



UK Research
and Innovation

RT1 01

UK Research and Innovation – High-level Sector Round Tables

ROUND TABLE 1

Valuing and Measuring Natural Assets for Infrastructure

Tuesday 26 June 2018, 11:00-15:00

(refreshments available from 10:30)

[Prince Philip House](#), 3 Carlton House Terrace, London, SW1Y 5DG

BACKGROUND PAPER

This paper outlines the objectives, the expected output and longer-term outcomes of the Round Table.

It then provides brief context for the Round Table, including an overview of interactions between the environment and infrastructure, drivers for measuring and valuing relevant activity in the sector, and some examples of current activity.

For a brief introduction from the Natural Environment Research Council (NERC) to existing research and innovation output relating to measuring and valuing nature, see separate paper RT02.

For examples of existing funding (mainly NERC) which supports business-academic collaboration, see separate paper RT 03.

Guy Duke

Business Champion, Valuing Nature Programme Coordination Team

Peter Young

Chair, Valuing Nature Programme Business Interest Group

GD NATCAP LTD

1. OBJECTIVE & EXPECTED OUTCOMES

The **objective** of this Round Table is to identify the research and innovation (R&I) needs and priorities of businesses in the infrastructure sector, so that current and future research has enhanced utility for the sector.

Expected outcomes include: (a) better integration of nature in project and investment decisions, and in the management and development of infrastructure assets; (b) knowledge needs and priorities identified by the sector influence R&I funding.

The Round Table will consider:

- **current activity to measure and value nature in the sector** (e.g. how to apply corporate natural capital accounting, and how to define and deliver 'net gain' for infrastructure projects), the direction of travel in this respect, and the related knowledge needs;
- **the extent to which these knowledge needs may be supported by existing output from R&I** (e.g. data, tools, methods, models) and **how uptake of this output may be accelerated** (e.g. through collaborative working between the research and business communities, filling knowledge gaps); and
- **what further R&I investment may be needed** to support the sector in measuring and valuing nature, and **what role the Natural Environment Research Council (NERC), or other funders, may have** in supporting that.

This is the first in a series of Round Tables commissioned by the NERC Innovation Team.¹ Subsequent Round Tables will focus on land management / agriculture (Autumn 2018) and insurance / financial services (Winter 2018). Other sector Round Tables may follow in 2019 subject to further funding being made available.

NERC and UKRI are interested in stimulating **benefit to the UK economy from publicly funded UK environmental research**, by enabling businesses to access the latest research. The Round Tables will therefore focus on businesses with significant operations in the UK (not necessarily UK-owned), but may also consider how these businesses are integrating natural capital in their business decision-making internationally.

2. EXPECTED OUTPUT

The output will be a concise report containing:

- **An overview of current relevant activity in the Infrastructure Sector** on the integration and application of natural capital in business decision-making, of **the future ambition of businesses** in this respect, of **what is driving business interest** and of **enablers/barriers**.
- **An overview of knowledge needs of the Infrastructure Sector** (focussing on but not limited to **environmental science**), and initial **analysis of the extent to which these needs may be met by existing output** from NERC and UKRI and of the **extent to which further R&I is required**.
- Consideration of **what role NERC Innovation funding could have** in accelerating uptake of R&I output, what impact this might have on the Infrastructure Sector, and what forms of funding and structures enable this. .

¹ Infrastructure, risk management, food systems, natural resources, environmental data... -

<http://www.nerc.ac.uk/innovation/activities>

² for scope of projects, see <https://infrastructure.planninginspectorate.gov.uk>

3. PARTICIPANTS

This Round Table brings together representatives from the infrastructure sector, including:

- transport infrastructure (roads, railways)
- utilities infrastructure (energy distribution networks, power generation, water)
- environmental management (flood, water and waste management, and large scale green infrastructure)
- integrators of environmental science involved in projects subject to national infrastructure planning² (e.g. engineering consultancies, large-scale developers, construction companies).

4. CONTEXT

4.1 Interactions between the environment and infrastructure

The National Infrastructure Commission’s 2017 report on [The impact of the environment and climate change on future infrastructure supply and demand](#) summarises key points of interaction between the environment and infrastructure across the six sectors considered within the National Infrastructure Assessment (NIA)² (Table 1).

