



# JBA Trust Limited

## Annual Report 2016-17

Charity Number: 1150278

Company Number: 07840801

# The JBA Trust is a charity that enhances understanding and management of risks in the 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

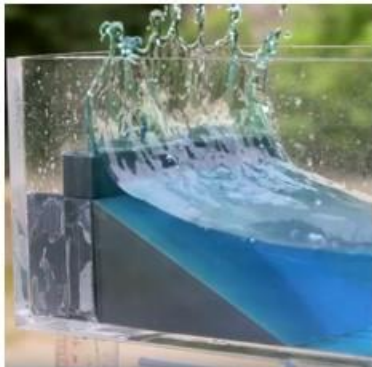
Publishing and disseminating research outputs, enabling knowledge exchange and sharing good practice

# Highlights this year

**10**  
collaborative  
research projects



**1,800** people  
learnt about river and  
coastal flood risk with  
**7** physical models at  
**22** events



Over  
**1 million**  
views of wave  
tank video  
(since posted in Oct 2016)

Research  
partnerships with  
**9**  
universities

Research grants  
helped support  
**7**  
PhD students



**6** MSc project  
placements  
supported  
**12** scholarships  
and bursaries  
awarded

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

**6**  
externally peer  
reviewed  
publications



## Director's Report



“We have added to our physical models, and helped other charities to build their own capabilities, while supporting a growing programme of research”

On behalf of the Trustees, I am pleased to present our annual report on our activities in 2016-17.

This year we have continued to expand our support for high quality research and the growth of skills needed to manage environmental risks.

We have added to our suite of physical demonstration models, and seen ever more demand from educators and other charities for support at events. Demonstrations of our models have been provided at training events, catchment management stakeholder workshops and academic conferences.

Our augmented reality (AR) sandbox has been a highly effective tool in explaining the concepts and complexities involved in working with natural processes, combined with flood defences, to manage risk in rivers. This year, we worked closely with the Rivers Trust to deliver an AR sandbox and supporting materials for them, making the technology more accessible to rivers trusts throughout the country. Our support for physical scale models also includes Wetropolis, which blends mathematical analysis of flood risk with physical visualisation. With the PARM system, we are supporting research to evaluate how physical

and AR models are most effectively deployed as communication and learning tools.

Our research programme continues to create opportunities for collaborations with academic partners, especially for graduate researchers, whose PhD projects we support. Our contributions to scientific and engineering research have, again, been recognised in papers published in peer reviewed journals.

Once again, we have sponsored and provided technical support for the joint British Hydrological Society and JBA Trust MSc student bursaries scheme, which is set to continue.

We promote our work through the JBA Trust website, where we continue to build a library of resources and research outputs. This year, we have also seen our social media profile increasing.

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**

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# 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 topics, 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.

### 2.1 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. There was a significant increase in demand for the physical models in 2016-17 and we supported a wide range of events including conferences, school workshops, professional training and flood awareness events for the general public, reaching over 1,800 people.

We continued our development of interactive visualisation tools, including our augmented reality sandbox that shows how topography affects water moving through a catchment. This year, we also 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 (see Section 4.1).

Many of the demonstrations were supported by the bespoke physical model van that houses and transports the models and new larger flume. The physical model resources and activities are summarised below:

