JBA Trust Limited

Annual Report and Financial Statements

Year ending 31 October 2013

Charity Number: 1150278

Company Number: 07840801

The JBA Trust is an independent charity, registration No. 1150278. The JBA Trust supports and promotes scientific research, education and training in the fields of environmental risks and resources.

Report of the Trustees for the year ending 31 October 2013

The trustees are pleased to present their annual report for the year ending 31 October 2013.

Director's Report

Since we were founded in November 2012, the JBA Trust has been building a programme of activities to deliver on our objectives to promote research and education in the fields of environmental risks and resources management. I am pleased to report on our progress in 2013, during which we have been establishing our identity and starting to see outputs from our programme.

Our work is split broadly between our educational and research activities, which naturally overlap in some of our projects. Thematically, we seek to work in three important areas: environmental risks, environmental resources and sustainability. Our focus is on the water environment. In this, our first full year since incorporation, we have funded work in environmental risk management and sustainability, and begun to explore opportunities to support projects in the water resources sector.

The JBA Trust's headline achievements for the year are:

- Our contributions to educational and knowledge exchange events with schools, public agencies and student conferences
- Financial sponsorship for seven post-graduate students enabling them to pursue training and research at masters or doctoral level
- Our broader in-kind technical support, facilitation and financial contributions towards four Masters and PhD projects
- We have written letters of support to UK research councils and ministers to underline industry needs for postgraduate training in relation to five doctoral training centres/programmes
- We have engaged with eight UK universities through studentships, placements, collaborative research or advisory boards (Newcastle, Leeds, Lancaster, Bristol, Bradford, Reading, Edinburgh and Oxford)
- We have supported the environmental education and professional development programmes of larger 3rd sector organisations including the British Hydrological Society and CIWEM.

We have been delighted with the enthusiastic responses to our initiatives from all of these partner organisations and hope to continue working together in future. I would like to thank the individuals who have worked with us, not least the students and early career researchers who we have been able to support. We are grateful for continued commitment to funding the JBA Trust from the JBA Group companies and their Directors.

Rob Lamb

Director

1 Our purposes and activities

The purpose of the charity is to support and promote scientific research, education and training in the fields of environmental risks and resources, especially related to flood risk and the water environment.

Our activities for the year reflect the Trustees' consideration of the Charity Commission's guidance on public benefit. The major areas of activity are:

- Provision of water management training and education in schools and in the flood risk management community
- Support for post-graduate education through provision of technical expertise and financial bursaries for MSc and PhD studentships
- Provision of training opportunities through placements and internships
- Publication and dissemination of research outputs, enabling knowledge exchange and sharing best practice
- Sponsorship of relevant conferences to enable students in higher education or early career professionals to attend

This report reviews the activities of the JBA Trust over the past year and how the outcomes of our work have delivered public benefit.

1.1 Environmental Education and Training

JBA Trust supports a wide range of activities aimed at encouraging students in schools to develop an interest in water and environmental management topics, which could ultimately lead them to pursue careers in the field.

1.1.1 Encouraging STEM (Science, Technology, Engineering, Maths) Participation

In 2012, we designed and built a mobile hydraulic flume to demonstrate how the design of culverts, bridges and weirs affects the flow of water in rivers and their impact on flooding.

JBA Trust has given demonstrations to a wide range of school and University students, including A-Level geography students and students in higher education studying flood risk management and hydraulic engineering.

Photo: Jeremy Benn demonstrates the principles of channel hydraulics to A-level Geography students at Douglas High School on the Isle of Man

The flume made an appearance at The Big Bang Fair in June 2013 which celebrates young people's achievements in science and engineering, and encourages 11-18 year olds to study science, technology, engineering and maths (STEM subjects). Over 1,800 young scientists and engineers attended the event and the interactive flume demonstrations attracted a very attentive audience of future flood and water management engineers and scientists.

In 2013 we created a short film of the demonstration, making this learning resource more accessible to a wider audience. This is available to view on the JBA Trust website. It explains the objectives of the JBA Trust and shows the key principles covered in the demonstration.

http://www.jbatrust.org/jbademonstrationflume

In 2013, JBA Trust began to develop a partnership with the Centre of Excellence for Environmental Technologies (CE:ET) in Bradford which links Buttershaw Business and Enterprise College and the University of Bradford. The CE:ET is committed to the developing the technical skills of students providing career pathways into the emerging and dynamic environmental technologies sector.

