Natural Capital and Biodiversity: A Briefing Note for Ecologists and Environmental Managers

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THE CHARTERED INSTITUTE OF ECOLOGY AND ENVIRONMENTAL MANAGEMENT (CIEEM) IS THE PROFESSIONAL BODY FOR ECOLOGISTS AND ENVIRONMENTAL MANAGERS WORKING TO MANAGE AND ENHANCE THE NATURAL ENVIRONMENT IN THE UK AND IRELAND. THIS BRIEFING NOTE HAS BEEN COMPILED BY MEMBERS OF THE CIEEM ENGLAND POLICY GROUP.

1. Introduction

For nearly eight years, Defra and the Office for National Statistics (ONS) have been working on how to embed natural capital into the UK Environmental Accounts by 2020[1]. The natural capital concept is increasingly used in policy, practice and in discussions about how to manage and enhance the environment and is the cornerstone of the 25 Year Environment Plan for England[2]. For practitioners working in an environmental planning context, Paragraph 170b and 171 of the 2018 National Planning Policy Framework (England) requires that both plan-making and decision-taking by Local Planning Authorities must recognise and enhance natural capital[3].

Outside of Government, both public and private organisations, such as Forestry England[4] and Strutt and Parker[5], are realising the opportunities that arise from taking a natural capital accounting approach to land management.

The natural environment is fundamental to the economy and to society at every spatial scale from global to local. But like the term 'sustainable', natural capital can have different meanings to different people, and is not without problems as an approach, particularly when attempting to quantity biodiversity. Also, from an ethical perspective, is it right to place a price on nature; in doing so, do we lose its true value?

The purpose of the briefing note is to provide a quick and easy introduction for ecologists and environmental managers on what natural capital is, its benefits, and associated challenges, and sources of further guidance.

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2. What is Natural Capital and Natural Capital Accounting?

Natural capital refers to the biological, physical and chemical resources/assets, referred to as 'Stock', in their raw state.

According to agreed convention, this Stock is broadly categorised as follows: biodiversity (ecological communities), soils, freshwater, land, minerals, atmosphere (air), subsoil assets, and oceans.

The benefits to people that flow directly from this Stock are known commonly as 'ecosystem services' or 'flows' (hereafter referred to as 'Services'). A financial analogy is that services are the 'income and expenditure' accounts of a natural capital balance sheet. With varying degrees of time and input (often human input) ecosystem services can be turned into traded and/or monetised goods for society (hereafter referred to as 'Value').

This relationship can therefore be summarised as: **Stock** -> **Services** = **Benefits** = **Value**. See Figure 1[6].

The natural capital approach starts with the recognition/qualification of these service benefits. These benefits should then be mapped to different stakeholders. The next step is to quantify the service benefits. The final step in the process is the monetisation of these service benefits. In simplistic terms, natural capital accounting is the final step; the process of placing a monetary value on the Services or Benefits. A natural capital account typically comprises a number of tables ('accounting schedules') and an overall summary table ('a natural capital balance sheet'). Figure 2 outlines how a simple approach can be taken to assessing natural capital.

Ecosystem Accounting focuses on just the biological (biotic) components of Stock and Services (i.e. it typically excludes atmosphere, minerals and subsoils assets).

In 2012, natural capital began to be embedded directly into the UK's Environmental Accounts (a subset of the main National Accounts compiled by the Office for National Statistics (ONS)). The purpose of the UK's Environmental Accounts is to measure