#### **Augmented Reality Sandbox (AR Sandbox)**

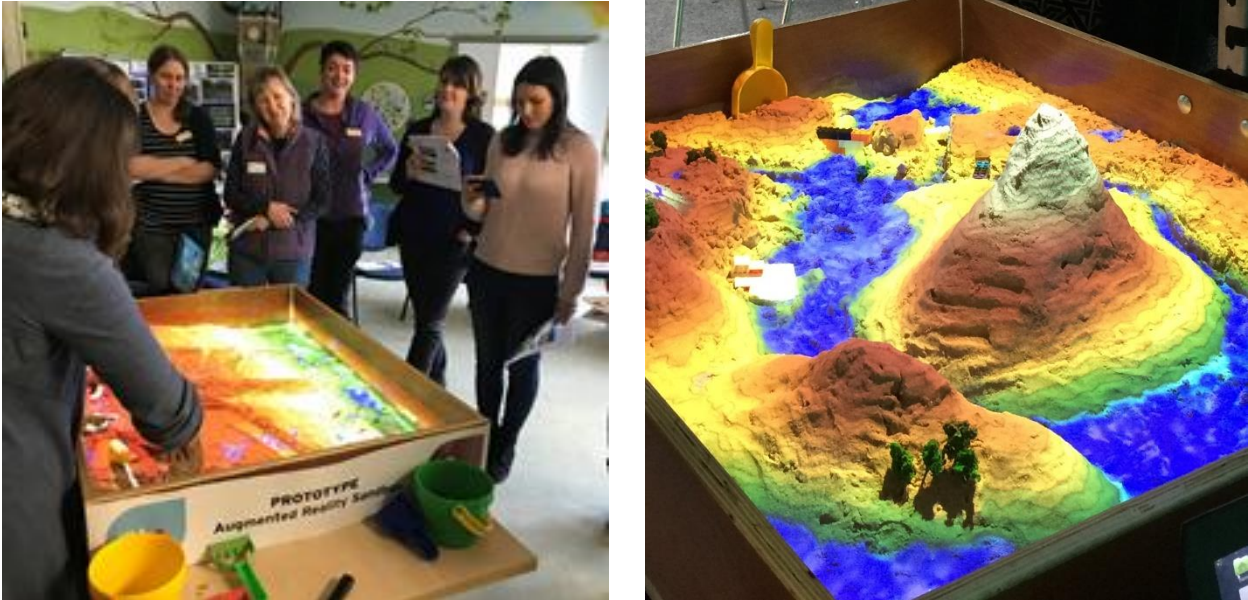
The sandbox is a very interactive visualisation tool that shows how topography affects water moving through a river catchment. We encourage people to shape the sand to create their own catchments, which are then 'augmented' in real time by a projector which shows a coloured elevation map and contour lines. Participants can 'make it rain' through gestures and then watch how the virtual water flows through the catchment in real time and explore how changes in land use affect flooding.



Our first prototype was developed with students at the Lancaster Environment Centre as part of their MSc project in 2015. It is based on the specifications shared by the University of California, Davis who have created an excellent library of online resources.

In 2017, we hosted a student, Elisa Stefaniak, as part of a 4 month research internship focusing on developing the functional capabilities of the sandbox for example, how to incorporate multiple hazards and enable the software to recognise the properties of different objects. Elisa developed ‘catchment stories’ which we will use to help explain how working with natural processes like roughness, attenuation and permeability can help to manage flood risk.

We tested the AR Sandbox at a Knowledge Sharing Event hosted by the Cumbria Floods Partnership and the Environment Agency in Penrith on 22 March 2017. The feedback was excellent and helped inform the direction of the software development. The event also raised the profile of our work and led to a collaborative project with the Rivers Trust to design and build an AR sandbox and engagement materials to support outreach and educational activities.



**Figure 1 . Demonstrating the Augmented Reality Sandbox to Rivers Trust staff**

**Demonstration flume**

The biggest flume is integrated into the new van. The design is based on the existing 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. The van houses the flumes as well as spares and tools and this set up has proven to be very useful when delivering demonstrations at different locations.

**Trailer flume (trailer mounted)**

This flume is the first mobile demonstration model built by JBA Trust. It shows the flow of water in a simple channel, driven by a system of re-circulating pumps and also features scale models of typical engineered structures such as weirs, bridges, culverts and debris screens to show how different structures interact with the flow and affect flood risk. The hydraulic flume demonstration video is available on YouTube and has been watched by over 42,000 people since it was posted in 2013.

### '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. In partnership with JBA Consulting, we developed teaching resources for secondary schools and delivered a day of interactive lessons about rivers, catchment and flooding to GCSE students.

### Wave tank

The portable wave tank demonstrates the performance of coastal defences under different wave conditions and builds on the prototype developed with a team of PhD students from the Fluid Dynamics Centre for Doctoral Training (CDT) at the University of Leeds and the Coastal Risk Management team at JBA Consulting in August 2015.

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 1 million views since it was posted in October 2016 (<https://www.youtube.com/watch?v=3yNoy4H2Z-o>).



**Figure 2.** Dan Rodger presents a short video tutorial on coastal flood risk using the wave tank.

## 2.2 STEM (Science, Technology, Engineering and Maths) activities

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.

Skipton Girls High School is an engineering academy and we are continuing to work with the curriculum leader for Geography to develop lesson plans that utilise our physical models (elements of engineering, maths and geography in the context of flood risk) building on the success of the Water Engineering Workshop in June 2016.



## 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 Masters or PhD level. JBA Trust therefore emphasises support for students and projects at this level.

