Landscape Institute Technical Information Note

Natural Capital Accounting

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Contents

This Note is provided for information only. After an introduction to the natural capital concept, the accounting process is explained. Two case studies of natural capital accounts relevant to the landscape profession are provided.

This Technical Information Note was drafted for the Landscape Institute by the Ecosystems Knowledge Network (http://ecosystemsknowledge.net). Comments received from eftec (economics for the environment consultancy) and Aecom are gratefully acknowledged.

1 Introduction

1.1 Some parts of national government, as well as some businesses, are seeking to apply the natural capital concept to the decisions they take. The natural capital concept is about the capacity of the environment to provide public and private benefits (Box 1). Professionals involved in planning, design and management activity relating to land and water need to know the implications of this for their work. This includes members of the landscape profession, for whom this Technical Information Note has been prepared.

1.2 Natural capital accounts are a way of presenting information about the condition of the environment and the value of the services it provides. Landscape professionals can play an important part in enhancing the value of the environment in ways that can subsequently be reflected in natural capital accounts.

1.3 This Note is provided for information only. After an introduction to the natural capital concept, the accounting process is explained. Two case studies of natural capital accounts relevant to the landscape profession are provided.

2 Natural capital

2.1 Human capital, manufactured capital (including the built environment) and financial capital are routinely considered in financial and management decisions. Users of the natural capital concept want the environment to be given due recognition for the way it underpins all economic activity.[1]

2.2 According to the natural capital concept the 'stock' of natural capital in any one area could be reduced even if the 'flow' of benefits is maintained for a period. The goal of those who advocate the concept is ensuring that we maintain the stock of natural capital, i.e. capacity of the environment to yield benefits and not only seek to maximise the flows. This is at the core of sustainable development (Price *et al*., 2010).

2.3 Given that the majority of features and processes in the environment contribute to benefits valued by people, all of the environment can be considered as natural capital. The added value of both the natural capital and ecosystem service concepts is that they make the links between the environment and wellbeing more explicit.

2.4 The increasing awareness of the natural capital concept comes in the context of growing interest in economic evaluation of the environment (for an introduction see Ozdemiroglu and Hails, 2016). The merits of assigning monetary values to aspects of the environment not previously valued are that it allows for the values of such services to be recognised in decisions. There are however, challenges and uncertainties associated with valuing some of these services. Care is needed to identify who values any aspect of the environment and to what end.

2.5 As illustrated in **Box 1**, natural capital cannot be easily isolated from the built environment and other modifications of the environment. This is the case for designed landscapes. The

[1] The term 'natural capital' was originally coined by economist E.F. Schumacher in his book *Small is Beautiful* (Schumacher, 1973).

design professions can play a major part in creating natural capital. This includes features such as green rooves and walls.

2.6 While the terms capital and asset have different meanings in economics, the terms natural capital and natural assets are generally used interchangeably.

Box 1: What is natural capital?

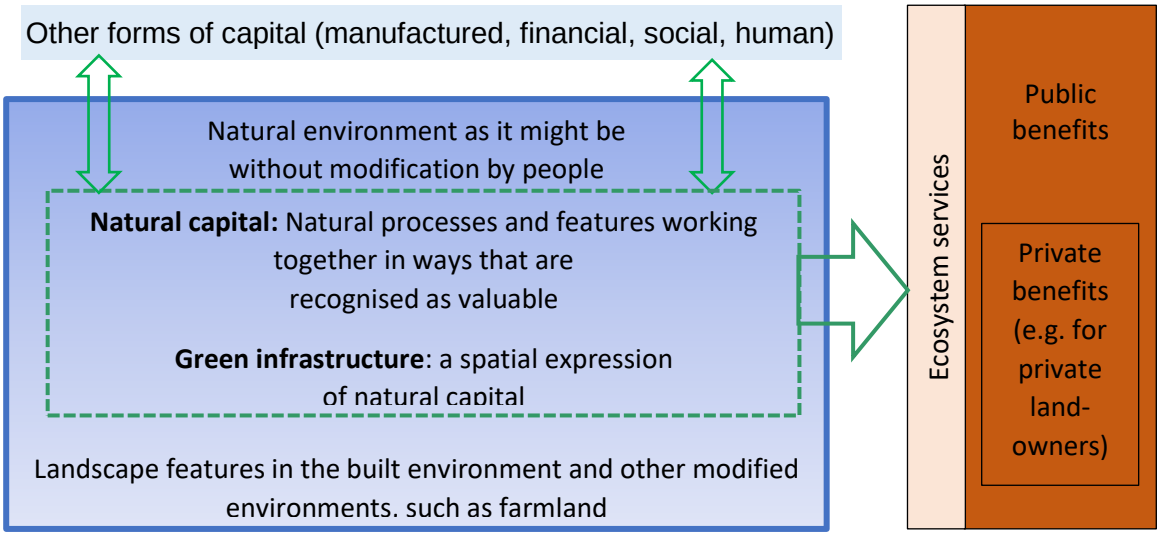
The natural capital concept involves understanding the environment in terms of the value and benefits it provides to people. The Natural Capital Committee, a group appointed by HM Government to advise on natural capital in England, has defined natural capital as follows:

"The elements of nature that directly and indirectly produce value or benefits to people, including ecosystems, species, fresh- water, land, minerals, the air and oceans, as well as natural processes and functions." (Natural Capital Committee, 2014)

In a paper intended to identify natural capital critical to economic welfare, Ekins *et al*. (2003) classified natural capital as air, water, land (including soil, space and landscape) and habitats.

Natural capital should not be considered as a set of isolated features. Work within the UK National Ecosystem Assessment, emphasised that natural capital is a configuration of features working together to deliver value (Dickie *et al*., 2014). For instance, water features, vegetation and landform need to be considered together when delivering the aesthetic qualities of a landscape valued by people. The concept of green infrastructure is closely related to natural capital. It focuses on the spatial configuration of natural features that provide value.

Figure 1 below illustrates how natural capital can be viewed from the perspective of the landscape profession.



3 Accounting for natural capital

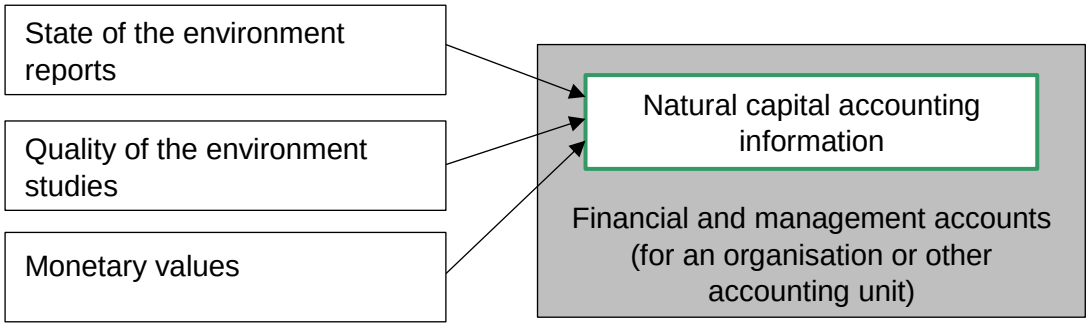
Scope and purpose

3.1 The accountancy profession uses standardised methods to ensure that information about economic activity is systematically collated, analysed, updated and made available to support financial and management decisions. The incorporation of the environment – natural capital – into accounting is a rapidly evolving area. It is being supported by accountancy organisations such as the Institute of Chartered Accountants for England and Wales.[2]

3.2 Organisations typically assess the value of the assets under their control by producing financial accounts. Two key components of these accounts are:

a. **Balance sheets**: summaries of the assets and liabilities attributable to an organisation. They show the condition and value of the stocks of assets.
b. **Profit and loss accounts**: statements of the value derived from the assets over a set period of time. They show the value of the flows of benefits from the assets.

