Institution: University of Nottingham

Unit of Assessment: UoA17 - Geography

Title of case study: Influencing UK and European environmental policy by demonstrating the value of the ecosystem approach

1. Summary of the impact

The ecosystem approach has been advocated as a way of moving consideration of biodiversity and the environment closer to the centre of decision-making. A conceptual 'cascade model', developed by Haines-Young and Potschin, has successfully overcome the challenge of the ecosystem approach by showing how it can be used in practice. The cascade model forms the basis of the Common International Classification of Ecosystem Services (CICES), recently introduced by the European Environment Agency (EEA), and has changed how UK and European policy-makers define the relationship between nature and the economy.

2. Underpinning research

Recent debates about the relationship between nature and the economy have been framed around the idea of ecosystem services, defined as the contributions that ecosystems make to human well-being. If ecosystem services are to be managed sustainably, the value of ecosystem services, need to be understood and properly taken into account. As a result, policy-makers have argued that we need to embed the ecosystem approach into decision-making.

The adoption of the ecosystem approach has posed a major challenge to the science and policy communities because it involves working across a number of different knowledge domains and coordinating policy development and implementation across different sectors. We need to understand, for example, how ecosystem structures and processes lead to benefits for people, how societies value these benefits, and how this information feeds back into decisions. By clarifying the relationship between key concepts by means of a cascade model (Fig. 1), Haines-Young (Professor of Environmental Management) and Potschin (Senior Research Fellow) demonstrate how the production chain linking nature and society can be described and used by decision-makers (1, 2 & 4).

The research began in 2005/6 with a review for Defra of current approaches to defining environmental limits (Grant a). This identified the importance of ecosystem services and proposed an initial framework for understanding how they function. The conceptual framework was refined by further research commissioned by Defra on the status of ecosystem services associated with England's terrestrial ecosystems (Grant b). The model identifies how ecological structures and processes are linked to societal values. It also shows how these linkages can be used to understand the notion of environmental limits and the general implications that follow for the sustainability debate. Critically, it shows how these concepts can be applied in policy and practice.

The cascade model provided the conceptual basis for the development of international environmental accounting and mapping initiatives led by the EEA and others (3). The model was used to design CICES because it enabled the concept of final ecosystem services to be defined and linked to internal standards to classify economic products and activities. CICES forms part of current proposals by the UN to revise the System of Integrated Environmental and Economic Accounts (SEEA). The ability of CICES and the cascade model to support mapping activities has recently been recognised at EU level.

3. References to the research

1. DeGroot, R., Fisher, B., Christie, M., **Haines-Young, R.** *et al.* (2010) Integrating the ecological and economic dimensions in biodiversity and ecosystem service valuation, in Kumar, P. (ed.) *The Economics of Ecosystems and Biodiversity: Ecological and Economic Foundations* (The Economics of Ecosystems and Biodiversity), pp. 9-40. Available at: http://www.teebweb.org/wp-content/uploads/2013/04/D0-Chapter-1-Integrating-the-ecological-and-economic-dimensions-in-biodiversity-and-ecosystem-service-valuation.pdf
2. **Haines-Young, R.** and **Potschin, M.** (2010) The links between biodiversity, ecosystem services and human well-being, in Raffaelli, D. G. and Frid, C. L. J. (eds) *Ecosystem Ecology: A New Synthesis* (Cambridge: Cambridge University Press/British Ecological Society), pp. 110-139. Available at: http://www.nottingham.ac.uk/CEM/pdf/Haines-Young&Potschin_2010.pdf
3. **Haines-Young, R.** and **Potschin, M.** (2013) *Common International Classification of Ecosystem Services (CICES): Consultation on Version 4, August-December 2012* (EEA Framework Contract No EEA/IEA/09/003). Available at: http://cices.eu/wp-content/uploads/2012/07/CICES-V43_Revised-Final_Report_29012013.pdf
4. **Potschin, M.** and **Haines-Young, R.** (2011) Ecosystem services: exploring a geographical perspective, *Progress in Physical Geography* 35: 575-594. DOI: 10.1177/0309133311423172

Copies of all of the above are also available from HEI on request.

