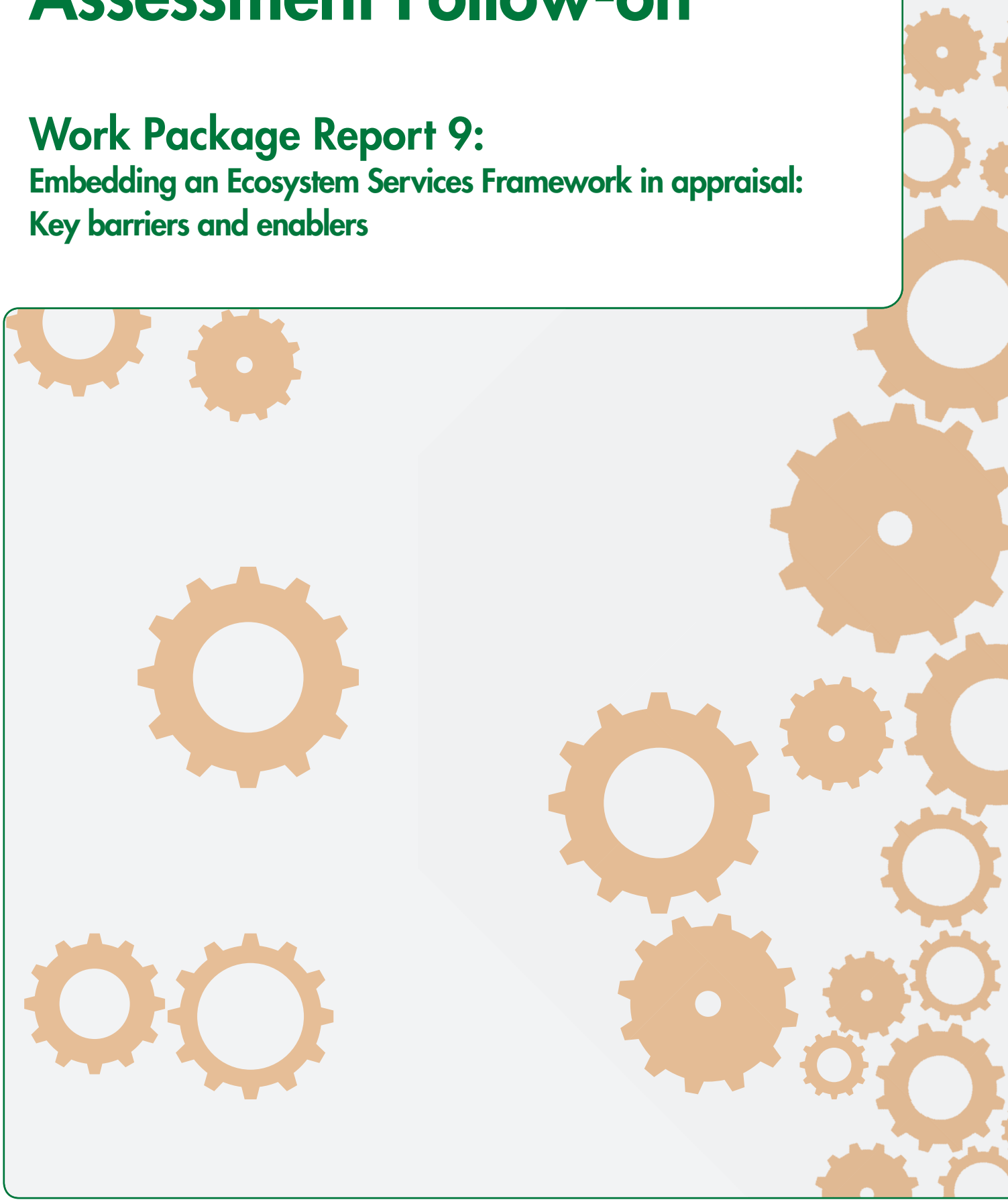
UK National Ecosystem Assessment Follow-on

Work Package Report 9:

Embedding an Ecosystem Services Framework in appraisal: Key barriers and enablers



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Contents

Abbreviations and Acronyms

Defra Department for Environment, Food and Rural Affairs
EIA Environmental Impact Assessment
EU European Union
ESF Ecosystem Services Framework
IA Impact Assessment
IEMA Institute of Environmental Management and Assessment
IFC International Finance Corporation
MA Millennium Ecosysem Assessment
NEA National Ecosystem Assessment
OECD Organisation for Economic Cooperation and Development
SEA Strategic Environmental Assessment
UK United Kingdom

Key Findings

Policy appraisal is widely practiced in government from the EU level right down to the lowest level of decision-making within individual Member States. In theory, it seeks to align individual policies with long-term objectives, is widely advocated by international bodies, and has a long history of engaging with environmental concerns. Therefore, in principle, policy appraisal is a critical venue for embedding ecosystem knowledge into policy processes.

Appraisal practice in the UK consistently falls short of high-level political ambitions to explicitly embed an Ecosystem Services Framework in decision-making. While few appraisals are explicitly framed in terms of an Ecosystem Services Framework, many of its constituent elements are often implicitly covered.

The Ecosystem Services Framework places a great deal of emphasis on securing a better knowledge of ecosystem functions and processes. But possessing 'more knowledge' does not necessarily mean that it will be embedded in appraisal and, subsequently, inform decision-making. Institutional cultures and behaviours determine how such knowledge is used. Crucially, these cultures and behaviours vary within, and between, different levels of appraisal.

The key barriers and enablers to embedding the Ecosystem Services Framework have been identified.

At the *micro level* of practitioner behaviour, barriers to embedding the Ecosystem Services Framework include:

(i) limited resources available to officials undertaking appraisal (e.g. data, time, money, skills, training and guidance);
(ii) limited awareness of the concept of the Framework; and
(iii) difficulty in understanding the concepts underlying the Framework.

Greater embedding of the Framework may result from actions such as:

(i) more integrated datasets formatted around the core concepts of the Framework in order to encourage a mixed-methods approach;
(ii) awareness-raising about the concepts of the Framework, highlighting its value in government and beyond;
(iii) simplifying and tailoring the language of the Framework to suit different audiences; and
(iv) having more demonstration projects to show what the Framework can contribute to appraisal.

At the *meso scale* of institutional culture and practice, barriers to embedding the Ecosystem Services Framework include:

(i) fragmented working across departments and levels of governance;
(ii) different legal requirements across appraisal levels and types; and
(iii) narrow focus of appraisals.

Greater embedding of the Framework may result from actions such as*:*

(i) stronger and sustained high-level leadership, backed up by statutory quality control measures and peer review by professional bodies and stakeholders;
(ii) integrating the Framework into existing institutional mechanisms and processes (e.g. through guidance for appraisal of the planning process);
(iii) better integration of mechanisms and institutions to help join-up policy (e.g. inter-sector working groups, and cross-sector training); and
(iv) creating neutral spaces such as workshops and knowledge networks to encourage communication and learning between actors and sectors.

At the *macro scale* of the wider social and political context, barriers to embedding the Ecosystem Services Framework include:

(i) underlying societal values – and, hence, political priorities – not being aligned with ecosystem protection.

Greater embedding of the Framework may result from actions such as*:*

(i) engaging with the many potential uses of the Framework, including using it as a platform to stimulate debate and enhance communication between different stakeholders;
(ii) using political 'windows of opportunity', such as floods, periodic media interest, or changes in government; and
(iii) encouraging partnership between government, non-government and international bodies to promote and employ the Framework.

There is significant interaction between types of barriers and enablers at different scales. Finding the right mix of approaches is what really matters, not focusing on one or two headline-grabbing changes at one level. This requires a combination of political leadership and opportunism, a commitment to engage in joint learning exercises (such as the UK NEAFO), and the institutional capacity to put the Ecosystem Services Framework into practice.

The whole issue of how the Ecosystem Services Framework is and/or could be embedded into decision-making is under-researched. Work package 10 has begun to fill this gap, but we present a number of additional areas that researchers and practitioners could jointly address in order to more deeply embed the Framework in decision-making.

Summary

The UK National Ecosystem Assessment (NEA) perceived the problem of how to better safeguard ecosystems to be partly about new knowledge development, but also about *inadequate knowledge utilisation.* However, the UK NEA did not systematically explore why this situation had arisen or what could be done to address it. This Work Package therefore investigates the scope for using an Ecosystem Services Framework (ESF) to embed a fuller consideration of ecosystem knowledge in UK *appraisal* systems, that is: national policy level Impact Assessment (IA); plan and programme level Strategic Environmental Assessment (SEA); and project level Environmental Impact Assessment (EIA). In this Work Package, ecosystem knowledge is taken to refer to **knowledge on both the current state of, and the potential impact of policy interventions on, the services that ecosystems provide directly and indirectly to human well-being**. All three appraisal levels are well-established, and hence are potentially important venues for more deeply embedding ecosystem knowledge in decision making. However, they also incorporate many more policy concerns than just the environment (EIA and SEA are applied in many sectors, most commonly via the planning process; IA is applied to all areas of policy making), hence the importance of understanding the interaction of enablers and barriers. The Work Package does this by extending on the 'policy response' examples of Chapter 27 of the UK NEA, to produce a more systematic analysis of what facilitates and what hinders the embedding of the ESF in everyday decision making practices. It draws on:

- a comprehensive review of the literature;
- analysis of a large number of published appraisal documents to examine how far the ESF has been considered in recent policies, programmes and projects;
- interviews with practitioners who undertake, oversee, and are affected by appraisal, to investigate the validity of the lessons drawn and better understand the patterns observed in the documentary analysis.

The most salient barriers and enablers that arise from this analysis are classified into three main types: *micro* ('behaviour'), *meso* ('institutional culture') and *macro* ('social and political context').

9.S.1 Main Findings

The literature review confirmed the existence of a well-reported 'gap' between principles and practices: appraisal practice consistently falls short of the high level political ambition to embed ecosystem knowledge in decision making. The document analysis demonstrated that few appraisals of any type have fully embedded the ESF. However, there is evidence – especially in EIAs and SEAs - of some elements of ESF thinking (e.g. an integrated approach and an implicit consideration of different types of services such as regulating, provisioning and cultural services) even though there is little explicit mention of ESF as a framing concept. The interviews explored the underlying reasons for these patterns.

Overall, the Work Package makes the following key points:

Possessing 'more knowledge' (a *micro scale* issue) does not necessarily mean that it will be embedded in appraisal and hence inform decision making. Institutional cultures and behaviours determine how knowledge is or is not used. Improving the embedding of knowledge requires a better understanding of the institutional environment at the *micro*, *meso* and *macro scale*s. Communication between knowledge producers, knowledge brokers and knowledge users is therefore crucial to understanding how knowledge can be tailored to the institutional context in which it is intended to be used.

Each level of appraisal has barriers and enablers to their potential as a venue for embedding an ESF. The legal mandate of SEA and EIA requires assessment of environmental impacts and should include stakeholder engagement, thus potentially facilitating ESF thinking. However, the analysis in these types of appraisal must conform to current legal standards or run the risk of judicial review which may reduce the likelihood of fully embedding an ESF. At the IA level – and to a lesser extent at the SEA level - there is scope for more strategic decision-making, but at present IA primarily focuses on reducing regulatory burdens on particular sectors. Cross-cutting initiatives like the ESF are therefore squeezed out. There is also a need to link across appraisal types, where possible, to ensure they build on one another and to promote learning opportunities, but this is difficult to achieve in practice.

The use of the ESF can extend well beyond an appraisal-like analysis. This can include more strategic uses of the concept to for example encourage more joined-up thinking on ecosystems management. It can also be used to facilitate communication and learning between different stakeholders, including those with opposing views, by acting as a platform to structure debates and to bring new people in to discussions.

The preceding point notwithstanding, recognition is needed that the ESF may not always meet a fitness-of-purpose test in contexts other than those for which it was designed. In its original conception the ESF could be considered fit for the purpose of better understanding nature's value to support decision making. However, in non-environmental contexts and at different decision making levels such an approach may not be appropriate, for many of the reasons outlined in this Work Package (e.g. it may not be seen to add value to specific policy agenda). This Work Package shows how context matters. Different institutions, decision making processes, sectors and decision support tools have to work to different time frames, different objectives, different capacities, different analytical processes and different boundaries. This fact needs to be recognised otherwise resources could be unnecessarily wasted in trying to promote the ESF where it has little immediate relevance or likelihood of traction.

9.S.2 Key Barriers and enablers across appraisal levels

In addition to these broader findings, this Work Package also identifies key barriers and enablers at the *micro*, *meso* and *macro scale*s.

***Micro scale* barriers:**

- resources available to officials undertaking appraisal (e.g. data, time, money, skills, training, and guidance);
- awareness of the concept of ESF is limited beyond Defra and its executive agencies;
- difficulty in understanding the scientific concepts underlying the ESF.

The analysis presented in the Work Package suggests the following may be appropriate for overcoming these barriers:

- more integrated datasets formatted around the core concepts of the ESF, to encourage a mixed methods approach (see Work Package 6);
- awareness-raising about the concept of ESF and what benefits it provides to a wider audience (e.g. facilitating communication; more demonstration projects);
- simplifying and tailoring the language of the ESF to suit different audiences.

***Meso scale* barriers:**

- fragmented working across departments and levels of governance;
- different legal requirements across appraisal levels and types;

- narrow focus of appraisals in terms of the policy sectors covered in SEAs and EIAs and in terms of a breadth of (environmental) analysis within IA. Appraisals also focus on specific plans, programmes and policies rather than on how these interact.

The analysis presented in the Work Package suggests the following may be appropriate for overcoming these barriers:

- stronger and sustained high-level leadership, with the support of institutional champions, to challenge accepted norms and priorities, backed up by statutory quality control measures and review by professional bodies;
- where possible integrating the ESF into existing institutional mechanisms such as appraisal of the planning system;
- better integration mechanisms and institutions to help join-up policy (e.g. inter-sector working groups, cross sector training);
- creating neutral spaces such as workshops and knowledge networks where actors from different policy sectors and governance levels can generate more integrated analysis and improve communication (e.g. communities of practice to share experience and good practice around the ESF).

Macro scale **barriers:**

- underlying societal values - and hence political priorities – may not be aligned with ecosystem protection.

The analysis presented in the Work Package suggests the following may be appropriate for overcoming these barriers:

- engaging with the many potential uses of ESF, including as platform to stimulate debate and enhance communication between different stakeholders;
- using political 'windows of opportunity' such as floods, periodic media interest, or changes in government to make the case for ecosystem protection;
- encouraging influential bodies including industry and international organisations to promote and employ the ESF in partnership with public bodies.

The interaction between different barriers and enablers needs to be considered. For example, the quality of political leadership at the *meso scale* can influence the amount of resources available (*micro scale*). Likewise the way in which the ESF is communicated (*micro scale*) may affect the ability to incorporate it into existing procedures (*meso scale*). However, these interactions can be steered. For example, while *macro-scale* elements may be harder to change, thus affecting strategic priorities, *meso scale* (e.g. creating more integrated institutions) and *micro scale* (e.g. demonstrating the added value of the ESF) factors can operate independently of the *macro scale*. Ultimately, therefore it is the mix of approaches that matters rather than prioritising one or two headline issues.

9.1 Introduction

Society faces unprecedented pressures on its natural environment. In seeking to address these, having knowledge about the changing state and functioning of ecosystems – including the services they provide to human well-being - is absolutely vital. But equally important is understanding the conditions in which this knowledge is or is not used by decision makers working at different levels of governance, ranging from the EU level right down to the lowest level of decision making within individual Member States (e.g. a Parish or neighbourhood). This Work Package investigates the scope for embedding a fuller consideration of ecosystem knowledge as embodied by the Ecosystem Services Framework (ESF) in policy and decision making through existing *ex ante* policy *appraisal* systems. In doing so, this Work Package focuses on the role played by institutional behaviours and cultures in terms of the individual and collective working practices within organisations. Specifically, it examines these practices as both barriers and enablers at the UK level, and in England, Wales, Scotland and Northern Ireland. Appraisal has been defined as: "[that] family of *ex ante* techniques and procedures…. that seek to inform decision makers by predicting and evaluating the consequences of various activities according to certain conventions" (Owens *et al.* 2004, p.1944). "Embedding" refers to the systematic framing of appraisals using central ESF concepts such as supporting, regulating, provisioning and cultural services.