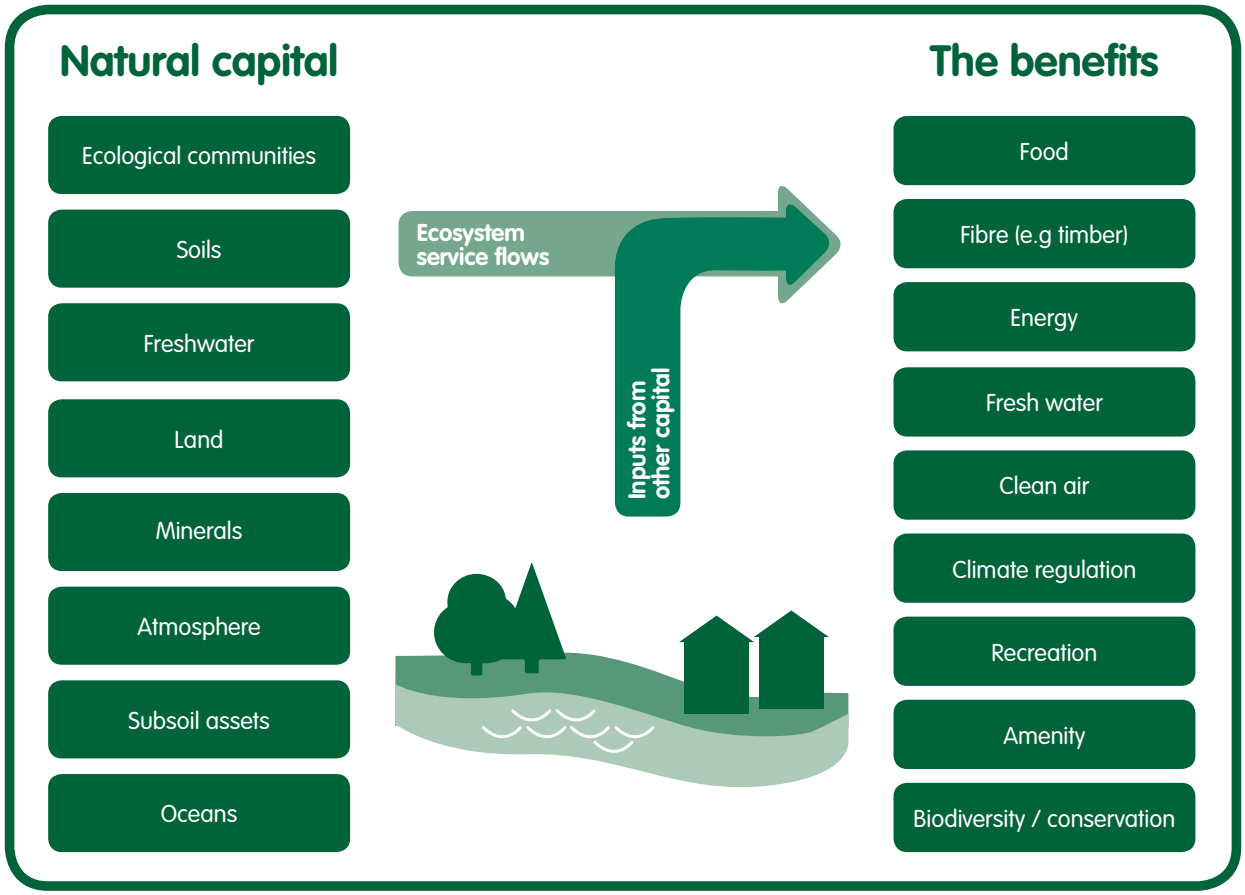

Figure 1: The flow of benefits from natural capital. Figure taken from Forestry England (2018).

Asset Register Tables

Table 4. Extent of habitats

Indicator			Baseline year	Reporting year (2016/17)	Trend
Extent of habitats	Area of BAP priority habitats (ha)	Ancient and/or species rich hedgerows		1	◂▸
		Blanket bog		4,534	◂▸
		Coastal and floodplain grazing marsh		7,067	◂▸
		Coastal saltmarsh		4,283	◂▸
		Coastal sand dunes		72	◂▸
		Coastal vegetated shingle		736	◂▸
		Eutrophic standing waters		917	◂▸
		Fens		699	◂▸
		Limestone pavements		2	◂▸
		Lowland calcareous grassland		62	◂▸
		Lowland heathland & lowland dry acid grassland		1,745	◂▸
		Lowland meadows		114	◂▸
		Lowland raised bog		102	◂▸
		Lowland wood pastures and parkland		1	◂▸
		Maritime cliff and slope		11	◂▸
		Mesotrophic lakes		61	◂▸
		Mudflats		12,231	◂▸
		Purple moor grass and rush pastures		52	◂▸
		Reedbeds		810	◂▸
		Saline lagoons		287	◂▸
		Seagrass beds		48	◂▸
		Upland calcareous grassland		29	◂▸
		Upland heath		3,030	◂▸
		Upland mixed ashwoods		29	◂▸
		Upland oakwood		289	◂▸
		Wet woodland		89	◂▸
		Total priority habitat		37,300	◂▸
	Total land area holdings (ha)	Owned		24,265	
		Leased		15,549	
		Management agreement		8,469	
		Shooting rights		11,347	
		Total		59,630	
	Land under statutory designations (SSSIs, AONB, SAM, NP) %			65	

Figure 2: An example of an asset register. Figure taken from RSPB (2017)[7].

"...the contribution of the environment to the economy, the impact of economic activity on the environment, and society's response to environmental issues."[8]

In 2016, the Government's stated ambition for England's environment was to: "*improve the environment within a generation so that England has the best environment and is one of the most beautiful places in the world to live, to work and to bring up a family.*"[9] The Natural Capital Committee was formed to help the Government deliver this vision, principally through the 25 Year Environment Plan for England[10].

