

# *con>flu>ence*

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UNESCO  
Biosphere  
Reserve

1

River

4

Artists

4

Partners

8

Schools  
and  
Communities

50

Ecoids

# Foreword

Elaborating perceptions of environmental data by way of artistic practice is an important strand of modern environmental discourse. The Confluence Project belongs to a tradition of work linking visceral engagements with non-human nature to wider questions of environmental citizenship. Scientific capacities to procure, assemble, display and propagate data on environmental processes carry the promise of revealing patterns from the deep complexity of nature, yet making sense of environmental change does not stand and fall on technical knowledge alone. The cultural theorist Jean Baudrillard once remarked that 'we live in a world where there is more and more information and less and less meaning'<sup>1</sup> and it is instructive to view the work of the Confluence Project in these terms.

The mediation of nature's signals through creative pedagogy helps unlock awe and wonder in nature and is essential for any journey of hope. The link to Romanticism that Simon Warner sees in his own work for Confluence is true of the Project as a whole. As much as the rational technocracies of policy and decision making might otherwise imply, environment processes need to be felt as much as understood. It is very difficult indeed to imagine a viable future for the communities of north Devon in the absence of an environmental aesthetic and sensibility, and the Confluence Project helps to cultivate these. From the vantage point of sustainable development the processes of environmental change register now as a litany of risks and threats to human and non human life and the extended landscapes of the Torridge will bear their fair share of these. Insofar as it resonates with extant concerns, the Confluence Project is part of the work enabling communities to orientate themselves towards the lived realities of environmental change and innovate within their changing circumstances.

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Dr Fish is an environmental policy specialist assisting in the development of community engagement strategies for the new North Devon Nature Improvement Area

<sup>1</sup> Baudrillard, Jean (1994) Simulacra and Simulation. Trans. Sheila Faria Glaser. Michigan: University of Michigan Press.

# con>flu>ence

1 UNESCO Biosphere Reserve  
1 River  
4 Artists  
4 Partners  
8 Schools and Communities  
50 Ecoids

**Confluence** combines art, science and technology to take a look 'behind the scenes' of the North Devon Biosphere. Over a period of a few months live online environmental data was collected from locations along the River Torridge, using remote sensors called Ecoids. Four project artists, **Antony Lyons, Jon Pigott, Simon Ryder and Simon Warner**, used the data streaming from these to create new hybrid artworks, as well as working with eight schools and communities along the river to visualise aspects of their local environments. This has all been made possible by the unique partnership of **University of Plymouth's i-DAT** (Institute of Digital Arts and Technology), **The North Devon Biosphere Foundation, Beaford Arts and Appledore Arts**.

[www.confluence-project.org](http://www.confluence-project.org)



## Funders:



## Partners:



Confluence received funding from Arts Council England and Leader 4 Torridge and North Devon.



# North Devon's Biosphere Reserve

## world class by nature

UNESCO World Biosphere Reserves are areas designated by UNESCO to be test beds for sustainability that address development and conservation on a system scale rather than a defined protected area. Crucially the point of the designation is to explore and seek to optimise the relationship between humans and the wider environment for mutual benefit.

North Devon's Biosphere Reserve is identified by the catchments draining to the north Devon coast and including the marine area that extends beyond Lundy; in all some 3500 sq Km. Within that area the reserve hosts some of Europe's most distinctive biodiversity from the iconic sand dunes at Braunton Burrows, the bogs of Dartmoor

and Exmoor, the rare Culm grasslands and the marine biodiversity hotspot of Lundy, and crucially 155000 people. However changes at global and local scale, human and naturally induced, are having an impact on the area.

In a Biosphere Reserve such as North Devon where society has developed to the extent that there is a cognitive disconnect between the actions and choices that people make and the impact it has on the environment, presents a significant challenge. The actual cause and effect of actions by society are ever present but not recognised; for example diffuse pollution or development in flood-planes restricting the functions and life of our rivers..

**The aim for the scientific dimension of the Biosphere Reserve in Confluence was to develop a methodology to start that recognition by the community of change and patterns in the environment that might be linked to behaviour and therefore start to engage people in dialogue about impacts.**

Our blue-sky vision was to establish an array of sensors that could detect a range of environmental parameters that would be linked to some human activity indicators. The environmental indicators might be turbidity, dissolved oxygen, flow rates, rainfall, animal movements, fish counters, air quality; and human activity recorders such as car movements, people movements, water usage, energy consumption, etc. The challenge of having access to such real time data is that there is often a lag between cause and effect being seen and indeed some cycles of change are markedly different; such as the turbidity as a result of a rainfall event and the recruitment rate of Freshwater Pearl Mussel in the river Torridge or wider factors such as the global price of grain impacting harvesting times and land-use choices. A second aim would be to explore these parameters to identify potential causal relationships by using mass participation and citizen science or with

people contributing their computer power by using their own computers.

