



Reclaiming Wetland Values: Marsh, Mud and Wonder

Exhibition Guide

valuing-nature.net/wetlandvalues
[#wetlandvalues](https://twitter.com/wetlandvalues)




Curatorial Statement

The aim of this exhibition is to show how the different and complex values of wetlands can be revealed through diverse approaches to knowledge manifest in the many disciplines engaged in the UKRI Valuing Nature Programme' CoastWEB and WetlandLIFE projects. It is very appropriate that the event is located at the Royal Geographical Society (RGS) and coincides with World Wetlands Day.

Different disciplines provide multiple ways of knowing: including the physical, such as geomorphology; the biological, such as entomology and ecology, and the human through psychology, economics, other social sciences, and history. The exhibition focuses on the methods and tools used by the different disciplines – including spreadsheets, 3D models, microscopes – alongside the outputs and new understandings of wetlands, their biodiversity, and their function.

In both projects, artists were also integral to the research teams. The artists and their works (visual, performance, sound and text) provide ways of understanding wetlands and the research undertaken by other disciplines and combinations of disciplines. In some cases the artists have re-framed and re-presented aspects of research to draw out patterns and significance of their own. In other cases the artists emphasise the sensual and haptic experience of wetlands, evoked through the ear as well as the eye. This 'meta' way of working with others is characteristic of artists involved in collaborations and results in new ways of knowing, perhaps characterised by being singular rather than abstracted.



By bringing all the methods and approaches into one space, the exhibition provides an opportunity to reflect overlaps and shared approaches, as well as differences. The double-sided display system enables complementary juxtapositions and reveals connections. The common framework provided by the display system supports the diversity of the material presented. There are many ways of navigating the exhibition.

Through the collaboration of both CoastWEB and WetlandLIFE on this exhibition, the importance of including and integrating natural and social sciences, economics, the humanities and arts-based research is revealed. As you walk around the exhibits you will gain insight into the diverse ways that the significance of wetlands can be made apparent, and from this an understanding of the different values which might be missed through single disciplinary approaches.

Many of the displays provide opportunities to engage with the researchers and their methodologies, whether that is getting up close with the 20+ different species of mosquitoes collected from study sites or creating your own poem from words spread through the RGS gardens.

We are very grateful to the Valuing Nature Programme for recognising the value of this exhibition as a way of highlighting the interdisciplinary work of the projects; to Middlesex University for their support, in particular the loan of the display system; as well as to the Royal Geographical Society (with the Institute of British Geographers).

Curated by
Simon Read
Chris Fremantle

Gallery Guide

Introduction

Wetlands are special environments for many reasons, not least they provide a home and refuge to a host of unique plants and animals, offer wonderful places for people to live and visit, deliver effective natural coastal protection, and lock away carbon to mitigate climate change. However, wetlands don't always receive positive recognition, words like swamp, mire, morass bring with them negative connotations.

The Ramsar Convention on Wetlands of International Importance defines wetlands as:

“areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres.”

Beyond Ramsar, wetlands are defined and understood in different ways depending upon time, location and the individual or group. How society engages with wetlands influences how they are defined and also how they are valued. To manage these remarkable environments into an uncertain future, a holistic understanding of these values is crucial.

For the past three years the Valuing Nature Programme has funded two research projects, WetlandLIFE and CoastWEB, that have explored diverse wetland environments using different approaches to knowledge. This exhibition brings together the work of artists, geographers, psychologists, economists, historians, and ecologists in an interdisciplinary exploration of how to reveal the values of wetlands.

WetlandLIFE

WetlandLIFE is a project exploring the ecological, economic, social and cultural values associated with lowland wetlands in England to better understand how to manage change into the future. Wetlands have always been an integral part of our landscape. Expanding and reinstating wetlands can bring many benefits to people and wildlife, but can also create concerns for local communities. For some, wetlands may be viewed with trepidation, as associations with bogs, marshes and swampy terrain are connected with unwelcome insects, such as mosquitoes. Working with Public Health England, WetlandLIFE explored the economic and socio-cultural values of wetlands with a particular focus on perceptions and ecology of mosquitoes. The aim was to reveal the rich tapestry of positive wetland values for health and wellbeing complemented by new ecological knowledge of mosquito distribution and habitat requirements. The values of wetlands were explored using diverse approaches to knowledge, with science, social science, economics and the arts and humanities all contributing equally. The arts element was particularly important as a way of creating new spaces for creativity and discussion about these often-misunderstood creatures. The team's results are being used to produce a mosquito handbook for wetland managers and the general public. The overarching aim of WetlandLIFE is to improve wetland management by delivering ecological guidance for wetland managers and decision-makers about managing wetland mosquitoes within a broader socio-cultural framework for valuing wetlands and to encourage their recreational use to support human health and wellbeing.

 [@wetlandLIFE](https://twitter.com/wetlandLIFE)

CoastWEB

The goal of the CoastWEB project is to better understand and value the contribution which saltmarshes make to human health and wellbeing, with a focus on flood and erosion risk management. The CoastWEB team includes ecologists, modellers, economists, geographers, psychologists and an artist. Initially the team worked together to develop a deep understanding of benefits and dis-benefits associated with saltmarshes, and as importantly to foster empathy with each other's perceptions. Novel ecological and modelling approaches quantified the positive role which saltmarshes play in alleviating flooding and erosion, but also discovered surprisingly extensive spatial variability in this capacity which can be substantially altered by marsh management. In parallel the team collaborated to undertake research into multiple value types, from qualitative individual relational values to quantitative monetary values, at multiple scales, from local to national. Through close working relations with Natural Resource Wales and relevant stakeholders, CoastWEB aspires to shift the future management of saltmarshes to incorporate a wider range of values in decision making, to ensure the maximum benefits are received across the breadth of society.

 [@coastwellbeing](https://twitter.com/coastwellbeing)

Overview

The aim of this exhibition is to show how diverse approaches to knowledge have been used to reveal the values of wetlands with an aim of informing future management to benefit all. Through the collaboration of both projects the importance of including and integrating natural and social sciences through to economics, the humanities and both art practice and arts based research is revealed. As you walk around the exhibits you will derive an awareness of the diverse ways that the significance of wetlands can be made visible, and from this an understanding of the values which may be missed when narrow traditional approaches are applied. It becomes apparent that we can only understand these complex environments through the application of a broad range of disciplines, and most importantly through the convergence of these disciplines. This exhibition is a rare opportunity to get an insight into the research processes contributing to ensuring that wetland environments are valued for all the positive contributions they make to human health and wellbeing.



The Valuing Nature Programme

The Valuing Nature Network was established in 2011 to bring together natural scientists and economists, alongside decision-makers in business and policy, with an interest in valuing nature. This first phase provided a sure footing by which to expand our understanding of how as society and researchers we can value nature through analytical, conceptual and empirical instruments, and how these can guide policy makers and decision making. It also made the case for paying due regard to the wider social, cultural and historical context in which values cohere around the natural environment and the decisions society makes about it. This meant recognising that the valuation of nature does not stand or fall on an economic viewpoint alone, but requires the development of ways in which the plurality of values people hold for the natural environment are presented and advocated for in terms that capture their many and diverse expressions. Therefore, a valuation world that accounts for nature in both monetary and non-monetary, and quantitative and qualitative terms.

Recognising and developing ways in which different approaches to valuation can be harnessed as a mutually reinforcing basis for informed decision making is what drives the work of the now over 1800 strong VNN membership, and the current five year £7M Valuing Nature programme forward.

The aims of the Valuing Nature Programme are to better understand and represent the complexities of the natural environment in valuation analyses, and to consider the wider societal and cultural value of ecosystem services. These are supported by the goals of the programme:

1. To foster inter- and trans-disciplinary research capabilities, as well as support researchers to make links with policymakers, businesses and practitioners through the Valuing Nature Network
2. To understand the value of the UK's natural environment for human health (physical and mental) and wellbeing
3. To understand links between ecosystem stocks, ecosystem service flows – defining critical levels of ecosystem stocks that avoid abrupt and damaging change in the delivery of benefits (tipping points)

The Programme Coordination Team have run a series of events and activities to develop the Valuing Nature Network and to help build an interdisciplinary research community capable of working across the natural, biological and social sciences, and the arts and humanities. They have also commissioned seven projects, four under the health and wellbeing goal, and three under the tipping points' goal.

Reclaiming Wetland Values: Mud, Marsh and Wonder, is the brainchild of two of the Valuing Nature Programme health and wellbeing projects, CoastWEB and WetlandLIFE, which have clearly demonstrated through their project development, stakeholder engagement activities and results, how crucial it is to consider the value of nature through an interdisciplinary perspective.

The Valuing Nature Programme is funded by the Natural Environment Research Council, the Economic and Social Research Council, the Biotechnology and Biological Sciences Research Council, the Arts and Humanities Research Council, and the Department for Environment, Food and Rural Affairs.

