



UK Research
and Innovation

RT3 03

UK Research and Innovation – High-level Sector Round Tables

ROUND TABLE 3

Valuing and Measuring Natural Assets for the Insurance / Financial Services Sector

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(refreshments available from 10:30)

[Prince Philip House](#), 3 Carlton House Terrace, St. James's, London SW1Y 5DG

RELEVANT RESEARCH AND KNOWLEDGE EXCHANGE

The aim of this paper is to provide both an overview and specific relevant examples of UKRI funded activities that have a focus on natural capital and the insurance and financial services sectors. It is structured in the following sections:

1. Overview of recent and ongoing research activity
2. Relevant research output - tools and methods
3. Examples of relevant research
4. NERC Knowledge Exchange contacts
5. Other Knowledge Resources

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1. OVERVIEW OF RECENT AND ONGOING RESEARCH ACTIVITY

A recent scour of research databases using relevant search terms identified over 340 projects funded within the past 10 years (Table 1). These have a combined value of ~£250M. This is predominantly made up of research grants (67%) however there are also significant numbers of studentships (9%), fellowships (6%), collaborative R&D (4%) and feasibility studies (3%).

It is likely that many of these projects may be producing output with potential utility to the insurance and financial services sectors. A selection of the 240 projects identified and likely to deliver output of relevance to the insurance and financial services sectors is shown in **Annex 1**.

Table 1. Numbers of projects funded within the past 10 years.

| Search Terms | Funding Organisation | | | | | | | | Total |
|---------------------------------|----------------------|----------|-----------|-----------|-------------|----------|------------|----------|------------|
| | AHRC | BBSRC | EPSRC | ESRC | Innovate UK | MRC | NERC | STFC | |
| Biodiversity AND Insurance | | | | | | | 7 | | 7 |
| Carbon accounting | | | 1 | 2 | 2 | | 3 | | 8 |
| Carbon offsetting | | | | | 2 | | 2 | | 4 |
| Environmental economics | | 2 | 1 | 4 | | | 7 | | 14 |
| Green bond | | | | | | | 1 | | 1 |
| Green finance | | | | 2 | | | 1 | | 3 |
| Green investment | 1 | | | | | | 1 | | 2 |
| Impact bond | | | | 2 | | | | | 2 |
| Impact Investing | | | | 3 | | | | | 3 |
| Impact investment | | | | 4 | 2 | | | | 6 |
| Mitigation banking | | 2 | 9 | 8 | 2 | 2 | 15 | 1 | 39 |
| Natural asset AND Investment | 3 | 1 | 37 | 26 | 36 | 1 | 31 | 1 | 136 |
| Natural Capital AND Finance | 1 | | 3 | 18 | | | 30 | | 52 |
| Natural Capital AND Investment | | | | | | | 1 | | 1 |
| Payments for ecosystem services | | | 11 | 5 | 4 | 1 | 35 | | 56 |
| Sustainable finance | | | | 2 | | | | | 2 |
| Sustainable investment | | | 3 | 1 | 2 | 1 | 1 | | 8 |
| Total | 5 | 5 | 65 | 77 | 50 | 5 | 135 | 2 | 344 |

The extent to which projects work collaboratively with stakeholders – including business - varies, with some focussing on addressing specific gaps in scientific understanding whilst others take existing research and work with end users to maximise benefit to relevant sectors. In general, knowledge exchange is becoming an

increasingly important aspect of successful funding bids and working closely with potential users to deliver beneficial societal impacts is a funding requirement.

2. RELEVANT RESEARCH OUTPUT – TOOLS AND METHODS

Many different tools and methods for measuring and valuing natural capital and/or ecosystem services exist. Several pieces of work have reviewed the models available and provided guidance as to which is suitable for a particular setting. The Joint Nature Conservation Council and NERC funded a piece of work to help users to identify the most appropriate assessment tool. The resulting ‘[Tool Assessor](#)’ is hosted by the Ecosystems Knowledge Network (**Table 2**).

