

JBA Trust Limited

Annual Report 2017-18

Charity Number: 1150278

Company Number: 07840801

www.jbatrust.org

The JBA Trust is a charity that enhances understanding and management of risks in the water environment by enabling research, education and training

We work with leading academic researchers, NGOs, charities and the JBA Group of companies in four key areas:

Providing training and education in schools and in the water management community

Facilitating collaboration between academia and industry to deliver high quality scientific research

Supporting post-graduate education by providing technical expertise and financial bursaries for MSc and PhD studentships

Publishing and disseminating research outputs, enabling knowledge exchange and sharing good practice

Highlights

46 events
helped raise awareness of river and coastal flood risk



Research partnerships with
9
universities



Research grants helped support
7
PhD students

5
externally peer reviewed publications

4 MSc project placements supported
9 scholarships and bursaries awarded

4.4 million views of wave tank video
(since posted in Oct 2016)



7 collaborative research projects

Over **2,500** hours of research and education activities funded

Director's Report



“This year we have increased our capacity to support knowledge sharing events, worked more closely with schools and continued to support research on rivers, coasts and climate risks.”

On behalf of the Trustees, I am pleased to present our annual report on our activities in 2017-18.

This year we have increased our capacity to support public and professional engagement events using our physical models, welcoming our new colleague Bridget Brady who joined us to help deliver on this ambition.

Once again, we have helped meet a high demand from educators and other charities for support at knowledge sharing events. Demonstrations of our models have supported training events, catchment management stakeholder workshops and academic conferences around the country.

This year we have also been developing and testing resources specifically geared towards science education in schools. We expect in the next year to publish resources that can be used to support STEM learning.

We continue to work closely with academic partners, especially through sponsorship and in-kind support

for graduate researchers. We have maintained our interests in a mix of topics around river catchment and coastal management, along with more diverse topics related to climate, air quality and ecology. Our contributions to scientific and engineering research have, again, been recognised in papers published in peer reviewed journals.

We have again sponsored and provided technical support for the joint British Hydrological Society and JBA Trust MSc student bursaries scheme, which is set to continue and has now gained additional support from the Environment Agency.

We would like to thank all the organisations and individuals who have worked with us, not least the students and early career researchers who we have supported. We are grateful for a continued commitment to funding the JBA Trust from the JBA Group companies and their Directors.

Professor Rob Lamb, Managing Director

Contents

1	Our purpose and activities.....	6
2	Environmental education and training.....	7
	Physical models.....	7
	Augmented Reality Sandbox.....	8
	Projection Augmented Relief Model (PARM).....	8
	Wave tank	9
	Trailer hydraulic flume	9
	Freestanding hydraulic flume	10
	Mini flume	10
	iCaptureFlood table.....	11
	STEM (Science, Technology, Engineering and Maths) resources.....	11
3	Support for students in higher education.....	12
	Masters projects	12
	The British Hydrological Society, JBA Trust and Environment Agency Studentship Awards.....	13
	Flood and Coastal Risk Management Scholarships	13
4	Science and research.....	14
	Collaborative research	14
	Publication summary 2017-18	17
	Doctoral research projects.....	18
5	Building our reach and enabling knowledge exchange	19
	Website..	19
	Social media	19
	Film.....	19
	Working with Natural Processes (WwNP) mapping website.....	19
6	Directors and trustees.....	21
7	Structure, governance and management.....	21
	Appointment of trustees	21
	Trustee induction and training	21
	Organisation	21
	Risk management.....	22
8	Financial review	22
	Reserves Policy.....	22
	Plan for future periods	22



1 Our purpose and activities

Our aim is to enhance understanding and management of risks in the environment by enabling research, education and training.

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

- Providing 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;
- Facilitating collaboration between academia and industry to deliver scientific research that improves society's understanding and management of environmental risks and resources;
- 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.



2 Environmental education and training

JBA Trust supports a wide range of activities aimed at encouraging students at schools and universities across the country to develop or enhance their interests in water and environmental management, which could ultimately lead them to pursue careers in the field. Our education and training activities also extend to the wider community, and to flood risk management professionals.

Physical models

We continued to develop physical models of rivers and coasts which are used to raise awareness, and demonstrate the technical principles, of flood and coastal risk management. In 2017-18, we supported 46 events including conferences, school workshops, STEM and careers days, professional training and flood awareness events for the general public.