The natural capital accounting approach has enabled policy makers and decision-takers to estimate the monetary value of natural assets and compare it with established benchmarks of economic expenditure. For example, the partial asset value of UK natural capital was estimated in 2015 to be £761 billion[11]. 58% of this value was considered

by the ONS to be attributable to 'cultural and regulating services' (recreation, pollution removal and carbon sequestration).

Since GDP in 2015 was £1.93 trillion[12], UK natural capital is equivalent to at least 40% of GDP (noting it was only a partial valuation). The estimated Natural Capital value of UK woodlands alone is estimated to be more than £270 billion[13].

3. Why is a Natural Capital Approach Both Beneficial and Problematic?

There are six principal advantages to a natural capital approach:

1. Qualification and quantification of benefits mapped to stakeholders can provide a more holistic view of the real dependencies and impacts around any plan, project or strategy to inform more transparent, more equitable decision-making;
2. It can be a useful design tool to ensure that ecosystem services are maximised;
3. In a modern world where there are limited budgets for new projects, it is useful to understand where money can be best spent to achieve net gains for the economy, society and the environment;
4. It is possible to track changes to Stock and Services and take timely and appropriate action that regulates the changes in efforts to curtail the irreversible depletion or damage of the Stock and/or Service;
5. It allows a wide range of technical specialist and non-technical executives to converse using a language of common currency; i.e. monetary value;
6. It ensures decision-making affecting natural Stock and Services is mainstreamed into core budgeting and accounting, not an after-thought or outside core decision-making.

With regards to budgeting, the ONS estimated that compared with freshwater and farmland, woodland removed more harmful pollution and carbon dioxide from the atmosphere; valued at £1.8 billion in 2015[14]. This could be useful information (along with fully costed accounts informed by timescales and efficiency savings) when

deciding where to prioritise air quality mitigation budgets, for example.

With regards to the last point, perhaps one of the most explicit and recent examples of where an opportunity to use a natural capital accounting approach for decision-making was missed, relates to the Government's announcement in 2010 to sell the publicly owned forests of England. Following the public backlash that ensued, the decision was withdrawn in 2012. Although there is no certainty that the natural capital value would have been altered from transfer of the asset to another landowner (had the decision gone ahead), nonetheless a natural capital approach would have greatly informed the process.

Subsequently, Forestry England (via Forest Research) produced its first natural capital accounts in 2015. From the work undertaken for its annual natural capital accounts, Forestry England was able to identify the need to better and more routinely measure visitor numbers. It is now able to understand and quantify the recreational value to the public from its forests.

The vital precursor for being able to place a monetary value on natural capital Services and Benefits is that certain parameters ('environmental characteristics') relating to the Stock or the associated Services can be reliably measured.

There are established units for measuring certain Services; for example, carbon sequestration (a 'regulating service' provided by the Stock item 'Land') is measured in tonnes of CO2 equivalents per hectare per year tCO2e/ha/yr.

However, there are several challenges associated with the natural capital approach:

- Natural capital and Services/Benefits are not just about 'nature', it includes the wider natural environment. By focusing on the wider environment, there is a challenge for Ecologists and environmental managers to ensure that biodiversity remains a focus for action and a policy priority.
- While it is widely acknowledged that "*biodiversity has key roles at all levels of the ecosystem service hierarchy: as a regulator of underpinning ecosystem processes, as a final ecosystem service and as a good that is subject to valuation, whether economic or otherwise*"[15] there is still a debate in the natural capital community as to whether biodiversity is a stock in itself or is an indication of condition of stock[16], is a Benefit or is a Good[17]. Biodiversity is, therefore, difficult to Value.
- Biodiversity underpins the Services and Benefits, providing a functional role in ensuring the stability, productivity and resilience of ecosystems which should be acknowledged but can be difficult to Value.
- Placing a price on wildlife is uncomfortable philosophical territory. Nature has an intrinsic value in its actual existence, not because of any human Value.
- Breaking down a complex ecosystem into arbitrary, generalised categories, or a single number detracts from its value as a whole and can be seen as an arbitrary classification.
- Many biotic components, often involving significant resources, cannot be readily measured, and therefore more simplistic proxies or surrogates are used instead (e.g. habitat type, condition/quality and extent) with the presumptions this brings regarding how well it can be applied to species/species groups. The full role of individual species within ecosystems is rarely understood so quantifying their full benefits is difficult. There are also problems of scale (extent) (e.g. a small community of plants will be more at risk from 'edge effects' than a large one) and the potential for error in habitat surveys which leads to questions over the robustness of data.
- Measuring natural capital can be resource intensive, particularly due to the need for follow-up measurements.
- There are concerns over the age ('datedness') of data used to build natural capital accounts, scales at which to consider natural capital balances and the reliability of sampling. Also, double counting of benefits may occur.