3.3 Natural capital accounting is the process of recognising and valuing the benefits associated with the environment within the accounts produced for an entire organisation or other accounting unit (such as a specific area of land). The focus on the provision of information that supplements existing accounts means that disparate data and metrics on the quantity, quality and economic value of natural capital assets can be organised in a meaningful and comparable way. Natural capital accounting involves more than a description of the state of the environment. As shown in **Figure 2** below, information generated in economic valuations and in general descriptions of the condition of the environment are used in producing accounts.



3.4 Natural capital accounting is intended to inform decisions about finance and management. The systematic process of producing the accounts helps organisations to understand:

- The value of specific aspects of the environment to an organisation or wider society (such as a woodland in reducing flood risk)
- Opportunities for making greater use of natural features, including further investment in them.

It also helps them to monitor changes in the condition of natural capital and the flows of services provided over time. This can grow their understanding of how particular

[2] http://www.icaew.com/en/technical/sustainability/accounting-for-nature

management decisions are impacting upon these values.

Application

3.5 National statistical agencies produce environmental accounts to describe specific ways in which the environment contributes to the economy (such as in timber production) and the impact of economic activity on the environment (such as in the release of pollutants). These are not natural capital accounts because they don't integrate information on stocks of environmental assets and flows of benefits. In addition they don't cover maintenance costs.

3.6 Natural capital accounting can take place within many different accounting units. Scottish Natural Heritage has produced a physical Natural Capital Asset index for all of Scotland. This based on the condition and area of ten land cover types covering Scotland's land area, set against a baseline of the year 2000.[3] The UK Government Office for National Statistics is producing accounts for the whole of the UK with a view to incorporating natural capital into the UK Environmental Accounts by 2020.[4]

3.7 As shown in the table below, natural capital accounts can be produced for areas of land and water at the sub-national level.

Accounting unit	Example
Habitats and specific land use types	• The UK Office for National Statistics has published experimental accounts for woodland, freshwater, and farmland.[5] • The National Trust has produced a natural capital account for Sheffield's greenspace.[6]
Contiguous land areas of mixed use / habitat type	• Natural capital accounts for: o The Land Trust's Beam Parklands in East London (See **Case Study 1**) o The National Trust's Wimpole Estate (Mayer, 2016) o The Duchy of Cornwall's estate (Duchy of Cornwall, 2016).
Administrative areas (such as local authority boundaries)	• Ecosystem accounts (based on habitats) have been produced for protected areas and local authority areas (White *et al*., 2015a). See **Case Study 2**.
Business supply chains	• Kering's Environmental Profit and Loss Account[7]

Note: 'ecosystem accounts' are a subset of accounts which fall within the broader natural capital accounting framework. The term is used to describe accounts focused on ecological

[3] Follow the link at http://www.snh.gov.uk/planning-and-development/economic-value/

[4] https://www.ons.gov.uk/economy/nationalaccounts/uksectoraccounts/methodologies/naturalcapital

[5] https://www.ons.gov.uk/economy/nationalaccounts/uksectoraccounts/methodologies/naturalcapital

[6] http://www.vivideconomics.com/publications/natural-capital-accounting-in-urban-parks

[7] http://www.kering.com/en/sustainability/epl

units such as species, habitat types (woodland, peatland etc), soils and rivers. They don't include features such as minerals and subsoil assets.

Methods

3.8 The Natural Capital Committee for England has published a framework known as Corporate Natural Capital Accounting. This is the primary technical guidance on producing natural capital accounts. The process is explained in **Box 2**. The CNCA framework is intended to be used for a variety of organisations (not just the private sector). It involves collation and presentation of information about the environment in a similar way to other classes of asset.

3.9 The Natural Capital Protocol is a step-by-step process to help businesses worldwide to appraise its impacts and dependencies on natural capital. It focuses users on questions such as "*What are the changes in the state and trends of natural capital related to your business impacts and/or dependencies?*" The Protocol does not provide detailed method statements itself. It allows for use of frameworks such as CNCA (**Box 2**). The Natural Capital Protocol has been piloted by Yorkshire Water in appraising options for infrastructure at its Rivelin Water Treatment Works.