The highlight of the year was the ‘Physical Models Demonstration Day’ held at Broughton Hall in September. The aim of the day was to raise awareness of how physical models and visualisation tools can support outreach and educational activities to communicate flood risk concepts. Supported by JBA Consulting staff, there were five models in operation including the wave tank, mini-flume, AR sandbox, PARM and iCapture Flood table. The event was well attended with representatives from the Aire Rivers Trust, Calderdale Council, Cheshire Wildlife Trust, Environment Agency, Hydrotec, iCASP, Lancaster University, the National Trust, Natural Resources Wales, Moors for the Future, Yorkshire Water and Yorkshire Wildlife Trust.

Augmented Reality Sandbox

We have continued our development of interactive visualisation tools, including our augmented reality sandbox. The sandbox is an interactive visualisation tool that shows how changes to the landscape affect the way water flows through a river catchment. Participants shape the sand to create their own catchments, which are then ‘augmented’ in real time by a projector which shows a coloured elevation map and contour lines. Virtual water can be added to watch how it flows through the catchment in real time and explore how changes in land use affect flooding.

Working with the Rivers Trust, we developed a new Augmented Reality Sandbox and demonstration resources to show how Working with Natural Processes (WwNP) can help reduce flooding. This model was handed over to Rivers Trust staff at a training day at the Tees Rivers Trust in Darlington on 8 February 2018.



Our sandbox supported over six natural flood management (NFM) community engagement events, an advanced skills training course on NFM funded by NERC, and the Rivers Trust conference in November 2017. Following the development of the sandbox for the Rivers Trust, we developed an improved sandbox model for JBA Trust in partnership with Hydrotec Ltd (shown above).

Projection Augmented Relief Model (PARM)

This year, we started a collaborative project with the University of Nottingham to evaluate how Physical Augmented Relief Models (PARM) are most effectively deployed as communication and learning tools.

PARM tools use a 3D printed landscape based on LIDAR data to create an accurate model that is then augmented with projected images.

With our support, the team at the University of Nottingham secured Impact Accelerator Funding from ESRC to investigate how effectively PARM technologies communicate flood risk concepts to different audiences (local communities, schools, flood risk professionals) and support decision making, compared to using traditional paper map-based imagery.



As part of this project, a case study of the Skipton Flood Alleviation Scheme is being developed to create a new PARM to help compare learning outcomes between visualisation based on 3D and 2D imagery.

Wave tank

The portable wave tank demonstrates the effectiveness of different types and combinations of coastal defences, for example vertical and recurved sea walls, on the potential for overtopping and flood risk.

Due to the high demand for the original wave tank, JBA Trust now has two wave tanks and they were used at a wide variety of events across the country including demonstrations at schools and Scout groups in Edinburgh and STEM fairs in Falkirk, Skipton and Leeds.

One of the highlights was the ‘Careers in Flood Resilience’ event at St Joseph’s Academy in South Tyneside in July 2018. Led by the Environment Agency, the event aimed to showcase flood risk management in the North East of England and to promote associated career opportunities.

Representatives from a wide range of organisations involved in flood risk management talked to approximately 350 Year 9 pupils and their parents about their role in flood resilience and the career choices that led them there. The event demonstrated the diverse opportunities for working in flood defence, resilience and management.

Our educational wave tank video shows the effectiveness of different types and combinations of coastal defences, for example vertical and recurved sea walls, on the potential for overtopping and flood risk. This video is freely available on the JBA Trust YouTube channel and has had over 4 million views since it was posted in October 2016.



Trailer hydraulic flume

This flume was our first mobile demonstration model, given to the JBA Trust by JBA Consulting in 2011. The flume channel is mounted on a trailer and shows the flow of water in a simple channel, driven by a system of re-circulating pumps.

Scale models of typical engineered structures such as weirs, bridges, culverts and debris screens show how different structures interact with the flow and affect flood risk.

In 2013 we created an education video of the hydraulic flume demonstration. This is available on YouTube and has now been watched by over **91,000** people.



Freestanding hydraulic flume

The design is based on the trailer flume and shows the flow of water in a simple channel, driven by a system of re-circulating pumps. It features scale models of typical engineered structures such as weirs, bridges, culverts, debris screens, a fish pass and a hydrobrake.

