conditions are made conducive has once again demonstrated the value of a Cooperative Research Partnership for freshwater science in the UK, and the FBA is coordinating a scoping study investigating options for developing such an initiative.

Two half-studentships awarded during the previous year to the University of Durham (supervisor, Martyn Lucas) and the University of Ulster (supervisor, Brian Rippey (Ulster) are now running. The Hugh Cary Gilson Memorial Award was made to Brian Moss (University of Liverpool). FBA Council approved a proposal to increase the value of the Gilson award to £4000, and to award a third half studentship for 2008.

By October 2007, 150 pearl mussels were installed in the hatchery having been removed from critically endangered populations in rivers in the north of England. They came with approximately 1000 salmon parr, essential for their reproduction and therefore survival. We are grateful to CEH for making some of the hatchery tanks available for this conservation and research project. At the end of March, the CEH contract on the hatchery and aquarium expired, thus ending many years' association with these facilities. CEH has not departed completely, as some of its staff still use the site as a base for field surveys of the Lakes, and we hope that this relationship will continue long into the future.

Engagement with members

Membership of the Association continues to grow with 95 new memberships taken out during the year. This included 52 Individual, 2 Life and 31 Student Members, plus 9 through the African Sponsorship initiative and we were very pleased to welcome Natural England as a new Corporate Member. In 2007, 5 members accepted honorary status having been members for 50 consecutive years. We received notification of the deaths of 9 members and 11 other members resigned membership through their own request. At the end of the period membership numbers had reached a healthy 1506.



ABOVE LEFT. The FBA library is one of the most comprehensive freshwater libraries in the world, and still receives around 100 journal titles through its library exchange programme. In 2007 it received several large donations of material, further enhancing its value. The satellite library at East Stoke (shown) successfully incorporated acquisitions received following the closure of the CEH library at Winfrith.

ABOVE. The Fritsch Collection of Algal Illustrations is a comprehensive taxonomic resource covering freshwater, brackish and terrestrial algae from around the world. It comprises around one million illustrations. In 2007, a strategy was adopted to seek funding for the collection not only based on its scientific worth, but also on its value as a historic archive.



LEFT. In 2007 the FBA launched a programme of training courses at both its centres. These cover identification, including algae, macrophytes, macroinvertebrates and fish diseases, and will be expanded to cover other taxonomic groups and field and laboratory techniques.

Several new initiatives have been instigated for the benefit of members. They now have the opportunity to involve themselves in the activities and decisions of the FBA through the Grants and Awards Committee, the Meetings Committee and the Honorary Research Fellows (HRFs) Committee. The HRFs Committee is currently restricted to members of Council and FBA staff, but the others are open to any member. The African Sponsorship Programme provides an opportunity to assist scientists and capacity building in the developing world. Members continue to receive discounts on all FBA products, including training courses, and have enthusiastically taken these up.

Staff

There were four staff departures during the year. Peter Allen retired after many years' service to the FBA, his lasting legacy being the Pearsall Building, whose refurbishment from laboratories to offices he oversaw. Roger Sweeting retired after eight years as Chief Executive, but remains as an HRF. Diane Hewitt finished in her role as dataset coordinator, having passed on her expertise to other members of staff, but continued to work voluntarily to curate some of the many valuable specimens in the Unpublished Collection. Finally, Xin Zhu left *FreshwaterLife* for pastures new.

We also welcomed some new appointments. Apart from myself in Windermere, these were to bolster staffing levels in Dorset, in response to the new

demands now the site is occupied once more. Stephanie Smith, formerly librarian at CEH Dorset and before that an FBA librarian, is now once again working for the FBA, overseeing the library and collection in Dorset. Russell Smith (no relation) was appointed as Assistant Site Manager.

Four new HRFs were welcomed to Windermere: Ken Clarke, Glen George, Allan Pentecost and Roger Sweeting. The year also saw the retirement of two HRFs: John Lund and Jack Talling; we are grateful to both for their excellent contributions to the FBA since their retirement from paid employment, and will be sorry to see them go.

Michael Dobson
Director

Report of Activities 2007/08

The Hugh Cary Gilson Award

Climate change and the balance of respiration and photosynthesis in shallow lakes

Charlotte Whitham, Uzma Noreen, Brian Moss & David Atkinson
School of Biological Sciences, University of Liverpool

The granting of the Hugh Cary Gilson award in 2007 allowed us to employ Charlotte Whitham, a recent graduate in Environmental Biology at the University of Liverpool, to coordinate a set of experiments within a larger experiment near Liverpool on climate change. The University has 48 experimental 3m³ tanks in which reasonably complete shallow lake ecosystems have been established and during 2005 to 2007 we carried out experiments on the combined influences of warming by 4°C above ambient, presence or absence of fish (three-spined sticklebacks) and nutrient loading, on a hypertrophic system dominated by submerged aquatic plants. The particular thrust of the work under the award was to determine whether warming would significantly alter the balance of gross photosynthesis and community respiration within the systems. Much of the world's landmass is covered by wetlands and shallow lakes, particularly in the extensive tundra and boreal zones and throughout south-east Asia. Recent work on lakes has suggested that they are sources not sinks for carbon dioxide in that their ecosystems depend on organic matter imported from the terrestrial vegetation of the catchment or surrounding wetlands. There is an immense amount of carbon stored in such systems and were warming to increase respiration rates compared with gross photosynthesis there would be an enhanced release of carbon dioxide and perhaps methane, with the dangers of a positive feedback on warming processes that would rapidly worsen the climate change problem.

With the Gilson Award, we carried out three 24-hour long experiments in which the oxygen concentrations were measured every two-hours in each of sixteen tanks by the laborious but reliable Winkler titration. The tanks were those in which there was no heating and no added nutrients, those heated but unfertilised, those fertilised with a high N to P mixture but not heated and those both heated and fertilised. Each of these four treatments was quadrupally replicated. From these data we calculated, using principles akin to those of the classic light and dark bottle

technique for determining production, but using the night time to measure respiration and making allowance for gas exchange with the atmosphere, the community respiration and the gross photosynthesis of the plants and algae in the tanks. The results were very clear-cut. The ratio of community respiration to gross photosynthesis was lower than unity in the high summer of our experiments, suggesting that the tanks were autotrophic during this period but warming increased the ratio by about 15% from around 0.65 in ambient tanks to 0.75 in warmed ones. Added nutrients had no additional effect on the ratio but increased the rates of photosynthesis and respiration. Since a rise of 4°C is reasonably likely later this century, the results have serious implications. By using separate bottle experiments on plankton, plants and periphyton, we also established that this overall effect arose from direct influences on the physiology of the plants and algae but also through indirect effects. Plankton production was reduced by a stimulation of surface duckweed cover in the warmed treatments and this led to reduced

photosynthesis and increased respiration, whilst the effect on *Lemna trisulca*, a major component of the plant community, was likely a direct physiological one.

The experiments had major implications for future fisheries. The tanks were hypertrophic and not unlike a myriad of small shallow waters in the lowlands of the UK. Warming reduced both the maximum and minimum values recorded for oxygen and the latter in warmed tanks usually went below 1 mg O₂ L⁻¹ by dawn and often reached zero. The prospects for future fish survival in such waters are thus not good.

The experiments also revealed useful information on the reliability of oxygen probes, a chemical problem in the Winkler titration at supersaturating concentrations of oxygen and our abilities to survive all-night experiments with equanimity. All in all, the award proved extremely valuable to us. The results will be published in a high quality journal alongside those obtained on other aspects of warming during the long-term experiment.