Confluence could only be a research and development stage with this ultimate ambition of open access to real time environmental data being a step or two away. In this phase much of the development effort was placed in designing and creating sensor types that could be plugged into the Ecoids and to develop some public engagement. This resulted in hosting 3 roadshows in village halls, running 39 workshops with schools, and building a community participation with a total of 1673 people.

The range of sensor choices on the regular Ecoids was limited due to the technological challenges and therefore the choice of parameters for the community to measure was limited. However the technicians and artists displayed great ingenuity for the sensors that were developed. The turbidity sensor was a good example which used a cigar tube, and LED and a light sensor; similarly the bat detector that hooked up a standard bat detector to an Ecoid. The data gathered from the sensors were not of any great consequence scientifically, but showed good potential as a resource for schools to work with for both science and art. A major benefit from the project was the trans-disciplinary working; which put the

Biosphere Reserve scientific people in contact with technicians developing the sensors and the lead artists to explore and challenge ideas and concepts and provide new inspiration is portraying information. Unfortunately the explorative conversations about measuring gene flow over landscapes, or time cycles on microbial, human and geological scales were not recorded in the blogs on line which would have documented the vivacity of the project more fully. Confluence concept still has a future in the biosphere reserve.

This phase has only scratched the surface. I would hope that the hardware and further development of the sensors would enable some of those original aspirations of the programme to be achieved.

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## Comments from the Confluence exhibition, June 2012

A great initiative and with inspiring results

I really appreciate the integration of science and art. There is definitely room for more of this! Thank you.

Interesting and thought provoking insight into Arts and Environment.

Immersive, interactive, entertaining.

A way of stimulating the mind to look at the environment through data capture. Wow!

Really great to expand ones imagination!

A fascinating show. Brilliantly presented.

Interesting ideas. Good to see something as innovative in North Devon.

Brilliant – innovative, stimulating and lots to learn.

A great project. Obviously inspired the children. Strange how wind features so strongly in the work!

Really interesting and fascinating.

I really liked the black dome. I came with my brother. He loved it so much he wouldn't come out!!

Gorgeous use of data. Dreamy, one minute I was flying then swimming underwater.



Faraway so close.

In many ways the Confluence Project embodies many of i-DAT's core principles - it was: a catalyst for engagement through creative experimentation; fundamentally collaborative [across institutions, individuals and disciplines]; highly networked [people, institutions and instruments]; and cultivated open innovation through a participatory 'Citizen Science'. The Ecoids themselves are model 'provocative prototypes', networked instruments for harvesting data to enhance our understanding of the world. They do this not through an algorithmic definition of what certain values (temperature, luminosity, humidity, flow and turbidity) actually mean, but through a negotiation of what the environment really feels like.

Our mission to harvest, make tangible and disseminate data generated by human and



In many ways the Confluence Project realised a microcosm of **Buckminster Fullers dream:**

***"The consequences of various world plans could be computed and projected, using the accumulated history-long inventory of economic, demographic, and sociological data. All the world would be dynamically viewable and picturable and radioable to all the world, so that common consideration in a most educated manner of all world problems by all world people would become a practical event".***

**(Buckminster Fuller, 1962)**

ecological activity was entirely synergetic with the aspirations of the Biosphere and Beaford Arts - Confluence explored and applied the transformative potential of digital technology to engage and fascinate.





Our transdisciplinary, practice-based and applied research provides a foundation for our core programme. We developed a series of 'Operating Systems' (op-sy) to harvest and dynamically manifest 'data' as experience through creative production from: architecture (Arch-OS.com), bodies (Bio-OS.org), communities (S-OS.org) and the environment (Eco-OS.org). Located in the recent history of interactive art, ubiquitous computing and the Internet of Things, the aspirations for these initiatives are clearly visible in the Confluence Project.

Eco-OS provides a substrate through the use of open source hardware and software to build environmental monitoring and remote, networked sensing devices - 'Ecoids' (xbee, arduino, sensors), mobile phones, tablets

and computers. It deploys software for data capture and broadcasting through the internet (processing, HTML, RSS, databases) and the integration of data harvested from the environment into platforms such as Google maps and other API's. Scattering the landscape with networked remote sensors generated a granulated, high resolution map of the environment in the Biosphere.