- There are a variety of guides on definitions/ methodologies – see below.

For ecologists working in an environmental planning context, current CIEEM Ecological Impact Assessment (EcIA) guidelines recognises the importance of recognising cases where ecosystem service provision might be affected as a result of a project's ecological effects, as well as assessing impacts on the usual suite of 'Important Ecological Receptors' (such as designations, habitats and species)[18]; even though to do so would require a multi-disciplinary approach not limited to the specialism of ecology.

Accordingly, natural capital accounts are rarely a complete or true reflection of the entire value of nature, and it is difficult in practice, to 'disentangle' Stock, Services and Benefits from other types during assessment and decision making. Which is why it is important to qualify the benefits by identifying what they are, who will receive them and if anyone will disbenefit; and quantify the benefits, for example tonnes of carbon sequestered prior to monetisation.

4. So, Do I Use a Natural Capital Approach to My Work?

The short answer is probably yes; how you do it will vary.

In simple terms, the practice of natural capital accounting is an exercise in accounting with an environmental emphasis; compiling numbers and spreadsheets. This is probably not an appealing way for most ecologists and environmental land managers to spend their time. But applying a natural capital approach need not necessarily involve the final step of undertaking the accounting process. The principles of natural capital accounting can be applied in a more simplistic manner. For example, for land managers, even the first step of mapping where assets are (broad land cover types) and compiling and keeping a simple annual 'asset register' (e.g. change in extent (ha) and quality each year against a baseline year) can greatly inform decision making.

Within the UK, there are a number of guides on applying a natural capital approach and accounting as follows:

- Girvan, M., Pecnik, G., Smith, M., Grant, H. & Beagley, L. (2018). JNCC report No. 620. *Biodiversity Risk - Integrating Business and Biodiversity in the Tertiary Sector.* JNCC, Peterborough. ISSN 0963-8091.
- Natural Capital Committee - *How to Do It: A Natural Capital Workbook*[19]
- Office for National Statistics - *Principles of Natural Capital Accounting*[20]
- ISO 14008:2019 Monetary Valuation of Environmental Impacts and Related Environmental Aspects — Principles, Requirements and Guidelines[21]
- ISO/FDIS 14007 Environmental Management Guidelines for Determining Environmental Costs and Benefits[22]
- BS 8583 Biodiversity: Guidance for Businesses on Managing the Risks and Opportunities[23]
- BS 8001 The Rise of the Circular Economy[24]

In addition, a British Standard on Natural Capital Accounting for Organisations is in progress. Outside the UK, guidance is also available from the Word Resources Institute[25] and the Natural Capital Coalition Protocol[26].

There are also a cohort of resources for mapping and assessing Services and Benefits available at the Ecosystems Knowledge Network[27]. The Natural Capital Planning Tool (NCPT)[28] is a freely available site assessment tool developed specifically for the planning context. The NCPT allows the indicative but systematic assessment of the likely impact of proposed plans and developments on Natural Capital and the ecosystem services.

The large variety of guides on definitions and methodologies can create confusion for policy-makers and practitioners. There is a need to consolidate this guidance into one or two key resources for ease of use.

The University of Oxford and the Sylva Foundation are working on an online market trading tool (NaturEtrade) to help landowners who sustainably manage their land to be rewarded for providing ecosystem services via investors[29]. In addition, there is work under way by Defra and delivery partners on designing and piloting a similar reward scheme for landowners delivering ecosystem services (the 'public money for public goods' advocated under the emerging Agriculture Bill). These could revolutionise the current Countryside Stewardship grant scheme system.

In Wales, the Wellbeing of Future Generations (Wales) Act 2015 and the Environment (Wales) Act 2016 legislate for ecosystem service consideration in projects and plans. For ecologists and environmental managers working on Environmental Impact Assessments for developments, even in the absence of a strict legislative requirement, a best practice approach would still possible to produce a stand-alone assessment chapter (or a section of the Ecology chapter) focusing on ecosystem services impact assessment and readily produce a limited number of simple text tables, which qualitatively describe the effects upon and mitigation for ecosystem services, for the assessment chapter.

Until further progress is made on the method of valuing biodiversity, perhaps the greatest strength of a natural capital approach for all environmental practitioners and landowners is to begin to think, assess, communicate and act in a more holistic and integrated manner, with greater emphasis on people and place in balance with the environment - whilst being fully aware that natural capital estimates come with a wide confidence limit, and are not hard and fast figures. To do otherwise runs the risk of losing much of that capital, and with it the societal benefits we all seek.

Chartered Institute of Ecology and Environmental Management

43 Southgate Street, Winchester, Hampshire, SO23 9EH

01962 868626 | enquiries@cieem.net | www.cieem.net

Company number: RC000861

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