Table 2. Overview of the tools included in the Tool Assessor.

| Tool | Environmental setting | | Ecosystem service categories represented | | | Experience of use | | | Software | | | | | |
|----------------------------|-----------------------|---------------|--|------------|--------|-------------------|------------|----------|----------|----------------|-------------|-------|-----|-----------|
| | Multi scale | No. of models | Terrestrial | Freshwater | Marine | Provisioning | Regulating | Cultural | UK | Outside the UK | Open access | Excel | GIS | Web based |
| ARIES | ✓ | 11 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| Benefits of SUDS (BeST) | | 19 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | |
| CoSting Nature | ✓ | 7 | ✓ | ✓ | | ✓ | ✓ | ✓ | ? | ✓ | ✓ | ✓ | ✓ | ✓ |
| EcoServ-GIS | | 10 | ✓ | ✓ | | | ✓ | ✓ | ✓ | | ✓ | ✓ | | |
| GI Valuation Toolkit | | 14 | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | ✓ | | |
| i-Tree Eco | ✓ | 7 | ✓ | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| InVEST | ✓ | 18 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | |
| LUCI | ✓ | 9 | ✓ | ✓ | | | ✓ | | ✓ | ✓ | | | ✓ | |
| Natural Cap. Planning Tool | | 10 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | ✓ | | |
| ORVal | ✓ | 1 | ✓ | | | | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| Participatory GIS tool | | 5 | ✓ | ✓ | ✓ | | | ✓ | ✓ | | ✓ | | | ✓ |
| SENCE | ✓ | 1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | |
| TESSA | | 10 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ |
| Viridian | | 5 | ✓ | ✓ | | | ✓ | | ✓ | | | ✓ | | |

This Tool Assessor looks at 14 of the most commonly used tools and methods and, for each, provides a comprehensive fact sheet detailing the input data required to run the tool, the form of output produced, the geographic scale over which it can be applied, the land uses that it considers, and the cost, software and skill requirements to operate it. This is an extremely useful and highly recommended resource for any person or organisation wanting to find out more about the tools available for natural capital assessment.

3. EXAMPLES OF RELEVANT RESEARCH

The valuation of natural assets as providers of ecosystem services has received a lot of attention over the past 10 years. Initially this work focussed on individual services, such as the carbon storage benefit of woodland, the flood mitigation benefit of upland and riparian habitats, and the health benefits of access to recreational green space.

For example, a 2016 study led by the University of California found that more than US\$625 million in property damages were prevented in the U.S. during Hurricane Sandy in 2012 by coastal wetlands along the Northeast coast (Narayan *et al.* 2016). Scientists from the conservation, engineering and insurance sectors, used the latest modelling techniques to study the impact of Hurricane Sandy when New York and New Jersey

were badly hit by storm surges. Quantifying the economic value of natural defences supports their inclusion in risk models and raises other challenges such as the location of the natural defence and the location of the beneficiary – in this case the value of natural defence to properties accumulates as you move upstream away from the coast.

More recently, as complex processes have been better represented in mathematical models and computing power has increased, it has been possible to look simultaneously at multiple services. The Natural Environment Valuation Online (NEVO), completed in 2018 and now available for trial at <https://www.leep.exeter.ac.uk>, combines multiple biophysical models run online in real time for the purpose of natural capital management and investment. It works across multiple land uses such as agriculture, livestock, woodlands and urban areas, and considers multiple benefits and trade-offs.

NEVO is intended to support informed, transparent and efficient environmental decision making for a broad range of sectors, including valuing existing and new land use options, helping prioritise environmental interventions and investments and signposting those options that provide the greatest net benefits and value for money for the taxpayer.

Whilst natural asset valuation studies are becoming more prevalent, effective mechanisms for enabling private investment by companies who do not manage land themselves are still poorly understood. A 2017/2018 Valuing Nature Programme Placement, focussing on the Spey catchment in Scotland, set out to understand how private sector investments could be increased or diversified. The study found that whilst businesses recognise the importance of natural capital to their business success, this does not currently translate into significant investment. Despite business interest in diversifying and increasing their investments in the environment, they find it difficult to identify tangible returns on investment.

An ongoing EU-funded H2020 project is aiming to address this gap. Nature Insurance value: Assessment and Demonstration (NAIAD) aims to operationalise the insurance value of ecosystems to reduce the human and economic cost of risks associated with water (floods and drought) by developing and testing – with key insurers and municipalities – the concepts, tools, applications and instruments (business models) necessary for its mainstreaming (<http://naiad2020.eu/>). Amongst other things, NAIAD aims to develop financial instruments and novel business models in support of the implementation of nature-based solutions.

4. NERC KNOWLEDGE EXCHANGE CONTACTS

NERC currently funds several knowledge exchange activities focussing on natural capital and ecosystem services and with relevance to the infrastructure sector. These activities are targeted towards better collaboration between the academic and practitioner communities and are looking for opportunities to work closely with industry in order to understand how best use can be made of relevant science. Primary contacts for this are the NERC funded Knowledge Exchange Fellows.

- **Charlie Stratford**, Natural Capital and Healthy Local Economies: cstr@ceh.ac.uk
- **Alister Scott**, Mainstreaming green infrastructure: alister.scott@northumbria.ac.uk
- **John Hillier**, Insurance Sector.