 [@ValuingN](https://twitter.com/ValuingN)

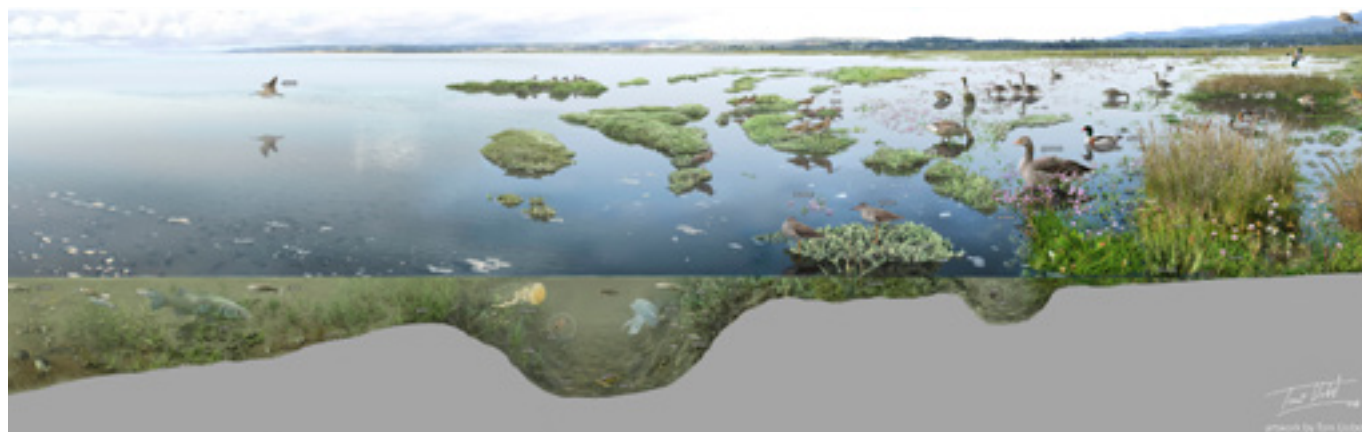




1. Saltmarsh panoramas

Illustrations by Toni Llobet (www.tonillobet.com), in collaboration with the CoastWEB team.

Text by Jordi F. Pagès



Salt marshes are sculpted by the sea, directly, especially when it is rough, but also in subtler ways, as in inducing plant ‘zonation’:

Nearest the sea, we find ‘pioneer’ plants that must tolerate water-logging and full salt water immersion. Cordgrass traps sediment and slows water movement, encouraging sediment to settle and raising the saltmarsh platform elevation. At these low elevations, plant shoots alleviate the harsh conditions for neighbouring shoots (i.e. slowing water, capturing sediment). Such a plant-plant ‘facilitation’ is key to make plant patches more resistant to waves and is responsible for the speckled look of a marsh front from above.

Saltmarsh creeks drain the marsh with each receding tide and act like blood vessels with every flooding tide, supplying the water full of sediment that the saltmarsh needs to keep up with sea level rise. Saltmarsh creeks are home to many invertebrates that live within the sediment. At low tide, birds of all kinds have a feast here. Crabs and polychaetes (worms) nest in the banks and bottom of creeks. Sticklebacks and mullets prey on small invertebrates that shelter in the flooded vegetation.

The low to mid salt marsh, gets flooded by most high tides. Many herbivorous wild species take advantage of the diversity of succulent and salt-rich

plants that live in salt marshes. Geese, rabbits and hares are common. In addition, around 80% of Welsh marshes are grazed by sheep and cattle.

The mid salt marsh is lush green and colourful during the summer. Sea lavender, sea thrift and sea aster are in full bloom, which attracts groups of pollinators, such as bumblebees and honeybees.

At higher elevations the diversity of plant species goes up. The first sea rushes appear, as well as the sea couch that marks the start of the high marsh. This area only gets flooded by the highest spring tides, especially in autumn and spring. Among the tall rushes, the redshank nests, and the hares run. The bumblebees buzz and the birds sing. The marine ecosystem has gradually given way to a more terrestrial ecosystem, with less salt-tolerant plants and more land mammals and insects.

Salt marshes are amongst the most changing natural landscapes you can find in the UK. At the fringe between land and sea, they can be seen as fully marine habitats, when fully submerged by spring tides, with their creeks gleaming with jellies, mullets and crabs... Or they can be seen as lush green, blooming meadows where sheep graze, hares run, birds nest and dog-walkers walk by. It is this fringing position between land and sea, and the ecosystem services they provide that make salt marshes so interesting and valuable.

2. Salt Marshes: Weak and wobbly or strong and stable? A short film

RESIST: A Natural Environment Research Council project to investigate the resistance of coastal salt marshes to extreme storms.



Coastal salt marshes in south-east England protect lives and livelihoods from storm surge impact (photo: B Evans)

Wetlands provide effective natural coastal protection, carbon stores, and unique habitats. As sea level rises, and storminess potentially increases, we need to act now to understand what we can do to predict and counteract their loss. On many low-lying coasts, salt marshes protect landward lying defences and communities from flooding and erosion. This film introduces you to the Natural Environment Research Council funded 'RESIST' project and its team. The project is improving our understanding of:

- How, why and when marshes erode,
- How we can better monitor and predict rates of marsh erosion,
- How varying amounts of silt and clay in marsh soils, and different plant species, affect the strength of the materials that make up marshes.

Until we have such knowledge, it will not be possible to predict the future of coastal wetlands, and thus the degree of natural coastal protection that they will continue to provide, particularly as sea level rises and the climate changes.

The film won the 2019 RGS Earth Photo competition (video category) and can also be viewed here: <https://youtu.be/4ZoPBfm2aBY>

The RESIST project is led by Prof Iris Möller (Trinity College Dublin, Ireland) in collaboration with Prof Tom Spencer (University of Cambridge), Prof Kate Spencer (Queen Mary University of London), Prof Kate Royse (British Geological Survey), Dr Simon Carr (University of Cumbria), Dr Ben Evans (University of Cambridge) and Dr Clementine Chirol (Queen Mary University of London). Associated PhD students: Helen Brooks and Olivia Shears (University of Cambridge), Jason Lynch (Queen Mary University of London). For further details, see: www.nerc-resist.uk

3. Mapping saltmarsh change

by *Angus Garbutt*

Salt marshes are found around the coastline of Britain and, in places, are truly 'natural', unchanged by human interventions. Although saltmarshes only occupy a narrow area between land and sea they provide several useful functions. They are valued for their wild, unspoilt beauty and the plants and animals that live there, specially adapted to cope with the salty tidal conditions and changing tides. In addition, salt marshes provide free-range grazing for livestock which produces high quality meat. The muddy substrate locks away carbon helping to mitigate the effects of climate change, and the shrubby plants dampen wave energy as water passes over the marsh acting as a natural flood defence, protecting people and property. Given the valuable functions that saltmarshes provide, understanding how they change over time can help manage the benefits and assess the impacts, both positive and negative.

During World War II the German Luftwaffe took detailed photographs of the British coast. Following the war the RAF continued taking aerial photo's of the coast up to the early 1990's, initially for national security and latterly flood and coastal defence. In the 1990's the work was contracted out to provide consultancies. Salt marsh extents in the Laugharne estuary were mapped for the years 1947, 1963, 1969, 1981, 1986, 1993, 2000, 2006, 2009, 2014 using these aerial photographs. The mapping was carried out from digital aerial photographs imported into a Geographical Information System (ArcMap). The data are presented as polygon shape files. The salt marsh extents were mapped to investigate changes in the extent and location of the saltmarshes between 1947 and 2014. Channels in the salt marsh were digitised until the channel became approximately 10 meters wide. Features such as road junctions, field boundaries and distinctive buildings on the historical images were matched up with features on the 2014 georeferenced images to ensure that there was an accurate overlay of images over time and accurate mapping of change.