Grants

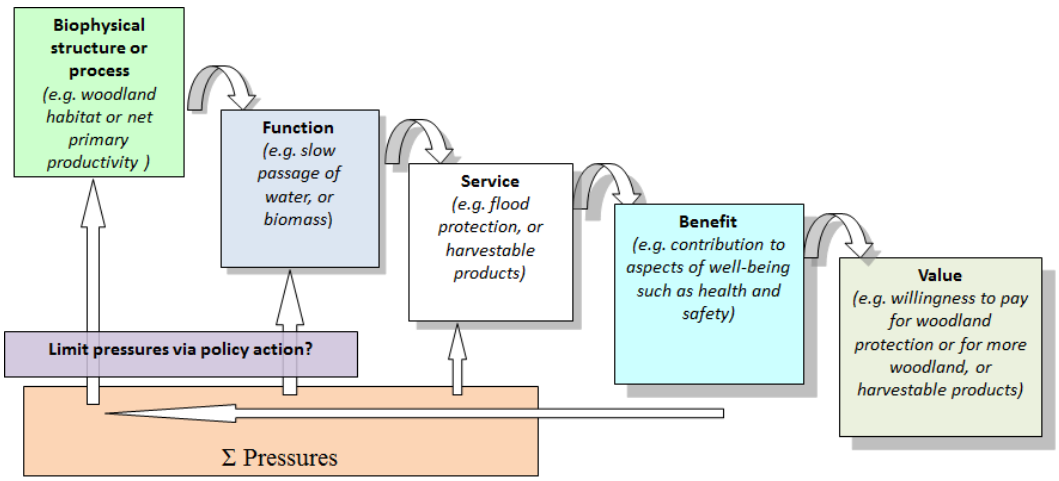
a) Defra (£91,000) to Haines-Young (P-I) and Potschin (Co-I) for 'Defining and Identifying Environmental Limits for Sustainable Development: Scoping Study (Thresholds)' (September 2005 to February 2006) (NR0102)
b) Defra (£157,000) to Haines-Young (P-I) and Potschin (Co-I) for 'England's Terrestrial Ecosystem Services and the Rationale for an Ecosystem Approach' (September 2006 to September 2007) (NR0107).

4. Details of the impact

Haines-Young and Potschin's cascade model (Fig. 1) was used by Defra in the 2010 revision of its *Action Plan for Embedding the Ecosystems Approach*. Alongside a version of the model, the report stated that: "***We are beginning to understand better in a number of areas how these services also relate to the structure and function of our ecosystems***" (a, p. 4). The same report also states that the cascade model allows "***different groups of experts to communicate with each other – ecologists and earth scientists looking at the first two steps need to put their work through the "translation" of ecosystem services, to help them explain issues of concern to them [and] to the economists and social scientists who might be studying the last steps of the process***" (a, p. 6). The revised *Action Plan* has underpinned Defra's application of the ecosystem approach since 2010 and the cascade model has been used to disseminate these ideas more widely. Natural England, for example, has used the model to explain "***understanding of the flow of ecosystem services from the environment***" and to specify an Ecosystem Service Transfer Tool for the organisation (f).

The influence of the cascade model in national policy debates is evidenced by documents from the Joint Nature Conservation Committee (JNCC), the agency that advises the UK Government and devolved administrations on UK-wide and international nature conservation. In 2009, the cascade model was presented as part of a Committee Briefing paper to stimulate discussion of how to define the relationship between biodiversity, ecosystem function and human well-being (b). This document notes the simplicity of the model, adding that: "***it provides a template that can be used to identify the different elements that have to be taken into account when making some kind of assessment or analysis of ecosystem services. The model can be used to identify the different categories or types of things that are useful for the researcher or decision maker to consider***" (b, para 3.3). The cascade model has been especially useful as a means of demonstrating key issues concerning the relationship between ecosystem services/functions and products developed by JNCC (g).

Fig 1: The cascade model (after Potschin and Haines-Young, 2011)



The influence of the model is also highlighted by its use in a document prepared for Members of Parliament by the Parliamentary Office for Science and Technology (POST), *Living Within Environmental Limits*, and in subsequent POST briefing notes (c). CICES and the cascade model were used to explain both the need for natural capital accounting and how it could be undertaken. In the international arena, the model has also been used to communicate the essential elements of the ecosystem service paradigm, especially within the EU (h, i).