5. OTHER KNOWLEDGE RESOURCES

A number of platforms bring together relevant knowledge on measuring and valuing natural assets for business. These include:

- [Valuing Nature Programme](#) – UK interdisciplinary research programme with business engagement focus
- [We Value Nature](#) – a recently started EU-funded research and innovation project which aims to accelerate uptake by business natural capital assessment, natural capital accounting, nature-based solutions and green infrastructure, with plans to address barriers and opportunities with the finance sector
- [Natural Capital Hub](#) – Managed by the Natural Capital Coalition, a global multi-stakeholder collaboration aiming to harmonize business approaches – see in particular the [Finance Sector Supplement](#) to the Natural Capital Protocol and [related resources](#)
- [Ecosystems Knowledge Network](#) – UK Network sharing knowledge on practice of putting environment at heart of decision making – currently running annual [Natural Capital Investment Conferences](#)
- Cambridge Institute for Sustainability Leadership, notably the [Natural Capital Impact Group](#) and [Centre for Sustainable Finance](#) – CISL aims to empower leaders from the worlds of business, government and finance in environmental sustainability
- [EU Business @ Biodiversity Platform](#) – Includes work streams on natural capital accounting, innovation and finance – see for example a recent brief on [Scaling Business and Biodiversity through Innovation and Positive Impact Finance](#)

REFERENCES

Narayan, S., Beck, M.W., Wilson, P., Thomas, C., Guerrero, A., Shepard, C., Reguero, B.G., Franco, G., Ingram, C.J., Trespalacios, D. (2016). *Coastal Wetlands and Flood Damage Reduction: Using Risk Industry-based Models to Assess Natural Defenses in the Northeastern USA*. Lloyd's Tercentenary Research Foundation, London.

Annex 1 – Projects of potential relevance to the insurance and financial services sectors

This list shows some of the over 340 research projects with potential relevance to the insurance / financial services sector. More information on all these projects can be found by searching on Gateway to Research (<https://gtr.ukri.org/>)

| Funder | Reference | Title |
|-------------|--------------|--|
| EPSRC | EP/J005274/1 | Transforming water scarcity through trading |
| ESRC | 1917480 | Challenges of accessing mainstream capital for impact investment |
| ESRC | ES/N013344/2 | Delivering Inclusive Financial Development and Growth |
| ESRC | ES/L016028/1 | Euro-China GE: Dynamics of Green Growth in European and Chinese Cities (DRAGON) |
| ESRC | ES/S011552/1 | From philanthropy to impact investment: Private sector initiatives for development in Brazil and the UK |
| ESRC | ES/J018155/1 | Measuring complex outcomes of environment and development interventions |
| ESRC | ES/P005241/1 | Research on China's Financial System towards Sustainable Growth: The Role of Innovation, Diversity and Financial Regulation |
| Innovate UK | 750947 | Footprint Web Tool |
| Innovate UK | 102417 | Holistic spatial asset investment planning service |
| Innovate UK | 730008 | PES Development Project |
| Innovate UK | 104217 | PROVIT - Planning Requirements Optioneering Visualisation Investment Tool |
| Innovate UK | 104215 | Urban Greenspace Valuation Toolkit |
| NERC | NE/I022183/1 | [Finance] Forest-Finance risk network: towards stable investment environments for forestry |
| NERC | NE/R014329/1 | Coastal Ecosystem Recovery Financing for the Future (CERFF): developing insurance products to enhance response and recovery from tropical cyclones |
| NERC | NE/K501384/1 | Developing a Payment for Ecosystem Service Scheme |
| NERC | NE/S009450/1 | Exploring Local Implementation of DEFRA's 25 Year Plan: Learning lessons from embedding the Natural Capital Approach in a Northern Coastal City Region |
| NERC | NE/M008541/1 | Forests at risk: Awakening the UK timber, forest carbon and forest insurance sectors to the threats of pests, disease and drought |
| NERC | NE/R006946/1 | Linking ecosystem services and businesses through Green Bonds |

| | | |
|------|--------------|---|
| NERC | NE/P016944/1 | Natural Environment Valuation Online (NEVO): Web-based tools for natural capital management and investment |
| NERC | NE/I00341X/1 | Safeguarding local equity as global values of ecosystem services rise |
| NERC | NE/P011217/1 | South West Partnership for Environment and Economic Prosperity (SWEEP) |
| NERC | NE/K501396/1 | South West Water/ University of East Anglia collaboration: Reducing River Pollution by Payments for Ecosystem Services |
| NERC | NE/G008531/1 | Valuing rainforests as Global Eco-Utilities: a novel mechanism to pay communities for ecosystem services provided by the Amazon |