This Work Package summarises new research on the many different ways that appraisal mechanisms and the analytical tools they harness have in the past attempted to embed knowledge about the environment in general, and ecosystems in particular, into decision making processes. Crucially the different parts of government in the UK are seeking to act on the UK's National Ecosystem Assessment (UK NEA) through for example the Natural Environment White Paper, Defra's Ecosystems Action plan, the Living Wales Programme, and Scotland's attempts to embed the ESF into Strategic Environmental Assessments. Thus it is vital that lessons are learnt from previous attempts to embed environmental knowledge more generally into appraisals, otherwise time and other scarce resources could be misallocated (Turnpenny *et al.* 2014).

The Work Package focus is on three appraisal mechanisms operating at different governance levels in the UK context: national policy level impact assessment (IA); plan and programme level Strategic Environmental Assessment (SEA); and project level Environmental Impact Assessment (EIA). The focus is specifically on the ESF rather than the somewhat wider ecosystem approach of, for example, the Convention on Biological Diversity (CBD, no date). By reviewing for the first time in one place the reported constraints and capacities for all three appraisal processes and mapping the role of different institutional cultures and behaviour as barriers to and enablers of embedding, this Work Package draws lessons on the potential for employing different appraisal mechanisms to embed an ESF in decision making.

The aims examined in the Work Package are to clarify the barriers and enablers, to examine where pressures come from at *micro*, *meso*, and *macro scale*s, and to assist appraisal practitioners in thinking through their responses and plans. We stop short of making explicit policy prescriptions for overcoming barriers, or focusing on particular enablers, as these depend strongly on the context. But, in addition to giving general guidance on the sorts of actions which may be considered appropriate, we show how context matters in different sectors, among different stakeholders, and in addressing different problems at different times. This information should therefore be a useful planning aid for relevant decision-makers.

9.1.1 The Ecosystem Services Framework: A knowledge utilisation perspective

The UN-sponsored Millennium Ecosystem Assessment (MA) revealed the wide-ranging impact that human activities have had on ecological systems. It provided an unprecedented overview of the state of the world's natural environment, and proposed a new way of estimating wealth based on the idea of the services that ecosystems provide to humans. It argued that unless the issue of ecosystem degradation is addressed, human activity "will substantially diminish the benefits that future generations obtain from ecosystems" (MA, 2005, p.1). A similar prognosis was delivered by the United Kingdom's National Ecosystem Assessment (UK NEA, 2011a, b), which demonstrated that the ability of UK natural resources to deliver ecosystem services has declined dramatically over the last 60 years, although there is evidence of some improvement in the ability of some ecosystems to deliver services since 1990.

The MA and the UK NEA have generated much new knowledge about the functioning of ecosystems (Potschin and Haines-Young, 2011), but possessing 'more knowledge' does not necessarily mean that it will be embedded into policy making, or ensure greater protection for ecosystems. Crucially, the MA generated new ecosystem knowledge[1], but did not fully explore the conditions in which it was - or was not - likely to be utilised (MA, 2005, p. 20). The UK NEA went a good deal further, however: "we already have sufficient understanding to manage our ecosystems more sustainably and good evidence of the social benefits that would arise from doing so" (UK NEA, 2011a, p. 14). The UK NEA perceived the problem of how to better safeguard ecosystems to be partly about new knowledge development, but also about *inadequate knowledge utilisation*: "Ecosystem services are critically important to our wellbeing… but are consistently undervalued in conventional economic analysis and decision making" (UK NEA, 2011a, p.13). Crucially, the UK NEA did not directly explore why this situation had arisen or what could be done to address it. Although Chapter 27 of the UK NEA contained many examples of potential policy responses (UK NEA, 2011b), it did not explore in detail the precise conditions in which a fuller consideration of an ESF in decision making could be facilitated.

Understanding *how, by whom and in which context (or policy making 'venue')* ecosystem knowledge is embedded in decision-making is thus a vital challenge for scientists and policy makers concerned about the diminution of global ecosystems. In theory, there are many different *venues* in which the embedding of ecosystem knowledge into policy could in principle occur (Jordan and Turnpenny, 2014; Jordan and Russel, 2014). These include expert advisory bodies, legislative inquiries, and planning systems (see, for example, Barker, 1993; Howlett & Craft, 2012). For the first time, this Work Package analyses the embedding of ecosystem knowledge in the venue of policy, programme, plan and project-level *appraisal*.

Appraisal is one of the principal venues promoted by environmental economists (e.g. see Hanley, 2001; Pearce, 1998, 2004; Turner, 2007) and institutions such as the European Union and the United Kingdom government (CEC, 2009a; CEC, 2012). The 2011 Natural Environment White Paper (HMG, 2011, Ch 3.) and Scotland's focus on applying an ESF to land use decision making (Scottish Government, 2011) emphasised the importance of appraisal for embedding ecosystem knowledge into decision making to better capture the value of the services provided by ecosystems. Such an approach has been backed up by supplementary guidance on the ESF, contained in a new edition of the Treasury's Green Book (HMT, 2012).

[1] We define this as "knowledge on both the current state of, and the potential impact of policy interventions on, the services that ecosystems provide directly and indirectly to human well-being"

9.1.2 Definitions and key concepts

Put very simply, appraisal attempts to formalise the provision of information for the decision-making process in a series of steps to be undertaken when developing a policy, a plan, a programme or a project. Typically, the end product is a report which describes the results of each step. The steps vary depending on the jurisdiction applying the system and the governance level in which it operates (e.g. IA at EU level, through to the EIA of local development projects within particular Member States), but they usually include the following: identifying the problem to be addressed by the proposed policy; defining the objectives of the proposed policy; identifying the different options to pursue these objectives; analysing the potential impacts of each option; comparing the options by weighing up the negative and positive impacts for each; and setting out plans for monitoring and evaluating the outcome once it is implemented (e.g. Barrow, 1997). At each step, appraisers can in theory harness different combinations of policy formulation *tools* such as cost-benefit analysis, scenario analysis, landscape assessment and computer modelling (e.g. Carley, 1980; de Ridder *et al.* 2007; Nilsson *et al*. 2008; Jordan and Turnpenny, 2014).

In defining the ESF for this Work Package, the UK NEA conceptual framework is drawn upon together with insights from the MA and the Treasury's Green Book Annex (HMT, 2012). Specifically, the UK NEA approach recognises "the processes that link human societies and their wellbeing with the environment" (UK NEA 2011a, p. 15). Central to this conceptualisation is an understanding of the complex role played by biodiversity in providing services which "flow from [ecosystems] to deliver a range of goods that we value individually and as a society" (UK NEA 2011a, p. 15). Goods in this respect represent all monetary and non-monetary values that enhance well-being. Also implicit in this understanding is the consideration of drivers of change on ecosystems and the direct, indirect and long-term impacts on services of any resulting change. This understanding of the ESF employs the well-known differentiation between different ecosystem service types, namely (UK NEA, 2011a, p.18):

- **supporting** services that "provide the basic infrastructure of life". Supporting services usually support human well-being indirectly and in the longer term through the role they play in underpinning the functioning of the other ecosystem services. Supporting services are highly interdependent and are reliant on the interaction between complex chemical, physical and biological interactions;
- **regulating** services range from the impacts of pollination on ecosystem goods such as food, to the regulation of flood water. Although diverse, regulating services are highly interrelated with the other types of ecosystem services.
- **provisioning** services deliver the direct goods people acquire from ecosystems including food, fuel and water. Provisioning services are highly interdependent and are strongly underpinned by supporting and regulating services.
- **cultural** services generate cultural goods and benefits in environmental settings in which humans interact. They embody qualities derived from the interactions between natural phenomena, alongside those associated with societies, cultures, technologies and ecosystems over history. They stem from a range of natural settings, such as gardens, parks, rivers and lakes, the seashore and the wider countryside, including agricultural landscapes and wilderness areas. Among other things, they provide opportunities for outdoor learning and recreation with benefits in terms of health and broader spiritual well-being (see Work Package 4).

This Work Package also distinguishes between information about the existing state of ecosystems and their service provision, and (the rather harder to collect) information about the potential impacts of policy, plan or project interventions.

9.1.3 Outline of the Work Package

The main contributions of this Work Package are as follows. First, this Work Package seeks to build upon and extend Chapter 27 of the UK NEA (2011b) by moving from isolated 'policy response options' to a systematic analysis of institutional culture and behaviour in the context of appraisal practices. A great deal of the existing literature on the applicability of the ESF to decision making is speculative and/or normative. In contrast, this Work Package presents a much fuller analysis of its (non) embedding in practice; arguably a precondition for aligning everyday practices with 'best practices'. Second, it looks across the three levels of appraisal. While this may seem an entirely obvious thing to do, it has rarely been done by academics and/or practitioners. In fact, this Work Package explores the scope for learning and transferring new policy lessons within and across these different levels and appraisal types. Third, it examines enablers and barriers; to date, the existing literature has tended to focus on the latter rather than the former.

Appraisal has its roots in rational models of planning and decision making (Ortolano and Shepherd, 1995) whereby better information gathered as part of the assessment process is assumed to lead to 'better' decisions. It is important to be aware that this Work Package examines appraisal processes, as documented and recalled by those who participate in them. It does not seek to explain or assess the final policies that are supposed to be informed by appraisal (see Work Package 7 for an assessment of potential policy responses) or the changes that these policies have on the natural world. By concentrating on appraisal, however, it seeks to draw wider lessons for embedding the ESF in policy making.

The remainder of this Work Package proceeds as follows. Section 9.2 explains the nature of appraisal and summarises the three sub-types, namely IA, SEA and EIA. Section 9.3 outlines the methodological approach used, including an analytical framework – covering *micro* (behaviour), *meso* (institutional culture) and *macro scale*s (societal values). Sections9.4, 9.5 and 9.6 present the main findings. Section 9.4 reviews the findings from the perspective of existing published research and presents the main barriers and enablers to implementing and embedding environmental knowledge more broadly into appraisal. This analysis draws out themes on embedding environmental knowledge that may be pertinent for the more specific ecological knowledge associated with the ESF. The literature review is then built upon with documentary analysis (Section 9.5) and interview data (Section 9.6) to look more specifically at the embedding of the ESF in appraisal. The conclusions (Section 9.7) highlight key points that emerge from the analysis and identify policy implications, and finally Section 9.8 discusses links with other Work Packages in this report.

9.2 The context of different levels of appraisal

9.2.1 Different purposes and 'levels' of appraisal

There are several main levels of appraisal aimed at different decision making levels and tasks. Appraisal of *projects* (e.g. through EIA) has been routinely undertaken in many countries since the 1970s (Jay *et al.*, 2007). This has been followed by attempts to institutionalise appraisal at the more strategic level of *plans and programmes* (e.g. SEA) (Bina, 2007). The latest extension of appraisal practices - to the *policy* level - was in part driven by criticisms that project and programme appraisals do not start early enough in the policy cycle. The purposes for which specifically *policy* appraisal has been employed are diverse. They have varied enormously across jurisdictions, policy sectors and governance levels, from environmental protection through to reducing regulatory burdens and promoting a neo-liberal economic agenda (Kirkpatrick and Parker, 2007; Jacob *et al*. 2008; Hertin *et al*. 2009b; OECD, 2008a). Different sub-types have emerged such as Regulatory Impact Assessment (e.g. Radaelli, 2004) and Sustainability Impact Assessment (SIA) (e.g. Kirkpatrick, 2002). These policy appraisal systems have been implemented in different ways to achieve different policy goals. For instance, some forms of policy appraisal in the early 1990s were aligned to agendas of cutting red tape, while in the late 1990s and 2000s appraisal was framed more as a tool for improving regulatory quality. Since the 2008 financial crisis, the discourse surrounding appraisal has once again moved back to reducing regulatory burdens and red tape.

9.2.2 What is different about the venue of appraisal?

As noted above, there are many different venues in which knowledge can in theory be fed into, taken up in and thus embedded in the policy process (see Jordan and Russel (2014) and Work Package 9). Generally, however, appraisal is regarded as being rather "different" (Radaelli, 2007, p. 3) to other venues (e.g. public enquiries, planning reviews), where getting knowledge utilised is heavily determined by the ability of knowledge 'generators' to find the right moment to push their knowledge. With appraisal, on the other hand, it is the decision-makers (or contracted parties) that are supposed to search for and weigh the knowledge for themselves. Indeed, in many jurisdictions appraisal is mandatory and therefore decision-makers - many of whom are generalists rather than specialists – are formally obliged to collect or commission, and show, via the production of published reports, that they have utilised knowledge in their activities.

The act of performing appraisal does not of course mean that a particular type of knowledge will be embedded. In practice, knowledge is susceptible to the influence of institutional cultures and related behaviours (see Peters, 2005). These appear as both enablers of, and barriers, to the embedding of ecosystem knowledge in decision making. Chapter 27 of the UK NEA explicitly recognised this: "the choice among policies cannot be separated from the political context in which alternatives are considered" (UK NEA, 2011b, p. 1314). However, the authors did not dig further into the everyday practices to explore how these different contexts shape the embedding of ecosystem knowledge.

The remainder of this section therefore introduces in more detail three different levels of appraisal, what underlies them, how they have developed and diffused, and some of the challenges that have arisen as they have been used by practitioners.

9.2.3 The three levels of appraisal studied

Policy level appraisal: Impact Assessment (IA)

Forms of policy appraisal were first introduced in the 1960s. They began to spread in the second half of the 1990s, following OECD recommendations on regulatory reform (OECD, 1995). By 2008, all 31 OECD countries had adopted, or were in the process of adopting, policy appraisal procedures. Although each country has its own distinct approach, they all have certain common elements. They: are often – but not always - supported by a legislative act and therefore are more or less mandatory; consist of procedural steps set out in 'guidance' documents; are undertaken by the official responsible for policy development; result in a written document, which may or may not be made public. In theory, policy-level appraisal offers an important venue for embedding ecosystem knowledge into policy making. Firstly, its broad framing means it is possible to focus on policy-wide effects than may be missed by particular programmes or projects (e.g. see Russel and Jordan, 2007). Second, it is possible to examine policies and their associated impacts that cut across multiple sectors and levels. Third, it offers opportunities to adopt a holistic, sustainable development approach that covers environment, social and economic issues at the same time (Eales *et al.* 2005. Russel and Turnpenny, 2009).

Plan and programme level appraisal: Strategic Environmental Assessment (SEA)

Strategic environmental assessment (SEA) is based in part on an awareness of the successes and limitations of project level EIA (see below), in the sense that much of the potential to reduce damage to the environment lies at the strategic level of decision making (Sadler, 2000). It has been defined as "a systematic, on-going process for evaluating at the earliest appropriate stage of publicly accountable decision making, the environmental quality, and consequences, of alternative visions and development intentions incorporated in policy, planning or programme initiatives, ensuring full integration of relevant biophysical, economic, social and political considerations" (Partidario, 1999, p.3). Throughout the 1980s and 1990s, many countries produced their own forms of SEA (Therivel and Partidario, 1996). The 1992 Rio Declaration helped to give these pioneering efforts a stronger push, so that by the mid-1990s the majority of OECD countries had some form of SEA in place (Therivel and Partidario, 1996). In reality, SEA has been practiced in many different ways (Sheate *et al.*, 2001). Indeed in the EU, a Directive (2001/42/EC) was adopted to promote greater harmonisation in the assessment of certain plans and programmes. Initially, SEA was regarded as being environmentally focused, but more recently it has been used to advance sustainable development, through for example being rechristened Sustainability Appraisal (Therivel, 2002) in England. Opinions differ on the merits of such a move. Some analysts feel it offers a practical opportunity to engage with the broad concept of sustainability (George, 2001). Others claim that the environment loses out when trade-offs are made (Pope *et al,* 2004a; Jenkins *et al.* 2003; Lee and Kirkpatrick, 2000). Meanwhile, increasing recognition is being given to SEA's ability to deliver other benefits such as the consideration of the impacts of alternative options, making decision makers more publicly accountable and promoting knowledge exchange (Sheate *et al*. 2001; Runhaar and Driessen, 2007; Sheate and Partidario, 2010). On the other hand, SEA practice has often found it difficult to gain real leverage in influencing plan making (Therivel, 2010). Irrespective of these debates, the potential relevance of the ESF to the SEA frameworks being used in the UK is undeniable.