We are supporting the CEET's STEM curriculum activities by creating case studies based on expertise from one of the Trust's funders, JBA Consulting, including the demonstration flume and renewable energy such as wind and hydro-power.

JBA Trust is supporting the Chartered Institute of Water and Environmental Management (CIWEM) by contributing to the Environmental Education Network (EEN) steering group and aligning the Trust's educational activities with those coordinated by EEN.

'Tomorrow's Water' is an initiative led by the EEN. This national water and environment competition encourages groups of students to demonstrate their ability to apply their science, technology, engineering and mathematical skills to solving water and environmental challenges.

JBA Trust helped judge the 2013 Tomorrow's Water competition and sponsored the winning student team's travel to Sweden to represent the UK at the Stockholm Junior Water Prize during World Water Week, held 1-6 September 2013. The winners were Elena Stronach, Leah Edwards and Astrid Blee from Rugby High School, for their study measuring the hydrodynamic load on wave energy structures.

Photo: The winning team of the 2013 Tomorrow's Water competition celebrate their success with Maria Ingles, WaterAid's Education Officer

JBA Trust aims to facilitate closer links between the EEN and organisations like CE:ET to encourage more students to participate in STEM curriculum activities related to our core areas of interest in environmental risks and resources.

1.1.2 Training and promoting best practice

The hydraulic flume is also proving helpful in explaining open channel hydraulics to professionals working in roles connected with flood risk, water and environmental management, especially groups with varying levels of formal technical training in river hydraulic theory. This helps us to promote best practice in channel design and maintenance and minimising flood risk to communities.

Over the past year, the Trust has delivered a number of demonstrations to a wide range of audiences including Leeds and Bradford City Councils, Flood Risk Engineers at the Environment Agency, Rivers Agency Northern Ireland and the office of Public Works in Ireland.

"I have learnt more in an hour today on culvert hydraulics than in 20 years of engineering"

Stuart Peddar, Principal Engineer at Leeds City Council following a demonstration of the hydraulic flume by JBA Trust

1.2 Geographical Information Systems (GIS) in Schools

JBA Trust has helped to share industrial expertise with school students through a variety of routes including class workshops, seminars and lectures

In 2013, JBA Trust supported GIS workshops for students and teachers at Tarporley High School in Cheshire. Mike Williamson, a Senior GIS Analyst at JBA Consulting, shared his GIS expertise and gave students an insight into how GIS can be applied to environmental challenges in the real world. The workshops also helped the school get started with GIS using 'Web GIS'.

The Web GIS concept is a completely new way of delivering GIS to schools and allows students, teachers and industry to remotely access ArcGIS. This enables students to access GIS at relatively little cost and also enables industry partners to add data and work with the schools to apply GIS to real world examples.

The JBA Trust also funded the subscription to ArcGIS Online and aims to support further GIS education activities in schools and encourage more students to pursue a career in this field.

1.3 Support for students in higher education

There are many academic subjects that touch upon our core interests in environmental risks and resources. Whilst undergraduate courses such as Geography and Environmental or Physical Sciences are all important, the relevant specialist training comes into focus at masters or PhD level. The Trust therefore supports students and projects at this level.

1.3.1 MSc Projects

JBA Trust helps students completing their MSc dissertation projects through provision of case study data, facilitating access to software resources and technical expertise from within the JBA Group companies for co-supervision and supporting the dissemination and publication of outputs in the professional and public domains.

Students gain an insight into how methodologies and techniques are applied in industry and have an opportunity to experience how they will be able to use their skills in a career in the industry.

MSc Case Study

In the summer of 2013 we worked with Janie Haven who was studying for her MSc in Water and Environmental Management at the University of Bristol.

Sometimes flood defence embankments can fail, or breach, when river or sea levels rise during a flood. These are rare but potentially damaging events. They are included in the Environment Agency's national flood risk assessment models, and so we are interested to know how the models compare with what has happened in real floods.

Janie's research work for her dissertation "A Comparison of Actual Fluvial Embankment Flood Defence Performance to RASP Estimated Performance", was completed with the support of the JBA Trust, Horritt Consulting and the Environment Agency and found that:

The flood risk models suggested that we should have been seeing more flood defence failures then actually seem to have been observed

Sensitivity analysis showed that substantially more flood defence failures would be expected if these assets were in a worse condition

The key findings of the research were published in a leaflet for the Environment Agency *'Evaluating flood defence performance: are fragility curves right?* and were disseminated on the JBA Trust website. The findings support on-going initiatives to collect better, more consistent records on flood defences, including breaches, and to update flood risk models.