### 3.1 MSc 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 2016-17, the JBA Trust helped six students from the Universities of Leeds and Lancaster. The students worked with JBA Consulting staff on a wide range of MSc projects including:

- Bioengineering techniques used for coastal shoreline stabilisation and their application to regenerate mangrove forests for coastal defence and risk reduction
- Opportunity mapping for the implementation of natural process management to reduce coastal flood risk, with a specific focus on mangroves
- The effectiveness of partnership-building to deliver Natural Flood Management solutions, focusing on case study analysis to identify the secrets to success
- Wetropolis: a public engagement model on the science of flooding

### 3.2 PhD 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 students and PhD projects we supported in 2016-17 are summarised below:

- Peter Metcalfe, Centre for Global Eco-Innovation at Lancaster University (*Modelling nature based approaches to flood management at a catchment scale*). We are pleased to report that Peter successfully completed his PhD in 2017.
- Zora van Leeuwen, University of Leeds (Impact of woody debris on hydro-geomorphological processes and flood risk)
- Eleanor Pearson, University of Leeds (Multi-scale sediment and debris impacts of NFM measures)
- Ashley Buchan, University of Edinburgh (Impact of a Water Level Management Plan on the Humberhead Wetlands)
- Tom Padgett, University of Leeds (Hydrodynamically- and ecologically-driven design of weirs, hydropower plants and fish passes)
- Suzanne van Zuijlen, Lancaster University (Development of tools to understand future climate change-air quality interactions)
- Josephine Westwood, University of Lincoln (Estimating flood frequency in the Trent and Yorkshire Ouse rivers using documentary and floodplain sedimentary archives to extend flood series)

Details of the PhD research we sponsor is published at: [www.jbatrust.org/who-we-help/phd-students/](http://www.jbatrust.org/who-we-help/phd-students/)

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

Specialist skills are needed to manage the water environment. In 2016-17 we continued our partnership with the British Hydrological Society (BHS), a registered charity, to support students working towards relevant MSc qualifications who will go on to play a vital part in the future management of the water environment. We also welcomed the support of the Environment Agency who joined the scheme this year.

Now in its seventh year, the Studentship Award aims to encourage talented students wishing to pursue development of their academic experience and qualifications in this sector. Ten bursaries of £1,500 were awarded to students applying for a hydrology related MSc and the publicity generated a significant amount of new traffic to our website.

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.

### 3.4 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 two scholarships in 2016-17 to fully fund the tuition fees for Lancaster University's Flood and Coastal Risk Management Postgraduate Certificate course. The successful recipients were Vikki Teasdale, a Senior SuDS Officer at Buckinghamshire County Council and Allison Chapman, a Flood Risk Engineer at Wirral 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. In 2016-17 we worked with universities, research institutions and organisations and are pleased to report on the good progress of the following collaborative research projects.

### 4.1 Physical Augmented Relief Models (PARM)

**Partners:** University of Nottingham

Interactive visualisation tools are becoming increasingly sophisticated and can be a very powerful way of communicating flood risk. PARM tools use a 3D printed landscape based on LIDAR data to create an accurate model that is then augmented with projected images. Supported by Impact Accelerator Funding from the Economic and Social Research Council (ESRC), we are working with the University of Nottingham 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 a 'live' flood alleviation schemes will be selected to create a new PARM and test the learning outcomes of participants.

### 4.2 EPSRC Fellowship - Gordon Blair

**Partners:** Lancaster University

We have been supporting a £2.5million research project with Lancaster University on 'The role of Digital Technologies in understanding, mitigating and adapting to environmental change'. This 5-year EPSRC Senior Fellowship will focus on three areas of innovation: the Internet of Things (IoT), cloud computing and data science. The funding supports a team of five people at Lancaster and, in the first year, this team of researchers will focus 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 in Kendal on 20-21 March 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 Environment Agency (EA), the European Centre for Medium-Range Weather Forecasts (ECMWF), United Utilities, Oxford University, Centre for Ecology and Hydrology (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.

**Outputs:** The workshop outputs are available (<http://ensembleprojects.org/flood-modelling-sprint-workshop/>) and also a paper ([http://eprints.lancs.ac.uk/87679/1/Data for Policy 2017 paper 60\\_11.pdf](http://eprints.lancs.ac.uk/87679/1/Data_for_Policy_2017_paper_60_11.pdf))

### 4.3 EPSRC Fellowship - Sarah Dance

**Partners:** University of Reading

Sarah Dance at Reading University has also been awarded a Fellowship (EPSRC Senior Fellow in Digital Technology for Living with Environmental Change). JBA Trust will work with Sarah over the course of the Fellowship through the DARE project - Data Assimilation for the REsilient city.