Brian Moss



Charlotte Whitham (left) and Uzma Noreen (right), monitoring oxygen concentrations.

Reports from the Honorary Research Fellows

Honorary Research Fellows are an integral element in the FBA's research activities. Generally taken on after they retire from full time employment, the Research Fellows continue to carry out research and publish their work under the auspices of the FBA. In return for the provision of facilities such as laboratory and office space, they enhance the profile of the FBA and wherever feasible become involved in its activities.

This was a year of great change: four new fellows were appointed (Ken Clarke, Glen George, Allan Pentecost and Roger Sweeting), while two retired (John Lund and Jack Talling). We shall miss the contributions of John and Jack, but are already feeling the benefits of the new fellows who, in addition to their research activities, have thrown themselves wholeheartedly into the general activities of the FBA.

The reports from Research Fellows for their activities during 2007/8 are included below. Each Research Fellow has a personal style in which he or she prefers to produce a report, and these have been retained, rather than following a fixed format. The references cited provide further information about research activities and the interactions with external researchers.

Patrick Armitage Applied Invertebrate Ecology

During the year I collaborated with the Universities of Loughborough, Birmingham and King's College in working up data from previous research and have continued to review books, and papers. I am also a copy-editor for *Freshwater Reviews*. In addition I maintain daily contact with my colleagues at CEH in an advisory and collaborative role (Bowes *et al.* 2007).

The LOCAR (Lowland Catchment Research) project is now finished but I am still involved with Professor Angela Gurnell and Dr Jo Goodson in their study of vegetation management influences on fine sediment and propagule dynamics within groundwater-fed rivers and the overall implications for river management, restoration and riparian biodiversity. The information gathered from these studies is currently being processed for publication, including a paper examining the river bed as a dynamic store for plant propagules (Gurnell *et al.* 2007).

The FBA/Birmingham University project on 'The impact of disturbance

frequency on benthic community structure in experimental stream channels' for which I was a co-supervisor, still continues to provide publications (Harris *et al.* 2007) and two more papers addressing disturbance frequency and algal community dynamics in stream mesocosms and utility of stream mesocosms for experimental research, are in review.

My work on the small streams of the River Frome catchment and adjacent areas continues and I am currently looking at the relationship between catchment characteristics and faunal communities using the data from nine streams collected over the last 10 years. In addition I have started a new survey of a small acid stream draining an SSSI-designated area of heathland. This work is being carried out with a new member of the CEH staff and will have the dual function of presenting new data and providing experience in the running, processing and production of a piece of work suitable for publication.

Work on the effects of sediment from the Bovington training ranges has been going since November 1999 and is now building up into a useful dataset to examine long-term changes in widely different but adjacent water courses, the Bovington Stream and the adjacent River Frome.

My recent work at Cow Green is now published and this is supplemented with a further paper on data collected in 2004 from the River Nent in Cumbria, a heavy metal polluted stream which I had previously studied in 1976 (Armitage *et al.* 2007). Change between years in total abundance, numbers of taxa and community composition varied considerably between sites. Two tributary sites showed major changes between years due to a reduction in acidity in one and changed substratum in the other but in the main river no significant difference in total taxa and total abundance was observed between years. Environmental assessment methodology identified 'sensitive' faunal groups and indicated that the extensive impact of zinc pollution in the main river has remained practically the same in 1976 and 2004. This persistence of community structure despite the heavily disturbed nature of the river is attributed to relative constancy in habitat conditions.

I am involved with the University of Plymouth in an Esmée Fairbairn Foundation project entitled "Evaluating and protecting the biodiversity of lower, tidally-influenced

river reaches". The sub-project "Seasonal dynamics of tidal-influenced reaches in chalk rivers" is based at FBA East Stoke. I have assisted the post-doc Dr. Michael Chadwick and his research assistant Dr Miira Riipinen in settling in to the River Laboratory and have provided general advice and assisted with field sampling techniques and the identification of Chironomidae.

Ken Clarke Electron Microscopy

During my first year as an HRF I have been involved in activities with other HRFs and running the FBA's electron microscopes (EMs). Both microscopes have performed well with little maintenance required over the past year, with most use made of the dedicated scanning electron microscope.

I have worked with Roger Sweeting on the Pearl Mussel Project. Regular samples were taken from the gills of salmon carrying the juvenile form of the mussel (glochidia). These were fixed and prepared for electron microscopy. We wished to assess the development of the glochidia cells, to understand their attachment and incorporation into the gill tissue of the salmon, and to predict the moment when the developing young mussel would part for its host. In the first two of these cases we were successful; we are still awaiting the separation of mussel from fish. In the process of examining the tissue and embedded glochidia we have secured a range of reference material and explicit images of the embedded cells.

With Allan Pentecost I have been looking at silica (quartz crystals) from dissolving diatom frustules. A study was made of the shapes and sizes of quartz micro-crystals re-crystallising from the dissolved or dissolving remains of diatom frustules present in aquatic sediments.

I am also working with Bland Finlay and Genoveva Esteban (QMUL) on the freshwater protozoan ciliate genus *Histiobalantium*. This organism is able to exist in both aerobic and anoxic waters, and sequesters and utilises organelles harvested from its algal prey, consuming these organelles once their efficiency has declined. The publication of this research is nearing completion.

The EMs have been used in three teaching courses during the past year. Students have used the instruments under guidance and the instruments have been

used to demonstrate both their technical abilities and their application to microbiology and in the application of scientific photography. The EMs have also been used routinely to study heterotrophic microflagellates and micro-algae for a small number of FBA research workers.

J. Malcolm Elliott Ecology of Freshwater Fish and Zooplankton

I made an enjoyable visit in October to Tromsø where I am an Emeritus Professor in the Norwegian College of Fishery Science at the University of Tromsø. I gave two lectures and discussed various projects with students and staff. I also presented a paper at the Annual Scientific Meeting of the FBA.

Collaboration with Norwegian scientists produced a paper comparing the marine temperature and depth preferences of Arctic charr (*Salvelinus alpinus* (L.)) and sea trout (*Salmo trutta* L.) (Rikardsen *et al.* 2007). The fish were caught just before they migrated to sea and were tagged externally or internally with depth- and temperature-measuring data-storage tags before they were released into the sea in the Alta fjord in north Norway in June 2002. All sea trout were recaptured after they spent 1-40 days at sea and all charr were recaptured after 0.5-33 days at sea. On average, trout preferred water about 0.6 m deeper and 1.3 °C warmer than the charr. Both species spent >90% of their time in water no deeper than 3 m from the water surface, but they made occasional deep dives, especially at the end of the sea migration. Comparisons between data from the tags and temperature measurements within the fjord showed that the two species selected different feeding areas; the sea trout chose the inner and warmer parts of the fjord whilst the charr preferred the outer, colder parts. These differences in migratory behaviour can be related to different prey preferences and optimal temperatures for growth, so that there is little competition between the two species for food and habitat resources at sea. However, some observations, such as the deep diving behaviour, remain to be explained.