Once captured, analysed and parsed this raw material can be visualised and sonified through traditional audio/video and image manipulation, screens, web pages but, more interestingly, through FullDome environments. These new forms reveal the 'temporal' ebb and flow of environmental factors and manifest the 'invisible' fabric that allow us to 'feel' things that normally lie outside of our normal frame of reference.

Installing remote sensors in the landscape may be common practice within the Earth Sciences. However, these are normally expensive industrial weather stations that collect data from a focused area. The data collected may well be calibrated to professional scientific standards, but at the same time it brings with it an 'institutionalised' model of the environment, a non-negotiable model that can be difficult for the inhabitants of an environment to understand and 'own'. The Confluence

Project offered a different model, something that was totally negotiable, participatory and thoroughly owned by those that contributed. The creative outputs made the environment understandable, highly relevant and empowering.

Through the manifestation of material, immaterial and imaginary worlds Confluence brought the 'Landscape', which is by definition, unreachable and out there, just a little closer...

Fuller, R. B., (1962). Education Automation, Southern Illinois University, Carbondale, IL, p. 49. Hill, pp. 107-127.

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## Teachers comments on the project

Attracted to the project as the timing seemed to work with us in college- we are often getting people who want to work with us in a very short time frame which does not fit in with curriculum planning.

The project involved 30 children from age 7-11. Being a small school the whole class had to be involved however some of the younger children found the whole concept a challenge. We did some work as part of geography visiting locations and discussing what they were like.



# beaford**arts**

During the Confluence Project the Education team at Beaford Arts supported a range of workshops both in and outside the school. The aim of this part of the project was to use the arts to help participants to engage more directly with their environment. The inspiration of the artists delivering the workshops, and the work of each partner involved with the project, led to a diverse range of interactive installations representing a sense-led journey through their surroundings.

Confluence combined digital media and art to raise participants' awareness both of their immediate environment, and of

their responsibilities as custodians of north Devon's natural capital. At primary school level Confluence achieved this not only through the arts, but also through research and responses in design technology, science, geography, history, english and maths – all of which drew on the knowledge and expertise of the partner organisations.

Beaford Arts worked to help students learn outside of the classroom with artists, encouraging them to interpret their landscape in different and creative ways. In working together with teachers the project contributed to core and creative curriculum areas of study. We supported these with the

artists through workshop presentations, resources and lesson plans provided to the schools to support the project.

The project's roadshow presentations, which preceded the work in schools, helped to embed the Confluence project within the wider community. Children, families and community members were able to meet the professionals and learn about the context and concept of Confluence and the Biosphere designation, and to sample some of the technology involved. A series of in-school workshops followed, introducing the project and identifying ways in which each child could 'take the project home' to friends and family for the school holidays. Examples of this were watching for bats in the back garden, photographing the local environment and their interactions with it, and reflecting the project's 'citizen science' approach through written work. In each term that followed there were 27 workshops in eight schools, as well as workshops at RHS Rosemoor, Appledore Quay and Fremington Quay. To conclude the project, an exhibition of the work produced by the artists, children and young people in the eight communities formed a showcase exhibition at the Appledore Arts festival.

683 festival attendees, as well as the families of the children who participated, saw their data-driven animations projected in the special iDAT dome in addition to the artists' own work.

This project reinforced the importance of arts-led school projects which open doors to cross-curricular teaching and learning. It supported Beaford's work in supporting wider learning through the arts for children and young people, and through this strengthened relationships and opportunities for parents and carers, family, and the wider community.

***"Time spent viewing artists work, activities around school grounds and local environment were project highs for us." – Secondary School Teacher***

***"Being involved on a project involving so many schools was good." – Primary School Teacher***

***"Seeing artist's work was great and understanding the connection between the photography and the impact the digital information could have was a real eye opener for the students." – Head of Art, 2012***

[www.beaford-arts.org.uk](http://www.beaford-arts.org.uk)





# Simon Warner



*For me, all landscape work engages with the Romantic tradition.*

Our continuing fascination with picturesque views indicates how little our taste has changed. We seek panoramic viewpoints as eagerly as the first countryside tourists 250 years ago, and yet continue to exploit the land in numerous ways that make its traditional appearance ever more precarious. Working with ecoids on the Torridge has presented a unique opportunity to probe the notion of countryside as a series of prospects. The remotely-transmitted environmental data shows how sensitive our natural surroundings are to variations in local conditions. On a river where rainfall, discharges and tidal movements create a constantly changing situation, it becomes clear that digital data gives us a 'real' picture that nostalgic ideas of an unchanging landscape do not.