Change

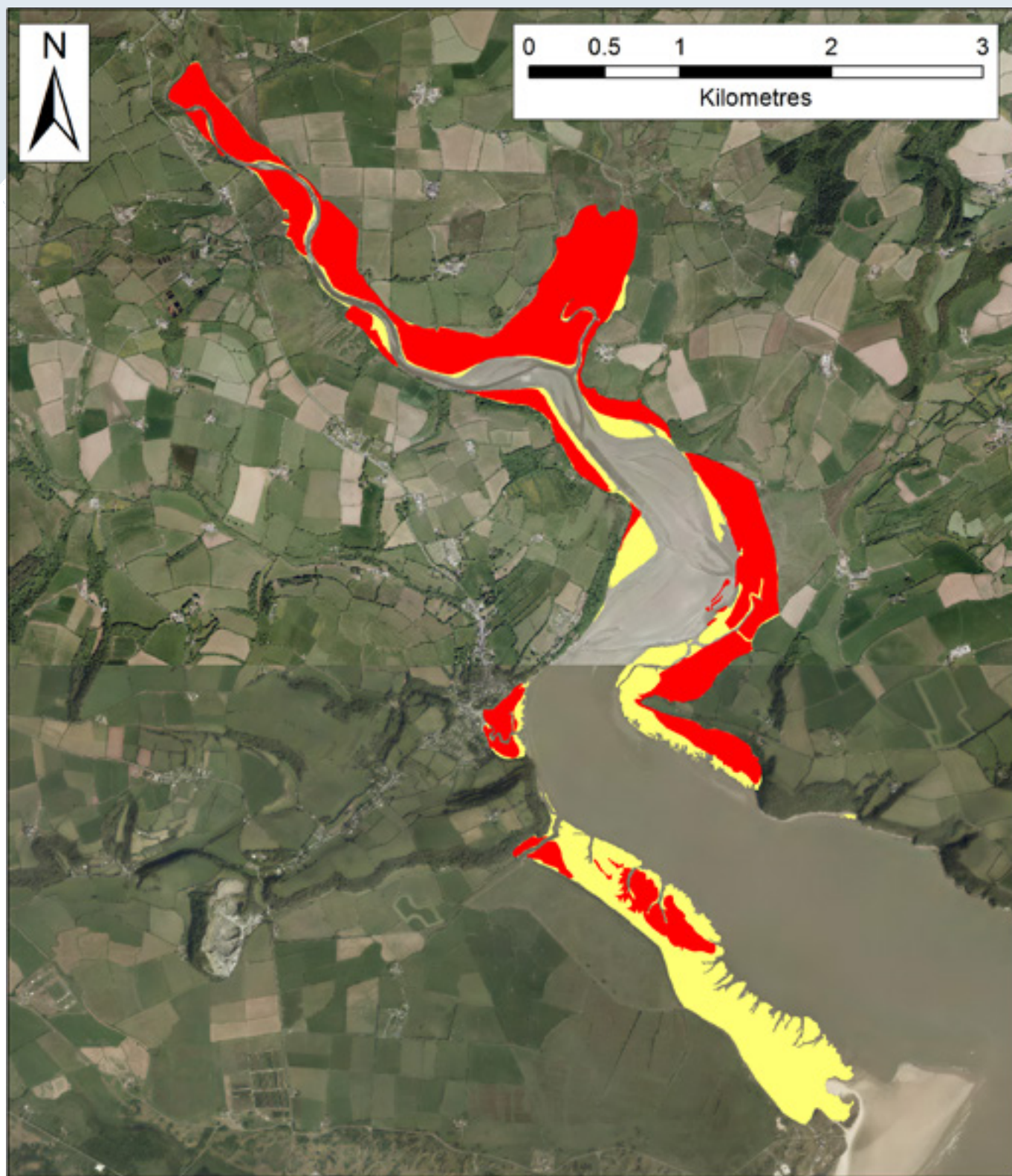
Change is inevitable. Nothing stays the same. Our environment is constantly changing; changing naturally over time as wild animals and plants compete for food and light, or in response to storms and droughts; or changing because of human interventions, the need for food and shelter, recreation or commerce.

Salt marshes are in constant flux, caught between land and sea, expansion and contraction, and wet and dry as the moon waxes and wanes drawing the tide in and out, and in and out again. Birds nest, flowers bloom, bees pollinate and sheep graze. Fishes swim, crabs hunt, geese and ducks paddle.

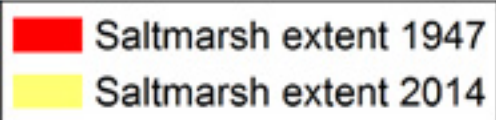
And just as the natural environment changes, so does the human relationship with salt marshes. The perception of wild nature is constantly moving as society evolves and the balance of powers and cultures shift, and economies expand or contract. From hostile and foreboding, to a place of refuge, from ugly and unloved, to beautiful and celebrated.

Understanding salt marshes and the plants and animals that live there, the salty water and the mud that supports life, through either reading or study, through familiarity and personal experiences both challenging and uplifting bring us closer to our environment. Nature can be brutal, frightening, miserable, wet, and cold. Nature can be gentle, soothing, joyful and warm. These feelings can change in a single day or evolve over a lifetime.

Just as human relationships evolve and change, and the ups and downs of life can bring us closer together or tear us apart, our relationship with nature can change too. The more we observe and describe, talk and share, the greater chance we have of understanding change. The greater chance we have of stability and the closer the relationship we will develop with the people and places around us.



Aerial photography courtesy of Welsh Government



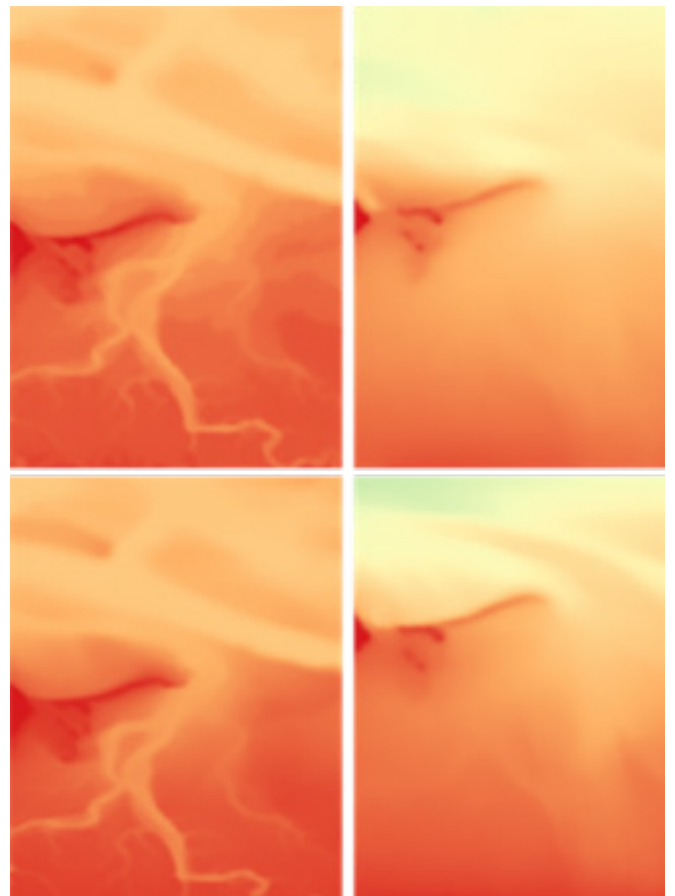
The red areas on the map shows the extent of salt marsh in 1947, the red plus yellow areas show the considerable expansion of salt marsh by 2014.

4. Modelled Estuaries

by Tom Fairchild, William Bennett, Thomas van Veelen, Harshinie Karunaratna, and John Griffen

Flooding profoundly impacts the lives of those it affects, and can damage homes and businesses, destroy possessions, and cause grief and pain. Within Wales, thousands of people live on or near estuaries which are vulnerable to coastal flooding from tides and storms, with increasing sea levels and storm intensities posing significant risks to communities and infrastructure.

The salt marshes that fringe the coastline may be one of the most important characteristics of Welsh estuaries for preventing flooding. These marshes not only reduce waves, as has been well documented, but also reduce tidal and storm surges that are funneled up the estuaries. We used computer models to try and understand how these marshes affect flooding around the welsh coastline, and how different storm effects contribute to flooding. This multifaceted nature of flooding is explored in our work, with cast-resin layers over a 3-D printed eco-PLA section of marsh representing the tides, storm surge and waves, and their associated flooding.



5. Where do you feel most calm & relaxed? Wellbeing from natural coastal environments

by Elizabeth Gabe-Thomas

This piece of work reflects a photo rating study where members of the public were shown images of different coastal environments and were asked to rate them on how they made them feel.

One way in which natural environments can increase our wellbeing is by promoting feelings of calmness and revitalisation. These feelings are proposed to contribute to psychological restoration – like a battery, our memory and attention can become drained due to the stress of daily life. Being in nature can restore our brain power making us better able to deal with challenges.



The coast has been found to be especially beneficial for our wellbeing but until now there has been little research into whether different types of coastal environments are more beneficial than others. Here we compare coastal wetlands (saltmarshes) with other common coastal habitats to better understand which may be more beneficial for our wellbeing.

We also explored what demographic and personality factors would affect people's reactions to the images, for example how connected to the ocean one feels. The images themselves were carefully controlled to ensure that people's judgements were not affected by distractions or changing conditions like weather or tide.