In my report for last year, I described the life cycles of four species of riffle beetles (Elmidae) and used life tables to identify critical periods in the life cycle (Elliott 2006). This work has continued in two publications. The first examined ontogenetic changes in the drifting of the following four species and elucidated the complexity of their drift-benthos relationships: *Elmis aenea*, *Oulimnius tuberculatus*, *Esolus parallelepipedus* and *Limnius volkmari* (Elliott 2008a). Most larvae and adults were taken in the drift at night with little variation between

catches in the three nets at each of two sites. Day catches were very low, often zero. No significant relationships could be established between mean numbers in the drift catches and benthic densities. When night catches were converted to drift densities (number caught per 100 m³ of water sampled), the latter were positively related to monthly losses in the benthos, but not to benthic densities. A linear regression described the relationship, and equations for the different life-stages within each species were not significantly different from the equation for all life-stages combined. However, drift losses were only about 0.07% of total losses in the benthos. Key life-stages with the highest drift density were the earliest life-stage soon after egg hatching for *E. aenea*, the start of the larval overwintering period for *O. tuberculatus* and *L. volkmari*, and mature adults during the mating season for all three species. Drift density for *E. parallelepipedus* was too low to identify a key life-stage. These key life-stages corresponded with critical periods for survival in the life cycle, as identified in the earlier study in the same stream. Mortality was high during these critical periods, hence the strong relationship between drift density and benthic losses. The latter relationship was very consistent for different life-stages within each species, and partially supported the rarely-tested hypothesis that drift represents surplus production in the benthos.

The third and final paper on riffle beetles examined ontogenetic shifts in the drift periodicity and the upstream-downstream dispersal on the substratum for the same four species (Elliott 2008b). Comparisons of periodicity between life-stages of the same species were limited to months when numbers in the drift were highest. Dispersal was evaluated in six experimental stream channels, placed above the stream, with initial numbers of each life-stage varying from 20 to 80. Ontogenetic shifts in diel periodicity were similar for all four species. Drift catches were similar throughout the night for the early and intermediate larval instars and for mature adults, but were highest in the early hours of the night with a gradual decline hereafter for later larval instars and immature adults. These patterns were unaffected by a severe spate, even though drift numbers increased considerably. Dispersal was density-independent; the number of dispersing animals was a constant proportion of the initial number for each life-stage. The relationship between dispersal distance and the number of animals travelling that distance was well described by an inverse power function. Median and maximum distances (m day⁻¹) were estimated for each life-stage. Ontogenetic shifts in dispersal in

the stream channels matched those shown in diel drift periodicity. For all four species, the later larval instars and immature adults showed little movement in either direction, whereas early and intermediate larval instars and mature adults dispersed predominantly upstream, adults travelling further than any other life-stage. Ontogenetic shifts in diel drift periodicity and dispersal were related to seasonal changes in drift density and critical periods in the life cycle. Such shifts have not been quantified in other stream invertebrates, but should be considered when evaluating the role of dispersal in their population dynamics and their colonisation ability.

D. Glen George Zooplankton

I retired from CEH in February 2007 but still spend a significant proportion of my time attending meetings and workshops in mainland Europe. In March, I was in Finland at a meeting of the Global Lakes Environment Observation Network (GLEON). In May, I attended a 'Eurolimpacs' meeting at University College London where I presented a paper on the climatic responses of thermally stratified lakes (George 2008). During the summer, I served on two review panels in Ireland and attended a number of climate-related meetings in Zurich, Granada and Brussels. My visit to Brussels was funded by Harmoni-CA, a catchment management programme supported by the European Commission (see George 2007).

Throughout the year, I have been in regular contact with colleagues from University College London and Aberystwyth University. I am currently helping UCL compile a report on river and lake temperatures and working on some lake monitoring projects with the University of Aberystwyth. As part of my drive to encourage more limnological research in Wales, I have also had meetings with the Countryside Council for Wales (CCW) and staff from the Snowdonia National Park. A consortium led by CCW is currently funding a project on the automatic monitoring of Llyn Tegid where new studies are planned in the coming year.

In January 2008, I helped organise a workshop on the development of climate related research at the Swiss Federal Institute of Aquatic Science and Technology (EAWAG). The meeting was attended by more than a hundred delegates and invited speakers from research groups in Switzerland, Germany and the US.

In the past six months, I have spent most of my time editing a book on my last EU project (CLIME). This is due to be published by Springer later this year with contributions from ten European countries. The book will include chapters on the

impact of climate change on the physical, chemical and biological characteristics of lakes located in northern, western and central Europe. I am the lead author for four chapters and a co-author of six others.

Most of the papers published in 2007/08 have been based on work completed in CLIME or in earlier EU funded projects. They include a meta-analysis of the 'climatic signatures' detected in a large number of European lakes (Blenckner *et al.* 2007), an analysis of the impact of climate change on the larger lakes of the English Lake District (George *et al.* 2007) and an account of the factors influencing the spatial distribution of phytoplankton in a Spanish reservoir (Moreno-Ostos *et al.* 2008).

Terry Gledhill

Invertebrate Taxonomy

Collaborative work continues with my colleagues Dr Reinhard Gerecke (University of Tübingen), Dr Harry Smit (University of Amsterdam) and Dr Antonio di Sabatino (University of L'Aquila) on the European water mites. Hopefully the manuscript for volume two, to be published in the *Süsswasserfauna von Mitteleuropa* series, will be sent to the publishers later this year.

I have spent a considerable amount of my time 'improving the English' of manuscripts for my 'water mite' colleagues. One in particular, which also included review, was a 362 page revisional study of European species of the notoriously difficult water mite genus *Lebertia*. Publication of this review is necessary in order for us to incorporate the results into the second volume of the water mite work mentioned above.

I am collaborating with Dr Paul Wood (Loughborough University) and Dr Andreas Fuchs (Arbeitsgruppe Grundwasserökologie, Universität Koblenz-Landau) on a study of an enigmatic amphipod from a river in Kent. In August I visited the former FBA site at Waterston in Dorset where I had previously carried out a five year study of the relative abundance of four species of subterranean amphipod crustaceans. With permission from the present owner, samples were taken from my original sampling sites and numerous specimens of *Niphargus* obtained. Some specimens of *Niphargus kochianus* from these samples have been sent for genetic analysis to Dr Bernd Hanfing (Hull University) for comparison with that of *N. kochianus irlandicus*. (The Waterston location is where I discovered the true males of *N. kochianus*).

During the weekend of 14-15 April I tutored at the FBA course on 'Freshwater Invertebrate Identification' held at the Windermere Centre. Almost a year later, over the weekend of 29-30 March, I was once again a tutor on a similar course. In

June I attended the 'First Workshop of the Hyporheic Network' (a three year NERC-funded knowledge transfer project) held at the University of Sheffield. Also in June I was involved in 'A Family Day at the FBA' as part of the 'Windermere on Water' festival. Visitors were shown how to sample for and identify common freshwater invertebrates.

I have advised my colleagues Dr Melanie Fletcher and Simon Pawley on many things dealing with invertebrates and taxonomy; on the development of resources for FBA courses and on the production of a leaflet on 'Cave Life in Britain' by Lee Knight, the coordinator for the Hypogean Crustacea Recording Scheme. This leaflet was produced by the FBA as part of the 'Recorders and Schemes Project, funded by the Esmée Fairbairn Foundation.

Elizabeth Haworth

Diatoms and Palaeolimnology

Honorary Curator of the Fritsch Collection

Most of my time this year has been spent in supporting and promoting the Fritsch Collection rather than on my own research. Funding applications take inordinate time and, whilst our application to Global Biodiversity Information Facility (GBIF) was unsuccessful (there being >80 applicants for 11 awards) we have been urged to seek other funding and were provided with a highly supportive letter. In June, I visited Oxford University Botany Department to discuss the use of their freely available BRAHMS program for the internet use of a digitized copy of the Fritsch sheets. This has highlighted the early need for a species index. The online bibliography continues to be updated and the Fritsch website (www.fritschalgae.info) was completely revised and updated by Gina Devlin, with the assistance of FBA IT staff.