*The natural world renews itself at every moment, and in recent work I have placed small video cameras directly into moving water so that they almost become creatures of nature themselves.*

Simon Ryder and I floated a raft, complete with camera and ecoids, onto the incoming Spring tide at Appledore, following it in canoes upstream beyond Bideford, then back from Weare Gifford to Bideford the following day. Turning in contrary currents the camera records an unfamiliar, liminal view, sometimes obscured by rain and condensation, and recognizable landmarks lose their significance in the world of water. I also recorded rising water against the tidal board at Bideford, using a traditional data-source to chart the huge forces that produce this stealthy, twice-daily change.

Approaching directly the idea of the inherited, heritage view I chose two spots on the river – the view towards Taddipport from Castle Hill in Torrington and the view of Appledore from Instow – and portrayed them alongside corresponding data from nearby ecoids.

*At the upstream site, historic hedged strip fields make a big statement about landscape restoration; at the estuary site I inserted a print of Thomas Girtin's 1798 watercolour of Appledore into the view. How easy it is to pretend to ourselves that little has changed.*





[www.simonwarner.co.uk](http://www.simonwarner.co.uk)

## **SHADOWS AND UNDERCURRENTS**

*A collaborative project in the catchment of the River Torridge  
by Antony Lyons and Jon Pigott*



[www.UNmapping.net](http://www.UNmapping.net)

**Jon Pigott : sonic art, sculptural assemblage  
and electromechanical systems**

[www.sonicmarbles.co.uk](http://www.sonicmarbles.co.uk)

**Antony Lyons : eco-design, installation works,  
sculpture, environmental residency projects**

[www.antonylyons.net](http://www.antonylyons.net)

[www.antonylyons.blogspot.co.uk](http://www.antonylyons.blogspot.co.uk)









## SHADOWS AND UNDERCURRENTS

The Confluence Project was located in and around the Torridge River and Estuary - a place of shadows and undercurrents. As well as their literal meanings, these terms express a metaphorical sense of hidden realms; of underlying feelings and influences; of perhaps a mismatch between appearance and reality.

The North Devon Biosphere Reserve is a picturesque, serene, wooded river valley setting, with a largely undisturbed, un-developed estuary coast. However, beneath the surface, all is not well. Salmon and trout numbers are in serious long-term decline. The rare and special freshwater pearl mussel population, within the gravel beds of the river, has not reproduced in well over forty years. This artist-led project relates to a particular, unique river landscape; but it is also concerned with threats to biodiversity on a global scale, and communicating the importance of ecosystem health indicators - the early warning signs.

With a focus on the shadowy twilight world of bats and the equally mysterious and unsettling underwater realm, the artists Antony Lyons and Jon Pigott teamed up to explore the river-valley terrain. Helped by some innovative data-harvesting technologies, they sought to make the information tangible, physical, a source of real wonder. In a culture that is increasingly desensitised and disconnected from the planet's life-support systems, such attempts at re-connection are important.

Over the course of this residency the methods included: creative research, schools-based activities, experiential fieldwork, sound-walks, media recordings, dialogues with specialists, co-operation with i-DAT (especially with the novel 'ecoid'-based sensor development); and with others locally.

The artists were interested in teasing out some vital, yet somewhat obscured, ecological threads within this special protected landscape setting. The aim was to manifest data in ways that are performative and atmospheric, transparent and enchanting, as well as being informative.

Working with the school groups - in class, on the riverbank and at the Rosemoor RHS Centre - formed an important part of the exploration of the themes and techniques. Bat-sounds were re-created in a playful way, and the hidden underwater river world investigated using hydrophones. The 'grounding' of the project was also aided through close working with a local bat-expert who undertakes innovative monitoring of rare bat species at Rosemoor. Fieldtrips up and down the river helped to uncover some of the vital connections operating within this landscape - in particular the importance of fishing activities. The potential for further creative ecological work, involving local communities, is enormous.







Making the invisible, visible. For this, Lyons and Pigott developed an installation containing augmented and hacked objects that possess strong local resonances. The information emerges via these devices, using motion, sound, projected light and shadow. The approach is direct, playful, and at the same time complex in its allusions and associations. These works are described as 'Aliveness Machines', communicating the 'vital flux' or the 'aliveness' of the river, and its ecosystem. Within the immersive installation, there are also works of video, recorded-audio, archival photographs and text - together forming a poetic datascape, a stage-like scene with its props and backdrops. It is an experiment in intimate science, intended to be a catalyst that inspires deep interest in the river landscape and its processes.



