Scientific evidence, expert entrepreneurship, and ecosystem narratives in the UK Natural Environment *White Paper*

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ABSTRACT

The Natural Environment *White Paper* represents the most important conservation policy shift in the United Kingdom (UK) in twenty years. It formalises the ecosystem approach within national policy objectives and emphasises the economic value of ecosystem services. By analysing the use of various evidence sources, the involvement of science entrepreneurs, and the development of policy narratives, our goal was to understand factors that influenced adoption of an ecosystem service framework in the UK. We interviewed 48 policy actors and found that centrally-sponsored synthesis reports with entrepreneurial authors provided the most influential expert-based knowledge in the development of the *White Paper*. More recently published reports had greater influence, yet the window of opportunity for scientific evidence having policy impact was greater in the problem-setting stages of policy development. The interaction between teams preparing syntheses and expert entrepreneurs helped influence the construction of strategic policy narratives. Those narratives increased the impact of scientific evidence by communicating and framing key policy-salient messages, and brokering between broad ecosystem-based and environmental economics narratives. The combination of ecological and economics evidence was particularly salient in the UK case due to the context of continued biodiversity loss and the acceptability of valuation narratives within central government. Our findings suggest that evidence impact varies at different stages of the policy process, and that this is driven by the interplay of contextual factors like policy timing, personal influence, and the competition between different sets of actors and narratives.

1. Introduction

Academics and policy-makers have long worried about how to understand and improve the way science informs policy (Bijker et al., 2009; Cozzens and Woodhouse, 2002). Due to the urgency of environmental change (Rockström et al., 2009), increasing the uptake of scientific expertise is a particular concern for researchers in conservation science (Robinson, 2006; Rudd, 2011). Environmental science and management have undergone a shift over the past three decades, from conservation approaches that originally focused on protecting individual species and habitats (Franklin, 1993), to ecosystem-based management (EBM) focused on preserving and improving the integrity of ecosystems health and functioning (Christensen et al., 1996), and, most recently, to a more utilitarian ecosystem service approach (Gómez-Baggethun et al., 2010), where the natural world is re-framed in terms of the "benefits people obtain from ecosystems" (Hassan et al., 2005).

The ecosystem services approach has entered the environmental policy mainstream in recent years (COP10, 2010; Hassan et al., 2005), with economic narratives of ecosystem services becoming increasingly prominent (Cowell and Lennon, 2014; Gómez-Baggethun et al., 2010; Sarkki et al., 2013). They entail the quantification, and commonly monetization, of aspects of natural systems that sustain and regulate ecosystem health and functioning, or support the provision of environmental goods (Daily et al., 1997). The economic framing of ecosystem service stocks and flows has been found to resonate with policymakers (Raffaelli and White, 2013), albeit with important differences in the way that the concepts are understood in ecological and economic terms.

The United Kingdom (UK) is leading the way in the adoption of ecosystem service decision-making frameworks (Bateman et al., 2013). The Natural Environment *White Paper* (Defra, 2011) (henceforth *White Paper*) introduced concepts of ecosystem service delivery and natural stock accounting, and established the Natural Capital Committee (NCC) to advise the UK Treasury on the value of

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natural assets to the economy. At a conceptual level, the *White Paper* aimed to 'reconnect people and nature' by increasing public awareness of the importance of natural environments to health and society, and connecting economic productivity to the health of natural systems (Defra, 2011).

In the UK, the application of ecosystem services measures to environmental management has been adopted quickly and heartily, arguably more so than in any other G20 nation. That raises questions about what conditions existed in the UK to facilitate such wholesale adoption and more broadly on the effect of scientific evidence relative to other factors influencing UK policy-making. There are numerous ways to approach the thorny issue of 'research impact' and the interaction of science and policy in decision-making (Jasanoff and Wynne, 1998; Van den Hove, 2007; Weiss, 1991). Both the expertise of scientists and evidence about the state of the world play important roles in explaining policy development but science is only one of many inputs in the policy-making process (Weiss, 1991). Beyond the credibility of scientific evidence, shifts in policy may also be explained by social processes of negotiation and deliberation (Bijker et al., 2009; Jasanoff, 2004) and the work of brokers and entrepreneurs to increase the salience and relevance of new information (Pielke, 2007).