The report concludes that:

- infrastructure can harness the environment to deliver multiple benefits;
- the environment can reduce the demand for infrastructure;
- infrastructure can have a negative impact on the environment; and
- changes in the environment can increase the costs for infrastructure.

Table 1: Relationship between key environmental parameters and NIA sectors

	Water & Wastewater	Flood Risk	Energy	Transport	Waste	Digital
Water quantity & quality	**		*		*	
Atmosphere			**	**	*	
Natural hazard protection	*	**	*	*		*
Noise			*	**		
Climate Change	**	**	**	**	*	*

Note: single asterisk denotes a relationship, double asterisk denotes a strong relationship.

4.2 Drivers for measuring and valuing natural assets in the sector

A number of drivers may be leading businesses in the infrastructure sector to do more to measure and value natural assets and integrate this knowledge in decision-making. These drivers may include regulatory / policy drivers for the sector, the need for longer-term economic viability of infrastructure (in the face of increasing frequency and intensity of natural hazards, notably flooding), financial drivers (including lender policy, shareholder pressures, insurance against natural hazards), asset management considerations, corporate responsibility considerations, external stakeholder pressures

² The NIA will analyse the UK’s long-term economic infrastructure needs, outline a strategic vision over a 30-year time horizon and set out recommendations for how identified needs should begin to be met. It will cover transport, digital, energy, water and wastewater, flood risk and solid waste.

(e.g. civil society groups) and maintaining a licence to operate. These drivers may vary considerably in importance between different parts of the infrastructure sector – for example, between water utilities and power distribution, road and rail infrastructure.

Regulation and policy are likely to be a key driver. A number of recent regulatory / policy initiatives are notable in this regard. These include: (a) for the UK as a whole, the Government's [Industrial Strategy](#) and [Green Growth Strategy](#); the work of the Natural Capital Committee with the Office for National Statistics and the ONS commitment to [natural capital accounts](#); (b) for England, the [Natural Environment White Paper](#), [National Planning Policy Framework](#) (including the duty to achieve biodiversity net gain) and [25 Year Environment Plan](#); (c) for Wales, the [Wellbeing of Future Generations Act 2015](#) (notably the goal 'A Resilient Wales'); (d) for Scotland, the [Programme for Government 2017-18](#) (which includes several relevant provisions).

4.3 Examples of relevant activity in the sector

While there is considerable activity across the infrastructure sectors in relation to measuring and valuing natural assets / capital, there is a long way to go before consideration of natural assets / capital (and of the services that flow from this capital) is fully taken into account in business decision-making across the sector.

The Valuing Nature Programme's series of Business Impact Schools 2017-18 have featured a number of speakers from the infrastructure sector presenting case studies on how they are taking natural capital into account in their businesses. A small selection of these is outlined in *Annex 1* to give a feel for relevant activity across the sector.

4.4 Direction of travel

Where might the sector be heading in regard to measuring and valuing natural assets and integrating this knowledge into business decision-making? Recent discussion on this at the Valuing Nature [Business Interest Group](#) suggests that the key needs may be to bring activity to scale, and to integrate the business interests across the land management, infrastructure and finance sectors (including insurance). What would be the implications of this for research and innovation? The next two round tables – addressing land management and the finance sector, respectively, will consider this from the perspective of these other two sectors.

CONVENORS

This Round Table is convened by the [Valuing Nature Programme](#) in association with the [Natural Environment Research Council](#) (NERC).

The five year, £6.5m Valuing Nature Programme, funded by NERC, ESRC, BBSRC, AHRC and Defra, aims to better understand and represent the complexities of the natural environment in valuation analyses and decision making. It considers the economic, societal and cultural value of ecosystem services. The Programme is funding research and supporting researchers in making links with policymakers, businesses and practitioners through the Valuing Nature Network. Current funded projects focus on health and wellbeing values of nature, and on tipping points in nature.

As part of UK Research & Innovation (UKRI), NERC has a role in supporting the use of research to create value for business. NERC works in partnership to understand where business challenges can be addressed through collaboration with environment scientists or drawing from data and knowledge in the research base. It encourages and supports collaboration between business and researchers and funds projects that develop innovative products and services for the future.