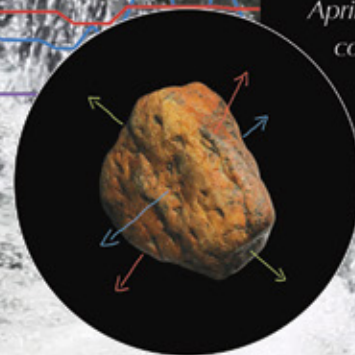
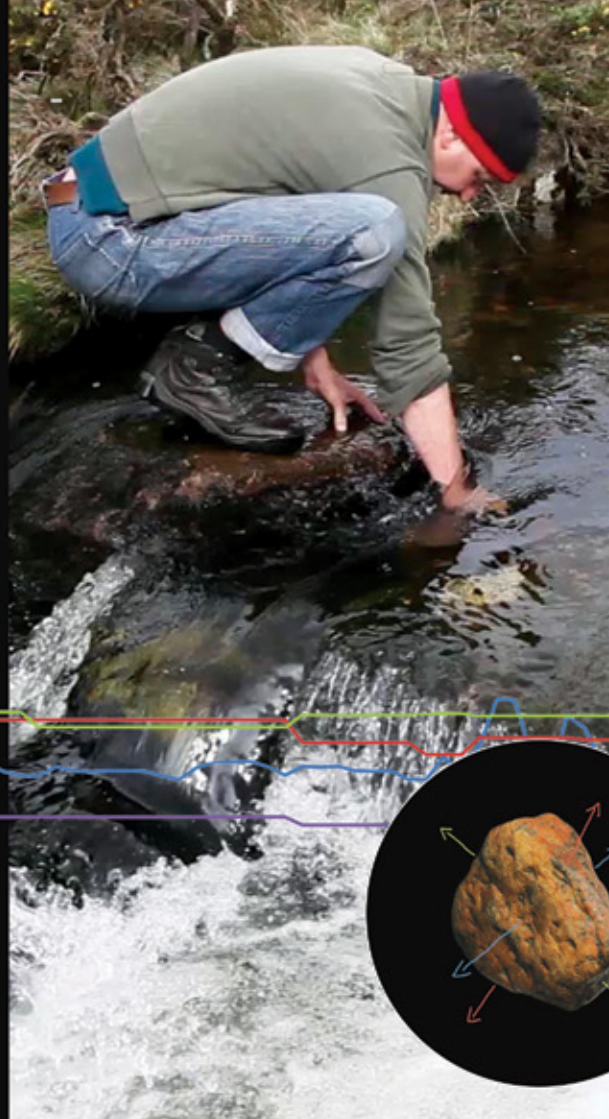
PE-TRI-CHOR



"Do the technological devices by which we enlarge our understanding of nature enhance or diminish our sense of kindredness with it?": so asks nature writer Richard Mabey in his radio essay *The Scientist and the Romantic*. It is a theme that has emerged as this project has progressed from one that set out to work with environmental data, to one in which the data collecting itself became the focus. I started by walking the land, as a way of finding where to place the environmental sensors, the 'ecoids'. But it soon became clear that this was not the question: I first had to find my own relationship with this technology, if the data produced were to have any relevance. So I started by turning myself into a walking, breathing ecoid; and the work became an investigation into the link between data and the world from which they are drawn. [Simon Ryder]



- ▲ Mobile data collection whilst out walking
- ▲ Recordings of breathing, pulse, body temperature and galvanic skin response
- ▲ Selecting a stone from the Torridge on Dartmoor
- ▼ Tranquility Map for the Torridge as it flows from Dartmoor to Bideford: red for 'least tranquil', green for 'most tranquil' © CPRE
- The digital stone responds to the body data by moving in three directions at the same time



With sensors for breathing, pulse, temperature and galvanic skin response strapped to my chest, the subconscious responses of my body as I walked became the source for the artwork, the digital code. A three-dimensional scan of a stone that had caught my eye whilst crossing the Torridge was then squeezed and stretched using this data: the stone itself becoming a live expression of the relationship between landscape and walker, between world and witness, its movements part of an ongoing conversation with nature. As the driest March on record moved into the wettest April, the digital and sensory collided in the smell of rain on dry earth – petrichor – which literally means 'essence of stone'.



#### Photo Credits

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Warner**, Page 19: **Antony Lyons**, Page 20: **Antony Lyons**, Page 22: **Simon Ryder**,  
Page 23: **Simon Ryder**

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