On the death of Winifred Tutin, I helped her daughters to sort and pack her remarkable archives for the FBA. These eventually came to Windermere and I plan to do some further sorting out so that they may be made available to visiting researchers. The production of the memorial in the FBA newsletter brought together by various of her colleagues and produced some long forgotten information.

Over the summer I took part in tarn surveys with the Cumbria Wildlife Trust. I also assisted in the first macroalgae course held at Windermere in October. I have continued to review manuscripts and I continue to respond to various algal queries when appropriate.

I have been collaborating with the National Oceanography Centre (Southampton) over an extremely comprehensive multidimensional seismic survey of the sediments of Windermere. In the 1980s Professor Gerald Sargent of Queensland spent several summers at Ferry

House making seismic transects of Lake District lakes and his results were extremely useful to the FBA's palaeolimnology group. These records, and the 'Sand and Gravel Company' borehole data that we also hold, have assisted in this new survey. The first results have provided fascinating details of some underwater deposits and I was able to link these to the local glacial activity. Sadly I was unable to be present for the second survey session but look forward to the results.

Mike Ladle

Dorset Fishery Management and Ecology

I still visit FBA East Stoke regularly to liaise with members of FBA and CEH staff and in March/April I collaborated successfully with Dr Stewart Welton on the control of the Blandford Fly in (Welton *et al.* 2007).

I attended meetings of the Wessex Region Fisheries Forum throughout the year and will continue to do so as required. In the current volatile situation of fish research it seems particularly important to foster strong links with the local Environment Agency. With regard to the installation of a new fish pass on Louds' Mill gauging weir (a long-term serious barrier to salmon migration on the River Frome) by the Environment Agency in 2007, I was able to press for continued long-term monitoring of salmon stocks on the River. I have also continued as chairman of the River Frome Conservation Trust and as advisor to the River Allen Association. I again lectured, to various organisations including MSc courses at the Universities of Bournemouth and Oxford, on various topics.

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

The run of salmon was very small (FBA Counter figures) but catches were impressive. Fifteen salmon were landed on the East Stoke beat and thirteen at West Holme – very good considering the run. In addition one trout (seatrout) was landed at East Stoke and ten at West Holme. All the salmon were returned alive to the River. The beats were becoming dilapidated and I am pleased that progress is now being made in constructing a new fishing hut, although the foot bridges still require repair.

As usual I volunteered my services to the annual fund raising auctions of the Atlantic Salmon Trust and the Salmon and Trout Association, and I continue to operate my very successful angling website www.mikeladle.com.

Allan Pentecost

Algal Ecology

Approximately 80% of my time as an Honorary Research Fellow has been spent reviewing papers on phosphorus in lakes and rivers. The aim is to produce a comprehensive publication on this topic. As a review exercise it has proved so far to be interesting, as I began the task by looking at the most recent and the earliest literature and then gradually moving into the mid-period literature of the 1990s. Of the many thousands of research papers on this topic, it would appear that about 1000 provide useful original information but I may have to revise my opinions as the work progresses. The final form of the work resulting from this review will not be known for another year. After that, two years or more will still be needed to gather the information together in a readable form. So far it has proved to be a voyage of discovery. I have been interested in the chemistry of phosphorus since my early teenage years but still have much to learn, and it is as J.W. Mellor once said, 'the most interesting of elements'. I hope that the experience gained in this review will add significantly to the expertise base the FBA will be able to offer to its members and colleagues.

My remaining time has been spent looking at the freshwater algae in a range of contexts. Arriving at the FBA as a newcomer almost one year ago, I felt the need to become better acquainted with the freshwater algae of the district. While the FBA library has unrivalled resources for algal research, I could not find any accessible lists of algae recorded from the area. I began by making a checklist of the Cumbria desmids. This is now reasonably complete, although it includes only published records, and exists only as an Excel spreadsheet. With some refining it should be suitable as a web-based file. I suspect that there are large unpublished lists of these algae from the lakes, but again it was interesting searching the early literature, which uncovered by chance some rivalries between the Wests and their competitors in the late 19th Century. Although not a 'desmidologist' I have published on these plants and find them fascinating and hope to focus on a small field based desmid study in the near future. On completing the list, I prepared another for the algae of Windermere. Although a good phytoplankton list exists, there was no list for the littoral and benthic taxa. This is again in spreadsheet form and contains several hundred species recorded from the lake. Already some casual lakeside samplings have revealed 'new' records, but again I suspect there may be much

unpublished material by John Lund and others which needs to be added. I have also managed to do some cave algae surveys in the Yorkshire Dales and my wife has serendipitously collected two cyanophytes new to Britain in the Cumbrian fells.

Finally I have a huge backlog of results and work done at King's College London that needs completing and writing up. For example I have a manuscript on *Rivularia* photosynthesis using optodes – a novel method we adapted at the Max Planck Institute to locate and measure photosynthesis rates in the colonies. I have a few measurements to complete but they are challenging, as they involve analysis of CO₂ and Ca in single drops of water expressed from colonies. However I am optimistic that this can be completed in 2008.

Colin Reynolds

Ecology and Modelling of Phytoplankton

Editor *Freshwater Reviews*

My fellowship activities this year have been wholly dominated by publications. The most significant of these (and also the most time-consuming) has been the editing of the FBA's new journal, "*Freshwater Reviews*". I am still not quite sure how I came to be doing the job but, whilst it has had its share of tribulations, the task has achieved the pleasurable outcome of seeing the first, really nice papers, laid out and finished off so attractively. For this, I have to thank the excellent co-operation of the members of the team – who, between them, manage the correspondence with authors and reviewers, the copy-editing, the "laying out" (what I still think of as typesetting) and the technical side of making the articles properly accessible on line – as well as the encouragement of a comprehensive editorial board. I adopted as my first priority the task of inviting well-known authors to write for us. The response has been such that I can be pleased at the quality of contributors – active scientists all, of authority and esteem – and the fact that they have made their articles accessible to non-specialists. I am aware, however, that while my invitations have been spread as widely as possible across the field of freshwater biology, most of the positive reactions have come from European limnologists; zoology and flowing water are, so far, poorly represented, as are the perspectives of freshwater scientists from other continents. The "invitation" process continues, of course, but I am hopeful that, as the Journal becomes recognised and its value appreciated, we will receive increasing numbers of unsolicited submissions.

I have continued my "ambassadorial" role for the FBA through the convening of the European Federation of Freshwater Sciences. Most of its work is by correspondence but Federation delegates assembled in Palermo at the SEFSS meeting in July, 2007. Among its tasks was the selection of the venue of the next SEFS meeting, which is to be in Sinaia, Romania, in August, 2009.

SEFSS was the only scientific meeting that I managed to get to during the year. I presented a paper there, on the nitrogen-deficient lakes of Patagonia. I have had some correspondence about chapters I contributed some time ago to Elsevier's Encyclopaedia of Inland Water which, we are assured, will be published during the Third Millennium. More hopeful is a paper sent to the *International Review of Hydrobiology*, celebrating the centenary of its first publication as *International Revue des gesamten Hydrobiologie und Hydrographie*. Besides its self-electing deadline, my optimism is compounded by the receipt of page proofs! Why do I feel so much empathy for the editorial teams, trying to put the materials together?