Information requirements

3.10 Natural capital accounting is reliant on the collation of a wide array of data representing the environment and the benefits it provides to people. A scoping exercise may be required to evaluate what benefits derived from the relevant natural capital assets should be included. Absence of specific information, such as the impact of a type of vegetation cover on air quality, is not necessarily a reason for not producing a partial set of accounts. Data gaps, assumptions and uncertainties need to be explained clearly in any accounts so that they can be interpreted correctly.

3.11 There is a large academic and grey literature on economic values of the benefits people receive from the environment. There are also some summary tools to make access to this literature easier, such as:

a. The Environmental Value Lookup Tool is a spreadsheet database of indicative values for environmental impacts.[8]

b. Natural England has produced Microeconomic Evidence for the Benefits of Investment in the Environment (Natural England, 2015)

c. Analytical tools to appraise the value of the environment. The Ecosystems Knowledge Network's Tool Assessor service provides an overview of these tools.[9]

d. The Outdoor Recreation Valuation (ORVal) tool provides outdoor recreation values for outdoor routes and spaces in England.[10]

[8] http://www.eftec.co.uk/eftec-projects/evl-tool

[9] http://ecosystemsknowledge.net/resources/tools/tool-assessor

[10] http://leep.exeter.ac.uk/orval/

3.12 Natural capital accounting always requires the establishment of a baseline against which changes can be evaluated. This baseline may be the point before a project to enhance the environment begins (as in the case of Beam Parklands – see Case Study 1), or some other reference date.

3.13 Natural capital values change over time as the environment, socio-economic factors and the number of beneficiaries change. Therefore, if the population close to, say, a public park increases, or if access to a protected area is improved in some way, the asset value is likely to increase.

Box 2: The Corporate Natural Capital Accounting (CNCA) framework

The following is based on eftec et al (2015a).

The CNCA framework was developed for the Natural Capital Committee for England. It was designed to help organisations and landowners in the UK to account for natural capital.

The framework considers:

- The private value that an organisation receives from its natural capital (usually included in existing financial accounts).
- External benefits, i.e. benefits to others outside the organisation including the general public (typically not accounted for).

The main outputs of the CNCA framework are:

- A natural capital balance sheet: this reports the value of natural capital assets, and the costs associated (liabilities) of maintaining natural capital assets.
- A statement of changes in natural assets: this reports the change (gain or loss) in asset values and liabilities over an appropriate accounting period.

These outputs are based on the information contained within the following 'supporting schedules' to adopt a financial accounting term:

Output	Description	Question
Natural capital asset register	An inventory that holds details of all the natural capital asset stocks relevant to the accounts. Includes assessment of their extent and condition, quality and other relevant factors.	What natural capital assets does the organisation own, manage or hold responsibility for?
Physical flow account	The expected flow of goods and services which are dependent on the natural capital assets stocks that are identified in the asset register.	What flows of benefits do those assets produce for the organisation or wider society?
Monetary account	The value of the flow of public and private goods and services that are captured in the physical flow account.	What is the value of those benefits?
Maintenance cost account	The costed schedule of current and future maintenance activities for natural capital assets.	What does it cost to maintain the natural assets and the flows of benefits?

Expertise requirements

3.14 Natural capital accounts are currently being produced by economists, following methods in accountancy practice. While frameworks for natural capital accounting are available, professional economics and accountancy advice is likely to be required when producing the outputs. Once an organisation establishes a natural capital account, it is likely to be able to repeat it with minimal external advice. As the number of accounts increase, the accountancy profession is likely to show further interest in preparing or at least auditing the accounts.

Future developments

3.15 Natural capital accounting presents opportunities for collaboration between the landscape profession, economists and accountants to demonstrate the value of enhancing outdoor spaces and landscapes. The formation of these accounts could provide a way of prioritising the potential beneficiaries of changes to landscapes. For example, it might help identify the value of the health benefits associated with designed landscapes.

3.16 In the specific context of reduced finance for public parks, the practice of showing nominal (e.g. £1) rather than real asset values for such spaces in local authority accounting is a hurdle. Natural capital accounting can help local authorities show estimates closer to the real asset value (even if the accounts are incomplete) and thereby prove the economic value of public parks for continued or new funding models for urban greenspace.