Project level appraisal: Environmental Impact Assessment (EIA)

EIA can be traced back to the US National Environmental Policy Act (NEPA) 1969 (Glasson *et al.*, 2012; Morgan, 2012). By 1995 EIA had spread to "more than half the nations of the world" (Ortolano and

Shepherd, 1995, p.3), and to all but two by November 2011 (Morgan, 2012). It has been defined as the "process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made" (International Association for Impact Assessment and Institute of Environmental Assessment, 1999, p.2). In many nations, EIAs are legally mandated. Any failure to undertake EIA properly can thus be exploited by those opposing development (Craig and Jeffery, 2013). Nonetheless, as with IA and SEA, the way in which EIA is practised can vary enormously across different jurisdictions, hence on-going debates about the underlying *effectiveness* of EIA. The vast weight of available evidence suggests that final consent decisions on projects - by decision-makers - are *not* significantly affected by EIA (for example, Wood and Jones, 1997; Cashmore *et al.*, 2004; Elling, 2009), although other decisions throughout project planning and by other stakeholders may be (Sheate, 2012). The relationship between EIA and sustainability has also been the subject of much discussion. Some argue that EIA has, and indeed should have, transformed into a tool with sustainable development as its goal (for example, Pope *et al.* 2004b; Hacking and Guthrie, 2008). Others argue that in doing so, the original environmental purpose of EIA has been watered down (Morrison-Saunders and Fischer, 2006; Rozema *et al.* 2012).

9.2.4 Summary

In summary, all three levels of appraisal have an ambiguous relationship with sustainable development concepts and thinking. EIA and SEA are arguably 'more likely' cases to observe embedding of the ESF given their existing and exclusive environmental focus. On the other hand, policy level IA has traditionally been used to assess a broader range of potential impacts, so environmental factors (including the ESF) are less likely to be routinely embedded (Russel and Jordan, 2007). Second, both SEA and EIA have legal backing, which creates legal rights that can be enforced by those seeking to oppose/shape particular forms and types of land use development. However, in political terms there is normally less to play for at the programme and project level. Third, all three levels of appraisal have diffused rapidly, especially since the 1990s. But all three have also experienced significant implementation problems. Thus there can be very big differences between how they are described in guidance documents and how they function in practice. Fourth and related to that, national practices of appraisal vary across jurisdictions and the main appraisal levels. Therefore there is one appraisal tool, but it comes in many different national colours. Hence, the remainder of this report focuses on appraisal practices in the UK.

9.3 Methods and analytical framework

9.3.1 Academic and technical literatures

The extensive literature on appraisal was systematically examined for the ways that different levels of appraisal, and the analytical tools therein, have operated to embed knowledge about ecosystems and the environment into decision making processes. Sources included academic books and journal articles, consultancy reports, and government reviews. They cover four broad topics: the design of appraisal tools and systems; the performance of appraisal systems; relations between appraisal systems and policy making contexts; and the underlying motivations for appraising (Turnpenny et al. 2009).

9.3.2 Appraisal documentation

A sample of appraisal documents were analysed (see Section 9.5) to examine how far the ESF has been considered in recent policies, programmes and projects. The sample comprised: 75 IAs conducted in the UK between 2008 and 2012; 49 non-technical SEA summaries, i.e. up to 10 from each year; and 50 non-technical EIA summaries, i.e. 10 from each year 2008-2012 (See **Box 9.1** for details). The sample comprised appraisal documents from all parts of the UK. The use of summaries rather than full reports on EIAs and SEAs was a conscious decision to enable a sufficiently broad analysis of sectors and jurisdictions. It is noted that NTSs are sometimes acknowledged as apoor reflection of the full reports, but the extent to which elements of an ESF have been adopted in the assessment (on the criteria used) should still be identifiable.[2]

Documentary analysis is extremely useful because of the requirement (noted above) for appraisal documents to record in a transparent manner the different sources drawn upon. Documentary analysis also allows the patterns of ecosystem knowledge embedding over time to be mapped. Indeed an appraisal report represents a discrete event - a snapshot of evidence around an issue at a particular time, as well as a summary of a knowledge-gathering and marshalling process - and hence contains clues to the different influences on policy.

[2] The analysis did involve triangulation using a subsample of the non-technical summaries and the full appraisal documents reports.

Box 9.1. Sampling strategies for three types of appraisal

General strategy

The sample was taken from the period 2008-2012. These years cover the period when the ESF was progressively embedded within UK policy discourse, including the publication of key documents such as the UK NEA (2011), the Natural Environment White Paper (2011), the Living Wales Programme (2010-2013) and Scotland's Strategy for applying the ESF to land use policy (2011). Each sample was coded by two of the authors to ensure consistency; frequent consultation between coders sought to minimise inter-coder variability.

IA:

The sample of 75 IAs contained 15 IAs from each year, chosen to achieve roughly equal proportions of IAs covering i) environmental policies, ii) policies related to environment - principally those with potentially significant environmental impacts (agriculture; housing and land; energy and natural resources; transport) - and iii) non-environmental policies (e.g. social security, sport, criminal law). The final totals were: 17 environment cases, 36 environment-related cases, and 22 non-environment cases. Within each of those broad categories, the IAs were sampled at random.

SEA:

The SEA non-technical summaries were sampled at random, but proportionally by a) the total numbers from each nation (England 26 SEAs, Scotland 11, Wales 4, Northern Ireland 2, Whole UK 6; and b) the sector under which SEAs are submitted (Town & Country Planning 15 SEAs; National Policy Statements 7; Transport including Local Transport Plans 7; Others 20). Four of these non-technical summaries were cross referenced with the full appraisal reports to check for consistency. The final sample content was also dictated by the public availability of the documents.

EIA:

50 EIA non-technical summaries were sampled at random, but proportionally by a) the total numbers from each nation (England 36 EIAs, Scotland 8, Wales 4, Northern Ireland 2) and b) the regulations under which EIAs are submitted (Town &Country Planning EIAs 36 cases; others 14). Four of these non-technical summaries were cross referenced with the full appraisal reports to check for consistency. As with SEA, the final sample content was also dictated by the public availability of the documents.

For all three levels of appraisal, the documents were coded on the basis of the categories outlined in **Box 9.2**. The first part involved an assessment of the problem framing and impacts analysis generally, and the degree to which they embedded an ESF. The second part involved allocating a 'strength of analysis' score to reflect how far each appraisal considered each of the four ecosystem service types (supporting, regulating, provisioning, and cultural).

Box 9.2. Coding scheme for the appraisal content test

Appraisal type according to engagement with the Ecosystem Services Framework:

- Type A: No ecosystem or environmental knowledge on impacts referred to;
- Type B: environment mentioned but not evaluated at all;
- Type C: environment mentioned but only weakly evaluated;
- Type D: strong environment framing and evaluation, but ESF not explicitly mentioned;
- Type E: contains ESF framing but does not evaluate at all.
- Type F: ESF framing but only weakly evaluated. In this sense it identifies the ecological impact of the proposed policy but analysis does not go beyond vague descriptions. Lacking in-depth analysis of the different services affected.
- Type G: ESF fully integrated throughout. As well as explicitly referring to one or more of the ecosystem services - supporting services, regulating services, provisioning services, and cultural services – the appraisal examines long-term impacts; considers indirect impacts (spillovers); takes an integrative approach (both between policy fields and environment, social and economic aspects); and uses different valuation tools, or other types of analytical tools, to understand ecosystem complexity.

Scores for coverage of different service types in appraisal

3 = the (supporting/regulating/provisioning/cultural) service considered with strong analysis

2= the (supporting/regulating/provisioning/cultural) service considered but only weakly evaluated

1 = the (supporting/regulating/provisioning/cultural) service mentioned but impacts on it are not evaluated

0 = no consideration of the (supporting/regulating/provisioning/cultural) service

The results of the coding analysis appear in Section 9.5. As with the literature review, the results were grouped into themes to explore further through the in-depth interviews (Section 9.6).

9.3.3 Interviews with stakeholders

A series of interviews with a range of experts were carried out to:

- investigate the validity of the lessons drawn from the literature review on appraisal and the embedding of environmental and ecosystem knowledge;
- better understand the patterns observed on the embedding of the ESF in appraisal in the documentary analysis; and
- identify associated challenges for embedding the ESF.

The 'elite interview' method is commonly used in social sciences, as a way of addressing gaps and checking facts in the documentary evidence, and providing a deeper understanding of actors' motivations (Richards, 1996). To ensure a range of perspectives was captured, the classification of participants developed by Howlett and Wellstead (2010) was used to select interviewees. Howlett and Wellstead identify four main types organised according to two main dimensions: inside government (including actors in the devolved areas of UK decision making) vs. outside government; and proximate vs. peripheral actors. 'Proximate' means those with a direct day-to-day responsibility for the ESF and/or appraisal process, including those who: conduct appraisal; implement the ESF; champion appraisal and/or the ESF; write guidance for appraisal and the ESF. 'Peripheral' means those more distant from the policy making process, but with an interest or stake in the ESF and/or policy appraisal, for example: those who are consulted by government on nature and biodiversity issues; those who supply data to government such as scientists; and those representing bodies with

some responsibility for managing ecosystems be they private or public actors. A total of 54 people were approached and a total of 32 agreed to participate, from UK and devolved governments, arms-length bodies, consultancies, and non-governmental organisations (**Table 9.1**). The interviewees were asked a number of questions based around the headline questions in **Box 9.3**, in a semi-structured format to allow for both comparability and flexibility. These questions were broad enough to test points raised in the literature and document analysis while simultaneously avoiding steering or leading the interviewees. Not all questions were appropriate to all interviewees; the conversations were led by each interviewee's experiences and knowledge. The interviews were conducted either face-to-face or via telephone. Interview summary transcripts were produced shortly after each interview to enable thematic data analysis.

Box 9.3. Headline questions for interviewees in semi structured interviews

1. Who are you and what is your role? (for all)
2. What is your opinion of the ESF? (for all)
3. How important is the ESF to your sector/organisation/day-to day work responsibilities? [more generally] (for all)
4. What key factors influence the adoption of the ESF in you organisation/sector/more generally? (for all)
5. To what extent has appraisal become an important venue for embedding the ESF in decision making [in your organisation/sector?] [more generally] (For interviewees other than appraisers)
6. What are the advantages and disadvantages of using appraisal to embed the ESF? (for all)
7. How did you go about including the ESF in the appraisal? What were the barriers and enablers to doing so? (for appraisers only)
8. What are the main factors that limit – or enable - the embedding of the ESF in the appraisal processes? (For interviewees other than appraisers)
9. How might ESF be better embedded in the decision-making process apart from appraisal? (for all)

Table 9.1. Number of interviewees by relationship to policy appraisal and the ESF

	Proximate Actors	**Peripheral Actors**
Public/Governmental Sector	**(A) Core Actors** (e.g. national and devolved government departments, executive Staff, governmental policy analysts) **15 interviewees**	**(B) Public Sector Insiders** (e.g. Commissions and Committees, task forces, Research Councils, scientific advisors, advisory bodies) **6 interviewees**
Non-Governmental Sector	**(C) Non-governmental Insiders** (e.g. consultants carrying out appraisals) **4 interviewees**	**(D) Outsiders** (e.g. businesses, trade associations, Third Sector Organisations, independent academics, think tanks, media) **7 interviewees**

9.3.4 Analytical framework

Following Turnpenny et al, 2008, the results are structured using a three-fold classification of *micro*, *meso* and *macro scale*s (see **Table 9.2**). The *micro* scale is concerned with the individuals involved with embedding ESF, their behaviour and the resource constraints which bear upon them. The *meso* scale is concerned with institutional culture at the organisational level, including organisational procedures and management structures, systems of knowledge transfer, norms and incentive structures. T*he macro scale* is concerned with the wider societal context, including linkages with broader values, norms and goals. Note that there is no assumption that the '*macro*' level provides the overarching societal structure within which decisions at other levels are taken, rather that barriers and enablers at different scales interact with, and shape each other.

Table 9.2. Analysis framework

Scale	Focus	Examples of key barriers and enablers to embedding ESF in appraisal
Micro	"Behaviour"	expertise, professional background, timeframes, awareness, understanding, perceived added value, resources
Meso	"Institutional culture"	core objectives, incentives, established procedures
Macro	"Social and political context"	economic competitiveness, deregulation, broader societal values

9.4 Literature review

9.4.1 Policy Level Appraisal: Impact Assessment (IA)

IA in the UK: a brief history

For commentators such as Pearce (1998), appraisal at the policy level is the 'only game in town' as far as knowledge utilisation venues are concerned. It is probably for this reason that the UK Government highlighted policy appraisal as a key venue for the ESF in the 2011 Natural Environment White Paper, and subsequently commissioned research on how well supplementary guidance on the ESF in the Treasury's Green Book (HMT, 2012) was being used in government appraisals (EFTEC, 2013). UK central government has pioneered the use of policy appraisal (Radaelli, 2005; Russel and Jordan, 2007). A system was first introduced as long ago as 1986. The 1990 Environment White Paper (DoE, 1990) rolled out a system specifically to assess the environmental impacts of major policy developments. This type of appraisal was dominated by economic thinking and modes of valuation. The accompanying guidance (DoE, 1991) heavily advocated the use of cost-benefit analysis to quantify impacts. However, it had little impact on either the process or substance of policy making, with very few environmental policy appraisals ever being conducted (Russel and Jordan 2007). Those appraisals that were conducted were to "green-proof pre-determined policies" (ibid, 2007, p. 11).

A more systematic approach to policy appraisal cutting across all policy areas – dubbed Regulatory Impact Assessment – was promoted by the Labour government in 1997 (Radaelli, 2005), its primary aim being to produce an "assessment of the impact [to business, charity or the voluntary sector] of policy options in terms of the costs, benefits and risks of a [policy] proposal" (Cabinet Office, 2003, para. 1.1). The guidance again advocated the use of tools such as cost-benefit analysis (Cabinet Office, 2003). In 2004, the UK government combined all sectoral appraisal systems into a more integrated form of RIA. This system was monitored and promoted by the Cabinet Office's Better Regulation Executive (formerly the Regulatory Impact Unit). In addition, the Panel for Regulatory Accountability, chaired by the Prime Minister, performed a major quality control function. It was seen as a 'cornerstone' of the wider effort to achieve more strategic goals such as 'better regulation' and 'sustainable development' (HMG, 2005, p.155). In 2007, RIA was re-branded 'Impact Assessment' (IA) and placed under the stewardship of the Department for Business, Enterprise and Regulatory Reform (now the Department for Business Innovation and Skills, BIS). Given the business focus of BIS, this move would suggest a reorientation of IA towards assessing business and economic impacts of new policy rather than a broader integrated assessment of impacts. Scrutiny of IAs is carried out by the independent Regulatory Policy Committee, established in 2009.

Impact Assessment in the UK: practices and patterns of use

As noted above, in theory, policy-level appraisal offers important opportunities to embed ecosystem knowledge into policy making. There is, however, a growing literature that suggests that the way it has been implemented has been somewhat at odds with the models described in textbooks and official guidance (e.g. Russel and Jordan, 2007, 2009; Nilsson *et al.* 2008; Russel and Turnpenny, 2009; Hertin *et al,* 2009a, 2009b; Turnpenny *et al.* 2009; Lee and Kirkpatrick, 2004; Renda, 2006; Jacob *et al.* 2008; EEAC, 2006). Many studies raise questions over whether more integrated forms of appraisal produce a more integrated assessment process; the economic aspects of policy can all too easily crowd out other (e.g. social and environmental) aspects (e.g. Wilkinson *et al.* 2004; NAO, 2006; Russel and Turnpenny, 2009; Hertin *et al.* 2009a). Recent analysis of 249 UK IAs by EFTEC (2013) also suggested that there is a need for a more balanced coverage of environmental, social and economic impacts. Furthermore, appraisals have tended to be performed at a relatively late stage in the policy

process and consequently have had little or no influence over the final policy (NAO, 2001; 2004; Russel and Jordan, 2009; Russel and Turnpenny, 2009; Hertin *et al.* 2009a). Consultation has been often limited to the 'usual suspects' (Russel and Turnpenny, 2009; Turnpenny *et al.* 2009), and the use of advanced appraisal tools such as computer modelling have been only partially used despite repeated political pledges to make greater use of them (Nilsson *et al.* 2008).

Impact Assessment in the UK: Institutional enablers and barriers

A wide range of different potential reasons for these patterns have been identified in the existing literature. These enabling and constraining factors operate at a *micro*-, *meso*- and *macro-scale*s.

Micro scale factors relate directly to individual behaviour. They include: the background of many government staff in Whitehall who tend to be generalists rather than specialists (Russel and Jordan, 2007); lack of resources (time, money and human) (see for example the NAO, 2001; Russel and Jordan, 2007; Turnpenny *et al.* 2009), resulting in the use of the most readily available information, rather than the best.