I did have one publication reach the literature this year: a paper I presented at the International Association for Phytoplankton Taxonomy and Ecology at Sapança, Turkey, in September, 2005 (Reynolds, 2007).

Roger Sweeting

Fish and Water Quality

The first report of my fellowship is only really nine months long as my handover to the incoming director, Mike Dobson spanned the first three months until the end of June 2007. However as early as 2006 I entered into discussions with the Environment Agency (EA) and Natural England (NE) about the use of the Hatchery at Windermere as an ark for the rapidly declining populations of pearl mussels *Margaritifera margaritifera*. Pearl mussels are in catastrophic decline across their range from the Eastern part of North America to the western part of Russia, through modern agricultural and industrial practices. The function of an ark is to provide a breeding opportunity for the remaining relict populations and a safe environment in which the young can flourish. To this end individuals from six populations (to become at least seven in 2008) in England have been maintained for at least nine months during which time three of them have produced glochidia which have attached to young salmon maintained, in the Hatchery, to complete the first stage of their life cycle. Each stage is fraught with difficulties both in the

wild and in the Hatchery at Windermere. Agreement has been reached between FBA, EA and NE for a five year initial project. This has occupied considerable time for both myself and my colleagues, Louise Miles and Ken Clarke, since the spring of 2007. There is much to learn about the breeding of the pearl mussel both in wild and cultured conditions: with assistance from colleagues from agencies and universities across Europe we hope to report relevant findings and success over the duration of this project.

During this year I have also run a number of courses on the Water Framework Directive implementation (part of an EU project), fish health and disease (with the EA) and on science education with the University of Cumbria. The support of the FreshwaterLife team with its grant from the Esmée Fairbairn Foundation has been pivotal in this. Discussions are now in progress to extend the courses to support the European Services Directive and the Water Framework Directive in the training and recognition of competencies of individuals who carry out the monitoring and analytical work associated with this. If it is successful from an FBA perspective you will hear more of this in the next report.

Jack Talling General Limnology

During the past year I have been concerned with three distinct pieces of limnological history. These are aimed at promoting a broad perspective of our science.

The first was a cooperative attempt to provide a listing and brief overview of scientific work published by the FBA and its later Research Council associates. The overview was published during 2007. We ran into unforeseen difficulties with the listing of publications (1929-2006) owing to the need to reconcile different systems of bibliography. After much effort by Olive Jolly and Karen Rouen, the listing is now complete, and will be available online as well as in hard copy (McCullough *et al.* 2007).

The second was a general history of the development of freshwater or inland-water science. My original plan was to incorporate extracts of the published history of specialisms plus descriptions of dramatic events of human interest. It was pointed out to me that such a combination, of book-length, would probably be unpublishable. A much reduced and more orthodox version has been prepared (Talling, 2008). It has benefited greatly from the sources available in older 'classical' holdings of the FBA Library.

Thirdly, I have agreed to contribute to a new book on the Nile, planned by Prof. Henri Dumont and now in preparation. This

book is intended to update the survey in a 1976 work edited by my former colleague Julian Rzóska. My main contribution (Talling, submitted) is an outline of the history of scientific work on the river. In addition, I am advising on the revision by others of my published (1976) accounts of its water characteristics and phytoplankton.

My personal history would be incomplete without a further note. I have now completed the work that I planned to do since my official retirement from the FBA staff some 19 years ago. This, with consequences of limited locomotion and an impending move to Appleby, have led me to resign as an FBA Honorary Research Fellow from April 2008. I am very grateful to the FBA for the support and opportunities afforded me since I first arrived at its door as a research student in 1950.

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Trustees' Report

for the year ended 31st March 2008

The members of the Council of the Freshwater Biological Association (FBA), acting as Trustees of the Association submit their Annual Report and audited Accounts for the year ended March 31st 2008.

The financial statements have been prepared in accordance with current UK statutory requirements, the Association's Memorandum and the Statement of Recommended Practice 2005 (revised). The Accounting Standards Board recognises SORP as being in line with its code of practice and the Freshwater Biological Association agrees to follow these principles. This is the third year in which the Accounts have been prepared under SORP 2005.

Trustees

The Trustees of the Freshwater Biological Association during the period April 1st 2007 to March 31st 2008 are listed on page 17 of the Annual 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. During the year a review of Trustees skills was undertaken, which was used to inform the nomination process for prospective Trustees. If the proposed nominations for Council are approved at the forthcoming AGM the skills base of the Trustees for the next period will be broadened to incorporate high level financial experience as well as extensive librarianship experience, both of which are key to the future strategic success of the Freshwater Biological Association.

Statement of Trustees Responsibilities

Company law requires the members of Council to prepare financial statements for each financial year which give a true and fair view of the state of affairs of the Association and of the surplus or deficit of the Association for that period. In preparing those financial statements, the Council is required to:

- select suitable accounting policies and apply them consistently
- make 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 members of Council are responsible for the management of the Association's activities in accordance with its Memorandum and Articles of Association and the keeping of proper accounting records which disclose with reasonable accuracy at any time the financial position of the Association, to enable them to ensure that the financial statements comply with the Companies Act 1985. 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 Members of Council, we certify 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 Charity'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). Council Trustees have no interests in the Association as defined by the Companies Act 1985 and receive no remuneration for their services to the Association. Council 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, with responsibility for the operational activities of the Association 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 Officer 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 completion of the five year Business Plan has resulted in a refinement of the strategic objectives, focussing 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 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 reduced during the year, with a negative net movement of funds totalling £875,670, giving a closing fund balance of £5,773,841. The reduction in the fund value has arisen from:

- Realised and unrealised losses on the FBA's investments of £569,000
- A deficit of £306,065 on the Income and Expenditure Account.

This year's deficit has arisen primarily through operational activities, with some depreciation charged to the Accounts for the first time. The East Stoke site has been particularly successful this year with full occupancy at the site, resulting in a positive financial contribution of £55,136. The increase in income at the East Stoke site of £134,178 is primarily from rent, with office and laboratory space leased to the Centre for Ecology and Hydrology, Queen Mary University of London, the

Environment Agency and Soil Mechanics. The situation in Windermere is less positive, with the deficit arising from activities amounting to £361,200. This situation was not unexpected and had been written into the five year Business Plan.

This year has seen a small net increase in the number of members and with the continuing reduction in arrears, there has been an overall increase in membership income of just over £3,300. This year has also seen the steady growth of the training course programme for the identification and understanding of freshwater life, supported by a £50,000 grant from the Esmée Fairbairn Foundation, which has enabled the courses to be accessible to a broad range of users, both professional and amateur. Bank interest has reduced during the year by £16,334 whilst investment income has increased by £24,934, reflecting the continuing move towards equity from cash reserves within the FBA's investment portfolio and the reduction in cash on hand balances. The Trustees accept that in the medium term, the FBA is dependent on its investment income in order to support some of its core activities. Scientific activity continues to attract funding, with the Pearl Mussel project bringing with it £30,000 of funding from Natural England and the Environment Agency. Sales of scientific publications, particularly the identification keys, have increased by 40% on last year, which is very positive.

Salaries remain the most significant area of expenditure, accounting for 55% of total expenditure. There has been a reduction in the headcount of one, which has in part offset the cross over costs of £24,000 associated with the change in Director at the beginning of the financial year. The increase in pension costs is the result of more staff joining the pension scheme, rather than increases in direct salaries, which have remained unchanged during the year.