3.17 Natural capital account outputs such as balance sheets do not present information in a format usable in environmental assessment processes such as EIA or SEA. There is however, potential for the information used to form natural capital accounts to be used in the scoping and delivery of environmental assessment projects.

3.18 As methods in economic valuation advance, a broader range of benefits provided by the environment can be appraised. This may include the appraisal of the cultural value of historic landscape features.

4 Summary

4.1 Natural capital accounting is an emerging way of presenting information about the value of the environment. The goal is incorporation of this information in formal accounts that would be recognised by those involved in financial and management decisions.

4.2 Through site-specific work, members of the landscape profession are likely to be enhancing the value of the environment in ways that can subsequently be reflected in natural capital accounts. This is the case, for example, in improvements to urban greenspace and private landowners in rural areas.

4.3 Landscape professionals are involved in bringing natural features into the built environment. Natural capital accounts can show the value of doing this.

5 References

Dickie, I.; Cryle, P. and Maskell, L. (2014) UK National Ecosystem Assessment Follow-on. Work Package Report 1: Developing the evidence base for a Natural Capital Asset Check: What characteristics should we understand in order to improve environmental appraisal and natural income accounts? UNEP-WCMC, LWEC, UK.

Duchy of Cornwall (2016) Annual Report and Accounts for the Financial Year 2015/16. 90p.

eftec (2015a) *Developing Corporate Natural Capital Accounts.* Final Report for the Natural Capital Committee. Report by eftec in association with RSPB and PwC. 87.

eftec (2015b) *Beam Parklands Natural Capital Account.* Final report for the Greater London Authority. November 2015.

Ekins, P.; Simon, S.; Deutsch, L.; Folke, C. and de Groot, R. (2003) A framework for the practical application of the concepts of critical natural capital and strong sustainability. *Ecological Economics*, **44** (2-3): 165-185.

Mayer, C. (2016) Introduction to the Natural Capital Committee's Corporate Natural Capital Accounting project. ICAEW: London.

Natural Capital Committee (2014) *The State of Natural Capital. Restoring Our Natural Assets*. Natural Capital Committee: London, March 2014. 12p.

Rolls, S. and Sunderland, T. (2014) Microeconomic Evidence for the Benefits of Investment in the Environment 2 (MEBIE2). Natural England Research Reports, Number 057.

Ozdemiroglu, E. and Hails, R. (eds) (2016) *Demystifying Economic Valuation*. Valuing Nature Paper VNP04. Valuing Nature Programme.

Price, R.; Durham, C. and Chan, J. (2010) *Review of the Economics of Sustainable Development*. Government Economic Service.

Schumacher, E.F. (1973) *Small is Beautiful. Economics as if People Mattered*. Blond and Briggs: London.

Scottish Natural Heritage (2015) *Scotland's Natural Capital Asset Index*. 2015 version.

White, C.; Dunscombe, R.; Dvarskas, A.; Eves, C.; Finisdore, J.; Kieboom, E.; Maclean, I.; Obst, C.; Rowcroft, P. and Silcock, P. (2015a) Developing ecosystem accounts for protected areas in England and Scotland: Main Report. Department for Food, Environment & Rural Affairs/The Scottish Government.

White, C., Dunscombe, R., Dvarskas, A., Eves, C., Finisdore, J., Kieboom, E., Maclean, I., Obst, C., Rowcroft, P. and Silcock, P. (2015b), 'Developing ecosystem accounts for protected areas in England and Scotland: The Borders Summary Report', The Scottish Government.

Case Study 1 - Natural capital account for Beam Parklands, East London

What this case study shows

It is possible to show the value of an area of greenspace in a format that mirrors standard financial accounts. By showing how the social value of greenspace far outweighs the annual maintenance costs, a natural capital account can provide the basis for securing long-term investment in an environmental asset.

Context

Beam Parklands occupies 53 hectares of former industrial land in the Borough of Barking and Dagenham in East London. The site was redeveloped between 2009 and 2011 in order to provide a much-needed greenspace in the area. It is now managed by the Land Trust; a non-profit organisation that manages open spaces in partnership with local communities in various parts of England.