In addition to its influence at a conceptual level, the cascade model has had impact in terms of application through the development of a framework for the classification of ecosystem services and the assistance it provides for mapping ecosystem services (j). Since 2009, Haines-Young and Potschin have led two rounds of consultation on the design for a CICES. These proposals influenced the input of the EEA into the 2012 revision of the System of Integrated Environmental and Economic Accounting (SEEA) led by the United Nations Statistical Division (i). According to the Head of Integrated Environmental Assessment Programme at the EEA, "***the cascade model was used to inform our proposals for a revised version of CICES (Version 4.3) and to explain the logic for the revisions during the recent consultation process***" (h).

CICES forms part of the recommendations submitted by the UN Committee of Experts on Environmental-Economic Accounting (UNCEEA) to the 44th session of the UN Statistical Commission in March 2013 (d, section 3.3). Elsewhere, the influence of CICES on thinking and practice is evidenced by its use by the Swiss Federal Office for the Environment as a framework for welfare-related environmental reporting (e, pp. 7-8) and the classification of ecosystem services in Belgium, as well as proposals for future initiatives in Germany and Finland. Most significantly, CICES has been proposed as the basis for mapping ecosystem services by the EU in support of its Biodiversity Strategy 2020 (e, p. 10). The model's impact here is in enabling the standardisation of approaches and reporting outcomes. In the context of CICES, a Eurostat officer notes the importance of standardisation, adding that "***The classification also divides up the subject matter in a way that influences how data are collected, integrated, organised and presented***" (i).

5. Sources to corroborate the impact

Reports or documents

a) Defra (2010) *Delivering a Healthy Natural Environment: An Update to 'Securing a Healthy Natural Environment: An Action Plan for Embedding an Ecosystems Approach'*. Available at: http://archive.defra.gov.uk/environment/policy/natural-environ/documents/healthy-nat-environ.pdf. This corroborates the claim about the national impact of the research on

environmental policy.

b) Joint Nature Conservation Committee (2009) *Ecosystem Services: A Tool for Nature Conservation*. Available at: http://jncc.defra.gov.uk/pdf/comm09D05.pdf. This corroborates the claim about the international impact of the research on environmental policy.

c) POST (2011) *Natural Capital Accounting: POSTNOTE Number 376*, *May 2011*. Houses of Parliament, Parliamentary Office of Science and Technology. Available at: www.parliament.uk/briefing-papers/POST-PN-376. This corroborates the claim about the national impact of the research on policy debates.

d) European Commission, Organisation for Economic Cooperation and Development, United Nations and World Bank (2013) *System of Environmental-Economic Accounting 2012 Experimental Ecosystem Accounting*. Available at: http://unstats.un.org/unsd/envaccounting/eea_white_cover.pdf. This corroborates the claim about the international impact of the research on environmental accounting.

e) Staub C. *et al.* (2011) *Indicators for Ecosystem Goods and Services: Framework, Methodology and Recommendations for a Welfare-Related Environmental Reporting* (Bern: Federal Office for the Environment, Environmental Studies No. 1102, 17 S). Available at: http://www.bafu.admin.ch/publikationen/publikation/01587/index.html?lang=en. This corroborates the claim about the international impact of the research.

Copies of all of the above also available from HEI on request.

Individual beneficiaries

f) Responses from Head of Profession, Ecosystem Approach at Natural England (details provided on submission system), 6 June 2013. This corroborates the use of the cascade model in UK environment policy. Available from HEI on request. The beneficiary can be contacted by the panel if further testimony is required.

g) Responses from Non-Executive Chair of Committee and Support Company, Joint Nature Conservation Committee (JNCC) (details provided on submission system), 19 May 2013. This corroborates the use of the cascade model in national and international environment policy. Available from HEI on request. The beneficiary can be contacted by the panel if further testimony is required.

h) Responses from Head of Integrated Environmental Assessment Programme, European Environment Agency (details provided on submission system), 5 June 2013. This corroborates the use of the cascade model in communicating elements of the 'ecosystem services' paradigm. Available from HEI on request. The beneficiary can be contacted by the panel if further testimony is required.

i) Responses from Team Leader, Monetary Environmental Accounts Team (details provided on submission system), 5 June 2013. This corroborates the international impact of CICES. Available from HEI on request. The beneficiary can be contacted by the panel if further testimony is required.

j) Responses from Scientific Officer at Joint Research Centre, ISPRA (details provided on submission system), 6 June 2013. This corroborates the international impact of the cascade model and CICES. Available from HEI on request. The beneficiary can be contacted by the panel if further testimony is required.