Observers can see in real time how different structures interact with the flow and what happens under flood conditions at different locations. The flume is housed in the bespoke van which also stores and transports the wave tank, mini-flume and spares and tools for all the models.

Highlights of the year for the hydraulic flume include demonstrations at the 'Engineering for the Future' event in Peterborough celebrating 200 years of the Institution of Civil Engineers on 23 June 2018.



The freestanding and mini flumes were also in action at the Peterborough STEM Festival on 13 October as part of a range of fun hands-on activities to celebrate and experience science, technology, engineering, and maths. The event attracted over 2,000 visitors with the flume proving very popular and an excellent way to start conversations about careers in engineering and flood risk management.

Mini flume

The 'mini' flume also demonstrates the interaction of engineered structures with flow in a channel but is more portable than the trailer flume and can be set up inside, for example in a classroom or office.

We have developed teaching resources for secondary schools and delivered a day of interactive lessons about rivers, catchment and flooding to GCSE students.

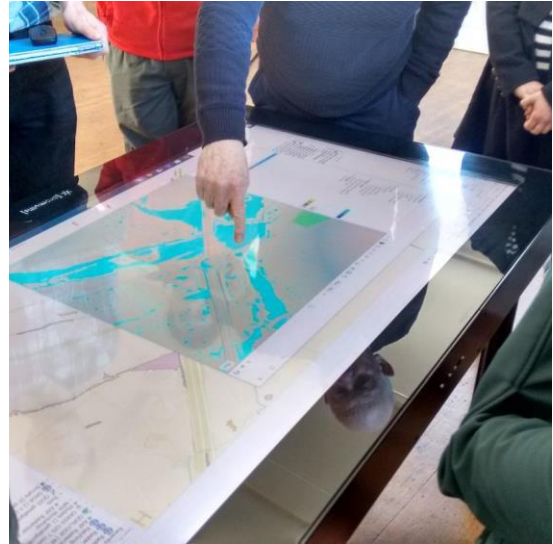
In May 2018 we also delivered training for the Canal and Rivers Trust to enable their staff to use the mini-flume during their three-day annual boat show at Crick. We aim to build capacity within our partner organisations by training their staff to demonstrate the physical models. This will help maximise utilisation of the models and enable attendance at a wider range of events.



iCaptureFlood table

With our Augmented Reality (AR) Sandbox we have been able to support communication and engage with a wide range of stakeholders to explore flood risk and natural flood management (NFM) concepts. The sandbox is an effective way to start conversations about catchment management using an interactive digitally-enhanced physical model.

We have also been supporting the Ensemble research programme (See Section 4) with a common aim of working together for digitally-inspired environmental science to help people manage risks and build resilience. Working with the Ensemble team, the Q-NFM research project at Lancaster University and Natural England, we have helped take a step further with an interactive digital table, which allows conversations started at the sandbox to move on to focus on a specific place.



With the iCaptureFlood table, detailed local information can be displayed digitally. Furthermore, the views and knowledge of people who know most about a place can be captured digitally and fed into improved models of flood risk almost immediately. This includes, for example, capture of data from farmers as part of the Catchment Sensitive Farming (CSF) initiative.

In February 2018, the iCaptureFlood table was trialled in three NFM engagement workshops in Somerset, Huntingdonshire and Cumbria organised by Natural England, which we reported on via the JBA Trust website.

STEM (Science, Technology, Engineering and Maths) resources

We recognise that we need to align our environmental education activities with the curriculum in STEM subjects to fully engage with schools and develop learning resources that can be scaled up and shared more widely.

In 2017-18, we started to focus on developing partnerships with local schools to support the GCSE Geography curriculum. Working with the curriculum leader at Ermysted's School in Skipton, we have been developing learning resources that utilise our physical models and incorporate elements of engineering, maths and geography in the context of flood risk.

We are also working with Ermysted's School in Skipton, the University of Nottingham, Skipton Girls High School (SGHS) and JN Bentley Ltd to develop interactive activity days focused on water and environmental risks which will be delivered in 2019.



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 important, the relevant specialist training often comes into greater focus at postgraduate (masters or doctoral) level. JBA Trust therefore emphasises support for students and projects at this level.

Masters projects

JBA Trust helps provide students with placements, technical expertise and access to software resources and case study data, as well as offering a platform for them to share highlights from their research projects. The students we help have gained insight into how methodologies and techniques are applied in industry and have an opportunity to see how they will be able to use their skills in a future career.