In the existing literature, ideas for *enabling ecosystem knowledge utilisation at the micro scale* have therefore been couched in terms of improving data sets (e.g. Coleby *et al.* 2012) and the availability of information (Maes *et al*. 2012), and offering staff greater training and guidance (EEAC, 2006; DBR, 2004; Jacobs, 2006; NAO, 2006; TEP, 2007; Wilkinson *et al.,* 2004). Another common recommendation is to start the policy appraisal earlier in the policy process, when more options are likely to be open to discussion (Renda, 2006; TEP, 2007; Wilkinson *et al.* 2004). Moreover, others have highlighted the importance of translating scientific terms into an understandable format (Helming et al. 2013)

However, it is also important to look beyond these *micro-scale* issues (e.g. Billé *et al.* 2012) to more *meso-scale* factors such as the wider 'culture' in which appraisal operates (Jacob *et al.* 2008; Russel and Jordan, 2009; Thiel, 2008; Turnpenny *et al.* 2008). In the existing literature these factors include: the traditions of policy making in particular ministries and informal 'norms' about how policy gets made; pressures arising from ministers or senior civil servants wishing to promote their personal ideas; the strength or otherwise of quality control mechanisms (Dunlop *et al.* 2012); and the path dependent effect of previous policy decisions (Turnpenny *et al.* 2008).

In the existing literature, ideas for e*nabling greater ecosystem knowledge at the meso-scale* include ministers offering civil servants stronger political leadership (Jacob *et al.,* 2008; Russel and Jordan, 2007), creating better oversight and quality assurance mechanisms (DBR, 2004; TEP, 2007; Torriti, 2007; Wilkinson *et al.* 2004), and nurturing the use of more advanced tools such as modelling (Jacob *et al.* 2008; Nilsson *et al.* 2008; de Ridder *et al.* 2007; Turnpenny *et al.* 2008).

Finally, *macro-scale* factors constitute the wider context in which all decision making activities – including appraisal - operate. These include broader societal views about what policy should aim for (Dunlop *et al.* 2012), which are in turn embedded in discourses such as 'austerity' or 'sustainability'. Indeed the framing of ESF could be seen as a symptomatic of these discourses in the way in which it elevates economic considerations over others. Finally, decisions made elsewhere, such as in the EU or the UN, can limit the policy space in which UK policy appraisal operates (e.g. Russel and Jordan, 2007).

Enabling *greater ecosystem knowledge use at the macro-scale* is often couched in terms of mobilising wider societal support for ecosystem protection for example through information synthesis and awareness raising exercises such as the UK NEA, or by building supportive policy appraisal

frameworks at EU level (Helming *et al.* 2013) or in the OECD. At present the European Commission has its own system of policy appraisal which it hopes will mesh with those operating within the Member States and the other EU institutions. In practice, these different systems do not necessarily feed into and support one another, producing many overlaps and gaps (Jordan and Schout, 2006).

Impact Assessment in the UK: concluding remarks

Policy appraisal is a long established venue in which ecosystem / environmental considerations can in theory be embedded into policy level decisions. Huge amounts have been written about how appraisal should function at this level, but more work is needed to understand why, by whom it is used and what the effects are. Although more work has focused on attempts to embed environmental considerations into policy appraisal, there has been very little work done on the embedding of an ESF – see though Laurens *et al.* (2013) who suggest it is hardly used in EU level impact assessment, and Turnpenny, *et al*. (2014). The revisions to the Treasury Green Book supplementary guidance are very recent and many crucial questions remain. For example, are some of the barriers that have bedevilled the appraisal of environmental policy impacts likely to hinder the embedding of an ESF? Can lessons be learnt from past attempts to appraise policy for environmental impacts? Such questions are crucial to understanding the feasibility of the aspirations expressed in the Natural Environment White Paper.

9.4.2 Plan and programme level appraisal: Strategic Environmental Assessment (SEA)

SEA in the UK: a brief history

SEA in England is based on the EU Directive (2001/42/EC), but implemented variously through the Environmental Assessment of Plans and Programmes Regulations 2004 for certain sectors (Sheate *et al.* 2004) and similarly in the devolved administrations, apart from Scotland. Here, the Environmental Assessment (Scotland) Act 2005 applies, which extends the application of SEA to a wider array of plans, programmes and strategies than the SEA Directive. Current Government guidance on SEA is provided in the form of generic guidance to support SEA across all sectors (ODPM *et al.,* 2005). In England, SEA in spatial planning is implemented through being integrated within Sustainability Appraisals (under the Planning and Compulsory Purchase Act, 2004), or Appraisals of Sustainability for National Policy Statements in relation to nationally important infrastructure planning, such as energy generation, transmission and ports (under the Planning Act, 2008) (Sheate *et al.* 2004; Eales and Sheate, 2011). These sustainability-type appraisals follow a similar approach to SEA, but instead of focusing solely on environmental factors, also address social and economic issues. Sustainability appraisal developed before the adoption of the SEA Directive in 2001 from environmental appraisals undertaken for local authority development plans since the early 1990s (DoE, 1993).

SEA in the UK: practices and patterns of use

SEA has been implemented formally in the UK for nearly a decade, though with mixed results (Fischer, 2010; Therivel, 2013). It is difficult to estimate the total number of SEAs undertaken to date given there is no central repository of SEAs held by central government. Its impact in helping shape plans and programmes depends significantly on its early application in the plan/programme making process, otherwise it ends up being a tick-box exercise to justify the proposed measures rather than foster environmentally sustainable plans or programmes (Eales and Sheate, 2011; Therivel, 2013).

The core basis of SEA (as legislated in the EU) is a list of specific environmental topics against which the plan or programme, and its alternatives, should be assessed for its likely significant effects. These topics do not explicitly include ecosystem services or the ESF, but do include biodiversity, fauna and flora, for example, as well as water, air, soil and climatic factors, among other things[3]. There is only limited evidence to date that the ESF has been considered explicitly or systematically within SEA. On the other hand, it could be said that SEA already addresses all the components of the ESF because of the extensive list of factors that need to be considered, including interactions, positive, negative and cumulative effects. The debate around whether the ESF (and consideration of ecosystem service types more generally) genuinely adds anything new to SEA as prescribed and/or practiced frames the challenge for integrating ESF within SEA.

SEA in the UK: institutional enablers and barriers

In the existing literature, several *micro-scale* barriers to knowledge use have been noted, including insufficient time and resources (Therivel, 2010; Eales and Sheate, 2011). Other key barriers at this scale (Baker *et al.*, 2013) relate to:

- the perceived usefulness of the concept of ecosystem services (over and above an already broad consideration of environmental factors in SEA);
- the lack of awareness or understanding of the concepts among plan makers (Campbell and Sheate, 2012);
- the concern that it will simply add additional burden to already over-stretched local authority and agency staff, especially when faced with reducing budgets in an era of austerity; and
- data availability in suitable (ESF) formats at the appropriate land use scale (Sheate *et al.* 2012).

In the existing literature, *enabling factors at the micro-scale* include the provision of better guidance. Indeed the consideration of biodiversity and climate change in SEAs (and EIAs) across Europe was considered to be so poor that the European Commission, in response to requests from practitioners and authorities, was moved to produce guidance on how biodiversity and climate change could be considered (CEC, 2009b; CEU, 2013). This sees ecosystem services as being useful conceptually for considering related issues such as climate change adaptation, resilience and cumulative effects. It encourages practitioners to think about ecosystem services early on, but not in a prescriptive way. A high degree of flexibility is thought to be needed in the methodologies utilised by SEA in order to be able to respond to the very diverse nature of plans and programmes (and in some jurisdictions, policies) in the most appropriate way. Several other organisations have produced briefings, guidance or other forms of support in relation to ecosystem services. Internationally the CBD (2012); OECD (2008b) and others (MER, 2008) have been developing guidance in this area for SEA. In the UK, IEMA has produced a briefing document at the project level on *Considering Ecosystem Services in EIA* (IEMA, 2012) and the Scottish Government has produced an information note on applying an ecosystems approach (and an ESF within that) to land use planning (SG, 2011). Better integration and tiering of plans and SEA would also help facilitate the inclusion of an ESF, if issues identified in one plan/programme are picked up in other plans/programmes.

[3] (i) biodiversity; (ii) population; (iii) human health; (iv) fauna; (v) flora; (vi) soil; (vii) water; (viii) air; (ix) climatic factors; (x) material assets; (xi) cultural heritage, including architectural and archaeological heritage; (xii) landscape; and (xiii) the inter-relationship between the issues referred to in heads (i) to (xii) (Annex 1, SEA Directive 2001/42/EC)

At the *meso-scale*, a major barrier is perceived to have been the simultaneous introduction (during the mid-2000s) of a new planning regime (Local Development Frameworks) under the Planning and Compulsory Purchase Act 2004 alongside the Regulations implementing the EU SEA Directive. Moreover, at the most strategic levels of SEA (e.g. high level plans and programmes, national level strategies), one barrier has been the fuzzy boundary between what constitutes a plan, programme or policy (see Joao and McLauchlan, 2011). This is important as it has a significant bearing on whether a plan or programme meets the complex screening criteria for the Directive to apply (Robinson and Elvin, 2004; Sheate and Leinster, 2005).

Enabling factors at the meso-scale include the development and implementation of the SEA Directive as a legal instrument (and its enforcement through the courts) has been a key enabler for Member States in putting in place their own SEA regimes, as has been the evolving role for SEA in helping to deliver sustainability and sustainable development commitments (Stinchcombe and Gibson, 2001; Partidario et al. 2009; Bond *et al.* 2012). The existence of a well-established community of practice for the sharing of knowledge and experience, as exists in Scotland through the SEA Forum, is another enabler for SEA and potentially for embedding an ESF.

At the *macro-scale* a barrier which is widely reported in the existing literature has been, most recently, the twin emphasis on deregulation in the pursuit of economic growth (an extreme illustration of this trend is the review of the Canadian Environmental Assessment Act governing SEA, which has been "gutted" according to Gibson (2012, p.186)) and the desire to 'streamline' planning and assessment processes (e.g. CEU, 2012). The National Planning Policy Framework (DCLG, 2012) in England - seen by Government as a key attempt to streamline planning policy - missed the opportunity to champion SEA as a tool for delivering sustainability in spatial planning. Streamlining also presents a barrier to including the ESF in SEA by adding an additional perceived burden to existing assessment processes.

Finally, at the *macro scale*, and in addition to the points raised in relation to IA, wider societal views and discourses remain important. When public participation is already an integral element of the decision-making process in relation to SEA (Sheate, 2012), some (Campbell and Sheate, 2012; Baker *et al.* 2013) have asked just how user friendly is the ecosystems (and valuation) terminology to the stakeholders and decision-makers (e.g. local councillors) involved in plan making? In addition, the terminology of ecosystem valuation, and specifically monetary valuation, may be seen as less relevant, for example, to spatial planning decisions where a very wide range of socio-economic, environmental and political factors have to be taken into account. Indeed, earlier attempts to introduce valuation in the early 1990s to environmental appraisal of local authority development plans (DoE, 1991) were rejected by local authorities who developed their own qualitative assessment process (Sheate, 1996; Baker *et al.* 2013).

Enabling factors at the macro-scale for embedding ecosystem services within SEA include policy demand 'pull', i.e. the extent to which ESF begins to influence the wider planning frameworks within which SEA operates. For example, while the Environment Agency is piloting an ESF in the context of Flood Risk Management Plans (Marshall, 2013), there is so far little evidence that these concepts have yet penetrated local planning decision-making (Campbell and Sheate, 2012). They also include international lesson-drawing through the development of international guidance promoting ESF within SEA e.g. OECD (2008b), CBD (2012), and developing lessons from practice (TEEB, 2010; Partidario and Gomes, 2013).

A great deal of the discussion of barriers and enablers turns on what the overall purpose of SEA is assumed to be. Over and above the obvious need to comply with EU legislation, is it, for example, about supporting sustainable development (Nilsson and Dalkmann, 2001; Stinchcombe and Gibson,

2001; Noble, 2003)? Or is SEA really a tool to support participation, learning and knowledge exchange (Kørnøv and Thissen, 2000; Owens *et al.* 2004; Cashmore *et al.* 2010; Fischer *et al.* 2009; Runhaar, 2009; Fitzpatrick, 2006; Jha-Thakur *et al.* 2009; Sheate and Partidario, 2010; Partidario and Sheate, 2013), or to increase accountability (Sheate, 2012)? These varied purposes reflect the evolution of SEA (and EIA) over the last 25 years in the EU and its role in supporting the implementation of sustainable development (Sheate, 2012). The debate has significant consequences for the integration of analysis into decision-making, since differing understandings of SEA's purposes translates to debates over the criteria for evaluating its 'success'. Increasingly SEA is therefore seen as a deliberative tool and not simply as a rational (positivist) information providing tool (Wallington *et al.* 2007; Runhaar, 2009). – i.e. the process by which the assessment is undertaken being more important than the immediate output (i.e. the environmental report or assessment document).

SEA in the UK: concluding remarks

Perhaps inevitably given the rise of the ESF concept, there is significant interest in the potential role of SEA. But as yet, there are still limited studies of actual practices, but what there is indicates that ESF thinking has some potential to improve SEA as a process (Geneletti, 2011; Baker *et al.* 2013). It appears that different contexts – such as sectors, governance level of the assessment, available resources and available information – will drive the extent of embedding. In some contexts it may be appropriate to use comprehensive monetary valuation type approaches, but in most others this is not likely to be feasible due to the significant resource requirements of such techniques (Baker et al. 2013). In these cases, a lighter touch may be more appropriate, e.g. incorporating ESF thinking into SEA objectives or when considering interactions among environmental factors or cumulative effects.

Looking to past experience, it is also important that ecosystem services are not seen as an additional requirement on practitioners of SEA, as this could attract criticisms of 'gold plating' (see for example the draft Regulation on guidelines for trans-European energy infrastructure (CEU, 2012)). Therefore the utility of ecosystem services would appear to be via integration into normal SEA practices, e.g., through tying mitigation measures to specific ecosystem provision. But even integration may not be entirely unproblematic, since some issues, such as built heritage and the historic environment, need a broader interpretation of ecosystem services to enable wider aspects of cultural services to be properly recognised in an ESF.

9.4.3 Project Level Appraisal: Environmental Impact Assessment (EIA)

EIA in the UK: a brief history

EIA was formally introduced in the UK in 1988 primarily to meet EU obligations. The Directive[4] sets out a number of procedural steps that must be followed, and indicates those projects which must always be subject to EIA, and those for which discretion resides with the Member State. Implementation has proven to be a complex affair given that the Directive covered a number of sectors (for example, land use planning, highways, afforestation, agriculture) and the different legal systems in England and Wales, Scotland and Northern Ireland. The situation has become more complex since devolution as the scope of the Directive covers both devolved and reserved matters. The Directive requires that *significant* impacts on:
"(a) human beings, fauna and flora;
(b) soil, water, air, climate and the landscape;

[4] 85/337/EEC as amended and now consolidated as 2011/92/EU.

(c) material assets and the cultural heritage;
(d) the interaction between the factors referred to in points (a), (b) and (c). ….. are assessed in advance of a decision being made." (European Parliament and the Council of the European Union, 2011, Article 3).

In practice, the scoping stage is designed to streamline the process to prevent unnecessary time and money being spent on the assessment of impacts which are unlikely to be significant. The expectation is that the terms of reference for a specific EIA are set drawing on dialogue with statutory consultees (the Environment Agency, Natural Resources Wales, Natural England etc.), which is mandatory, and with other stakeholders including the public, which is discretionary.

EIA in the UK: practices and patterns of use

Glasson *et al.* (2012) report that over 9,000 Environmental Statement (ESs – the formal term for report of the EIA in UK EIA Regulations) had been produced in the UK by the end of 2008. The Institute of Environmental Management and Assessment (IEMA) further report that over 500 ESs are produced each year in the country (IEMA, 2011). There are no legal requirements to consider the ESF in EIA, although this topic is attracting increasing academic interest (for example, Geneletti, 2007; Baker *et al.* 2013; Coleby *et al.* 2012; Mitchell, 2012). The review of some existing cases by Baker *et al.* (2013) suggested that two approaches can thus far be recognised, one more comprehensive approach which is systematic and may involve a quantitative approach, and a second which uses ecosystems services as a device to frame the environment, helping to communicate impacts to members of the public and other stakeholders. They conclude that incorporating ecosystem services could have some benefits, if managed correctly, but that the legal prescription of EIA processes makes integration problematic. The Institute of Environmental Management and Assessment (IEMA), which is a professional body representing EIA practitioners (amongst other environmental management professions), has recently produced guidance on incorporating elements of the ESF into EIA, which may lead to more practice (see IEMA, 2012).