6. Exploring intangible values associated with saltmarshes

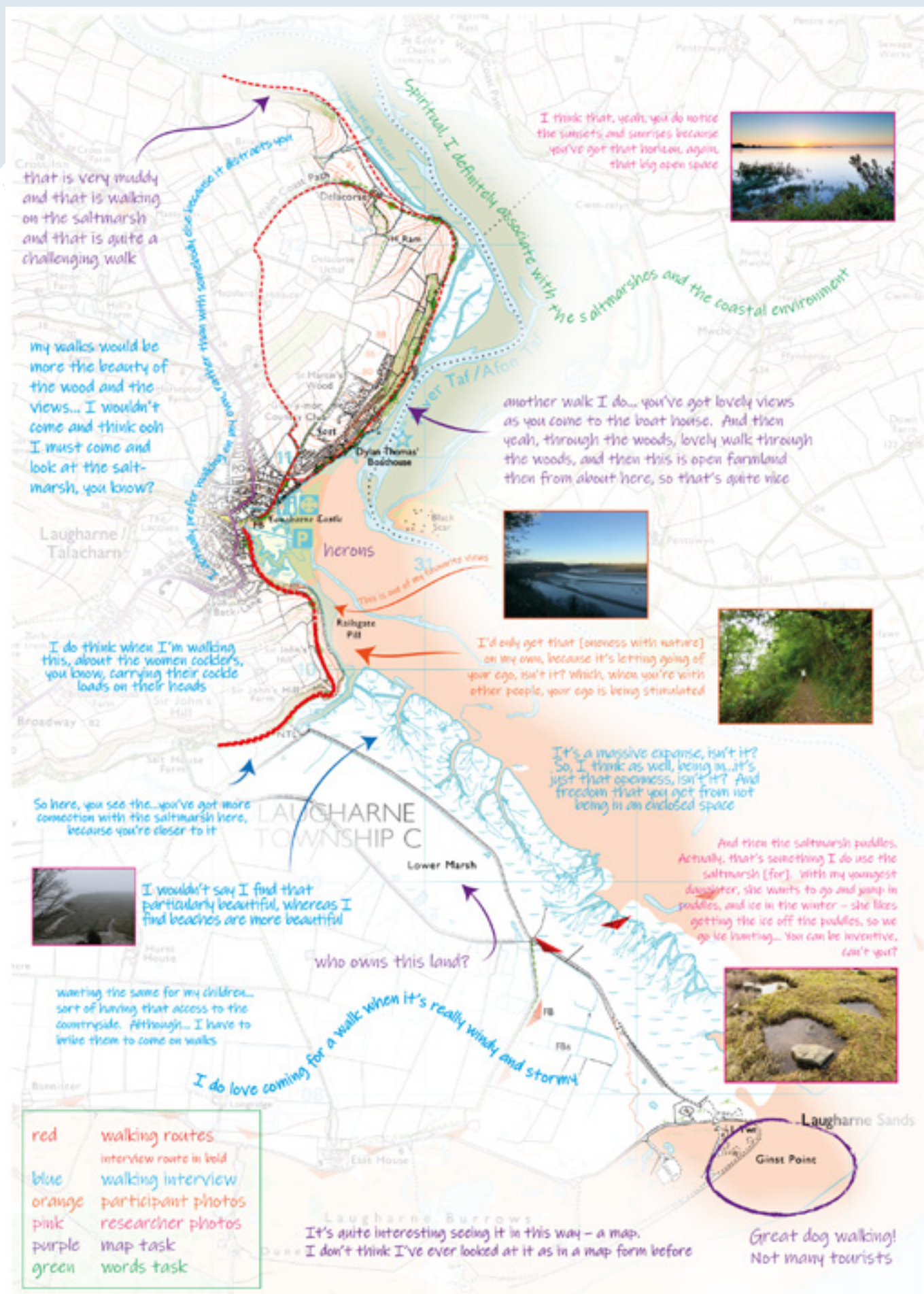
by Karen Henwood, Nick Pidgeon, Merryn Thomas, Erin Roberts

As part of the CoastWEB project, we developed a bespoke methodology to explore intangible and relational values associated with saltmarshes on the Taf (Carmarthenshire, South Wales) and the Mawddach (Gwynedd, North Wales). Our method was designed to elicit a broad range of values, as well as a rich understanding of what influences these values and how they interact.

Twenty six participants led walks, cycle rides, canoe or boat trips around the case sites to explore values relating to place. Next, they took part in a photo elicitation, mapping task and word association task. These different – but complementary – approaches allowed us to explore multiple angles including stories, images, maps and text.

Immerse yourself in the sights and sounds of the Taf and Mawddach with our methods video. Next explore participants' 'geonarratives' and see how their interviews, photographs and map annotations together tell a story of what their local saltmarshes mean to them. Then try our method by adding your own thoughts and feelings to a collaborative map of Hyde Park – find out how other people relate with it and tell us what the place means to you.





7. A Story of Saltmarsh

by Simon Read in collaboration with the Saltmarsh team



When we first discussed my involvement with CoastWEB, I suggested developing an electronic guide for communities upon saltmarshes and their management. As time passed and I became further immersed in the project it became quite clear that I should consider a form that would more readily reflect both the project and the specific locations that we have been working with. With the two case study sites, the Taf and Mawddach Estuaries in mind I then proposed an app that would be triggered at points on a walk through each location, but how to configure this was a challenge. Given that this would be accessed through mobile phone, we decided to use just audio files and since sites would not necessarily be visited in a predetermined order, we decided against a specific order.

So far so good, but the overarching form that a text might take remained elusive until, revisiting Dylan Thomas's *Under Milkwood*, I was encouraged by the synergies of place to consider it as a saltmarsh poem that could reflect our collective conversations in a way that is evocative and digestible. I was also attracted by the absurdity of an epic poem about saltmarsh. What came out of this was a poem for voices that, although composed in a linear form, could also be broken down to stanzas or groups of stanzas according to locations and the order in which they may be visited.

There are two versions, one for the Taf and one for the Mawddach. These can be experienced as two separate entities or deployed as location sensitive apps if there is the appetite to develop them. Each version exists as text or audio form.

8. What we know offers clues to what we must guess: a drawing of the Three Rivers Estuary

by Simon Read



Recently a coastal scientist came to visit me in my studio, where I was working on a very large drawing of the Three Rivers Estuary for inclusion in this exhibition. Utterly baffled by the labour-intensive process of gridding up the paper and transferring the basic configuration of the estuary to it prompted her to suggest that a photocopy might be better. My answer was that whilst a photocopy is fine as information, the process of making a drawing is an act of contemplation, where the speed of the making process allows a coexistence between inception of ideas and their realisation.

For me, the learning process for any project is incremental and, by its nature, disparate. Drawing is a means to combine what I have learned with what I surmise and to see if it makes sense when transferred to paper. The act of understanding an idea is an act of living with it and this is where the reflexive and reflective process of art comes into play. Making is understanding and there can be no short cuts.

Here is where the relationship between science and art comes into play for what use is art in this context if it isn't grounded and what purchase can science offer for the imagination if it doesn't strike a poetic chord?

9. Making space for saltmarshes — The challenges & opportunities of working with nature to protect against floods and coastal erosion: A governance perspective

by Meghan Alexander, Emma McKinley, and Rhoda Ballinger



Fairbourne (Gwynedd, Wales) faces “decommissioning” in the future (photo: merrynthomas.co.uk)

Littoral landscapes have long been valued as spaces for well-being, from providing benefits for physical and mental health, to forging cultural and social identities. At the same time, the coastline is exposed to a range of risks from flooding, storm surges and coastal erosion, which not only threaten the safety and well-being of coastal communities, but can have far-reaching effects for the nation as a whole. With sea levels rising and future climate change set to exacerbate these risks, a diversified approach to Flood & Coastal Erosion Risk Management is required – this includes working with nature, such as saltmarshes, to help mitigate coastal hazards. However, although saltmarshes provide a wide range of benefits, they can also be a source of contention and demand effective governance mechanisms to negotiate conflicting land uses.

Taking a governance perspective, this research examines the extent to which existing governance mechanisms support, or conversely constrain, the expansion of saltmarsh habitat in Wales. Drawing from an analysis of over 200 documents, 47 interviews and a workshop with key policy-makers and practitioners, we highlight key governance gaps that, unless addressed, will seriously restrict our ability to adapt to the climate emergency.

https://www.pml.ac.uk/getattachment/CoastWeb/Outputs/Policy_Brief_FCERM_governance_in_Wales_Nov2019.pdf

10. The flood mitigation benefits of saltmarsh

by Brett Day and Greg Smith



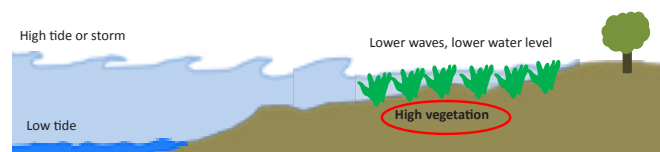
Using sophisticated models the scientists in CoastWEB have generated detailed simulations of flood events in six separate estuaries around the Welsh coast. The task of the economics team was to turn those flood simulations into predictions of the damage costs experienced by people. This exhibit explores those costs. Through maps, images and numbers, we examine the types of damage that result from estuarine flooding and where those costs arise in the estuary. More importantly we compare the damage costs associated with undisturbed salt marshes to those where salt marsh vegetation is degraded or even lost. Salt marshes, it transpires, deliver significant value to the people of Wales through mitigating flood damages.