In 2017-18, the JBA Trust helped four students from the Universities of Leeds, Reading and Lancaster. The students worked with JBA Consulting staff on a wide range of MSc projects including:

- Valuing natural capital: A study of natural capital tools and their application to natural flood management
- Augmented Reality Sandbox user interface
- Glacial Lake Outburst Flood (GLOF) risk assessment using Structure-from-Motion 3D Point Cloud, GIS and Dam Breach Modelling
- Investigation into whether observations of floods from satellite images can help improve the accuracy of forecast flood maps

We also support the dissemination and publication of the students' research. Poster summaries of the MSc projects are available on our [MSc Research](#) webpages.

Valuing natural capital: A study of natural capital tools and their application to natural flood management
 Katie Chorlton, MSc in Sustainability and Consultancy at the University of Leeds 2018

The UK Government's recent 25 Year Environment Plan sets out the need to have more consideration for natural capital, which is the overarching concept relating to the elements of nature we take value from, intertwined with ecosystem services. This idea of placing a value, and in some instances a monetary value, on nature and the benefits we derive from it is an increasing area of interest. This study set out to explore how this concept can apply to natural flood management (NFM). The key focus was to look at how existing natural capital tools work for NFM, and if there is a gap to be filled here.

Aim of project
 To determine if there is a need for a new tool or framework to quantify natural capital values for NFM, and if so, recommend how this might be developed.

Methodology
 The approach for this project comprised of 3 stages:
 Literature review: This involved identifying key concepts already established within this area of work, and identifying any gaps in existing literature. At this stage a review of some existing natural capital tools (29 were identified) also took place, to identify what is already out in the market and how these worked for NFM.
 Data collection: To find out about the existing tools already in the market, 13 semi-structured interviews were undertaken with a selection of tool users and tool developers. Following this a survey was carried out with potential employers of a new tool for NFM, which gained 68 responses from people in a variety of industries.
 Data analysis: A thematic analysis was carried out to assess all qualitative data, and statistics were extracted from the survey.

The following criteria were used to decide which tools to assess further:
 • Does the tool generate monetary measures?
 • Does the tool map ecosystem services?
 • Is the tool accessible and free to use?
 • Is there a good user documentation set of the tool?
 • Can the user input data to the tool to calculate values?
 • Can it be automated?
 • Is the tool applicable to non-flooded landscapes?
 Tools that fit all or most of these criteria were then assessed in more depth through interviews.

Results
 The results of this study suggest there is a gap for a new tool to be developed, as one does not currently exist specifically for NFM. However one was found to be in development. 70% of survey respondents indicated that they could use the value in a new tool for NFM, and they would use it in their work (Figure 1). One issue that was identified with current natural capital tools is that too many exist, and people have stated concerns about not knowing which tool to choose for their work.
 This, coupled with the finding that generally people are quite sceptical of economic valuation of the environment due to a lack of understanding, makes it increasingly important that any new tools developed consider this and avoid filling the market with overly complicated tools.

The results indicate that there is a need for a tool that uses multiple approaches, not just monetary valuation, that can produce several different outputs. The reasons behind this lie in the users wanting to be able to present results to different stakeholders, and as different groups respond better to different types of outputs, it was suggested this would be a useful approach.
 The tool should value multiple ecosystem services, and there was also some suggestion to link this to already existing work, such as the Environment Agency benefits wheel in the flooding with natural in-rivers evidence directory.

The study showed that there is a lack of understanding and knowledge of natural capital. Therefore, another recommendation is that a new tool should be supported by good documentation and user guides that are easy to understand, and explain exactly how values are calculated. If this is the case, people are more likely to see the benefits of economic valuation of the environment. It may also support development of a standard methodology and help mitigate the problem of there being too many tools in the market.

The importance of considering natural capital and ecosystem services in flood risk management is increasingly recognised. The results of this study suggest that there is a gap for a new natural capital tool specifically for NFM, and it would be welcomed by potential end users.
 Despite this, development of a new tool should be approached with caution. The recommendations presented in this study indicate areas to focus on to avoid a new tool becoming just in the filing cabinets that exist and support development of a standard tool for industry wide use.