EIA in the UK: institutional enablers and barriers

The *micro scale* barriers to EIA implementation which have been identified in the literature include the cost implications, and the potential for delays to the decision-making process (Baker *et al.*, 2013). Glasson *et al.* (2012, p. 218) find no evidence for EIA delaying decision-making in the UK, but do suggest that the additional time taken by consultees and decision makers to engage in the EIA process was potentially a problem. A cross-EU study in 2008 indicated that costs per EIA varied from €10,000 for small projects to €100,000 for large projects and even €0.5M for major projects (GHK Technopolis, 2008). The same evaluation of the EIA Directive also pointed to a lack of capacity amongst consultants, decision-makers and statutory consultees to deliver good quality EIA. These barriers can be assumed to be just as applicable to the embedding of an ESF.

Enablers at the micro-scale include the increasing expectation that practitioners will join professional organisations such as the Institute of Environmental Management and Assessment (IEMA), which places training demands both on individual members and consultancies (see http://www.iema.net/eia-quality-mark). IEMA has recently produced guidance on ecosystem services which aims to identify best practice (IEMA 2012).

At the *meso scale*, the literature suggest that practice is a function of a number of variables, including the fact that there is a legal requirement to conduct EIA, and that courts have powers to intervene if necessary. The threat of legal action is both a significant constraint (as it becomes a

critical consideration of involved stakeholders) and an enabler (as court cases tend to stimulate training that increases knowledge and staves off court action) (see, for example, IEMA, 2011: 39).

Potential *enablers at the meso-scale* include the EU proposal to amend the Directive (CEU 2012). Another potentially significant enabler is learning in the context of organisations employing EIA over time (in the context of SEA this aspect has been explored by Dalkmann *et al.*, (2004) and Jha-Thakur *et al.*, (2009)). Also, a number of EIAs are submitted every year in the UK on a voluntary basis where EIA may not otherwise be required. In these cases, the developers could be using EIA as a design tool or as a public relations exercise.

At the *macro scale*, a key barrier is the economic recession (Morgan, 2012). There is a view that recent changes to the planning system (namely the National Planning Policy Framework (DCLG, 2012) aimed at facilitating growth, have emphasised financial viability over environmental impacts (Levett, 2011). Politically, barriers have also been noted at EU level, specifically the 'better regulation' agenda championed by DG Enterprise (GHK Technopolis, 2008: 3).

Enablers at the macro-scale include international bodies such as the UN Economic Commission for Europe through its working parties to the Espoo Convention (United Nations Economic Commission for Europe, 1991), and through the International Finance Corporation's (IFC) Performance Standards (see Bond and Pope, 2012). For instance the IFC has specifically promoted ESF embedding into EIA through their performance standards (IFC, 2011) which has directly led to the preparation of guidance by the World Resources Institute (Landsberg *et al.* 2011). In addition, the European Commission has prepared guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (CEU, 2013) which promotes an ESF. Furthermore, integrating the ESF with EIA has been argued to shape constructive relations with stakeholders (Karjalainen et al., 2013) through its integrative approach. Finally, guidance has been developed for the oil and gas industry setting out the business case for applying an ESF to project development (IPIECA and OGP, 2011); although the links to EIA are not well developed and there remains the risk of a separate, parallel process developing rather than integration.

EIA in the UK: concluding remarks

EIA is a globally relevant decision tool. Whilst some still question its cost effectiveness, and raise doubts over its relevance in times of economic recession, it has shown itself to be resilient and has, over time, reinvented itself to maintain its political relevance. Its institutional reach is great, and the regulatory position it enjoys guarantees a level of practice, if not universal acceptance of the subsequent decision outcome. The embedding of the ESF into EIA has been the subject of some academic research, and is actively encouraged by some key stakeholders both nationally (most notably the Institute of Environmental Management and Assessment), and internationally (for example, the IFC). As such, there is potentially a window of opportunity to embed ESF principles into EIA, although the current text of the proposal for an amendment to the EIA Directive does not incorporate an ESF[5], and the political nature of amending the Directive is likely to impose significant constraint on ambitions.

[5] Article IV (4) refers to: *"biodiversity and the ecosystem services it provides".*

9.4.4 Summary

Importantly, embedding the ESF in appraisal builds upon a long history of appraising policies, programmes and plans for their environmental impacts. **Table 9.3** summarises the key enablers and barriers of appraisal implementation and embedding environmental and ecosystem knowledge as identified in the existing literature. There are a number of important points to note from Table3. First of all, some factors are common across all appraisal levels. Crucially the biggest overlap occurs at the *micro scale*. This could perhaps be expected given that the literature suggests, albeit with subtle differences between assessment types, that behaviours are influenced by the availability of resources (including skills, data availability, etc.). Likewise there is also substantial overlap at the *macro scale*, where broader international and societal pressures shape the wider political and cultural environment in which different assessment processes function. The greatest variation is found at the *meso scale* - a reflection perhaps of the different histories and institutional contexts of individual appraisal processes. Thus, when accounting for the factors that enable and/or constrain the ESF in appraisal, understanding the *meso scale* appears to be especially crucial.

Second, even where a specific enabler or barrier is only associated with one appraisal type, it does not necessarily mean that it is not relevant to the other appraisal types. It could simply reflect a gap in the literature, which as noted above, has not systematically analysed the embedding of the ESF across all appraisal types. One way to address these gaps is to employ (as this Work Package does) a mixed methods approach.

Table 9.3. The key enablers and barriers of appraisal implementation identified in the existing literature.

Scale	Enablers	Barriers
Micro	Better training (IA, EIA). Better Guidance (IA, SEA) Resources/Better datasets (IA, SEA)	Resources & capacity (data, time, money, skills) (IA, SEA, EIA) Delaying decision making (EIA) Perceptions of usefulness (SEA) Low awareness (SEA)
Meso	Political leadership (IA) Oversight and quality control (IA) Legal backing/ judicial review (EIA & SEA) Sustainable development commitments (SEA) More advanced appraisal tools (IA)	Established policy making norms/routines (IA) Political policy preferences (IA) Weak quality control mechanisms (IA) Poor clarity between plans, programmes and policy (SEA) Contested purpose of assessment (SEA) Fit between legal requirements and policy context demands (EIA& SEA)
Macro	Supportive EU and international commitments/guidance (IA, SEA, EIA) Pressure from professional and international organisations (EIA) Wider policy demand (SEA) Industry buy-in (EIA) Stakeholders buy-in (EIA) Windows of opportunity (all)	Unsupportive EU and UN commitments (IA, EIA) Societal views about policy priorities (e.g. Deregulation, austerity) (IA,SEA, EIA) Weak societal buy-in (SEA)

9.5 Content analysis

In this section the embedding of the ESF in appraisal is explored through the results of the content analysis (see section 9.3.2). Each of the samples of different appraisal levels is discussed in turn, starting with IA and finishing with EIA. The literature review (Section9.4) shows that the embedding of environmental knowledge generally in appraisal has not always been consistent. Moreover, very little research has systematically examined whether the embedding of the ESF in appraisal has fared any better. Before drawing lessons from past experience and identifying barriers and enablers to the routine embedding of the ESF, this section identifies how far appraisals currently incorporate the ESF in the UK.

9.5.1 Policy Impact Assessment (IA)

All 22 of the 'non-environment' policy cases were classified as Type A, and do not appear in **Figure 9.1.** The results show an explicit ecosystems framing (i.e. Types E, F, or G) to be present in about 11% of the remaining 53 environment and environment-related policy cases. The most common policy areas are climate change, energy and nature conservation. But these figures are perhaps not surprising, as an ESF has only been actively embedded in legislation at the UK level since the UK NEA and the publication of the Natural Environment White Paper in June 2011. Within the sample of 75 IAs, only 25 dates from after this, and the most recent IA analysed was dated only 11 months after the White Paper. Among these 25, six IAs were classified as Types F or G, and five of these were published around the time of, or after, the UK NEA. There were a larger number of these 25 IAs that had a strong environmental framing and/or impacts analysis without explicitly mentioning an ESF (i.e. Type D): about 29% of the 17 environment policy IAs, and 8% of the 36 environment-related ones. So in all there may be a small effect stemming from the White Paper, but nothing conclusive over the timescale covered by the research.

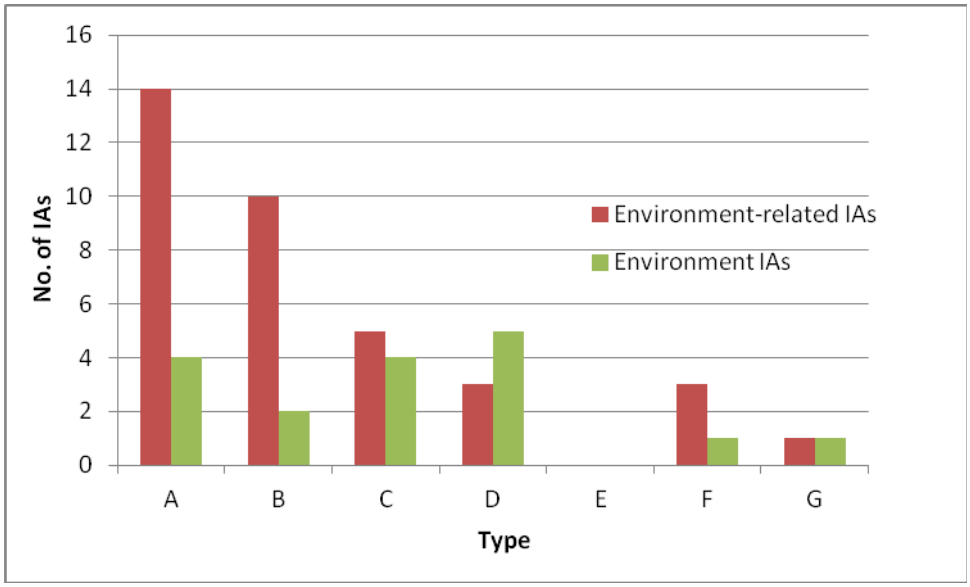

Figure 9.1. Number of sampled IAs with different types of ecosystems services framing: environment policies and environment-related policies.

Where the analysis around the different types of ecosystem services (i.e. supporting, regulating, provisioning and cultural services) did occur, which elements of the ESF came out most strongly?

Figure 9.2 illustrates the different ecosystem service types within an ESF that were most prominent, classified by the strength of analysis described above.

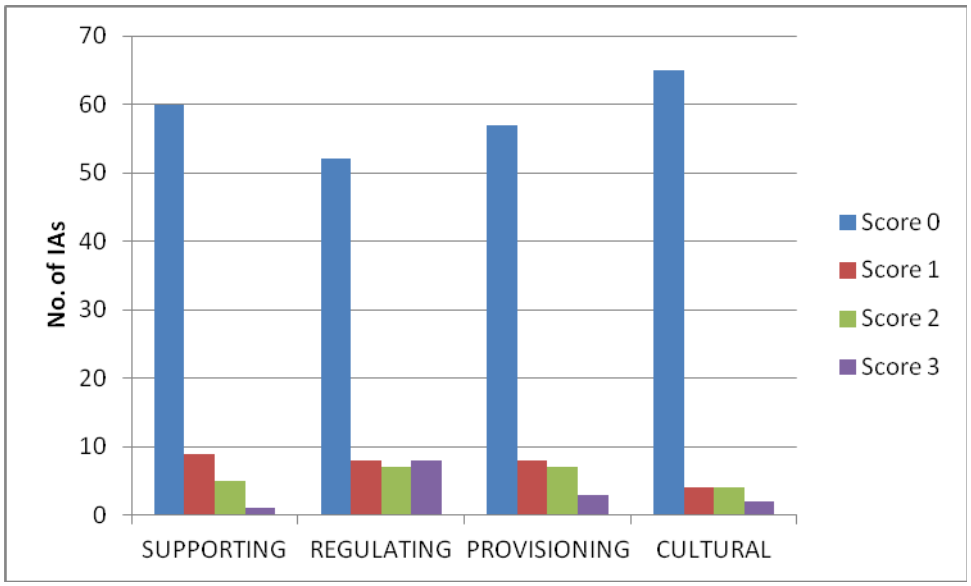

Figure 9.2. Level of analysis on each type of ecosystem service, by number of IA cases.

Where analysis is present at all, regulating services appears to attract the strongest attention compared with the lower profile of cultural services. It appears that the least 'explicitly environmental' aspects of an ESF (i.e. cultural services) still appear less frequently than the more explicit natural processes and food and fuel provision.

9.5.2 Strategic Environmental Assessment (SEA)

Figure 9.3 shows that just over half the non-technical summaries analysed contained a strong environmental framing and analysis without mentioning the ESF concept (Type D). Splitting by 'environment' and 'non-environment' does not make sense for SEA. However, the ESF was mentioned in only a very small number of cases. Generally, much of the analysis is strategic, qualitative, wide-ranging, and statutory (i.e. it is legally specified what sorts of areas must be covered). It is hence rather hard to classify 'quality of analysis' – analytical tool use is low, but the range of topics present is quite high.

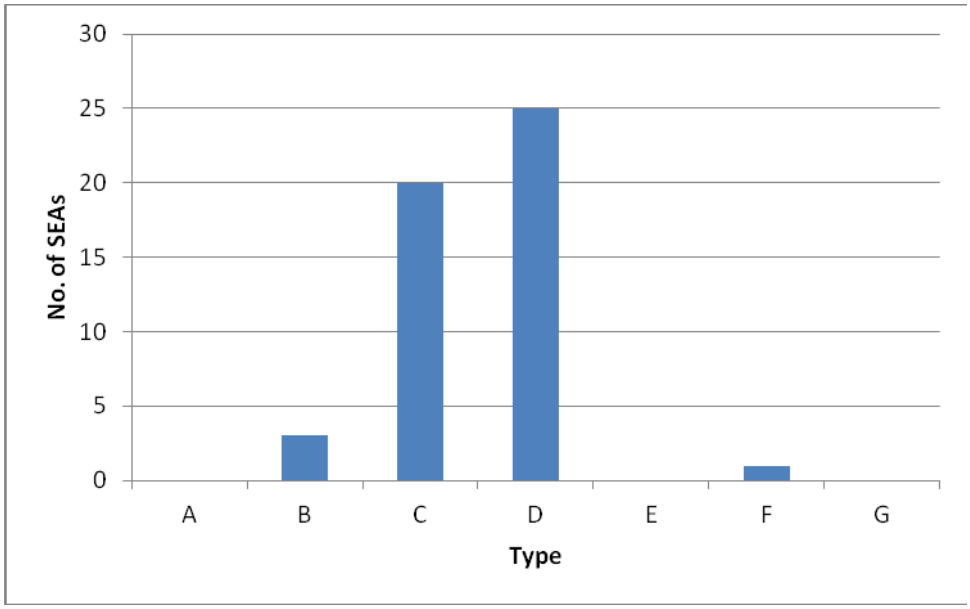

Figure 9.3. Number of sampled SEA nontechnical summaries with different types of ecosystems services framing.

Figure 9.4 shows the equivalent of **Figure 9.2**, but for SEAs. The strength of analysis in all types of ecosystem service was far more extensive than for IAs. This may be expected given the explicitly environmental remit of SEA. Furthermore, supporting services were the most strongly covered in SEAs, while again cultural services received somewhat less attention, although this difference was not as pronounced as with IA.

Finally, no obvious pattern was observed for SEA non-technical summaries conducted in different UK regions and policy sectors, a finding consistent with operating within the same overarching legal framework created by the EU SEA Directive.