11. Monetary values for nature-based solutions vs defense structures for flood protection: What do we want the coast to look like?

by Olivia Rendon

One way of valuing a change in nature is through a choice experiment survey. This is a rigorous environmental economics technique that asks people to state their willingness-to-pay for a set of potential environmental attributes. The technique indicates how people make trade-offs between environmental attributes, and what socioeconomic characteristics influence these trade-offs. The technique involves: expert consultation, scenario design, focus groups, piloting, experimental design, survey implementation and econometric analysis.

The results of a choice experiment of 1553 respondents in Wales evidence a preference for increasing saltmarsh, over defences, to reduce coastal flood risk. The willingness-to-pay to double the current area of Welsh saltmarsh is £6 per household per month, while it is £2 for defences. The Welsh sample can be divided into four groups. The largest group has a high willingness-to-pay for increasing saltmarsh; it includes younger, coastal people that are very concerned about flood risk. Group 2 doesn't want any change; it includes inland people that haven't experienced flooding. Group 3 has a positive willingness-to-pay for all attributes; it includes older people with low education, not concerned about flood risk. The smallest group has low willingness-to-pay for all attributes; it includes older females, not concerned about flood risk.



Biographies

Dr. Nicola Beaumont has specialised in the assessment and valuation of marine and coastal ecosystem services for over 20 years' (h-index: 22; 6100+ cites), including extensive interdisciplinary project and people management experience. Nicola's research spans scales from local to Global, and to a variety of issues, including: renewable energy, plastics, flood and erosion management, ocean acidification, and marine planning and policy. Nicola is currently lead PI on the Valuing Nature Partnership UKRI study CoastWEB, and the UKRI UKERC Phase 4 Energy, environment and landscapes theme.

Dr. Meghan Alexander is a Senior Research Associate in climate change adaptation at the University of East Anglia. As an interdisciplinary Human Geographer, Meghan's work examines the interactions between human and environmental systems, with a particular focus on risk management and risk governance. Meghan's research centres on the effectiveness and legitimacy of governance processes, and corresponding implications for societal resilience, well-being and social justice, to inform recommendations for government, policy and practice.

Dr. Rhoda Ballinger is a Reader in Marine Geography in the School of Earth and Ocean Sciences at Cardiff University. She has over twenty years' experience researching and teaching aspects of coastal governance in Europe as well as practical experience of coastal management, through her involvement with coastal management programmes such as the Severn Estuary Partnership. Her research focuses on science-policy integration as well as on stakeholder and policy analysis in the context of coastal change.

Dr. William Bennett is a research assistant specialising in coastal engineering and coastal modelling at Swansea University. Will's research centres around developing the understanding of coastal management methods, under both present and future climate conditions. Whilst studying his PhD as part of the EPSRC funded FloodMEMORY project, he developed interests in various coastal modelling techniques and in particular, process based modelling. Following his PhD he joined the CoastWEB project, developing models to understand the influence of coastal management interventions on coastal defence function, with a particular focus on the role of saltmarshes on coastal flooding.

Professor Brett Day, is an environmental economist working in the field of ecosystem services, the particular focus of his research being the development of methods and knowledge for the support of environmental decision-making. He has extensive research experience in the areas of environmental valuation, integrated environment-economy modelling and the design of taxes and payment schemes for efficient delivery of beneficial environmental outcomes. Brett has worked extensively with government and business in transforming research into decision-support tools and practical policies. Brett is a Director of the Land, Environment, Economics and Policy Institute (LEEP) at the University of Exeter, UK.

Dr. Elizabeth Gabe-Thomas is an environmental psychologist at the Plymouth Marine Laboratory. As such she applies psychological approaches to understand how the marine environment affects humans psychologically, in particular their wellbeing and also to understand human behaviour in order to help reduce our impact on the marine environment.

Dr. Tom Fairchild is an ecologist based at Swansea University looking at how intertidal plant and animal communities interact with the environment, and also with humans. He is particularly interested in how these communities provide resources, services and opportunities for people, and how working with nature can enhance the benefits we get from them. He is also excited by creating and using novel ways to visualise and characterise interactions with nature using digital 2-D and 3-D imagery and computer models.

Angus Garbutt is an ecologist with a special interest in salt marshes. He has worked on projects that have taken him to all the major saltmarsh complexes in the UK and Europe giving a unique insight into their diversity and cultural setting. An expert in saltmarsh botany, he has also worked on saltmarsh breeding birds, small mammals, fishes and invertebrates. He specialises in biodiversity and ecosystem science, focusing on field experimentation, long-term and national scale monitoring and quantifying the relationships between saltmarsh functions and the goods and benefits they provide.

Dr. John Griffen is a lecturer in the Department of Biosciences at Swansea University. His specialist areas include: Biodiversity, Ecosystem Functioning, Coastal Ecology, Restoration Ecology. Research in John's group is aimed at elucidating how biodiversity and species interactions affect the functioning of ecosystems. They are addressing this across a range of systems including rocky shores, salt marshes, coral reefs and even alpine meadows. Empirical approaches include large-scale surveys, field and mesocosm experiments and meta-analysis.

Professor Karen Henwood is a Professor in the Cardiff School of Social Sciences, a COASTWEB Co-Investigator, and longstanding Associate of Cardiff University's Understanding Risk Group. Her empirical work involves conducting in-depth longitudinal and community case studies, and using interpretive, qualitative research methods to engage with local communities on issues of risk, environmental controversy and identity. As a social research methodologist, she has worked within collaborative consortia to investigate questions about time and temporality and showcase innovative study designs. Her past research projects include Energy Biographies: Exploring the dynamics of energy use for demand reduction (ESRC 2011–2016) and Homing in: Sensing, sense-making and sustainable place-making (AHRC 2013–14).

Professor Harshinie Karunarathna is a professor in Coastal & Estuary Engineering with expertise in computational modelling of coastal hydrodynamics and morphodynamics. The primary focus of her research is on climate change impacts on the coastal zone. Her work was recently supported by the UKRI funded FloodMEMORY(EP/K013513/1), iCOASST(NE/J005428/1), COASTWEB(NE/N013573/1) and Mitigating hydro-meteorological hazard impacts(NE/S003282/1) projects and, DEFRA/EA ERP-II and British Council's Ensemble Estimation of Flood Risk in a Changing Climate projects. She has produced over 160 journal articles and refereed conference proceedings. Her research has substantially contributed to national coastal & estuary management and understanding climate change impacts on coastal hazards.

Dr. Emma McKinley is a Research Fellow in the School of Earth and Ocean Sciences at Cardiff University. An interdisciplinary marine social scientist, Emma's work focuses on the relationship between society and marine and coastal environments, encompassing a range of topics including: public perceptions and attitudes, marine citizenship and ocean literacy, coastal community resilience and sustainability, Blue Growth, ecosystem services, stakeholder engagement, and evaluating the policy landscape associated with marine and coastal ecosystems and management. In September 2018, Emma launched the Marine Social Science Network; a global, interdisciplinary community of researchers and practitioners working in and around the fields of marine social sciences.

Dr. Magnus Moar is a Senior Lecturer in Digital Technologies at Middlesex University, where he is currently Programme Leader for the MA/MSc Creative Technology. His research interests focus on how emerging technologies may be used by novice and intermittent users. He has recently been involved with VR and AR research, and his work with Simon Read on his part of CoastWEB project has explored interactive audio augmentation and dissemination.

Professor Iris Möller is a coastal geomorphologist working on how physical and biological processes interact at the coast, particularly in the intertidal zone (the area between tidal high and low water). She uses these insights to work with others within and beyond the discipline of Geography to develop integrative solutions for a coastal environment in which people are protected from flooding and erosion whilst also taking advantage of the many benefits healthy ecosystems have for humans. The monitoring and understanding of long-term coastal morphodynamics (the link between coastal landforms and the processes shaping them) forms a key component of her work, as does how we use these insights to adapt to a changed environmental future through climate change, sea-level rise, and altered storm frequency/severity.

Dr. Jordi F. Pagès is a Marie Skłodowska-Curie research fellow at the University of Barcelona. He is interested in ecology in a broad sense, although his research so far has focused primarily in how aquatic plants and animals interact. In recent years he has been incorporating new points of view, such as the study of past ecosystems (paleoecology), or the integration of the social component into ecological studies. This last topic is increasingly taking a transversal nature in the studies in which he participates: can we really accurately describe any ecological process, without understanding the human context in which these ecological processes unfold?

Professor Nick Pidgeon is Director of the Understanding Risk Research Group at Cardiff University School of Psychology and a COASTWEB Co-Investigator. His research looks at public engagement, risk communication, and decision-making for environmental and energy technology risks, including climate and ecological risk. Nick chaired the 2006 Cross-Party Parliamentary inquiry 'Is a Cross-Party Consensus on Climate Change Possible – or Desirable?' which recommended the setting up of the UK Climate Change Committee. He was awarded an MBE in the 2014 Queen's Birthday Honours for services to climate change awareness and energy security policy.