Our goal in this study was thus to help build understanding about factors that influenced the recent adoption of the economically-oriented ecosystem services framework in the UK. In order to do this, we interviewed 48 UK policy actors, asking them about the sources of information and knowledge mobilization efforts that were most influential during the development of the *White Paper*. These findings have broader relevance to understanding how science informs policy through policy narratives and the importance of contextual factors that influence the uptake of scientific evidence and concepts. In the final analysis, we use these findings to explore the wider implications for how researchers should approach influencing policy and provide recommendations for better informing policy with science.

2. Background

In our daily lives we as individuals organise, process, and communicate new information and ideas through the construction and dissemination of narratives (Herman, 2004; Stone, 2002). Narratives are used to structure causal explanations of the world through arguments, dramatic rhetorical devices, characters, and morals (McBeth et al., 2014; Shanahan et al., 2011). The same process occurs in science and policy spheres as researchers seek to convey the insights, relevance, and implications of new and existing evidence, and policy actors develop strategic narrative techniques which apply scientific information to form compelling policy narratives for use in policy debate and decision-making (Hajer, 1993).

The Narrative Policy Framework (NPF) provides a set of analytical tools to analyse the construction of narrative discourse and their effects on policy change (Jones and McBeth, 2010; McBeth et al., 2014). The construction and interpretation of scientific information can be explored through analysis of micro-level narrative strategies, defined as the "how, when and why policy narratives shape pubic policy processes, designs and outcomes" (McBeth et al., 2014, p. 237). These include direct strategies that improve the communication, translation and utilization of technical evidence into a format that is salient to non-expert actors. Meso-level narratives involve the construction of causal stories that create links from a problem's cause to a wider societal effect, in a way that bestows authority on those groups offering relevant solutions. Meso-level narrative strategies include scaling-up and the use of policy metaphors, both of which aim to associate a policy issue to problems of greater perceived societal weight (Stone, 2002). Finally, macro-level narratives are defined as the broad concepts and overarching metanarratives that promote a broader worldview and encompass the assumptions behind discursive arguments. Common examples include consumerism, environmentalism, and traditionalism (McBeth and Shanahan, 2004), but could also include divergences in ecological and economic approaches to environmental conservation (c.f., Kwa, 2002).

We combine NPF analysis with insights on the communication and translation of scientific evidence across science-policy boundaries as developed by Cash et al. (2003). Scientific evidence, as presented in expert reports and publications, is likely to be most effective and influential when it "simultaneously enhances the salience, credibility, and legitimacy of information" (Cash et al., 2003, p. 8087). Credibility is defined through peer-approved methods of evidence production and claims to scientific objectivity. Legitimacy, in turn, is shaped by perceptions of fairness, appropriateness, and acceptance by multiple audiences. Finally, the salience of information depends on the perceived relevance of scientific evidence to the problems being addressed by societal interventions and policy discourse (see also, Sarkki et al., 2013).

Consideration should also be made of the personal factors influencing the adoption of evidence supporting ecosystem-based management. We explore the influence of key individuals in communicating evidence and shaping policy narratives. Previous studies on knowledge brokerage have identified individuals or organizations who act as intermediaries in the knowledge production process by developing relationships and bridging networks between research and policy institutions (Oldham and McLean, 1997; Pielke, 2007; Ward et al., 2009). In this paper we focus on expert knowledge producers who act as 'entrepreneurs', helping to shape policy-maker preferences by converting evidence into a policy-relevant form most relevant for policy-makers (Kingdon, 1995). In particular, we explore how entrepreneurs provide 'trans-scientific expert judgements' (Brickman et al., 1985): input on areas of policy that go beyond scientists' own expertise. In this way, expert entrepreneurs may serve an important role linking complex evidence to broader concepts and ideas used for strategic policy purposes.

3. Material and methods

3.1. Interview protocol

We used a mixed structured and semi-structured interview protocol. We first asked background questions on respondents' professional role, field of expertise, education level, discipline, and role in the *White Paper* development process. In Section 2, we provided respondents with a list of 17 evidence documents, reports, and journal articles (assembled through literature review of documentary sources cited in the White Paper and its supporting documents – see Lawton and Rudd, 2013a). Based only on the titles of the reports, we asked respondents to rate the importance of each evidence source on the White Paper on a Likert-scale of 1–5 (very important to not at all important; with a 'do not know' option) at three temporal points: during initial problem-setting; during construction of policy solutions or output documents; and, where appropriate, during implementation. We asked follow-up questions on the evidence reports identified as most influential by respondents.

In Section 3, with an open question we identified high-profile entrepreneurs contributing to the *White Paper* process by asking which individuals or organizations championed each evidence source from Section 2. Responses were coded in NVivo (2012) after interviews were transcribed. We asked a set of semi-structured