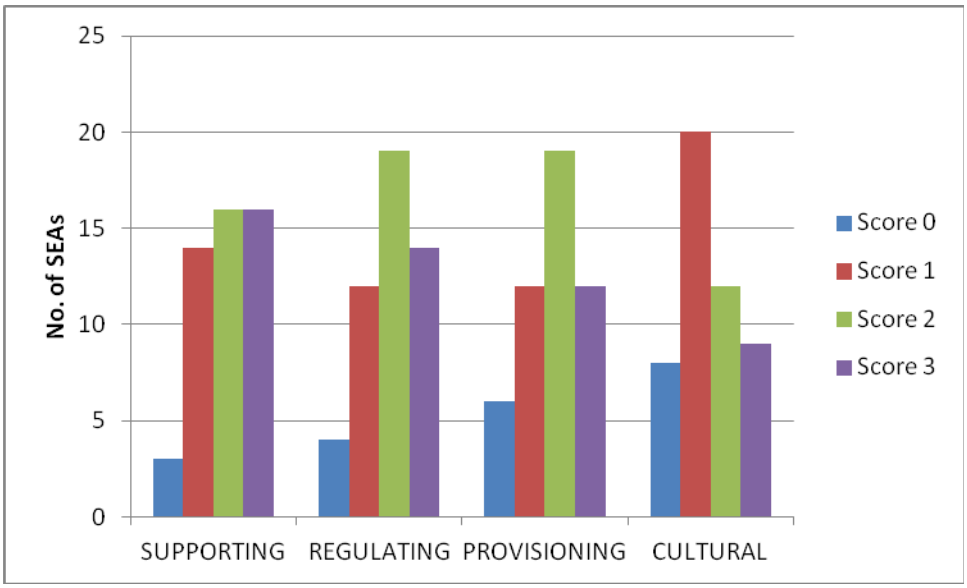

Figure 9.4. Level of analysis on each type of ecosystem service, by number of SEA non-technical summary cases.

9.5.3 Environmental Impact Assessment (EIA)

Figure 9.5 shows the 50 sampled EIA non-technical summaries classified according to types of ESF framing (again, splitting by 'environment' and 'non-environment' is invalid for EIA which is based solely on potential environmental impact). The patterns are very different to IA but not dissimilar to SEA. Not one non-technical summaries mentioned the ESF though more than half carried out strong environment framing and analysis (i.e. Type D) without mentioning the ESF concept. At the other end of the scale, there were very few cases which did not incorporate at least some basic analysis.

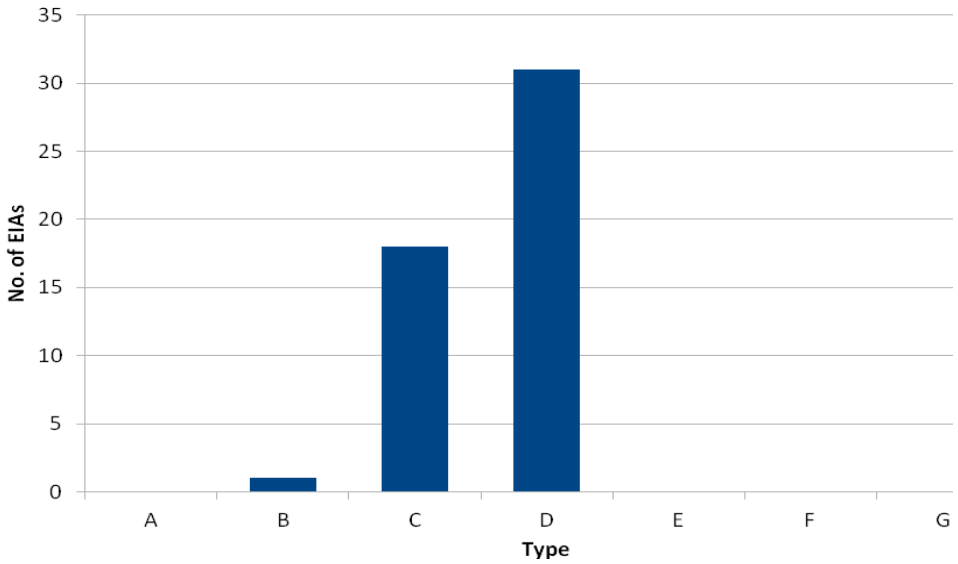

Figure 9.5. Number of sampled EIA non-technical summaries with different types of ecosystems services framing.

Figure 9.6 shows around half of all the EIA non-technical summaries sampled carrying out strong analysis around supporting and cultural services, while regulating and especially provisioning services are rather less well analysed. As with the SEAs, no variation in the types of EIAs, and the coverage of services against different policy sectors and the regions in which they were carried out, was found. Again, this is consistent with the common legal framework established by the EU EIA Directive.

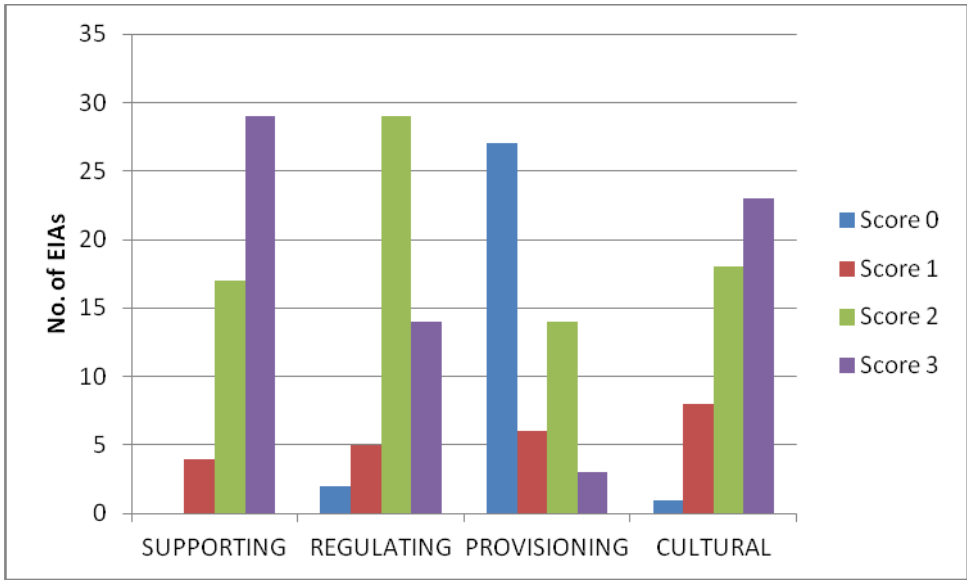

Figure 9.6: Level of analysis on each type of ecosystem service, by number of EIA non-technical summary cases

9.5.4 Summary

Section 9.5 sought to build upon the analysis in the literature review (Section 9.4) by reviewing a subset of appraisals to examine the extent to which they had embedded the ESF in the analysis. Overall the analysis found that few appraisals had fully embedded the ESF. Given the UK's long experience with environmental appraisal, it is not entirely surprising that environmental factors were more readily picked up than the more recent ESF. Nonetheless, in all forms of appraisal one finds some elements of ESF thinking, including an integrated approach and regulating, provisioning and cultural services, even though there is no explicit mention of ESF as a framing concept. This is especially the case in SEAs and EIAs. Much of course depends on how tightly one chooses to define an ESF. For example, impacts on climate change may be considered but not framed in terms of a regulating service. Thus, while appraisals may not be framed using the language of an ESF, they nonetheless consider many elements of it.

While there were many examples where an ESF has not been found, this does not necessarily mean that the assessment was 'bad'. These are clear examples that could be interpreted as deliberate 'non-embedding' where the appraiser has not sought out ecosystem knowledge as it clearly is not relevant to the issue at hand. For example with IAs a number of policy sectors are covered which have very little relationship to the ESF (e.g. criminal justice). However, the large percentage of environment and environment-related IAs that did not analyse environmental impacts at all (see **Figure 9.1**) is more interesting. An IA may acknowledge that the policy issue at hand has strong implications for ecosystems, but does not actually analyse in detail the impacts of specific policy options. It could be that the policy is framed so tightly (e.g. simple policy amendments where impacts are minimal) that there is little room to consider wider implications.

In order to better understand the observed patterns it is important to elicit the views of those who actually produce the appraisals and/or work closely with the ESF and map them onto the *micro-meso-macro scale*s identified in the existing literature. This is the subject of the next section.

9.6 Interviews

The literature review identified some of the barriers and enablers to embedding environmental and ecosystem knowledge in appraisal, and those around how the appraisal systems themselves work. The results from the interviews presented below build on the literature review. They detail the barriers and enablers, at the *micro*, *meso* and *macro scale*s, to embedding the ESF within appraisal. The interview findings also help explain the patterns observed in the content analysis. In this way, it is easier to differentiate between those barriers and enablers associated with the use of appraisal in general and those associated specifically with embedding the ESF. Note that the references to perspectives of different interviewees have been anonymised in the following way, referring back to **Table 9.1** in Section 9.3.3.

A1 to A15: 'Core Actors'
B1 to B6: 'Public Sector Insiders'
C1 to C4: 'Non-governmental Insiders'
D1 to D7: 'Outsiders'

The relative weights of points made by interviewees are visible through indication of the numbers and range of interviewees who made those points in the footnotes.

9.6.1 *Micro-scale* barriers

Inadequate understanding

Interviewees talked about the difficulties they faced in getting colleagues to fully understand the ESF and relate it to their work[6]. For example one interviewee remarked:

"People internally find it difficult to grasp what the ESF means. It is the current sexy term but people struggle to understand what it means." [A3]

As in the existing literature, other interviewees spoke of low awareness of the issue in general amongst colleagues[7]. Both the issues of understanding and low awareness may be a product of the technical nature of the ESF. For instance, many interviewees[8] argued that the language of the ESF did not immediately resonate with key people. For instance, one interviewee remarked:

"…at the moment, the concept is so nebulous there is a danger that it won't be meaningful…. If I have 10 experts in a room, I will currently get 10 different approaches." [C2]

This problem was said to be compounded by a lack of clear terminology[9], with weakly-defined concepts like shared social values (see Work Package 5) and a plethora of overlapping terms such as the 'ecosystems approach', and the 'Ecosystem Services Framework'. Some interviewees suggested that academics should more simply and better define their concepts, for example:

[6] A3, A4, A15, B2, C1, C2, C3, C4, D3, D5, D7
[7] A11, A12, A13, A15, B4
[8] A2, A4, A6, A8, B2, B5, C1, C2
[9] A4, A8, A14, C1, C2, C3, C4, D3, D7

"…we operate in an academic world, so there is a lot of jargon of language and terms surrounding the [ESF]. As things develop, we need to be less worried about the specifics of jargon. Even if we are not quite talking in the same terms, are we pushing in the same direction?" [A2]

Weak credibility

As a consequence, many interviewees thought that the ESF was mainly an exercise in quantification[10] – and thus an inherently controversial activity:

"… people resist it because they think it is just about monetising bio-diversity which runs against their core values" [B2]

Indeed, the difficulties and ethical dilemmas behind measuring ecological impacts and assessing their costs and benefits are well known (e.g. Pearce, 1998; Russel and Jordan 2007). Hence the ESF could be met with resistance by some who see it as an exercise in quantification as a matter of principle. However, notwithstanding these issues, it was felt by some that understanding simply takes time,[11] meaning that with diffusion will come better understanding:

"There has been 25 years of culture of doing these things the way they are with [appraisal], so to turn the ship around might take some time." [D2]

What does it add?

Many interviewees were negative[12] about the concept, questioning whether it really added value to existing policy making processes such as appraisal[13]. Some interviewees wondered whether the ESF was something (greater environmental protection) that had been attempted (albeit in different guises such as sustainable development) many times before. For some it was seen as an empty 'buzzword'. Others questioned whether employing an ESF led to better decision making, or whether it added anything new to what they were doing already[14]. For example one commented:

"The common question is invariably, 'what is it that we should be doing different internally?'" [B2]

Some decision makers see the ESF as peripheral to their core work:

"This is interesting stuff, but there is no evidence of its value to us" [A2]

Many interviewees noted that the ESF was not necessarily felt to be applicable to all decision-making situations and project areas[15] even in the environmental sector, for example with simple amendments to policy or in situations where EU policy has to be transposed. In such cases, the ESF could be seen as a burden and therefore treated as a tick-box exercise rather than an opportunity to approach decision making in a different way[16]. Indeed, an interviewee expressed scepticism about the chance of embedding ESF in appraisal – and especially IA - which is regarded purely as "economics in some people's minds" [A13]. So often, as was argued by another interviewee,

[10] B2, C3, C4, D2,
[11] B2, D4
[12] A6, A10, A14, A15, C1, C2, C3 D4, D7
[13] A5, A7, A14, B2, B3, C2, D6
[14] A6
[15] A1, A3, A4, A8, A11, A12, A14, A15, B3, B4, B5, C1, C2, D3
[16] A14, B3

officials try to get out of doing an appraisal or treat it as a superficial exercise[17]. Indeed, as one respondent remarked:

*"people are desperate to get out of doing an IA ... there is a mini industry in [*ministry x*] in 'getting out of it'"* [A13]

The added value of the ESF was also questioned even by individuals working in the natural environment sector. Some interviewees suggested that this may be because the ESF represented a threat to professional expertise, and by implication jobs[18].

Inadequate resources

Mirroring the literature findings on the quality of policy appraisal generally, the resources and capacity to embed the ESF into appraisal practice was widely identified as a strong barrier. Issues such as inadequate finance[19] and short timescales that decision makers have to work with[20] were raised. Many respondents also mentioned the lack of suitable data generated from a mix of qualitative and quantitative methods to use in appraisal[21]. Going beyond what is noted in the existing literature, one interviewee remarked:

"*There is a problem both in terms of accuracy of data, but also in terms of how we can repackage existing data for the ESF. For some areas this is easier to deal with than others, but there are definitely some gaps…. the information we hold on environment is not in the right format to stick into CBA format. For example we may have information on land use cover, but this tells us little about the ecological interactions in the soil and how this interacts with the wider ecosystem*." [A4]
Where new complex data are required, the gap perceived between the lengthy time to commission research and the speed of policy making was striking[22]. The applicability of ESF to appraisal and decision-making timescales was flagged by many interviewees[23], both the administrative timescale differences and the conceptual ones, such as the different distances into the future considered by economic (shorter-term) and environmental (longer-term) analysis[24].

It was suggested that the current environment of austerity had placed further pressure on resources[25] as well as a perception of assessment overload[26] (Russel and Jordan, 2007). Others spoke of a skills gap to deal with the type of analysis that the ESF entails[27]. Within IA this was particularly, but not exclusively, noted in non-environment departments (see content analysis, Section 9.5), where most appraisers are generalist civil servants. With SEAs, the issue of skills availability may be compounded by how infrequently they are conducted, due to the timescales of planning cycles, meaning that many staff members who had previously conducted or overseen (contracted to consultants) an SEA have moved on by the time the local authority has conducted

[17] A7
[18] A5, B1, C2
[19] B5
[20] B2
[21] A3, A4, A7, B2, B3, B4, B5, C3, C4, D2, D3,
[22] B2, B5
[23] A4, A15, B1, B2, B3, C1, C3, D3, D5
[24] A8, D5, D7
[25] A14, B2, D2
[26] C1, C2, D1, D2
[27] A1, A3, A15, B2, C1, C2, C3,D3

another[28]. With EIA this is less of an issue because EIAs are usually conducted by in-house experts within government agencies or by environmental consultants in the non-governmental sector.

9.6.2 *Micro-scale* enablers

Clarify the purpose and ensure the context is supportive

A major enabler identified by many interviewees was to communicate the ESF concept better. To some extent, this may simply involve clarifying terminology and being more consistent in its use. However, many interviewees suggested the importance of tailoring the language to the professional context of different institutions[29]:

"We need to understand the benefits of differentiation. You can't give the same pitch to different audiences" [C2]

For example, rather than using the terminology of the ESF, using similar concepts (for example green infrastructure) may have more resonance with planners as in the words of one interviewee *"infrastructure is a concept they understand…"* [C1] (also see Cowell and Lennon, in press). However, alternative terms, such as green infrastructure, are also not without their own definitional challenges and have been developed to achieve specific policy aims which many not always support an ESF.