The research described here is based on a study conducted by Katie Chorlton for her MSc in Sustainability and Consultancy at the University of Leeds in 2018. Author work was supported by the research in Action North-East, JBA Consulting's nature office and the JBA Trust.

The British Hydrological Society, JBA Trust and Environment Agency Studentship Awards

In 2017-18 we continued our partnership with the British Hydrological Society (BHS) and the Environment Agency to support students working towards MSc qualifications in hydrology, water resources, catchment management and other related subjects. Eight bursaries of £1,500 were awarded and we have now supported 56 students since 2011.



The web-based application management system that we developed in 2014 continued to work well and enabled us to coordinate the assessment process with the BHS and Environment Agency effectively.

Flood and Coastal Risk Management Scholarships

The challenges of more frequent extreme weather and new flood risk responsibilities mean that there is a growing need for skilled water and environmental risk management professionals.

In recognition of this, the JBA Trust awarded a scholarship in 2017-18 to fully fund the tuition fees for Lancaster University's Flood and Coastal Risk Management Postgraduate Certificate course. The successful recipient was Michelle Fitzpatrick, an engineer at the Vale of Glamorgan Council.

Previous recipients of the scholarship are:

- Vikki Teasdale, Senior SuDS Officer at Buckinghamshire County Council
- Allison Chapman, Flood Risk Engineer at Wirral Council
- Daniel Turner, Project Officer at the Yorkshire Dales Rivers Trust
- Peter Burrows, Development Engineer (SuDS) at Gateshead Council
- Faye Tomalin, Engineering Assistant in Flood and Coastal Risk Management at the Vale of Glamorgan Council
- Robin Gray, Pennine Prospects
- Stuart Edwards, North Yorkshire County Council



4 Science and research

One of the aims of JBA Trust is to facilitate collaboration between academia and industry and deliver scientific research that improves society's understanding and management of risks in the environment. We publish and disseminate the resulting research outputs, enabling knowledge exchange and sharing best practice.

Collaborative research

In 2017-18 we worked with universities, research institutions, public sector and charitable organisations. We are pleased to report on the good progress of the following collaborative research projects.

The role of Digital Technologies in understanding, mitigating and adapting to environmental change

Partners: Lancaster University

JBA Trust is supporting a 5-year EPSRC funded research project at Lancaster University. The funding supports the award of a Senior Fellowship for Professor Gordon Blair as well as a team of researchers. Their research will focus on three areas of innovation: the Internet of Things (IoT), cloud computing and data science. In the first year the team focused on utilising digital technologies to enhance flood modelling within a concentrated programme of agile development – a “Flood Modelling Sprint”.

JBA Trust co-hosted a workshop with Lancaster University Kendal in 2017 to identify the industry drivers and technology needs in applications of flood risk modelling, to help prioritise the work during the Sprint. A wide range of organisations attended including the EA, ECMWF, United Utilities, Oxford University, CEH, JBA Consulting and JBA Risk Management.

Subsequent work is developing small demonstration examples of the use of semantically-enriched data, natural language processing and semantic queries to blend structured data from detailed flood models with post-flood event reports in a flexible, adaptable environment for risk assessment and economic appraisal.

Research output highlights

Workshop outputs available at:

<http://ensembleprojects.org/flood-modelling-sprint-workshop/>

Paper on Data-driven decisions for flood risk management available at:

http://eprints.lancs.ac.uk/87679/1/Data_for_Policy_2017_paper_60_11.pdf

Journal paper on digital technology for “Models of Everywhere” (Blair, G. et al.) submitted to Environmental Modelling and Software.

Data Assimilation for the Resilient city (DARE)

Partners: Reading University

Professor Sarah Dance at Reading University has been awarded a Fellowship (EPSRC Senior Fellow in Digital Technology for Living with Environmental Change) to work together with a team of researchers to produce a step-change in the forecasts of urban natural hazards such as floods, snow, ice and heat stress.

The project is using data assimilation techniques to improve predictions from large and complex forecasting models, by combining uncertain model predictions with a diverse set of observational data in a dynamic feedback loop.

JBA Trust is working with Professor Dance over the course of the Fellowship through the DARE project and we are co-developing future PhD research projects.