ANNEX 1
EXAMPLES OF RELEVANT ACTIVITY IN THE INFRASTRUCTURE SECTOR

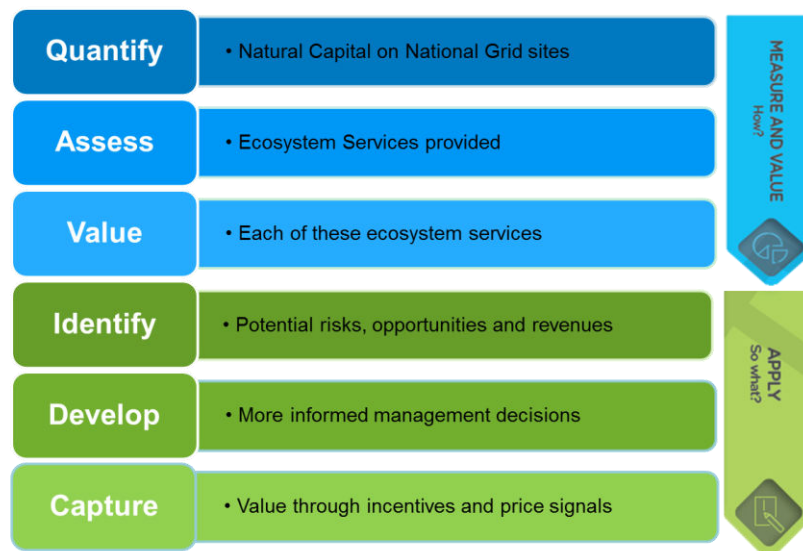
Example 1: POWER DISTRIBUTION

National Grid's Natural Capital Valuation Tool

Chris Plester, National Grid

National Grid developed, with AECOM, a Natural Capital Valuation Tool that helps focus its approach to proactive management of non-operational estate, as a key element of the company's sustainability strategy. The tool helps recognise and account for the value that NG's natural assets provide and manage them in a way that delivers greatest value to NG, its neighbours and stakeholders.

The tool is based around the identification, quantification and valuation of 10 broad habitat types and 12 ecosystem services. It uses data from over 100 external sources to assign indicative monetary values to these services. These values provide NG with a better understanding of which habitats deliver greatest benefit and to whom.



Overview of National Grid's natural capital valuation process

NG uses 'scenario analysis' to develop a series of management options and potential ecosystem service benefits (expressed in monetary terms) for each site. Financial values are derived from many valuation approaches for example, payments for ecosystem service schemes as well as biodiversity and carbon 'offsetting' schemes. The benefits and returns delivered via the natural environment provide both private and public benefits to the business and to external stakeholders (e.g. local residents, farmers).

Natural capital accounting using the tool, captures the value of the ecosystem assets and allows NG to highlight potential to grow this value, whilst helping to quantify risk, and identify new opportunities for partnership and collaboration. The Natural capital values help to prioritise management approaches that target greatest need and opportunity, protecting and enhancing natural capital assets and the multiple benefits they provide.

Translation of the value of nature into a language that resonates with a range of functions across NG's business has built greater engagement with land managers, asset owners and finance teams and supports NG's strategic ambition to embed sustainability, particularly to integrate sustainability factors such as carbon and natural capital, into decision-making. This approach drives informed, long-term decision-making and targeted investment that optimises the natural capital value of NG's estate.

Example 2: WATER UTILITIES

Natural Capital Accounting (NCA) and Ecosystem Services Assessment in the water sector

Jonathan Dobson, United Utilities

The water sector relies on natural assets to provide the right amount and quality of water for treatment, and to receive treated effluent. The sector protects natural assets through treatment of wastewater, attenuation of flow (storage of water) and support for appropriate land management. The sector also impacts on natural assets through the supply chain (e.g. energy, chemicals) and operations (e.g. pollution prevention, waste management).

In 2005 United Utilities started the widely-known Sustainable Catchment Management Programme (SCaMP). SCaMP aimed to improve land management to enhance the condition of Sites of Special Scientific Interest in the company's land-holdings, while also enhancing carbon sequestration and reducing dissolved organic carbon in run-off. SCaMP helped to provide holistic management plans for all United Utilities' agricultural land holdings, providing tenant farmers with business plans that were viable and productive. Cost Benefit Analysis following SCaMP1 indicated a benefit:cost ratio of 2.275 (the greatest benefit arising from carbon sequestration).