Emphasise what the ESF adds

Many interviewees stressed the importance of 'selling' the concept to get broader buy-in[30]. This may entail the need to:

"Sell the positives of the ESF. For example, this will help you get around difficult stakeholder problems, stop you making bad decisions, be prepared for different outcomes, give you evidence for robust messages" [A2]

So it is a case of demonstrating "*it is different but it works*" [B2], or that it can help policy making through structuring communication with stakeholders and reducing the risk of unforeseen problems down the line. In SEA and EIA, ESF can be seen as another tool in the armory of the environmental policy maker/practitioner[31], enabling the discussion and prioritization of environmental protection to be put into terms of human well-being and economics. However, there was a feeling that for this to be done there was a need for more analysis to examine the collective impact of the ESF[32] alongside the development of more case studies and pilot projects to show the benefits of incorporating the ESF[33]. This includes providing greater clarity on the tools that can be used[34] to show they are credible[35]. Indeed, on reflecting on the impact of pilot studies in his organization, one interviewee remarked:

[28] D2
[29] A2, A4, A6, A8, A14, B2, B5, C1, C2
[30] A2, A4, A5, A14, B1, B2, D1
[31] A5
[32] B5
[33] A2, A4, A5, B2, B4, D2
[34] A1, B2
[35] A11

"Once the pilots are over we will look at them and evaluate positives and negatives. We are already getting requests from other parts of [institution x]" [A5]

9.6.3 *Meso-scale* barriers

The contested nature of knowledge in policy-making

Many interviewees confirmed that there is a gap between evidence use and policy making, with many suggesting that the reality is a long way from the 'technical rational' (Owens *et al.*, 2004) model noted in the existing literature.[36] For instance, one interviewee remarked:

"Appraisal's something that people do, but in a tick box manner because they have to do it. But policy doesn't change on the basis of policy appraisal. There are no instances of big issues being thrown up [through appraisal]*."* [B6]

In some cases, using the ESF was seen more as a political exercise; e.g. a desire to appear to implement but not actually doing so[37], using the requirement for proportionality in appraisal as an excuse to not incorporate the ESF, or deliberately choosing not to understand the concept to avoid having to address the issues it raises[38]. The role of political steering is observed more generally in IA, beyond questions about the ESF, as politicians push for their preferred policy outcome[39]. In such situations a full policy appraisal could to some seem heavy handed or indeed superfluous[40].

Inconsistent institutions

As may be deduced from the literature review, an ESF is not always compatible with existing institutional arrangements. In some cases, this was framed in terms of institutional fragmentation and the existence of silos:

"Another problem is that the planning system doesn't address agriculture and forestry. These are not covered by planning and are the responsibility of a different department [Defra]" [C1]

In others, particularly at a national government level (including devolved administrations), departmental resistance or ambivalence was seen to be a key issue in relation to diffusion of the ESF into key non-environment departments whose work has an impact on ecosystems quality[41]. As one interviewee remarked:

*"Although the [*Environment*] White Paper is a Government Document, it is clearly perceived by other departments as Defra's White Paper. It's not got the other government departments interested. They still see it as Defra or the environment sector's agenda so they are not joining up policy for the holistic view present in the White Paper. This makes implementing it not very easy."* [B4]

The above situation is potentially compounded by separate strategies in the devolved regions of the UK (e.g. the Living Wales). Some interviewees were sympathetic with this situation, as they

[36] A4, A6, A10, A15, B1, B2, C1
[37] B1
[38] A2, B1
[39] A6, A8, A12, A11, D3
[40] A11, A12
[41] A2, A5, A11, B4, C1, D6

understood that other ministries and regions of the UK have their own policy targets and responsibilities which they have to deliver in a context of budget cuts. Also, the current structures produce more predictable outcomes which were seen as a valuable asset[42]. This is nicely reflected by an interviewee who said:

"You start to run into existing practices and ways of doing things. If you are actually doing nothing it is easier to bring in the ESF. But where you already have existing approaches you get adaptation rather than significant change." [B2]

There may also be other *meso* and *micro* factors at work here, such as seeing change as a threat to one's position or the cost of the ESF in both money and decision-making delays[43].

Mismatches between levels of appraisal

Relating to the discussion about institutions, the interviews suggest that there is a mismatch between the ESF and established appraisal and, more broadly, policy making procedure[44]. For example, conducting an IA according to the text-book guidelines is a complex procedure given the policy-making environment[45]. Thus, rather than embedded analysis, IAs tend to be written around the policy making process as deadlines are rushed[46]. As a result the IA can simply be a tidying up exercise that occurs late in the decision making process[47] (see literature review Section 9.4). Moreover, all IAs must pass through the UK Government's Regulatory Policy Committee, which has a focus on regulatory burden[48], and in some circumstances must meet Treasury investment appraisal rules[49]. All these can create incentives[50] *not* to integrate ecological or environmental knowledge.

The embedding of appraisal within wider policy venues is also important. For example, the planning system has a major impact on ecosystems and is hence potentially an obvious place to embed the ESF. However, the configuration of the planning system is geared towards development[51], despite the fact that EIA, SEA and indeed IA have an environmental focus. In such a policy making context, development goals may well get prioritised over environmental ones. Indeed, some interviewees questioned how much impact SEA has on planning processes, as it is often conducted as an add-on to the decision making processes. Often the expertise used to produce the SEA can be far removed from the planners who make the final planning decisions. This was an issue that was also observed with EIA, where analysis is often produced by outside consultants who are not central to the consenting processes. This is also an issue of the lack of joining-up of activity raised above. However, some interviewees felt that the ESF could be reconfigured with existing assessment requirements in SEA[52] especially as good SEA procedure/practice is sometimes seen as similar to ESF[53]. For example, the quality control provided by the legal basis of the SEA directive stipulates certain standards. Professional bodies such as IEMA can play a role advising on quality control

[42] D6
[43] B5
[44] A1, A2, A5, A8, B1, B3, C2, D2, D3,
[45] A12
[46] A12
[47] A11, B4, A12, A6
[48] A11, A12
[49] A5
[50] A12
[51] A5, B1. B2, B3, D3
[52] C1, D2
[53] A2

practice for both SEA and EIA. While these quality control mechanism are not currently aimed at the ESF some interviewees felt they could be, while others doubted whether this was possible, questioning whether the ESF fits with SEA at all[54] or EIA[55]. Moreover, even if this were done, where SEA has little impact on the planning process, the question becomes immaterial. Therefore some interviewees felt that there was a need for a more fundamental rethink of SEA's role in planning[56].

With respect to EIA and SEA, there is the issue of compliance with relevant EU Directives. It was felt that incorporating the ESF into these assessments may downplay other legal requirements, thus making assessors vulnerable to legal action[57]. For instance, one interviewee remarked

"*with SEA in the UK there is still more to do. It is a struggle because of the nature of legal challenges over alternatives*." [C1]

Another argued:

"*Most people have heard of EIA, but in the context of legal challenge, which doesn't help when trying to get proportionality because of fear of challenge. So going above and beyond to consider the ESF can be considered risk. There is a fear of EU law compliance; if you are not well versed you can get caught out, and this gets publicised.*" [D2]

However, one practitioner working for a government agency informed us that trials have shown that the ESF *can* be built into existing assessments while maintaining legal standards (see *meso* enablers below).

Compartmentalised skills

Others observed that skills were compartmentalised across all levels of government, meaning that key experts had limited opportunity to work together on ESF related matters[58]. Thus engineers tended to work on an area separately to ecologists and economists and so on. As one respondent put it:

"At the moment skills are siloed, meaning for example that an economist working on one place may not be properly linked-up with an ecologist working on the same place at the moment. So we need to integrate section skills." [A4]

Fragmented institutional arrangements have a history and thus traction; the consequence of this, according to many interviewees, is that policy is often not joined up[59]. Crucially there is a lack of institutional platforms for discussing the management of ecosystems limiting the opportunity of learning across institutional silos. This indicates another reason why the ESF may take time to embed[60].

[54] A1
[55] A3, D2
[56] C1, D2
[57] A5, B1, C1, C2, D2
[58] A4, A12, C2, C3, D2
[59] A5, A14, C1, D3
[60] C2

Weak leadership

A final factor identified in many interviews relates to the lack of sustained leadership from ministers, senior civil servants, executive officers and central government departments[61]. Indeed one interviewee noted open hostility amongst management in his institution:

"The high command tried to sabotage the ESF as it runs against the reductionist and managerialist culture of [my institution]. The ecosystems [framework] is thus seen as inconvenient. So they make the appearance of implementing the ESF, but in reality they may or may not be." [B1]

According to interviewees, this has been compounded by conflicting institutional steers[62] at the UK level and regulatory pressures[63]. As a result, the Natural Environment White Paper is perceived to have had little impact to date across Whitehall as reflected in the weak integration of the concept in IAs[64]. The situation was perceived to be better in the devolved governments of Scotland and Wales where the key institutional actors were seen to be more cooperative in terms of supporting the ESF in decision making. This situation is perhaps due to the reduced complexity of joint working because of the smaller size of the public administrations in both devolved governments[65]. .

9.6.4 *Meso-scale* enablers

Build on existing institutions

Interviewees suggested that more could be done to fit the ESF to existing institutional and procedural contexts. Some interviewees felt that regardless of the concept's utility, following the UK NEA the ESF is likely to persist in public discourse:

"Defra has spent a great deal of money in promoting ES and so they have to have a practical outcome." [C1].

With this in mind, ESF may be employed by 'piggy-backing' on existing mechanisms, concerns and discourses[66] and/or recognized best practice[67] (see also the aforementioned *micro* enabler on clarifying what the ESF adds). Given the number of policy making procedures already in place, there is the likelihood that adding new processes may be resisted as another bureaucratic burden, thus lending support to the use of existing appraisal measures. It may not be possible to incorporate the ESF concept completely, but some interviewees felt this was better than not incorporating the ESF at all[68]:

"We need to get out there and do it to learn from practice even if it is not right, not perfect. We need to get assessments working in terms of institutional contexts. 'Mark 1' will not be perfect but at least give people something to criticise" [A5].

[61] A4, A2, B1, B4, D4
[62] A11
[63] D6
[64] A2,B4, C1, C3
[65] A3, B2
[66] A2, A4, A5, A14, A15 , B1, B3, B4, C4, D2, D5,
[67] A4, D2, D5
[68] A2, A5, C4

In terms of being a suitable venue to embed the ESF, many interviewees felt that appraisal was the 'main game in town' as it is the most formally established mechanism for analysis in decision making[69]. The discipline of being forced to fill in an appraisal pro-forma[70] was seen as particularly important in the context of IA. EIA and SEA in particular were seen as useful vehicles for getting people to think in more depth about the environment[71].

The formal requirement for IA is now so well embedded in policy making procedures that there may be a cultural expectation to do an IA[72], but this process is equally well-established without ESF considerations. Similarly, IA quality assurance/monitoring processes through department economists and the Regulatory Policy Committee[73] may be useful, but to be effective mechanisms for the ESF they need to frame appraisals beyond issues of regulatory burden to incorporate broader regulatory quality concepts such as cross–cutting knowledge use, including the environment.

A small number of interviewees did question (although did not necessarily rule out) whether appraisal is the right venue[74] given the difficulties associated with practice more generally (see above), and the fact that appraisal can be seen as a tidying-up exercise or atomised snapshot rather than a process of policy analysis[75].

Change institutions

As well as working within existing institutional processes, some interviewees suggested that institutional change/reconfiguration was needed to initiate a cultural/value change. One general theme was that the ESF can promote more joined-up thinking on ecosystems management. The ESF's key strength in this regard was argued to stem from its potential to promote and capture the value that the environment provides across sectors early in the decision making process. In the words of one interviewee:

"[the ESF] is enormously useful. The foundation is fundamentally correct – there are values associated with environment not captured in economic frameworks, and we hence over exploit environment." [D3]

New institutions, standards or processes could also be established to provide censure for non-compliance. At an IA level this could be linked to oversight, for example by the Regulatory Policy Committee. Some interviewees simply talked about the need for champions to be established within key institutions to facilitate and promote activity around the ESF. In many respects, such a champion could push *micro-scale* enablers such as a communications strategy[76]. Others spoke about the need for more integrated institutions in terms of expertise to reduce the barriers between experts, and in terms of policy competence to make policy more joined-up[77]. However, it is not possible to join-up everything (Russel and Jordan, 2009), so cross-institutional relationships need to be established[78]. Drawing on experience in Wales, for example, neutral venues could be created whereby different

[69] A3, A12, B1, B3, B5, D3
[70] A11, A12
[71] E.g. A5, C3, C4
[72] A12
[73] A11, A13
[74] A14, B2, B3, C1, D3
[75] D4
[76] A3, A2, A5
[77] A2, A3, B2
[78] A2

institutions and stakeholders representatives could meet, communicate and start to get a better understanding to co-produce appraisals and broader strategies that incorporate the ESF[79]. As an interviewee explained:

"*We have set up more cross-cutting, cross-department internal boards to look at policy developments/proposals from other perspectives. This enables the different parts of the government to be better able to see things from other's point of view, and to be able to see a wider range of opportunities and conflicts. So there is a receptive understanding up to some level."* [A3]

Such institutions could also provide the catalyst to better prioritise those policy areas where the ESF is most relevant, ensuring that analysis is proportional. In line with the literature review findings some interviewees[80] felt that an ESF is something that could in part be synthesized from existing legal requirements through amendments to the EU SEA and EIA Directives. One interviewee commented that revision of the EIA Directive is a move in this direction, whereas other regarded it as a missed opportunity (C2). Others however added a note of caution on being too heavy handed or hierarchical:

"I would resist the incorporation of the ESF into directives, because institutionally we aren't ready for it across Europe. It would be looked at as red tape." [A5][81]

Indeed as another interviewee suggested hierarchical intervention could be resented as an extra assessment burden, as a blanket intervention not taking account of the ESF-policy fit, (see *meso-scale* barriers) or that "*Sticks tend to result in tick boxes*." [A2][82]. Indeed, there was a feeling among some interviewees that pressure for the ESF tended to be applied from the bottom up[83]:

"*There is also pressure on [my institution] from the bottom-up. People at the sharp end appreciate doing something that doesn't fit artificial boundaries. The chief executive is not interested. It's from the bottom up that people see value…*" [B1]

Offer leadership

As described extensively in the literature, sustained high-level leadership[84] is important to enhance the embedding of the ESF in policy appraisal and decision making more widely. Indeed many of the identified *micro* and *meso-scale* enablers require leadership to establish and support them. As an interviewee remarked:

"My real worry is that if people at the top do not get involved, then the Natural Environment White Paper will disappear into insignificance". [B4]

Regarding the type of leadership required, interviewees spoke of political leadership, the leadership of high-level officials within an institution, the role of powerful departments such as the Treasury, and the role of scrutiny and advisory bodies such as the Natural Capital Committee. This was particularly seen to be important for the UK government where leadership was seen to be more fragmented.