Research output highlights

Our collaboration led to an MSc project that investigated if observations of floods from satellite images can help improve the accuracy of forecast flood maps. Project summary available at: [MSc Research](#)

Yorkshire iCASP

Partners: Led by Universities of Leeds, Sheffield and York, with the National Centre for Atmospheric Science. 16 additional 'springboard' partners (including industry, NGOs and government)

iCASP is a 5-year programme that will utilise £4.5m of NERC funding combined with in kind and delivery support from partners to inform policy, investment decisions and new practice for regional and national agencies focusing on the Ouse catchment. It aims to build on NERC-funded science in climate change, flooding, integrated catchment management, carbon storage in soils, water quality and water resources to generate economic, societal and environmental benefits in rural and urban areas of Yorkshire. JBA Trust are a 'springboard' partner and sit on the governance panel.

In preparation for the release of new UK Climate Projections in 2018, six CASP Springboard Partners, including JBA Trust, worked with the Met Office to explore the implications for regional organisations who need to make decisions based on the impacts of future climate change. The project focused on the application of UKCP18 to the way specific organisations usually assess risks from surface water flooding and drought. Learning was fed back to the Met Office to inform how they formulate and present the new information.

We are in discussion with iCASP about future projects relating to forecasting surface water flooding from extreme rainfall events, working with natural processes and hydro-morphological modelling.

Where there are suitable public benefit outcomes we will work with iCASP to advise and promote those via JBA Trust channels.

Research output highlights

Case studies and guidance for organisations to update existing planning and assessment processes using UKCP18 data are available at: <https://icasp.org.uk/resources/uk-climate-projections/>

Infrastructure flood risk analysis/ network-scale risk assessment of bridge scour

Partners: Oxford ITRC, Network Rail, JBA Consulting

We worked with the Oxford ITRC (Infrastructure Transition Research Consortium) team to apply spatial risk assessment methods to UK infrastructure network risk analysis. A generic bridge fragility model was developed using the historical failure data published by the Trust and Network Rail asset data. When combined with JBA's

independently-derived national spatial model for river flow extremes, the fragility model predicts an expected rate of bridge failures per failure event that is within the 95% confidence interval about the historical mean rate.

A paper that significantly extended to include ITRC modelling of disruption to passenger journeys and to interpret the analysis within an economic framework was re-submitted to the journal Risk Analysis following revision after peer review.

Attribution of winter 2013-14 flooding to anthropogenic climate change

Partners: CEH, Oxford University

JBA Trust contributed to a study led by Oxford University to examine the possible contributions from climate change caused by human activities to the likelihood of flooding in winter 2013-14, or events of a similar nature. We obtained permission from JBA Risk Management to use their flood map data and Ordnance Survey for use of their property data to supply a simplified assessment of properties at risk of flooding in the Thames river basin to be incorporated into the study.

We also contributed to a follow-up paper, led by Alison Kay at CEH, which extends the analysis to national scale and also improves on some approximations made for expediency in the original impacts analysis for the Thames catchment by running JBA Risk Management’s industry-grade impacts model for the ensemble of climate attribution simulations.

Research output highlights

Paper published in Nature Climate Change and accompanied by commentary on the JBA Trust website reflecting discussion with the press and interested parties including Flood Re.

The commentary is available [here](#).

Paper published in International Journal of Climatology: Kay, A.L, Booth, N., Lamb, R., Schaller, N., Sparrow, S. “Flood event attribution and damage estimation using national-scale grid-based modelling: Winter 2013/14”.

Maths Foresees: Multi-Scale Mathematics for Mitigating Severe Environmental Events

Partners: University of Leeds (PI), Heriot-Watt University (Co-I), Pennine Prospects, HR Wallingford, Fugro GEOS Limited, EA, MetOffice plus 15 network members

This EPSRC Network aims to help foster links between the mathematical sciences and environmental change communities and promote mathematical modelling of environmental hazards. JBA Trust supported the network through participation in the management team and contribution to knowledge exchange events, technical reports, workshops and outreach projects.

We were directly involved in demonstration projects funded through the network on topographic uncertainty in flood models (Bristol University) and multi-level Monte Carlo case study for flood modelling (Imperial).

The Foresees network supported two “Environmental Modelling in Industry” study groups, and JBA Trust proposed and mentored industry challenges in both, which have been linked from our web site.

Research output highlights

The outputs of the 2017 Industry Challenge are available at: <http://www.turing-gateway.cam.ac.uk/event/tgmw41>

Poster presented at the 2018 European Geophysical Union conference in Vienna and available [here](#).