One of the Freshwater Biological Association's key objectives was achieved during the year with the part funding of two PhD studentships which amounted to £19,610. The PhD studentships are funded for three years. The Library continues to be supported by the Trustees as part of its charitable objectives at a cost of £58,982.

There has been over £75,000 spent on new projects during the year, particularly the new freshwater journal, to be launched early in April 2008 and the publication of two new books, the *Keys to the Adult Male Chironomidae of Britain and Ireland* as well as the *World of Lakes: Lakes of the World*. Both of these activities contribute towards the strategic aim of meeting

the information needs of the freshwater scientific community. Expenditure on maintaining two sites remains significant at nearly £225,000 per annum, which includes increased costs on heating and electricity.

The Trustees agreed to support the retention of the Fritsch Collection during the year and to fully incorporate the FreshwaterLife programme into the activities of the Freshwater Biological Association; this was justified on the basis of the contribution both projects make to meeting the charitable objectives of the Association. The costs associated with both activities are primarily staffing costs, with a proportion of allocated overheads and a small amount of other direct costs.

There has been an overall increase in governance costs during the year, due to the inclusion of £6,000 of IT equipment not capitalised and the depreciation charge in the year; it is the intention of the Trustees to continually seek to reduce this cost in order that more of its resources can be expended on its charitable activities.

Movements in assets are described in Note 14 to the Financial Statements.

Reserves

The level of Reserves, as reflected in the Unrestricted General Fund Account, is considered necessary to maintain the viability of the Association in order to promote its principal objectives. Cash balances reflect the amount necessary for the FBA to meet its short term expenditure obligations in respect of salaries, creditors and others, assuming no inflow of funds.

Investment Policy

The FBA's investments are detailed in Note 14(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 FBA. 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 the charitable objectives of the FBA.

The majority of the FBA's investments (63%) 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 2008 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 a complete review of the risks to which the Association is exposed was completed and documented 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.

Trustees

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

President

Sir Martin Holdgate

Chairman of Council

Prof. A.G. Hildrew

Honorary Treasurer

Dr I.G. Dunn

Representative Members

The Fishmongers' Company

Sir Matthew Farrer

Royal Society

Prof. B. Finlay (from 05.09.07)

Elected Members

Dr M.J. Burgis

Dr S.J. Clarke

Dr D. Evans

Dr J. I. Jones (from 05.09.07)

Dr S. M. Kett

Prof. T. E. L. Langford

Prof. P. Leonard (to 05.09.07)

Dr S. Maberly (to 05.09.07)

Dr B. Okamura

Prof. C.S. Reynolds

Dr A. L. Robertson

Dr C.J. Spray

Prof. B. Whitton (from 05.09.07)

Auditors

In accordance with Section 385 of the Companies Act 1985, Messrs Couch Bright King & Company will be proposed for reappointment.

Dated this 5th June 2008

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 2008

Incoming Resources		Unrestricted Funds		Total	Total
Incoming resources from generated funds	Note	<u>General</u>	<u>Other</u>	<u>2008</u>	<u>2007</u>
		£	£	£	£
<u>Voluntary income:</u>					
Awards and donations	4	12,891	-	12,891	30,180
Activities for generating funds	5	306,775	-	306,775	138,724
Investment income & bank interest	6	121,474	27,504	148,978	140,378
		-----	-----	-----	-----
		441,140	27,504	468,644	309,282
Incoming resources from charitable activities:					
	7				
Membership services		61,792	-	61,792	34,220
Scientific Research & activity		36,584	-	36,584	45,300
Information & Collections		95,419	4,278	99,697	115,275
Other incoming resources		-	-	-	7,557
		-----	-----	-----	-----
		193,795	4,278	198,073	202,352
Other incoming resources	8	-	-	-	443,304
		-----	-----	-----	-----
Total incoming resources		634,935	31,782	666,717	954,938
		-----	-----	-----	-----
Resources expended					
<u>Cost of generating funds:</u>					
<u>Cost of generating voluntary income</u>					
Awards and donations	9	-	-	-	4,299
Costs for generating funds	10	306,435	-	306,435	186,219
<u>Costs of charitable activities:</u>					
	11				
Membership and scientific research		46,576	-	46,576	36,306
Scientific Research & activity		61,166	25,993	87,159	87,595
Information & Collection		179,684	5,884	185,568	172,283
FBA Library		58,982	-	58,982	61,453
Meetings & courses		17,369	-	17,369	7,614
Governance costs	12	270,693	-	270,693	256,718
Other resources expended	13	-	-	-	10,401
		-----	-----	-----	-----
Total resources expended		940,905	31,877	972,782	822,888
		-----	-----	-----	-----
Net (outgoing)/incoming resources before transfers and other recognised (losses)/gains		(305,970)	(95)	(306,065)	132,050
Transfer in of property asset	14a	-	-	-	300,000
Realised and unrealised (losses) on investments	14b	(503,451)	(66,154)	(569,605)	233,094
		-----	-----	-----	-----
Net movement of funds in year		(809,421)	(66,249)	(875,670)	665,144
Reconciliation of funds					
Total funds brought forward 2007		3,988,970	2,660,541	6,649,511	5,984,367
		-----	-----	-----	-----
Total funds carried forward 2008		3,179,549	2,594,292	5,773,841	6,649,511
		=====	=====	=====	=====

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 2008**

	Note	2008		2007
		£	£	£
Fixed Assets				
Tangible	14a		1,756,621	1,676,723
Investments	14b		3,803,384	4,372,989
			-----	-----
			5,560,005	6,049,712
Current Assets				
Debtors and Prepayments	15	99,932		91,477
Cash at Bank and in Hand		182,338		553,094
		-----		-----
		282,270		644,571
Less Current Liabilities				
Creditors (due within 1 year)	16	68,434		44,772
		-----		-----
Net Current Assets			213,836	599,799
			-----	-----
Total Assets Less Current Liabilities			£5,773,841	£ 6,649,511
			=====	=====
Representing Members' Funds				
Unrestricted				
General Fund	17		3,179,549	3,988,970
Designated Funds	18a		2,594,292	2,660,541
			-----	-----
			£ 5,773,841	£ 6,649,511
			=====	=====

These accounts have been prepared in accordance with the special provisions relating to small companies within Part VII of the Companies Act 1985.

Approved on behalf of Council by Professor A.G. Hildrew: Chairman 5th June 2008

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.

The affairs of the Association are managed by an elected Council of Members who constitute honorary directors of the Company for Companies Act purposes. Details of the Council Members are given in the Annual 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 14) and provide the required information in accordance with the Statement of Recommended Practice 2005 (revised), applicable UK standards and the Companies Act 1985.

(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 to 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. 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.

(d) Tangible Assets and Depreciation

Freehold property at the Windermere and East Stoke sites is recorded at cost in line with FRS15; it is considered that the value of the assets relates principally to the land at each site and that any depreciation of the property would therefore be immaterial. Scientific apparatus and other equipment below the value of £1,000 are not capitalised.

Depreciation rates are provided on a straight line basis, in order to write off the assets over their useful lives as follows:

Computer Equipment over 4 years
 Scientific Equipment over 5-10 years

(e) Library and Stocks

No value is included in these accounts for the library or for stocks of publications and other materials.

(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.