MSc Case Study

In the summer of 2013 the JBA Trust also supported Robert Bertsch, an MSc student at Newcastle University, through provision of staff time to co-supervise a project to compare urban flood models at city scale. The project investigated the "Toon Monsoon" flooding events of July 2012, testing hydraulic model grid resolution dependency and using crowd-sourced observations from Newcastle University to ground-truth the modelling.

Robert successfully completed his MSc in Hydroinformatics and achieved a distinction for his dissertation "Implementation of the Urban Environment in 2D Hydrodynamic Models: CitiCat and JFlow+". The project has identified a number of areas for further investigation and the outputs of Robert's work will be disseminated via a summary leaflet on the Trust's website.

1.3.2 Morphological model trial

JBA Trust worked in partnership with Leeds University for six months to investigate how a hydro-morphology model developed by Mingfu Guan in his PhD, supervised by Professor Nigel Wright at Leeds, could be applied for field scale analysis with data from river channel surveys in Keswick.

The Trust helped to engage with the Environment Agency to obtain relevant data and expertise. This work will provide new evidence to inform a broader understanding of the role and use of sophisticated computer models in dealing with problems related to erosion and sedimentation in river channels, something that has risen to prominence through the public debate about dredging in Somerset Levels during the floods of winter 2013/14.

The project report will be released this year.

1.3.3 PhD on modelling to support resilient integrated catchment management

JBA Trust is co-funding a student, Peter Metcalfe, to complete a three year PhD at Lancaster University investigating intermediate complexity modelling approaches for catchment management.

It builds on JBA expertise in broad scale modelling and Lancaster University's interests in particle tracking and uncertainty. Peter Metcalfe successfully completed the first year and has now transferred to the PhD programme.

The outputs of the PhD will be shared with catchment management practitioners through publication in the literature and also test cases, demonstration applications and also via links from the JBA Trust web site and Catchment Change Management Hub (an independent non-profit initiative developed through research council funding at Lancaster University).

1.4 Placements and Internships

Zora van Leeuwen completed a **summer placement** with JBA Trust to investigate and document railway asset failures due to flooding and scour between 2003 and 2013. The placement builds on a project carried out by JBA for the Rail Safety and Standards Board (RSSB) in 2002 to investigate and record catastrophic failure of railway assets in flood conditions.

In the report, asset failure is defined as "complete or partial collapse of the structure sufficient to cause derailment or closure of the line". The most common failure mechanism was found to be the undermining of abutments or piers by scour, resulting in their collapse.

For the four incidents with sufficient data for further analysis to be carried out, three of the failures happened during relatively minor flood events. Only one of the bridge failure events was caused by a rare or exceptionally rare flood event. Other factors, such as the build up of debris, exacerbated the effects of scour leading to the failure of structures in relatively minor flood events. The report recommends that further work should be carried out investigating these factors.

The full report is available as an educational and research resource and we are working with the RSSB to disseminate the recommendations to improve railway safety.

Through the **STOR-i internship programme** (the Statistics and Operational Research Doctoral Training Centre based at Lancaster University), Emma Simpson carried out a project to gain statistical insight into the air pollution problem in China. Dr Ye Liu of JBA Risk Management Ltd. and Rob Lamb, Director of JBA Trust, worked with Emma to combine JBA's practical experience of modelling environmental hazards with Lancaster University's statistical expertise in time series analysis and extreme value theory.

The air quality in some major cities in China has suffered from rapid industrialisation and increasing vehicle usage. With the help of social network and media coverage, this profile of this issue has gradually increased, in particular the air quality is one of the most discussed ongoing topics in Sina Weibo (the Chinese equivalent of Twitter). Emma applied statistical techniques to a topical issue and provided some quantitative context for claims made in other scientific literature.

1.5 Publishing, Knowledge exchange

1.5.1 Multi-objective flood risk management demonstration project

The Holnicote Project aims to generate evidence to demonstrate how integrated land management change, working with natural processes and partnership working, can contribute to reducing local flood risk while producing wider benefits for the environment and communities. The project is being delivered by the National Trust, Penny Anderson Associates and JBA Consulting.

JBA Trust supported this project by co-authoring a position paper 'An Analysis of the Impacts of Rural Land Management Change'. The paper and case study is publically available on the Catchment Change Management Hub.

http://ccmhub.net/wp-content/uploads/2013/01/Holnicote-Position-Paper-v9.pdf

1.6 Sponsorship and bursaries

1.6.1 The British Hydrological Society and JBA Trust Studentship Awards

Following the withdrawal of the Natural Environment Research Council's MSc degree sponsorship in 2011, the British Hydrological Society recognised the gap in funding and, in partnership with the JBA Trust, has created an award scheme to support and encourage potential MSc students wishing to pursue a career in this sector.