Publication summary 2017-18

Title	Journal	Authors	Status
Vulnerability of bridges to scour: insights from an international expert elicitation workshop	NHESS (Natural Hazards Earth Systems Science)	Lamb, R., Aspinall, W., Odbert, H., and Wagener, T.	Published 11/09/2017
Flood event attribution and damage estimation using national-scale grid-based modelling: Winter 2013/2014 in Great Britain	International Journal of Climatology	Kay, A.L., Booth, N., Lamb, R., Raven, E., Schaller, N., Sparrow, S.	Published 30/11/2018
Geomorphological effectiveness of floods to rework gravel bars: insight from hyperscale topography and hydraulic modelling	Earth Surface Processes and Landforms	Reid, H., Williams, R., Brierley, G., Coleman, S., Lamb, R., Rennie, C., Tancock, M.	Published 27/09/2018
A new method, with application, for analysis of the impacts on flood risk of widely distributed enhanced hillslope storage	Hydrology and Earth System Sciences	Metcalfe, P., Beven, K., Hankin, B., Lamb, R.	Published 27/04/2018
Modelling spatial extreme events with environmental applications	Spatial Statistics	Tawn, J.A., Shooter, R., Towe, R.P., Lamb, R.	Published 4/05/2018
Digital technology for “Models of Everywhere”	Environmental Modelling and Software	Blair, G. et al.	Submitted
Infrastructure flood risk analysis	Risk Analysis	Lamb, R., Pant, R. Hall, J.	Revision submitted after initial review
Historical flash floods in England: new regional chronologies and database	J Flood Risk Management	David Archer, Greg O’Donnell, Rob Lamb, Sarah Warren, Hayley J. Fowler	Revision submitted after initial review

Doctoral research projects

Our collaboration with universities across the UK as part of our wider research programme enables us to support research students in developing advanced skills, and delivers high quality research that helps enhance the understanding of a wide range of risks in the environment.

The projects we supported in 2017-18 are summarised in Table 1 and more information about each project can be found on the [PhD research](#) pages of our website.

Topic	Partners	Student
Examining the role of habitat quality in determining river ecosystem resilience to extreme flood events	University of Leeds, Environment Agency	Andrew Johnson
Estimating flood frequency using documentary and floodplain sedimentary archives to extend flood series	University of Lincoln Environment Agency	Josephine Westlake
Methods and tools to communicate climate change and air quality risk	Lancaster Environment Centre	Suzanne van Zuijlen
Hydrodynamically- and ecologically-driven design of weirs, hydropower plants and fish passes	University of Leeds	Tom Padgett
Multi-scale sediment and debris impacts of Natural Flood Management (NFM) measures	University of Leeds	Eleanor Pearson
Impact of woody debris on hydro-geomorphological processes and flood risk	University of Leeds Yorkshire Dales Rivers Trust	Zora Van Leeuwen
Impact of a Water Level Management Plan on the Humberhead Wetlands	Edinburgh University Natural England	Ashley Buchan



5 Building our reach and enabling knowledge exchange

Website

The website is the main way that people access publications, educational resources and information about the Trust and our research projects. Our redesigned website (www.jbatrust.org) was launched in April 2016 and is helping us deliver our charitable objectives of sharing best practice and supporting training and education

Social media

We use Twitter to publicise research outputs, new resources, publications or scholarships and awards. The number of @jbatrust followers has been steadily growing and by the end of 2018 we had 537 followers.

Film

JBA Trust's [YouTube channel](#) hosts all our video resources. The wave tank video continues to be very popular with over **4.4 million** views since it was posted in November 2016. We have received feedback that it is being used as a resource to support the Geography GCSE AQA curriculum.

The hydraulic flume videos have also proved popular with 91,000 views since 2013.