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

This is stated after charging:

	<u>2008</u>	<u>2007</u>
	£	£
Depreciation	10,956	-
Auditors remuneration	2,500	2,400
Auditors other services – VAT	-	200
	=====	=====

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

<u>Incoming Resources</u>	Unrestricted Funds		<u>2008</u>	<u>2007</u>
	<u>General</u>	<u>Other</u>		
	£	£	£	£
4. Voluntary Income				
Membership donation campaign	4,053	-	4,053	18,382
Other donations	7,427	-	7,427	7,945
Gift Aid	1,411	-	1,411	3,853
	-----	-----	-----	-----
	12,891	-	12,891	30,180
	-----	-----	-----	-----
5. Activities for generating funds				
Scientific and special publications	21,221	-	21,221	15,063
Freshwater Reviews	390	-	390	-
Land and building income:				
Windermere	22,384	-	22,384	21,434
East Stoke	205,113	-	205,113	70,935
Contract income - FreshwaterLife	20,760	-	20,760	6,000
Windermere ferries commission	36,664	-	36,664	18,314
Miscellaneous income	243	-	243	6,978
	-----	-----	-----	-----
	306,775	-	306,775	138,724
	-----	-----	-----	-----
6. Investment income				
Bank deposit interest	24,701	7,481	32,182	48,516
Investment Income	96,773	20,023	116,796	91,862
	-----	-----	-----	-----
	121,474	27,504	148,978	140,378
	-----	-----	-----	-----
7. Charitable activities				
Membership services	27,254	-	27,254	23,930
Technical service agreements	19,700	-	19,700	10,290
Scientific research & activity	36,584	-	36,584	45,300
FreshwaterLife programme	45,420	-	45,420	50,125
Esmée Fairbairn grant	50,000	-	50,000	50,000
Fritsch Collection	-	4,278	4,278	15,150
Meetings and courses	14,837	-	14,837	7,557
	-----	-----	-----	-----
	193,795	4,278	198,073	202,352
	-----	-----	-----	-----
8. Settlement on sale of Ferry House	-	-	-	400,000
VAT refund 2004-2006	-	-	-	43,304
	-----	-----	-----	-----
	-	-	-	443,304
	-----	-----	-----	-----

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

<u>Resources Expended</u>	Unrestricted Funds		<u>2008</u>	<u>2007</u>
	<u>General</u>	<u>Other</u>		
	£	£	£	£
9. Donations	-	-	4,299	4,299
	-----	-----	-----	-----
	-	-	4,299	4,299
	-----	-----	-----	-----
10. Costs for generating funds				
Scientific and special publications	44,393	-	44,393	29,370
Land and Buildings:				
Windermere	74,400	-	74,400	50,133
River Laboratory	149,977	-	149,977	87,435
Contract income	-	-	-	1,203
Windermere ferries commission	6,330	-	6,330	7,001
E-journal development	31,335	-	31,335	11,077
	-----	-----	-----	-----
	306,435	-	306,435	186,219
	-----	-----	-----	-----
11. Charitable activities				
Membership services	46,576	-	46,576	36,306
Scientific research activity	61,166	25,993	87,159	87,595
Freshwater <i>Life</i> programme	97,039	-	97,039	116,078
Esmée Fairbairn (Recorders project)	56,455	-	56,455	17,658
Fritsch Collection	26,190	5,884	32,074	38,547
The FBA Library	58,982	-	58,982	61,453
Meetings & courses	17,369	-	17,369	7,614
	-----	-----	-----	-----
	363,777	31,877	395,654	365,251
	-----	-----	-----	-----
12. Governance Costs				
Council Meetings and reimbursements to Trustees	6,384	-	6,384	10,065
Other costs – direct and indirect:				
Audit Fees	2,500	-	2,500	2,400
Other fees	10,750	-	10,750	10,088
AGM & ASM	7,439	-	7,439	6,886
Depreciation charges	10,956	-	10,956	-
Windermere site	232,664	-	232,664	227,279
	-----	-----	-----	-----
	270,693	-	270,693	256,718
	-----	-----	-----	-----
13. Other resources expended				
Non capitalised refurbishment costs	-	-	-	10,401
	-----	-----	-----	-----
	-	-	-	10,401
	-----	-----	-----	-----

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

14. Fixed Assets

(a) Tangible

	<u>Freehold Land & Buildings</u>	<u>Computer Equipment</u>	<u>Scientific Equipment</u>	<u>Total</u>
	£	£	£	£
Cost or Valuation				
At 1st April 2007	1,676,723	-	-	1,676,723
Additions	-	66,820	26,034	92,854
Disposals	(2,000)	-	-	(2,000)
	-----	-----	-----	-----
At 31st March 2008	1,674,723	66,820	26,034	1,767,577
	-----	-----	-----	-----
Accumulated Depreciation				
At 1st April 2007	-	-	-	-
Charge for the year	-	8,352	2,604	10,956
	-----	-----	-----	-----
At 31st March 2008	-	8,352	2,604	10,956
	-----	-----	-----	-----
Net book value				
At 31st March 2008	1,674,723	58,468	23,430	1,756,621
	=====	=====	=====	=====
At 31st March 2007	1,676,723	-	-	1,676,723
	=====	=====	=====	=====

The Freehold Land & Building at historical cost is £1,344,842 (2007: £1,346,842).

The company has taken advantage of the FRS15 transitional provisions not to revalue Freehold Land and Buildings. The estimated market value obtained in 1999/2000 of Freehold Land and Buildings is based on independent professional advice from Chartered Surveyors Davis & Bowring (Windermere) and FPD Savills (Dorset) and reflects the terms of lease agreements then in place for tenancy of the principal laboratories by the Natural Environment Research Council.

(b) Investments

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

	<u>Quoted Investments</u>
	£
Market Value at 1st April 2007	4,372,989
Additions at cost	432,783
Disposal proceeds	(319,035)
Realised gains on disposals	27,044
Losses on Revaluations attributed to:	
General Fund Account	(644,243)
Frost Bequest	(66,154)

Market Value at 31st March 2008	£ 3,803,384
	=====

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

14. Fixed Assets (Cont)

	<u>Quoted Investments</u>
Acquisition Values	3,246,158
Represented by:	
Investments held on UK Stock Exchange	3,572,406
Cash held as part of Portfolio	230,978

	£ 3,803,384
	=====

The principal investments at 31st March 2008 were:

	<u>Market Value</u>	<u>% of Total</u>
	£	%
<u>M & G Charifund</u>		
19,366 Income Units	253,679	7.0
6,026 Accumulation Units	718,994	19.0
<u>J P Morgan Fleming Investment Management Ltd</u>		
153,977 Fledgeling Bond Units	189,721	5.0
94,223 Fledgeling UK Equity Fund Units	221,502	6.0
	-----	-----
	£ 1,383,896	37.0
	=====	=====

The accumulated units received during the year that were reinvested for capital growth had a cash value equivalent of £48,624 (2007: £42,602).

Investment management fees of £13,916 (2007:£14,008) were deducted from the Capital Account held at Rensburg Sheppards during the year.