Dr. Olivia Rendón is an environmental economist at Plymouth Marine Laboratory. Olivia has a PhD in Environmental Economics and has worked in the UK and overseas in different capacities i.e. academic, NGO and government. Her main area of research is the assessment and valuation of marine and coastal ecosystem services, and its application to sustainable management. In addition, Olivia undertakes research exploring the social, economic and well-being impacts of existing or potential management measures e.g. flood defenses, tourism, protected areas. Her research is often interdisciplinary covering developing and developed countries, and ranges from the local to the national scale.


Dr. Martin Skov is a marine ecologist with >20 years' experience and ~50 publications in coastal ecological and resilience research. He has had five NERC projects on coastal wetlands over the past 8 years and led the RESILCOAST research consortium (2014–2018: <http://nrm-lcee.ac.uk/resilcoast/index.php.en>) on coastal resilience, flood protection, ecology and policy. He is particularly interested in landscape-scale bio-physical processes that lead to human benefits (coastal protection, carbon, wellbeing), wherefore much of his work is stakeholder driven and directed at wider societal impact. For example, Martin's work led to the world's first carbon-trading project with a marine system ('Mikoko Pamoja', Kenya, <https://www.aces-org.co.uk/mikoko-pamoja-project/>).

Dr Greg Smith is an environmental economist who, until recently, worked in the LEEP Institute at the University of Exeter but now holds a post-doctoral fellowship at CSIRO in Hobart, Australia. At the heart of Greg's research is the application of the natural capital approach to the understanding of environmental problems and the design of environmental policies. In addition to COASTWEB, Greg's recent research activities include an exploration of the ecosystem service consequences of renewables development in the UK and an assessment of the impacts of climate tipping points on agricultural productivity.

Dr. Merryn Thomas is an interdisciplinary researcher working in the Understanding Risk Group at Cardiff University. She is particularly interested in using innovative methods to engage publics with environmental issues. Prior to the CoastWEB project, she worked with Professor Nick Pidgeon using qualitative deliberative methods to explore public perceptions of shale gas development in the UK and USA. For her PhD, she used a mixed-methods, mental-models approach to explore public and expert perceptions of sea-level change on the Severn Estuary. Her SeaChange public engagement photographic exhibition was shortlisted for the international Climate Outreach Climate Communications Research Award (2019).

Simon Read is a visual artist and Associate Professor of Fine Art at Middlesex University London. He currently lives on the Suffolk Coast where through a life both afloat and ashore he has developed a close affinity to coastal and estuarine systems. Over the past twenty years he has sought to plough this back into both his practice as an artist and his academic research, believing that the cultural community has a duty to contribute to a deeper understanding of environmental change and to promote a stronger sense of public engagement. He is actively involved with his local community as a Trustee Director of the Deben Estuary Partnership, working towards the implementation of an estuary management plan for the River Deben. This experience has become essential grounding for broader research activity that takes him into other territories and social contexts. Between 2014 and 2017 he was a partner in Hydrocitizenship, a research programme that explored the contemporary relationship between communities and water for which he produced a study of the River Lee titled Cinderella River. In 2017 he worked as arts advisor for a project in Bangladesh and Nepal to seek ways of addressing water resource conflict driven by climate change. His current engagement with the CoastWEB project reflects upon the cultural perception of saltmarsh with particular emphasis upon the Taf and Mawddach Estuaries on the West Coast of Wales.

Dr. Erin Roberts is a Research Associate based in the School of Social Sciences. Her research interests relate to the transformative power of the relationship between people and place as well as energy and society. Specifically, Erin is interested in how identity, place and practice combine to create unique cultural landscapes with their own set of opportunities and barriers to change. These interests result from my interdisciplinary background, which has provided her with an in-depth understanding of the social, cultural, environmental and political issues arising from the need to transition to a more sustainable society.



Thomas van Veelen completed his MSC at Twente University, The Netherlands, and then joined CoastWEB as a PhD candidate at Swansea University. His research focusses on the role of salt marshes to coastal protection, for which he investigates the effect of different plant species on wave dissipation. He enjoys turning experimental data from wave tanks into computer models of wide practical use. Thomas' other research interest lies in the long term evolution of coastal and marine landscapes, including estuaries and offshore sandbanks.

Dr. Kayleigh Wyles is an Environmental Psychologist at the University of Surrey. She is interested in the relationship between humans and the natural environment. Specifically, Dr Wyles has examined how people use different aquatic environments, the impact this has on the environment, and the impact it has on the user. Within CoastWEB, Dr Wyles is interested in how saltmarshes impact people's health and wellbeing (e.g. does experiencing this environment have benefits for people?).

wetlandLIFE





12. Wetlands, wonder and place: A photo essay

by Tim Acott



This photo essay is a subjective insight into the fantastically diverse and vibrant worlds of wetlands in lowland England. It is a personal encounter as I explore these wet landscapes and think about their sense of place and how different landscape elements come together and have meaning for me.

It is not a view that all will immediately recognise but I hope that discussion may coalesce around the pictures such that a deeper reflection emerges on what wetlands are and their importance for nature and society. The photographs presented in the exhibition have been selected from pictures taken over three years across numerous wetlands in England. Locations range from the North Kent Marshes in the South East, to Alkborough Flats on the Humber and the Avalon Marshes in the South West. The photographs and associated text captures my experience of wetlands and hopefully something of the inspiring, haunting and reflective qualities I encountered.

13. Exploring wetland values and community voice method

by *Adriana Ford, Tim Acott*



A participatory video approach called Community Voice Method was used to explore the values of people that live and work in and around wetland environments. The work focused on three case study sites, Bedford Priory Country Park, Alkborough Flats and the Avalon Marshes. Over forty people were filmed and interviewed about their views on the health and wellbeing benefits of wetlands and on dis-benefits such as mosquitoes. In the exhibition there is a chance to view the films that were made and learn about the importance people attach to wetland environments.



14. Wetlands on wheels: LIVE from Alkborough flats

by Kerry Morrison & Helmut Lemke



Kerry Morrison (Socio-Environment Artist) and Helmut Lemke (Sound Artist) are members of the WetlandLIFE team. As artists, they are irresistibly drawn to maligned species and landscapes and seek to uncover aesthetic and ecological qualities where they are neglected or vilified by some and where others may see ugliness, nuisance, or negative impacts. After an intense period of research into wetlands and mosquitoes at Alkborough Flats (North Lincolnshire) and the Priory and Millennium Parks (Bedford), they developed the 'WETLANDS on WHEELS' Hub: WoW. The WoW is a vintage Caravan transformed into a space to share the research of the wetlandLIFE team, and fascination with wetlands. WoW is at the same time a macro mosquito Laboratorium, a space for wetland conversations, and a gallery of found knowledge

from wetlandLIFE research sites. It is a venue for: listening to wetland sounds and stories; watching clips; looking at photos, drawings, objet trouve and mosquitos; and reading about wetlands and their inhabitants. Here visitors can experience artistic responses to wetlands and scientific knowledge and contribute their knowledge to the mix. For this exhibition Kerry and Helmut are in the WoW at the Alkborough Flats, live-streaming winter wetland life, daily to the RGS. Streaming times are displayed at their exhibit.