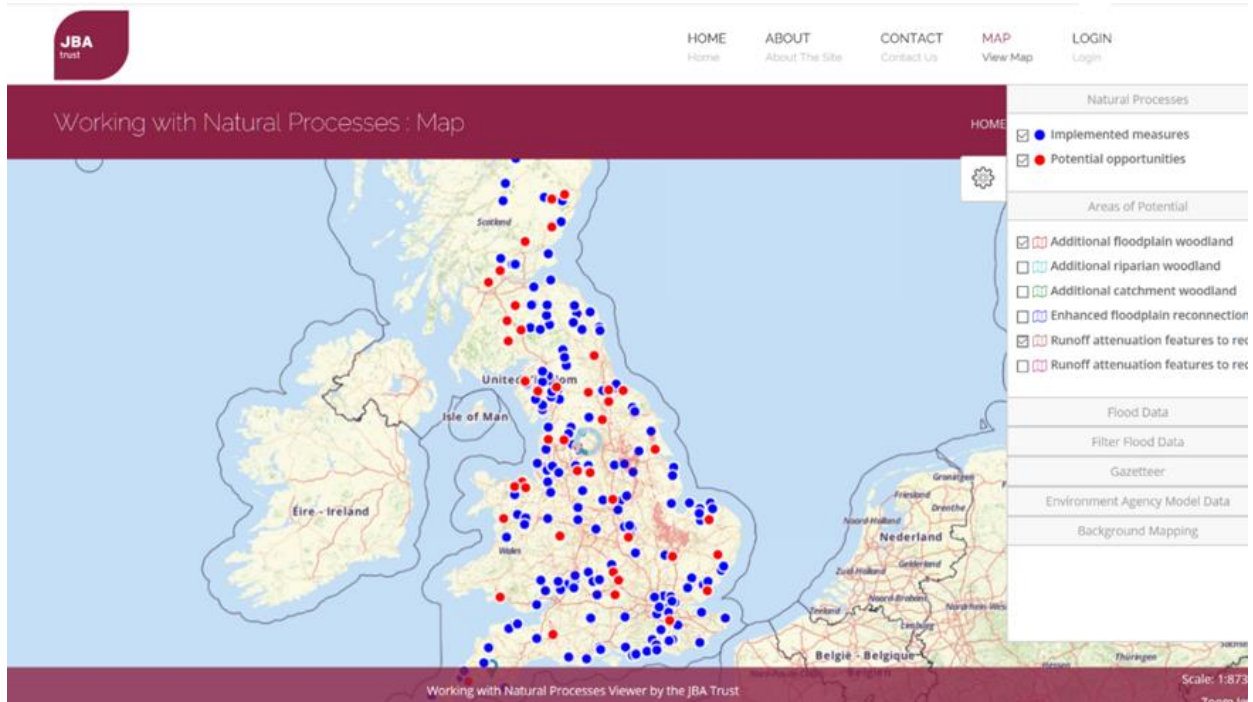
Working with Natural Processes (WwNP) mapping website

The online catalogue of nature-based flood risk management projects in the UK was created in 2015 and is freely available (<http://naturalprocesses.jbahosting.com/>) for practitioners and researchers to use. There is a new website in development which will provide a better user interface and allow users to add data/comments.

In 2017-18 we continued to update this resource and it has been cited in a variety of academic and industry literature and presentations. The most recent update contains a major new release of Environment Agency open-

source data, produced by JBA Consulting for the Environment Agency’s Evidence Base on “working with natural processes” (WwNP) for flood risk management.

The map layers show areas of potential for enhanced WwNP. It also includes additional 65 new case studies, documented during the project.



6 Directors and trustees

The Trustees serving during the year were as follows:

Trustees	Rob Lamb, JBA (Managing Director of JBA Trust)
	Jeremy Benn, JBA
	Jim Hall, Oxford University
	Keith Beven, Lancaster University
	Nick Russell, Independent financial consultant
Secretary	Craig Robson

7 Structure, governance and management

JBA Trust is a company limited by guarantee and is governed by its 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.

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).

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.

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.

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 adopts policies and procedures from our host, the JBA Group, which are externally validated where applicable. These include policies on: Health and Safety; Energy Use; Environment; Sustainability; Social Responsibility; Equality and Diversity.

8 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 Innovate UK or Research Councils. There is also an online donation page through 'MyDonate' to facilitate the receipt of donations from individuals and ensure that Gift Aid is claimed back efficiently.

Reserves Policy

Reserves are required to minimise the financial risks associated with the unlikely event of unplanned or unforeseen expenditure. The JBA Trust maintains sufficient reserves to cover all contractually committed expenditure or liabilities and operating costs for one year.

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.

On behalf of the trustees

Rob Lamb, Managing Director of JBA Trust

30 April 2019