This year, the JBA Trust and the British Hydrological Society have continued their Studentship Award Programme and awarded 6 bursaries to students applying for MSc's in hydrology and catchment management.

1.6.2 Conference Sponsorship

JBA Trust sponsored two student conferences in 2012-13 to support knowledge exchange, particularly for early career professionals and students about to embark on a career in the sector. The Trust has focused on conferences where students are encouraged to apply specialist skills, for example in risk, statistics or monitoring, to environmental challenges including:

- 36th Research Students' Conference in Probability, Statistics and Social Statistics at Lancaster University
- RSPSoc (Remote Sensing and Photogrammetry Society) Annual Wavelength Student Conference

2 Directors and Trustees

The Trustees serving during the year were as follows:

Trustees	Rob Lamb, JBA (Managing Director)
	Jeremy Benn, JBA
	Jim Hall, Oxford University
	Keith Beven, Lancaster University
	Nick Russell, Independent financial consultant
Secretary	Joy Whittaker (Retired July 2013)
	Craig Robson (from July 2013)

3 Structure, Governance and Management

JBA Trust is a company limited by guarantee and is governed by it Memorandum and Articles of Association. It was incorporated on 9 November 2011.

The trustees review the activities of JBA Trust every six months to ensure that they are focussed on supporting the purpose of the charity. The review also considers the strategic direction of the charity and considers how planned activities will contribute to public benefit.

We have referred to the guidance contained in the Charity Commission's general guidance on public benefit when reviewing our aims and objectives and in planning our future activities.

3.1 Appointment of Trustees

On incorporation of the JBA Trust, the Board of Trustees was appointed by invitation.

To preserve independence of the JBA Trust from JBA Group companies, which provide part of its core funding, the JBA Trust's Articles of Association stipulate that the number of trustees connected to or employed by JBA Group shall always be less than half of the total number of trustees appointed at any given time.

The Trustees are not remunerated (other than payment to cover travel and accommodation costs where required for JBA Trust business).

3.2 Trustee Induction and Training

The current Trustees were appointed in 2012 when the charity was first established and have been briefed on their legal obligations under charity and company law, updates to the Charity Commission's guidance on public benefit, the content of the Memorandum and Articles of Association and the JBA Trust business plan.

3.3 Organisation

The Board of Trustees meets every six months and is responsible for the strategic direction and policy of the charity. A Managing Director is appointed by the Trustees to manage the day-to day operations of the charity and is supported by a Programme Manager.

3.4 Risk Management

The trustees have a risk management strategy which comprises:

- An annual review of the risks the charity may face
- Policies and procedures in place to mitigate those risks
- Plans in place to minimise the impact of the risks should they materialise.

The principal risk to JBA Trust is financial sustainability. This is mitigated by having a robust reserves policy and a clear financial plan which is reviewed and subsequently approved by the trustees at the start of the financial year.

JBA Trust is governed by the same policies and procedures as the JBA Group. These include policies on: Health and Safety; Energy Use; Environment; Sustainability; Social Responsibility; Information Security: Equality and Diversity.

4 Financial Review

The principal funding source for JBA Trust is JBA Group dividends. JBA Trust also aims to leverage funding for research projects by applying for external funding from external organisations, for example the Technology Strategy Board (TSB) or Research Councils. In October 2013 we secured six months of research project funding from the Natural Environment Research Council (NERC) on this basis.

4.1 Reserves Policy

Reserves are required to minimise the financial risks associated with the unlikely event of unplanned or unforeseen expenditure. As a newly established charity, JBA Trust is in the process of establishing research and education partnerships with a number of external organisations and consequently is slowly building up reserves.

The JBA Trust maintains sufficient reserves to cover all contractually committed expenditure or liabilities, and a contingency fund of minimum 5% of annual operating budget.

4.2 Plan for Future Periods

JBA Trust anticipates continued long term funding from JBA Group. To ensure that the charity maximises the value of its income in carrying out its activities, the strategic plan focuses on continuing to seek match funding for research projects from funding bodies, including Universities and Research Councils. In the future JBA Trust may also wish to generate an income by licensing datasets, results or models generated by research.

The trustees declare that they have approved the Trustees Report above

Signed on behalf of the trustees

Rob Lamb, Managing Director of JBA Trust 30 April 2014