## 4.4 Yorkshire iCASP

**Partners:** Led by University of Leeds, also the Universities of Sheffield and York, and the National Centre for Atmospheric Science. 16 additional 'springboard' partners (industry, NGOs and govt.)

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 (benefit-in-kind contribution only).

An early pilot project has been completed to examine the implications of forthcoming UKCP18 climate projections for surface water and drought risk analysis. We are in discussion with iCASP about projects relating to forecasting surface water flooding from extreme rainfall events, working with natural processes and hydro-morphological modelling.

## 4.5 Attribution of winter 2013-14 flooding to anthropogenic climate change

**Partners:** 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 also 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 have written 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.

**Outputs:** 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. <http://www.jbatrust.org/news/human-influence-climate-2014-southern-england-winter-floods-impacts/>

Paper submitted to International Journal of Climatology: "Flood event attribution and damage estimation using national-scale grid-based modelling: Winter 2013/14".

## 4.6 UK multi-scale spatial/temporal rainfall and river flow extremes (KTP)

**Partners:** Lancaster University, Innovate UK

The two-year Knowledge Transfer Partnership (KTP) between JBA Consulting and Professor Jon Tawn at Lancaster University completed on 30 November 2016. The aim of the project was to develop improved statistical models for extreme river flow events that can cause both localised and widespread flooding.

JBA Consulting funded the company contribution to the KTP outright and grants JBA Trust rights to the project outputs under licence to further its charitable objectives, for example supporting knowledge exchange through the publication of technical papers.

**Outputs:** The post-doctoral researcher, Ross Towe, has produced a variety of outputs, including posters, papers, blogs. These are available at: <http://www.jbatrust.org/how-we-help/research/rivers-and-coasts/improving-statistical-models-of-large-scale-flood-events/>

Ross is also aiming to produce publicly available technical papers, including:

- Understanding the likelihood of widespread flood risk
- A more efficient approach for handling missing values in the conditional extreme value model
- A spatio-temporal model for interpolating flood risk along the river network

One key output of this work was the significant contribution to the Government's [National Flood Resilience Review](#) (NFRR) which was published on 8 September 2016. The NFRR aimed to improve the national understanding of flood risk in England. Through the Scientific Advisory Group, JBA Trust carried out analysis for the NFRR with support from JBA Consulting via the KTP funding for Ross Towe. The analysis examined the meteorological and hydrological evidence underpinning the review and built on statistical methods and data analysis developed as part of the KTP. JBA Trust provided a short commentary to accompany the report: <http://www.jbatrust.org/news/scientific-evidence-supporting-the-governments-national-flood-resilience-review/>

In addition, the KTP project has generated a scientific data set for use in further research on spatial extremes in hydrology and an alternative flood hydrology event set for use in risk model comparisons or development. The datasets will be accompanied by a package of documentation and guidance notes.

A paper including the NFRR analysis has been submitted to the journal *Spatial Statistics*.

## 4.7 Bridge scour elicitation workshop

**Partners:** Bristol University

JBA Trust contributed to a proposal by Bristol University to the NERC PURE programme for an international experts' workshop on bridge scour on 16-17 February 2015. Much of the analysis and generation of outputs from this work took place in FY 2015-16, however. The workshop brought together experts from around the world with different perspectives and expertise in scour management or research. Through a formal expert elicitation process, the workshop explored the group's understanding of uncertainties about scour risk.

**Outputs:** A workshop technical report and summary of key findings is published on JBA Trust web site. There is also a journal paper published in *Natural Hazards and Earth System Sciences*, both are available from: [www.jbatrust.org/news/vulnerability-of-bridges-to-scour-insights-from-an-international-expert-elicitation-workshop/](http://www.jbatrust.org/news/vulnerability-of-bridges-to-scour-insights-from-an-international-expert-elicitation-workshop/)

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

**Partners:** Oxford ITRC, Network Rail, JBA Consulting

JBA Trust is continuing to work with the Oxford ITRC (Infrastructure Transition Research Consortium) team to apply JBA spatial risk assessment method to the railway network and UK infrastructure.

A generic bridge fragility model has been 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. The work has now been significantly extended to include ITRC modelling of disruption to passenger journeys and to interpret the analysis within an economic framework.