15. WetlandLIFE Word Hide

by Victoria Leslie

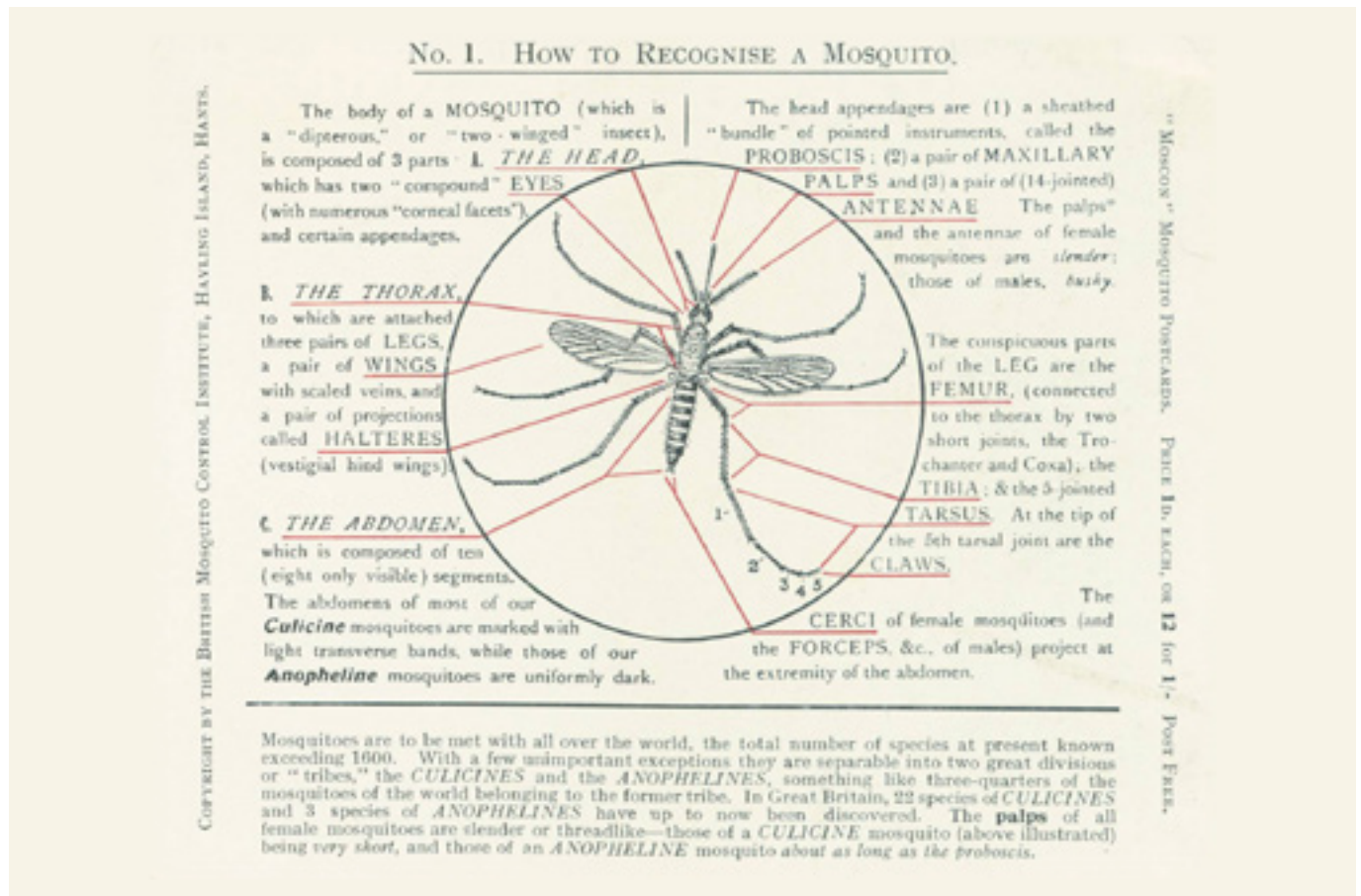


Inspired by manmade structures in nature, particularly the bird-hide, the WetlandLIFE Word Hide uses text and texture to consider how language and narrative shape our perception of the natural world. Part of the Hide & Seek Project, which reframes conventional bird-hides as story repositories, the WetlandLIFE Word Hide is an interactive space designed to encourage observation, reflection and creativity in thinking about the interconnection of nature and narrative. To learn more about the Hide & Seek storytelling network please visit: www.wetlandlife.org/hide-seek



16. Meet the Mosquito

by Frances Hawkes, Peter Coates, Jolyon Medlock, Alex Vaux, Gay Gibson, Bob Cheke



The source of this image is the first page of an 8-page, undated pamphlet: John F. Marshall, *A Mosquito Summary* (Hayling Island: British Mosquito Control Institute). Reproduced courtesy of Jolyon Medlock, Public Health England

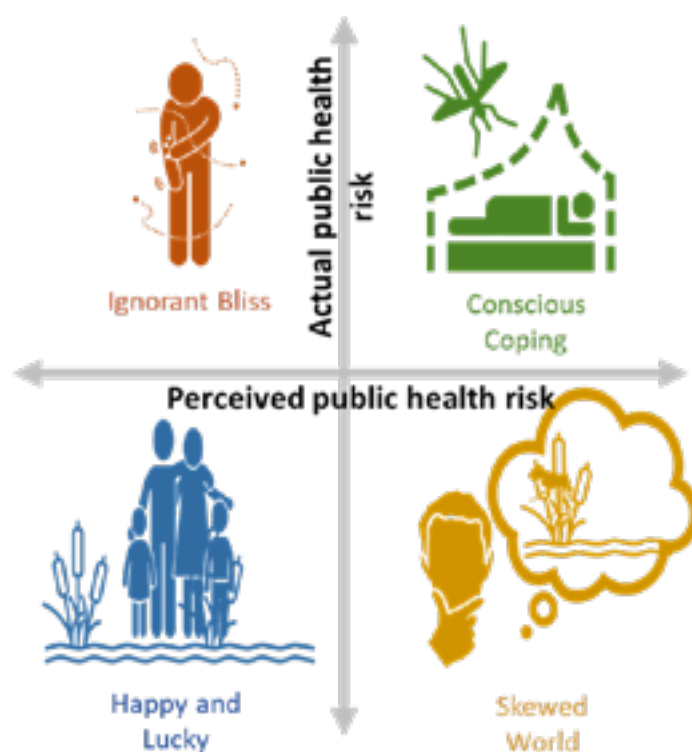
Have you ever seen a mosquito up close – and not as a squashed smear on your arm?! These often-misunderstood creatures are incredible examples of insect specialisation. When viewed under the microscope, their iridescent colours, intricate patterns and fascinating anatomy reveal more than meets the unmagnified eye. Their incredible compound eyes, the menacing mouthparts of females and the extravagant antennae of male mosquitoes, which do not bite and use their antennae for locating females, all come into focus and tell the story of this creature's life history and habits. Come and get a closer look on the big screen, as we examine all this and more on samples of some of the 35-plus species of mosquitoes found in Britain.

Some of these samples are nearly a century old. Relics of the 1920s, these specimens are housed in wooden cases (mounted on pins and within slides) and represent a legacy of the long-defunct British Mosquito Control Institute, established on Hayling Island, Hampshire, in 1920. Founded and funded by the independently wealthy, self-taught scientist, John Marshall, the Institute's staff played a key role in advancing the study of so-called 'nuisance' (non-lethal) mosquitoes. Posters, pamphlets and other written materials produced by the Institute in the 1920s and 1930s will complete the display.

17. Mosquitoes and the economic value of wetland ecosystem services

by Anil Graves, Joe Morris

Four future scenarios of mosquito related public health risk



Wetlands are highly complex ecosystems that can provide a huge range of benefits to people. These benefits are difficult to quantify from an economic perspective. In particular, because many wetland benefits are not directly bought or sold in markets, they often fail to be properly identified and valued. For this reason, economists have developed economic valuation approaches to give us some idea of the scale of the benefits that ecosystems provide. The purpose is to ensure that environmental benefits can be properly accounted for in decisions concerning land and water development. Sometimes, wetlands may also be associated with environmental hazards, including insect nuisance. In WetlandLIFE, we have tried to identify, organise, and quantify the great plurality of values associated with wetlands by using valuation data within an ecosystem services framework.

An interactive stand has been developed to explore the economic value of wetlands under plausible mosquito futures. This exhibit shows how economic values for wetlands and the impact that mosquitoes might have on those values have been calculated by combining a number of current approaches in social and economic sciences. This includes application of the ecosystems services framework to identify benefits from wetlands, the development of plausible future scenarios to scope out how these might change, the definition of public responses and wetland management options under these scenarios, and the development of a computer model to calculate the economic effects. A decision tree shows how different futures could be arrived at through possible future events and circumstances.

18. **Wetlands within sustainable futures: understanding and celebrating the different components that create a ‘sense of place’ within wetlands**

by Mary Gearey, Andrew Church, Neil Ravenscroft



Wetlands are amongst the most biodiverse ecosystems on the planet. As we know, they filter, purify and store water resources; regulate flood pulses; sequester carbon and provide essential habitats for a wide variety of animal and plant life. Our ability to mitigate and adapt to anthropogenic climate change is now closely tied to these paludal waterscapes. Shared sustainable futures, across species, is pivoted on protecting, reinstating and expanding wetlands across both urban and rural locations. Drawing on our empirical ‘sense of place’ fieldwork from the WetlandLIFE project, our station explores the varied and differing ways in which humans develop close ties to wetland spaces. As part of a contemporary landscape renaissance, English wetlands have been purposively repositioned as ‘ludic’ spaces. Rehabilitated as ‘wellbeing’ spaces, wetland users are encouraged to spend time, and money, on these sites in widely different ways. They are recreational places within which to spend time alone or with loved ones; restorative spaces in which to enhance one’s own wellbeing in multiple

ways; liminal zones to contemplate past lives and passed lives; playful spaces for deviance and creativity; literary spaces to feed creative minds. Play is a serious business on these wetlands. These ‘quaking zones’ of water, earth and marsh draw in a wide assemblage of human and more-than-human life, in spaces within which multiple utopian vistas are concurrently enacted. Utilising the Foucauldian concept of heterotopias, our fieldwork undertaken within the project evidences the types of ludic activities performed within three different English wetland case study sites. Intrinsic to an imaginary of paludal heterotopias is the notion of inclusive play; and ways to accommodate the tensions between normative and emancipatory self-expression are explored from the perspectives of the wetland users themselves. We consider multispecies co-existence on wetlands sites to explore what this means for human connectivity, with and within these spaces, as we heterotopically transition toward shared sustainable futures.