Several water utilities have attempted to use NCA and ESA for different purposes over the past few years. United Utilities has used them for triple bottom line accounting and catchment natural capital accounting, Yorkshire Water for total contribution and project accounts, and several companies have used them for cost benefit analysis of catchment management in uplands or elsewhere. This has led to collaboration with the Natural Capital Committee, Accounting for Sustainability and others.

Stimulated by the water industry, UKWIR in 2015 commissioned [a study](#) to consider the opportunities and barriers to the broader introduction of NCA and/or ESA into water company business planning. The objectives were: (1) to undertake a review of current NCA and ESA initiatives that are relevant to, or could benefit the water industry; (2) to describe the potential benefits and implications of NCA and/or ESA for water companies; (3) to identify opportunities, barriers and risks for integration of NCA and ESA into both the regulatory framework and water company planning and decision-making; (4) to develop proposals for research to fill knowledge gaps. Initial findings are summarised in the table below:

Understanding: General not specific Limited to specialist teams Relatively recent More evolved in GHGs	Benefits: Risk management Better CBA will result in better decisions Opportunities for collaboration Comprehensive assessments of wider contribution
Barriers: Complex and evolving ideas Difficult to demonstrate direct impact on some capital Unintended bias No standards Asset centric solution mindset	Gaps: Absence of clear business case Costs and risks of doing it Regulatory leadership Data Impacts and assets outside of management control

The project subsequently worked to develop a **flexible framework**, building on NCA and ESA techniques, with embedded decision support that allows the user (water company or strategic advisor) to assess the needs for and benefits of adopting the approaches – rather similar to a [Natural Capital Protocol sector guide](#). The collection of information, evidence and best practice guidance aimed to provide companies with comprehensive support in delivering these approaches, but importantly with the flexibility to deliver them in the way and to the timescale that best suits individual companies' situations.

The study identified other areas for further research including: (1) development of **tools and techniques** that make it easier for individuals or teams within water companies to undertake NCA and ESA; (2) identifying what types of **data** are required for NCA and ESA, whether they exist in the correct format, and if they are collected in a consistent manner across the industry; (3) working with stakeholders to establish the **political and regulatory framework** to enable such initiatives; (4) demonstrating how the approaches might work across the industry through relevant **pilots and case studies**.

EXAMPLE 3: TRANSPORT INFRASTRUCTURE

Biodiversity net gain - Network Rail and Highways England

Julia Baker, Balfour Beatty

Network Rail Infrastructure Projects and Highways England have committed to biodiversity net gain. In doing so, they are sending clear messages to their supply chains and to the rest of the industry. This means we need to measure biodiversity to know that 'net gain' has been achieved.

As part of its pilot on biodiversity offsetting, Defra issued in 2012 a [metric](#) for industry to calculate gains and losses of biodiversity. This allowed industry to set targets of 'no net Loss' and 'net gain'. Defra's metric is habitat-based, providing a proxy for overall biodiversity, helping to understand whether no net loss or net gain has been achieved and to quantify any loss or gain and the level of any compensation required. The metric uses '[multipliers](#)' to account for the risks of any offset failing. Decisions on what compensatory habitat should then be provided are then informed by other studies, such as conventional ecological impact assessment.

Balfour Beatty, working with Network Rail Infrastructure Projects to develop a net gain approach, adopted the [good practice principles](#) issued by Defra in 2012 and similar principles developed by the [Business and Biodiversity Offset Programme](#). These principles set a strong foundation for offsets that are appropriate and benefit biodiversity by contributing towards conservation priorities at local and national scales. They also include opportunity for business for proactive engagement with local government and conservation organisations. While this ensures that stakeholders are involved in decision-making about biodiversity offsets, from a business point of view, it's better risk management.

Balfour Beatty developed a Mitigation Hierarchy Evidence Base for environmental managers to record all actions to avoid and mitigate losses of biodiversity. They then report their performance in adhering to the mitigation hierarchy as part of their sustainability reporting. Balfour Beatty also developed a Biodiversity Units Tracker to help environmental managers 'keep track' of losses and gains in biodiversity units during construction and be able to respond quickly when a seemingly simple change on site, for example felling trees to re-route an access track, has severe consequences for the overall habitat loss of a project.

Balfour Beatty also worked with Highways England on using the Defra metric to calculate the first biodiversity unit baseline of their entire Strategic Road Network.