15. Debtors

	<u>2008</u>	<u>2007</u>
	£	£
Trade Debtors	50,477	47,190
Other Debtors	41,329	23,731
VAT Repayment	-	13,703
Prepayments	8,126	6,853
	-----	-----
	£99,932	£ 91,477
	=====	=====

16. Creditors

PAYE and National Insurance	14,849	13,162
Trade Creditors	37,326	12,604
Other Creditors and Accruals	15,948	19,006
VAT liability	311	-
	-----	-----
	£ 68,434	£ 44,772
	=====	=====

17. General Fund Account

	<u>2008</u>	<u>2007</u>
	£	£
<u>General Fund Account</u>		
Balance brought forward	3,988,970	3,350,897
Net movement in funds before transfers and other recognised gains	(306,065)	132,050
	-----	-----
	3,682,905	3,482,947
Transfer net movement to Other Funds (Note 4 to 13)	(95)	19,727
Gain arising from revaluation of Investments (Note 14b)	(503,451)	186,296
Transfer in of Farmhouse, East Stoke	-	300,000
	-----	-----
	£3,179,549	£ 3,988,970
	=====	=====

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

18. Other Funds

	<u>31.3.2007</u>	<u>Income</u>	<u>Expenditure</u>	<u>Transfers</u>	<u>31.3.2008</u>
	£	£	£	£	£
a) <u>Unrestricted Designated</u>					
Director's Fund	26,503	795	(5,970)	-	21,328
Fritsch Fund	8,153	4,278	(5,884)	-	6,547
Frost Bequest	576,124	-	(66,154) *	-	509,970
Frost Exhibition	26,761	5,996	-	-	32,757
Hugh Cary Gilson Fund	23,000	690	-	-	23,690
Freshwater Science Fund	2,000,000	20,023	(20,023)	-	2,000,000
	-----	-----	-----	-----	-----
<u>Total Unrestricted</u>	£2,660,541	31,782	(98,031)	-	£ 2,594,292
	=====	=====	=====	=====	=====

* Loss on revaluation of investments (Note 14b).

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

	<u>31.3.2007</u>	<u>31.3.2008</u>
	£	£
Current Assets	207,085	206,990
Quoted Investments	2,453,456	2,387,302
	-----	-----
	£ 2,660,541	£ 2,594,292
	=====	=====

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 FBA's charitable activities. Briefly:

Director's Fund – to support initiatives by the Director at his discretion.

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. Council has agreed to increase the fund in line with inflation.

Freshwater Science Fund – this is a new fund established by Council in order to support the attainment of the FBA's core charitable activities. This represents a long term commitment by the FBA to the promotion of freshwater science. It has been decided in the short-term that the Fund will be kept constant by allocating sufficient investment income each year.

19. Capital Commitments and Contingent Liabilities

There were no capital commitments or contingent liabilities at 31st March 2008.

20. Taxation Status

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

THE FRESHWATER BIOLOGICAL ASSOCIATION
NOTES TO THE ACCOUNTS (Continued)

21. Staff

There were 25 paid employees (2007:26) of the Association at 31st March 2008.

Total Staff Costs in the year were:	<u>2008</u>	<u>2007</u>
	£	£
Salaries	464,517	448,078
Employer National Insurance Contributions	33,748	36,851
Employer Pension contributions	40,588	33,575
	-----	-----
Total	£ 538,853	£ 518,504
	=====	=====

There were no employees in the remuneration band £60,000 to £69,999 (2007: one within the band of £60,000 to £69,999).

22. Retirement Benefits

The Association participates in the Universities Superannuation Scheme, 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 Association is unable to identify its share of the underlying assets and liabilities of the scheme on a consistent and reasonable basis and therefore accounts for the scheme as if it were a defined contribution scheme as required by FRS 17. The amount charged to the income and expenditure account represents the contributions payable to the scheme for the year.

The latest actuarial valuation of the scheme was at 31st March 2005. 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) and the rates of increase in salary and pensions. 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 valuation rate of interest would be 4.5% per annum, salary increases would be 3.9% per annum and pensions would increase by 2.9% per annum. In relation to the future service liabilities the assumptions used are an investment return of 6.2% per annum, including an additional investment return assumption of 1.7% per annum, salary growth of 3.9% per annum and pension increases of 2.9% 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 value of the assets of the scheme was £21,740 million and the value of the past service liabilities was £28,308 million leaving a valuation deficit of £6,568 million. The assets therefore were sufficient to cover 77% of the benefits which had accrued to members after allowing for expected future increases in earnings.

The institution contribution rate required for future service benefits alone at the date of the valuation was 14.3% of pensionable salaries but the Trustee Company decided to maintain the institution contribution rate at 14% of salaries.

Surpluses or deficits which arise at future valuations may impact on the institution's future contribution commitment. An additional factor which could impact on the funding level of the scheme is that with effect from 16th March 2006, USS has positioned itself as a "last man standing" scheme so that in the event of the insolvency of any of the participating employers in USS, the amount of any pension funding shortfall (which cannot otherwise be recovered) in respect of that employer will be spread across the remaining participant employers and reflected in the next actuarial valuation of the scheme. The next formal valuation of the scheme is due at 31st March 2008 but at the date of approval of these financial statements no further information had been published.

The total pension cost for the Association for the year to 31st March 2008 was £40,588 (2007 £33,575) which was 14% of pensionable salaries. The pension benefits of presently retired and seconded staff of the Association are administered by the Natural Environment Research Council.

23. Trustee Remuneration

No members of Council received any remuneration during the year. Travel costs and Council expenses amounting to £6,384 (2007: £10,065) were paid to 17 (2007: 16) members of 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 2008, on pages 18 to 26, which comprise the Statement of Financial Activities, 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 20.

This Report is made solely to the Association's Members, as a body, in accordance with Section 235 of the Companies Act 1985. 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

As described in the statement of the Council's Responsibilities, the Members of the Association's Council are responsible for preparing the financial statements in accordance with applicable law and United Kingdom Accounting Standards (United Kingdom Generally Accepted Accounting Practice).

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 and are prepared in accordance with the Companies Act 1985. We also report to you if in our opinion, the Statutory Report of the Council is not consistent with the financial statements, if 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 other information contained in the Statutory Report of the Council, and consider whether it is consistent with the audited financial statements. We consider the implications for our report if we become aware of any apparent misstatements or material inconsistencies with the financial statements. Our responsibilities do not extend to any other information.

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, in accordance with United Kingdom Generally Accepted Accounting Practice of the state of the Association's affairs as at 31st March 2008 and of its incoming resources and application of resources, including its income and expenditure, for the year then ended;
- have been properly prepared in accordance with the Companies Act 1985; and
- are consistent with the information given in the Statutory Report of the Council.

Couch Bright King & Co
Chartered Accountants &
Registered Auditors

91 Gower Street
London, WC1E 6AB
5th June 2008

NOTICE OF THE 79th ANNUAL GENERAL MEETING

Notice is hereby given that the 79th ANNUAL GENERAL MEETING of The Freshwater Biological Association will be held at 14:30 hrs on Wednesday, 16th July 2008, in the Fishmongers' Hall, The Worshipful Company of Fishmongers, London, UK.

AGENDA

1. To approve Minutes of the 78th Annual General Meeting held on 5th September 2007 at the FBA Windermere, Far Sawrey, Ambleside, Cumbria.
2. To receive Reports.
3. To receive the Auditors' Certificate.
4. To receive Accounts for the Financial Year 2007/2008.
5. To elect Honorary Officers for 2008/2009.
6. To appoint Elected Members of Council.
7. To elect Honorary Members for 2008/2009.
8. To appoint Auditors and to authorise Council to determine their remuneration (Couch Bright King and Company have expressed their willingness to be re-appointed).
9. Any other business.

Dr Michael Dobson
Secretary

9th April 2008

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 to 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:

Dr Michael Dobson, Director
The Freshwater Biological Association
The Ferry Landing, Far Sawrey
Ambleside, Cumbria, LA22 0LP
United Kingdom

Tel: +44 (0) 1539 442468
Email: director@fba.org.uk
Website: www.fba.org.uk

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.