Biographies

Dr Tim Acott is a Reader in Human Geography at the University of Greenwich. He has diverse research interests in environment and sustainability issues. Over the last ten years his research has focused on social science and arts based ways to value nature and approach sense of place. His research was initially concerned with fisheries and more recently wetlands. In addition to publishing many academic articles and editing books, he is a landscape painter and photographer having exhibited in solo exhibitions and established galleries.

Dr Adriana Ford is the Centre Manager for the Leverhulme Centre for Wildfires, Environment and Society involving Imperial College, King's College, Royal Holloway and Reading Universities. Her background is in environmental sciences, predominantly in relationships between society and the environment, including health and well-being, attitudes and values, and sustainable development. Prior to joining the Centre, she worked on wetlands, fisheries/coastal communities, invasive species, ecosystem services, and community-based wildlife management.

Dr Kerry Morrison is an independent artist who merges art with ecology to produce intriguing interventions in the landscape. Her methodology is collaborative, interdisciplinary and socially engaging. Through a conspicuous process of walking, talking, listening, drawing, data collection, and performance, she explores human impacts on the environment and people's connections with nature. In 2015 Kerry completed her PhD and her eco-art practice and research led to an invitation to join the National Forum for Urban Nature. In 2011, Kerry co-founded In-Situ, an artist led organisation, embedded within the community of Brierfield, Pendle. With a socially engaging and environmental approach, In-Situ nurtures into existence art that addresses local issues with the aim to make a positive difference to people's lives and the environment (<http://www.in-situ.org.uk>).

Helmut Lemke is an independent Sound artist with over 35 years of experience who has presented his work all over the world from concert halls and outdoor markets, to Galleries and Museums and to the frozen seas off Greenland, to Function Rooms of Pubs and to International Festivals. He has collaborated with other Sound Artists and Musicians, with Dancers and Scientists, Visual Artists and Architects, Poets and Archaeologists, Performance Artists and Wildlife Rangers.

Victoria Leslie is the author of a short story collection, Skein and Bone (Undertow Books) and a novel, Bodies of Water (Salt Publishing) and her short stories have appeared in a range of journals and anthologies. Her fiction has been shortlisted for a number of awards, including the Shirley Jackson Award and the World Fantasy Award. She is currently studying for her PhD in English and Creative Writing at the University of Chichester, researching migratory legends associated with water. Her interest in folklore and landscape similarly influence her fiction and her role as a writer within WetlandLIFE.

Dr Frances M. Hawkes is Senior Research Fellow, Natural Resources Institute, University of Greenwich: Frances has a PhD in medical entomology, the study of insects that transmit infectious pathogens. Until the WetlandLIFE project, her primary area of interest has been malaria-carrying mosquitoes in sub-Saharan Africa and south east Asia. Her research has focussed on examining their biology, with a view to identifying ways that the insects' behaviour and ecology can be exploited to improve surveying and control of the mosquitoes and the diseases they carry. More recently, Dr Hawkes has collaborated with Public Health England in surveillance of emerging mosquito species in the UK, and in WetlandLIFE has contributed to field sampling and analysis of British mosquito species in a wide range of habitats across English wetlands.

Dr Anil Graves, School of Water, Energy and Environment, Cranfield University: Anil is a senior lecturer in land use systems and applies biophysical, economic, and social methods to assess the costs and benefits of decisions over the environment. A particular focus has been on applying non-market valuation in economic analyses of land use systems through the development of bio-economic modelling. Anil has also applied social science approaches to investigating biodiversity and undertakes field measurements on growth and resource use of crops and trees.

Professor Joe Morris is Emeritus Professor at Cranfield University and Director of Morris Resource Economics Ltd. He specialises in land and water resource management and investment appraisal, including the economic assessment of environmental policy, business and environment interactions, and the valuation of natural capital. He has played lead roles in International, EU and UK Research programmes, including the UK National Ecosystem Assessment and NERC sponsored Biodiversity and Ecosystem Service Sustainability (BESS) and Valuing Nature Programmes.

Dr Mary Gearey, Senior Lecturer in Social and Cultural Geography, School of Environment and Technology, University of Brighton, UK. An empirical social scientist, her research utilises a political ecology framing to explore water resources sustainability within developed economies. Previous published work includes emergent socio-environmental community activism in response to changing water environments; renaturing cities through blue-green infrastructure; articulations of degrowth praxis within wetland environments.

Professor Andrew Church, Associate Pro Vice Chancellor for Research and Enterprise, University of Brighton. His research interests cover tourism and leisure geographies, human-nature relations and cultural ecosystem services. Recent funded research projects have included studies of drought and resilience, tourism and ecosystem services, the meanings and values of wetlands, water-based sport and recreation, domestic food growing, gardens and gardening.

Professor Neil Ravenscroft, Head of the School of Real Estate and Land Management, Royal Agricultural University, UK. His research interests lie in economic questions about the multiple relationships that people have with each other and with the natural and physical environment. Economic concepts such as wealth, individual utility and land management are at the core of these socio-natural exchanges.

Professor Peter Coates is Professor of Environmental History at the University of Bristol. Peter is an historian who puts nature into history and history into nature. He's particularly interested in animal history. Having worked on wolves, salmon and squirrels, he's currently researching eels and invasive species as well as mosquitoes. He contributed a report on cultural ecosystem services and the contributions of arts and humanities researchers as an appendix to the UK National Ecosystem Assessment Follow-On.

Chris Fremantle is Research Fellow and Lecturer in Contemporary Art Practice at Gray's School of Art, Robert Gordon University. He is a Producer/Curator working on interdisciplinary research projects. He has written extensively on the work of the pioneering ecoartists Helen Mayer Harrison (1927–2018) and Newton Harrison (b. 1932), known as 'the Harrisons'. He was Producer on their project *Greenhouse Britain: Losing Ground, Gaining Wisdom*. He is Chair of the Art Focus Group for the Ramsar Culture Network. He established ecoartscotland in 2010 as a platform for research and practice.

Dr David Edwards is an environmental social scientist and senior manager at Forest Research, the research agency of the Forestry Commission. He has an interdisciplinary background in ecology, history and sociology, in UK, Africa and South Asia. His research seeks to develop new ways to incorporate social and cultural values into environmental decision-making, and to evaluate and enhance the impacts of research on policy and practice. He has a particular interest in the potential role that artists can play in shaping the agendas, methods and outcomes of environmental research when collaborating as equal partners alongside scientists and economists.

Dr Alex Vaux, Medical Entomologist, Emergency Response Department Science and Technology, Public Health England. Alexander Vaux is a Medical Entomologist at Public Health England. Alex has a background in Ecology, and brings this discipline to the understanding of ticks and mosquitoes. He is responsible for advising government on the risk to public health posed by ticks and mosquitoes. This includes conducting surveillance for native and non-native mosquitoes, and field-based research on the impact of climate change and environmental change on vectors.

Dr Jolyon Medlock: Head of Medical Entomology and Zoonoses Ecology, Emergency Response Department Science and Technology, Public Health England. He has 20 years of experience working on mosquitoes, and has published field research on the impact of the creation, management and expansion of English wetlands on British mosquitoes. His group is responsible for coordinating UK surveillance of native and non-native mosquitoes. He is a Fellow of the Royal Entomological Society and has published >100 scientific papers on vector-borne diseases. He also advises the European Centre for Disease Prevention and Control on vector-related issues.

Professor Gabriella Gibson: Professor of Medical Entomology, Department of Agriculture, Health & Environment, Natural Resources Institute, University of Greenwich. Prof Gibson is a medical entomologist with a particular interest in mosquitoes. Her work has focused on understanding their sensory physiology and behavior, as well as their interactions with humans and other animals, including livestock.

Professor Robert A. Cheke: Principal Scientist, Professor of Tropical Zoology Agriculture, Health & Environment Department, Natural Resources Institute, University of Greenwich. Professor Cheke is an ecologist and entomologist specialising in modelling of integrated pest management approaches and implementing control methods for disease vectors and migrant pests. His research interests concern understanding the functioning of ecological systems. Most of his work is in tropical environments in Africa, involving the biology and control of vector-borne diseases and agricultural pests, often including mathematical modelling. As an ornithologist and entomologist, Professor Cheke specialises in vectors of onchocerciasis ('river blindness') on migrant agricultural pests such as locusts, armyworm moths and red-billed quelea birds, and on mathematical models of integrated pest management. His research has involved fieldwork in numerous countries in western, eastern and southern Africa. In addition, he has recently been working on mosquito ecology in the UK.

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