Beam Parklands now provides enhanced benefits to people and businesses in the local area, including flood protection, recreation and environmental education. Maintenance of the site for public benefit is secured by means of an endowment.

In 2015, a natural capital account was produced by environmental economists in order to communicate the value of the ecosystem services (benefits) provided by the Parklands.

Approach

The natural capital account for Beam Parklands was produced using the Corporate Natural Capital Accounting framework (see eftec 20015b for details). The main output of a natural capital accounting process is a natural capital balance sheet. The balance sheet for Beam Parklands in 2014 is shown overleaf.

Some of the principal components of the balance sheet are:

- The **baseline value** - a reference point for changes in the condition of the environment. In the case of Beam Parklands, 2009 was used as a reference year, representing the condition of the Parklands before they were redeveloped. The baseline value incorporated estimates of (1) the avoided damage to properties from flooding and (2) the amenity value from recreation.
- After consideration of the enhanced amenity value of the site resulting from redevelopment between 2009 and 2011, the **cumulative gain** in the natural capital asset value was estimated as approximately £10 million.
- The external **revaluation** of £12 million reflects an increase in the population benefiting from the Beam Parklands since 2009.
- The **gross asset value** of £44 million is the sum of the baseline, the gain and the revaluation, expressed as present value over 99 years.
- The principal liability relates to the ongoing **maintenance provision** that is the responsibility of the Land Trust. The estimated value of £1 million is based on actions stipulated in the 2012 to 2017 management plan for Beam Parklands.

Beam Parkland Natural Capital Balance Sheet at 31st December 2014

	Year 2014		
	Private (£ m)	External (£ m)	Total value (£ m)
Natural Capital Assets			
Baseline value (2009)	(<1)	22	21
Cumulative gains (/losses)	-	10	10
Additions (/disposals)	-	-	-
Revaluations and adjustments	<<1	12	12
Gross asset value	(<1)	44	43
Natural Capital Liabilities			
Legal provisions	(1)	(<<1)	(1)
Other maintenance provisions	-	-	-
Total maintenance provisions	(1)	(<<1)	(1)
Total Net Natural Capital			42

Notes:

1. *All values in 2014 prices (£ million) in present value terms over 99 years.*
2. *Negative values are presented in parenthesis.*
3. *Figures have been rounded to the nearest £1 million (unless <£1 million, whereby less than £1 million (<1) or significantly less than £1 million (<<1) is used). As a result, component values may not sum to totals.*

Significance of the account

The total net natural capital value for Beam Parklands was calculated as £42 million. This far exceeds the long term maintenance cost of £1 million. The account for Beam Parklands is a resource to help the Land Trust to demonstrate the wider social value associated with its activities. This includes secure additional funding through financial mechanisms such as endowments.

While the account is novel in its approach, there is potential to consider more functions of the environment in the valuation. This includes, for example, the effect of the site on the health of those who access it, or live close to it.

Image of Beam Parklands. Credit: The Land Trust

Case study 2: Natural capital 'ecosystem' accounts for the Scottish Borders

What this case study shows

Natural capital accounts can be produced for a contiguous landscape area based on broad habitat types. There are considerable scientific and data challenges in linking habitat extent and condition with physical and monetary flows of ecosystem services.

Context

Scottish Borders is a largely rural area occupying 4,700 km^2 in the eastern part of the Southern Uplands of Scotland. It is delineated by the Scottish Borders Council area. The eastern part is largely covered by enclosed farmland. The western part is dominated by woodland, semi-natural grassland and mountains, moors and heaths. The area has already been the subject of a Scottish Government-funded pilot project to inform new ways of achieving sustainable land use management.

Approach

The experimental accounts for the Scottish Borders followed a process being developed by the UK Office for National Statistics and Defra. It used guidance on ecosystem accounting available within the UN System of Environmental Economic Accounting. Further details in White *et al*. (2015b).