**Outputs:** A paper has been submitted to the journal *Risk Analysis*.



## 4.9 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 set up collaborations between the mathematical sciences and environmental change communities and promote mathematical modelling of environmental hazards. JBA Trust is providing in-kind support to the network through participation in the management team and contribution to knowledge exchange events, technical reports, workshops and outreach projects. We are directly involved in two small demonstration projects funded through the network:

- Topographic uncertainty in flood models (Bristol University)
- Multi-level Monte Carlo case study for flood modelling (Imperial)

JBA Trust is also supporting an outreach project, the 'Flood Hydrology Table Top Simulator' will be delivered through MSc group project with the CDT in Fluid Dynamics at Leeds in 2017. Each year, the Foresees network supports an 'Environmental Modelling in Industry Study Group' and JBA Trust contributes by proposing and mentoring an industry challenge.

**Outputs:** The 2016 challenge results published here: <http://www.jbatrust.org/how-we-help/publications-resources/weather-and-climate/identifying-coherent-weather-features-3d/>. The 2017 challenge interim outputs are available here: <http://www.turing-gateway.cam.ac.uk/event/tgmw41>

## 4.10 Susceptibility of catchments to INTense RAINfall and flooding (SINATRA)

**Partners:** Consortium led by Reading University and including academia (Reading University, Bristol University, Newcastle University, Exeter University, Hull University, King's College London), industry (Halcrow and JBA), and government (UK Met Office and their joint Flood Forecasting Centre with the Environment Agency, the British Geological Survey, the Health and Safety Laboratory and the Cabinet Office's Natural Hazards Partnership). Funded by NERC, the Environment Agency and the UK Met Office under the Flooding from Intense Rainfall thematic programme.

JBA Trust's contribution to the original SINATRA project is complete but we are now building on that work as part of a knowledge exchange project with Newcastle University (SINATRA KE) to link flow and rainfall in the analysis of rapid response events in rural catchments. JBA has begun work to assess the value of explicit hydrological and 2D hydrodynamic modelling steps within a surface water flood forecasting chain, in collaboration with the EA/Met Office Flood Forecasting Centre and funding from Reading University.

**Outputs:** Our analysis supported the development of a comprehensive archive of flood events in cooperation with researchers based at Newcastle University. A journal paper has been completed, co-authored by David Archer, Greg O'Donnell (Newcastle University) and JBA Trust.

## 4.11 Assessing the multiple benefits of SuDS (BeST – Benefits of SuDS Tool)

**Partners:** CIRIA, project steering group

CIRIA has developed a tool which can evaluate the multiple benefits associated with SuDS schemes to inform project investment and funding decisions. JBA Trust was a project partner and tested the tool by applying it to relevant case studies (provided by JBA Consulting). We also supported the dissemination of the tool.

**Outputs:** An Excel based tool, evidence base, nationally agreed methodology and guidance to support the assessment of the multiple benefits of SuDS. BeST is complemented by the updated 'SuDS Manual' which was launched alongside the BeST in November 2015 at the House of Commons. We attended a workshop to review implementation and uptake on 13 December 2016.

## 4.12 Monitoring of an event on an ephemeral chalk stream near Henley

Assendon Stream near Henley-on-Thames is an extremely ephemeral watercourse that is normally completely dry, even during a wet winter. It last flowed in 2001, resulting in flooding to roads and property, and before that it had not flowed since the 1960s. In February 2014 the spring started to flow following the extreme wet weather of the previous few months. This presented a very rare opportunity to monitor the progress of the stream down the valley, and gather important data in relation to the stream's response to groundwater levels and the mechanisms of flooding.

JBA Trust commissioned JBA Consulting to carry out monitoring of Assendon stream to collect data in relation to the stream's response to groundwater levels and the mechanisms of flooding and create a case study/report documenting the findings of the monitoring.

**Outputs:** The final report is now published on the JBA Trust website with the dataset available on request: <http://www.jbatrust.org/how-we-help/publications-resources/emergence-of-an-ephemeral-chalk-stream-assendon/>

## 4.13 Working with Natural Processes

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.

**Outputs:** We have 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.

# 5 Building our reach

## 5.1 Website and social media presence

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](http://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

We also use Twitter to publicise research outputs, new resources, publications or scholarships and awards. The number of JBA Trust followers has been steadily growing and in 2016-17 there was a 68% increase in Twitter followers.

## 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.

### 7.1 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).

### 7.2 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.

### 7.3 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.

## 7.4 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 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.

### 8.1 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.

### 8.2 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.

On behalf of the trustees

Rob Lamb, Managing Director of JBA Trust

16 April 2018