The Scottish Borders land area was categorised according to six broad habitat types (woodland, enclosed farmland, coastal margins etc) using Land Cover map.[11] A set of crude indicators was developed to quantify the extent and condition of each of the habitats. This was based on factors such as topsoil carbon concentration, the presence of sites designated for their nature conservation importance, and accessibility by the public.

For each habitat type, a one page 'asset account' table was produced. These summarise the extent and condition for each habitat in 2013.

Physical flows of ecosystem services were determined for crops, livestock, wild foods, timber, energy, air quality regulation, climate regulation, aesthetic values and existence values. Data constraints meant that it was not possible to quantify the flows of water supplies, flood protection, recreation, education or cultural heritage.

Below: An extract from the physical flows account (from White, 2015b).

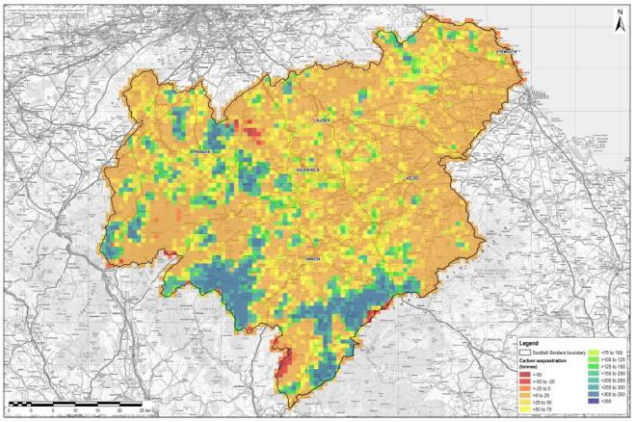
Ecosystem service	Measurement unit	Woodland	Enclosed farmland	Semi-natural grassland
Crops	tonnes crops	-	592,923	-
Livestock	livestock units	-	99,986	41,438
Wild foods (game birds)	kg meat	-	21,228	-
Wild foods (venison)	kg meat	1,620	-	-
Wild foods (fish)	kg meat	-	-	-
Drinking water	m^3 water	-	-	-
Timber	tonnes timber	459,667	-	-
Other water uses	m^3 water	-	-	-
Energy	tonnes woodfuel	66,123	-	-
Air quality	Tonnes PM_{10}	15,373	1,009	607
Flood protection	-	-	-	-
Climate regulation	Tonnes carbon	288,669	5,171	14,020

[11] http://www.ceh.ac.uk/services/land-cover-map-2007

Monetary flows for all the services were determined using a variety of valuation techniques, including market prices (for products such as crops) and avoided damage costs (for conditions such as air quality). Due to challenges with data availability and the use of valuation approaches, it was not possible to value aesthetic or existence values.

Alongside the asset accounts, GIS maps were produced for several ecosystem services at a spatial resolution of 1 km^2.

Below: Map of climate regulation (measured as tonnes of carbon sequestered in 2013). From White (2015b)



The accounts are accompanied by detailed explanatory notes describing the assumptions made and the datasets used. The notes highlight the data and methodological challenges of monetary valuation of any ecosystem service. They also highlight the research requirements to characterise the link between the condition of a habitat and the provision of ecosystem services from it.

Significance of the accounts

The Scottish Borders experimental accounts were published alongside accounts for Aberdeenshire and four protected areas in England. These are the first ecosystem accounts to be produced at this spatial scale in the UK. The significance of ecosystem accounts for landscape areas lies in their standardised format, which mirrors standard accounting procedures. It also enables more localised accounts to be linked to national accounts.

Monetary accounts for landscape areas covering land uses help to show which habitats yield the greatest value per unit area. For ecosystem services included in the Scottish Borders account, woodland was the provider of the greatest monetary value per unit area. A finding such as this could help direct new investment, as well as make the case for protection of existing habitat.

There is potential for accounts such as those produced for the Scottish Borders to influence certain statutory functions of local authorities such as local planning and flood risk management. The information could also inform the management plans of organisations seeking to protect and enhance landscape areas such as National Parks. It could also form the basis for bringing landowners and land managers together into new collaborative arrangements such as payments for ecosystem service schemes.

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