[79] A3, B2
[80] A11, C1, C2, D1, D2
[81] A point also made by D7
[82] A point also made by C4
[83] A1, A2, A4, A5, B1, B2
[84] A6, A8, B1, B2,B, 4, B5, C1, D2, D3

9.6.5 *Macro-scale* barriers

Underlying value conflicts

Echoing extensively the literature review findings, it was suggested repeatedly in the interviews that underlying values within society may act as a critical barrier to embedding the ESF more widely in government and appraisal processes. For example, some may be put off by the economic framing and question the ethics of valuing nature[85], arguing that nature has a right to exist or be valued beyond its services to humans[86]. This contrasts with current political discourse and broader values of society, which generally prioritise factors other than ecosystems: e.g. wealth creation, health, job security, car-friendly transport policy[87]. Broader political priorities have consequently tended to concentrate on broader economic issues such as economic austerity, better regulation and deregulation[88], and proportionality of analysis[89] to reduce costs and impacts on business and society. As a result, there is little pressure from the public on decision-makers to incorporate the ESF in their work. In such a context, new procedures or regulations which may accompany the ESF may actually contradict these broader political themes, especially given the UK's current economic situation[90]. As one interviewee put it:

"[government is keen to] *not let environmental regulation get in the way of infrastructure development and housing"* [B4]

9.6.6 *Macro-scale* enablers

Engage with the ESF

While this Work Package finds limited embedding of the ESF into policy appraisal and identified a broader array of barriers than enablers, many of interviewees nonetheless found the concept to be beneficial. Crucially, these uses of ESF can extend well beyond a specifically appraisal-like analysis function. Research on knowledge use clearly distinguishes between different types, namely instrumental where it is used to directly inform a decision, strategic use where it is used to support a particular agenda and conceptual use where it has a longer term influence on policy debate and outputs (Owens, 2005; also see Turnpenny, Russel and Jordan, 2014 for a specific example of such uses). Many of the critiques in this Work Package relate more to the fact that the ESF in not being embedded into appraisal in an instrumental manner. However, interviewees suggest benefits more akin to strategic and cognitive uses of the ESF

In terms of more cognitive uses of ESF knowledge, interviewees argued that it has enhanced the general understanding of ecological issues. The ESF was argued to, amongst other things, formalise different value perspectives, help bring people into the environmental debate, provide a spur to rethink existing activities, uncover multi-purpose outcomes and illuminate trade-offs, all of which can enhance policy support. Others marked out its potential for facilitating engagement and two-way dialogue with stakeholders through showing the benefits ecosystems provide to people and society

[85] B3
[86] D5
[87] A4, A6, A8, B1, B2, B4, B5, C1, D3
[88] A6, A2, A12, B3, B4, B5, C1, D1, D2, D3, D5, D6
[89] A1A12, D2, A1
[90] A5

more broadly in a holistic manner. It can also function as a way of breaking down barriers. As one interviewee suggested:

"ESF is more as a platform to facilitate debate, a tool to bring stakeholders together with same data and same assumptions, rather than a plan set in stone or a way to get quantitative outputs" [B3]

In terms of the benefits from the more strategic use of ecological knowledge, several interviewees of different 'types' reported that the ESF was deployed to facilitate communication with business groups through providing a stronger business case for environmental protection[91]. Another general theme was that the concept can be deployed to promote more joined-up thinking on ecosystems management. The ESF's key strength in this regard was argued to stem from its potential to promote and capture the value that the environment provides across sectors early in the decision making process. In the words of one interviewee:

"[In the past]… i*t's been about either environmental protection or growth. The ESF has helped square that circle while also recognising trade-offs and limits. No one wants to talk about limits, but they do want to talk about opportunities. By using the language of opportunities around the ESF we can ask departments to build Defra objectives into theirs as a way of working more effectively*." [A2]

Apply external pressure

Interviewees highlight the importance of external pressure by industry, professional associations such as IEMA, and international bodies and processes on the adoption of the ESF[92]. For example, some in industry use

"the ESF to show more value in certain parts of their activities than others, so thought it was a good tool to show to stakeholders. They took whole process on board. They didn't quantify but they took on the approach." [C2]

Some argued that stakeholders had a similar effect on government: stakeholder analysis and consultation is part of IA, EIA and SEA. This external pressure is registered in decision making institutions:

"They come and find us and they say gosh, we did this, is this okay. It starts a conversation" [A2]

On the international stage, the UK NEA, Natural Environment White Paper, the Living Wales Programme and Scotland's attempts at embedding the ESF in land use policy partly stem from the political opportunities created from the Millennium Ecosystem Assessment and TEEB. There is also potential for progress within the public sector driven by private sector actors who benefit from including the ESF in their other work. For example, the International Finance Corporation (a branch of the World Bank) has incorporated the ESF into its EIA guidance for investment projects, which may have an - albeit slow - trickledown effect into EIA more generally. As an interviewee remarked,

*"[*w*]ith our SEA work the ESF has started to become more prominent because of the IFC guidelines. IFC performance standards are important. Thus the concept is spreading in our work because of this lender's requirement."* [C1]

[91] A2, A8, A15, B3, C1, C2, C3 D1, D3
[92] D2, C1

Seize opportunities

Other changes to the wider political context, including the 2008 financial crisis and changes in government also provide opportunities to promote the ESF more broadly within the changing context. When institutions are in flux due to re-thinking of priorities at the deepest level, values are challenged, and opportunities arise for reshaping thinking. While these are often unexpected and difficult times, they are important chances to establish some of the enabling mechanisms suggested above.

9.6.7 Summary

Table 9.4 summarises the main findings from the interview analysis. It shows a degree of conformity of views across all appraisal types and levels, especially when compared with the literature review findings in Section 9.4 (c.f. **Table 9.3**), where the focus was on embedding (environmental) knowledge more broadly. This may well be due to the fact the literature review did not thus pick up the different *micro* (e.g. level of resources), *meso* (e.g. legal requirements, decision making constraints) and *macro* (e.g. stakeholder pressure and industry pressure) contexts associated with each appraisal level. By contrast the barriers and enablers identified through interviews in Section 9.1.6 were more narrowly focused on the embedding of the ESF in appraisal. Overall, the relative uniformity between appraisal levels would tend to suggest that embedding the ESF presents similar challenges for all, albeit with some variation. Crucially in this regard, the data show that embedding the ESF in appraisal depends on the fit between how the ESF is framed and the institutional context in which it must perform, including: how it resonates with, and is understood by, appraisal and decision making professions; how it is perceived to add value to existing work; and how it fits with existing assessment norms and expectations. Therefore in addition to understanding the factors that shape the way appraisal is used in the policy making process, consideration needs to be given more generally to the specific challenges entailed with embedding the ESF. Such consideration may have wider lessons for embedding the concept of the ESF in other knowledge integration venues beyond appraisal (Jordan and Russel, 2014).

Table 9.4. The key enablers and barriers of embedding the ESF into appraisal identified from the interviews. (Note: "all "= found in EIA, SEA and IA)

Scale	Enablers	Barriers
Micro	• Clarify purpose and ensure context is supportive (all) • Emphasise what the ESF adds (all)	• Inadequate understanding (all) • Weak credibility (all) • What does it add? (all) o Perceived threat to professional identity (mainly EIA) o Attempts to avoid doing appraisal at all (IA) • Inadequate resources (all) o Time, money and workload (all) o Data availability (all) o Skills (IA and SEA)
Meso	• Build on existing institutions (all) • Change institutions (all) • Offer leadership (all)	• Contested nature of knowledge in policy making (all) • Inconsistent institutions (all) • Mismatches between levels of appraisal o Norms and expectations (IA)

		o Legal requirements (SEA and EIA) • Compartmentalised skills (all) • Weak leadership (all)
Macro	• Engage with ESF, including recognising different 'uses' of ESF (all) • Apply external pressure (all) • Seize opportunities (all)	• Underlying value conflicts (all)

9.7 Conclusions: key points and policy implications

This Work Package has explored the scope for embedding a fuller consideration of ecosystem knowledge via the ESF in policy and decision making through existing *appraisal* systems. To achieve this aim, a three-step approach was followed. In Section 9.4 the literature on policy appraisal and knowledge embedding was explored, and the relevant enablers and barriers at *micro*, *meso* and *macro scale*s were identified (see **Table9.3**). Having done this, Section 9.5 explored the extent to which the ESF has been embedded in UK appraisals. Overall it was found that few appraisals were explicitly framed in terms of the ESF, yet many of its constituent elements were implicitly covered. Building upon the literature review and the content analysis, Section 9.6 drew on the perceptions of practitioners (see **Tables 9.1** and **9.4**) to explore the enablers and barriers more dynamically and in much greater detail.

A number of key points emerge. **At the *micro scale*:**
The availability of resources is a key issue identified in both the literature review and interviewee data. Resources include data, time, money, skills, training, and guidance. The government has presented new guidance on embedding the ESF within IA in the Treasury's Green Book. A recent analysis of the impact of the Green Book guidance on IA practice across UK central government shows that there is considerable room for improvement (EFTEC 2013). Crucially, this Work Package suggests such guidance needs to be supplemented by more integrated datasets as well as further research to address key data gaps (something that the UK NEA follow-on is attempting to address in part, through Work Package 1). However, such developments will be immaterial unless the added value of the ESF is recognised in government and beyond (and thus linked across *meso* and *macro scale*s).

If the UK government and devolved administrations want the ESF to have impact across different policy sectors and governance levels, awareness of the concept will also need to extend well beyond the environmental sector. Engaging messages could include how the ESF is different to what is already being done, and crucially, how it may work with rather than against existing practice through for example facilitating stakeholder communication and identifying potential problems. Having more demonstration projects of how the ESF could work in the context of appraisal, and decision making more generally, therefore is likely to be crucial. However, the data show that even Defra's appraisals do not consistently address the ESF or even environmental considerations more generally. Other policy sectors are likely to be more receptive to ESF thinking if Defra sets a good example in relation to its own work.

There are different understandings of the ESF purpose and value. As a concept, ESF currently means different things to different people and, whilst implementation in different contexts may need to vary accordingly, more clarity around specific aspects of the ESF (e.g. shared social values (cf Work Package 5)) would help communicate its added value more clearly. In doing so, the language needs to be tailored to different sectoral and professional contexts. For example, as the findings in this Work Package suggest, using concepts such as green infrastructure to communicate to people in the planning community might consolidate understanding more than the language of the ESF, which has its roots in ecological and economic thinking. Likewise, speaking about 'regulating' or 'supporting' services may not resonate as much with health officials, whereas the well-being and health benefits nature provides to society might have greater traction. However, such a strategy is not without its own terminological challenges.

At the *meso scale:*
There are established silos in policy making processes. Creating more integrated institutions and mechanisms such as inter-departmental committees and issuing new guidance are well known

responses to this problem (Jordan and Schout, 2006). However, on a cautionary note, if they become too large and unwieldy, such institutions can ironically fail to deliver a more integrated response (Russel and Jordan 2009).

Lack of interaction between different practitioner communities (economists, ecologists, planners, etc) can also inhibit embedding of the ESF. One way to address this problem – and the issue of silos - is to create neutral spaces (e.g. workshops, forums) where actors from different backgrounds can generate more integrated analysis and solutions (Partidário and Sheate, 2013). Such venues would also enhance communication to develop a better understanding of different needs (see points under the *micro scale* above). Likewise, establishing networks or communities of practice to share experience around the ESF can help to maximise resources and capacity to conduct analysis.
There are established routines and norms in policy-making and embedded legal requirements. Therefore linking the ESF to existing mechanisms is important. In this sense, appraisal is a natural venue as it spans different governance levels and policy sectors. However, appraisals usually focus on very specific policies, plans or programmes, and the legal framework and/or guidance stipulations are an important determinant of how far they can build in new thinking. The data in this Work Package suggest that the legal remit of SEA and EIA, which requires them to look at the environment broadly in an integrated manner, makes them potentially more promising for embedding the ESF, although of course only to the extent that entrenched practices can be altered. By contrast, IA has a broader reach across sectors but does not have the environment at its analytical core, leaving it more susceptible to the various barriers identified in this Work Package.

It is not appropriate to prescribe a specific assessment framework in EU legislation. EU Directives generally set out broad objectives to be delivered and establish the tone of debate around embedding the ESF, but not the methods by which they are to be achieved. Thus, while the interview data suggests that the ESF can be added to existing appraisal mechanisms, this may be better achieved indirectly through communicating the added value of doing so (see *micro scale* points above). Related to that, sustained high-level leadership from ministers and executives is needed if the ESF is to be recognised as an enduring priority. Such leadership will be even more effective when it is backed up by quality control measures such as the Regulatory Policy Committee (see Dunlop et al. 2012) and professional bodies like IEMA. Finally, leadership has to be underpinned in daily working practices. One way to achieve this is via extended external peer review/monitoring of appraisals (Arrow, 1997, p.222). This would involve key stakeholders with different perspectives critiquing appraisals and/or producing alternative appraisals to check the robustness of their work and learning lessons from one another (Russel and Radaelli, 2010). This kind of reinforcement work can easily be sidelined when deadlines have to be met, hence the need for high level political support and leadership.

At the *macro scale*:
Change at this scale is by its nature more difficult to achieve because underlying social values and preferences tend to be rather stable over time. But there are opportunities at the *macro scale* that can be exploited by those promoting the ESF. These include: engaging with the many potential uses of ESF, including as platform to stimulate debate and enhance communication between different stakeholders; environmental events such as floods to push for more ESF thinking in flood risk management; supra-national developments such as the decision to revise relevant EU legislation; reports by influential bodies such as the Natural Capital Committee and National Ecosystem Assessment contributors.

When considering the different types of enablers and barriers it is important to consider the interaction between scales. For example, the quality of political leadership at the *meso scale* can influence the amount of resources available, as can the legal basis for undertaking ESF. Likewise the

way in which the ESF is communicated (*micro scale*) may affect the ability to graft it onto existing procedures (*meso scale*). However, such interaction is not necessarily deterministic. For example, while macro-*scale* elements may be harder to change, thus affecting strategic priorities, *meso-scale* (e.g. creating more integrated institutions) and *micro-scale* (demonstrating the added value of the ESF to policy makers) factors can operate independently of the *macro-scale*. Ultimately, finding the right mix of approaches is what matters rather than focusing on one or two headline grabbing changes at one or two scales. Finding that mix requires a combination of political leadership and opportunism, a commitment to engage in joint learning exercises (such as this report), and the institutional capacity to put their findings into practice.

The broader context of appraisal

The analysis in this Work Package highlights several broader messages. First, the whole issue of how the ESF is and/or could be embedded into decision making is massively under-researched. This Work Package has begun to fill this gap. However, there are a number of key areas that require a deeper understanding by researchers, policy makers and stakeholders alike. For example, it would be useful to build upon this analysis by focusing on more in-depth case studies to better understand the patterns of use and associated enablers and barriers in specific institutional, sectoral and operational contexts. This could include learning across countries, across appraisal levels, and across integration challenges, and could use a range of methodologies from interviews and focus groups to more ethnographic approaches. In this way a further differential between those factors that are context specific and those that are more generally observed might be possible. Additionally, this Work Package has mainly focused on policy appraisal, a process that focuses on the activities of policy formulation. Future research might therefore build upon this and Work Packages in the Policy Reponses section (e.g. Work Package 8) by exploring other parts of the decision making processes such as how far appraisal affects the detailed content of policies and the manner in which they are in turn implemented and affect the world, including the quality of ecosystems. Policy appraisal is only one (albeit important) venue amongst many. Such venues might include the planning system, the work of expert committees such as the NCC, ex post policy evaluation exercises within Whitehall, and the work of parliamentary committees. A special issue of the journal *Environment and Planning C* (Jordan and Russel, 2014) has begun to address this need, but more is needed fully to support the embedding of the ESF.

Second, each level of appraisal (IA, SEA, EIA) has advantages and disadvantages as a venue for better embedding an ESF. The fact that SEA and EIA are legally mandated can act as both a *meso-scale* enabler and barrier to embedding the ESF. Both appraisal types require the appraisal of environmental impacts to the standards laid down in the relevant EU directives. But while environmental analysis is guaranteed, and EIAs for example provide greater opportunities for stakeholder engagement at the more localised level, the specification of the legal standards means that appraisers may be unwilling to embed the ESF for fear of not conforming to guidance, and opening up the risk of judicial review. At the IA level – and to a lesser extent at the SEA level - there is scope for more strategic decision-making as national policy sets the scene and defines the boundaries for the development of programmes or plans. However, IA has a broader focus anchored in the reduction of regulatory burdens. As such it is more likely to be geared to the strategic needs of the sector in which it is being applied (Dunlop et al 2012), the danger being that cross-cutting initiatives like the ESF are squeezed out (Russel and Jordan, 2007).

Third, possessing 'more knowledge' (on the face of it, a *micro scale* issue) does not necessarily mean that it will be embedded into appraisal and used more widely in decision making. Barriers and enablers at *meso* and *macro scales* must also be accounted for, yet this point is often forgotten. Since the late 1980s a lot of useful environmental knowledge has been produced for government, but has

not necessarily been extensively embedded into appraisal to inform decisions more widely (Russel and Jordan, 2007).

Fourth, some recognition is needed as to the extent to which, and when, the ESF meets both fitness *for* purpose and fitness *of* purpose tests. As originally conceived the ESF could be considered fit for purpose in helping to better value nature in policy making. However, in other contexts and at other decision-making levels, it may not always meet a fitness *of* purpose test, i.e. its design and content is not automatically appropriate to the context of appraisal. This needs to be recognised, otherwise resources could be wasted in trying to promote ESF where it has little immediate relevance or likelihood of traction. Worse, it may trigger a strong reaction against its use.

9.8 Links to other Work Packages

This Work Package provides an analysis of how the ESF, and other types of ecosystem and environmental knowledge more generally, have been embedded to date in appraisal systems, and the institutional cultural and behavioural enablers and barriers to doing so. It thus provides critical lessons for the design and deployment of such novel tools and frameworks.

The design of Work Package 9 was informed by the kinds of tools that are being designed in the UK NEA Follow-on, such as asset checks (Work Package 1), scenarios (Work Package 7) and land-use models (Work Package 3), and hence the research questions were tailored with those endeavours in mind. Work Package 1, 2, 3, 4, and 5 provide useful economic context and data on the value provided by ecosystem services which can be incorporated into appraisal in line with recommendations outlined in the Treasury's Green Book (HMT, 2012). In this respect, this Work Package (9) offers opportunities for lesson drawing on the embedding of knowledge generated through the UK NEA follow-on around the enablers and barriers examined. For instance the *micro scale* barrier that economic valuation and analysis can be off-putting to appraisers and policy makers alike unless the added value can be demonstrated and effectively communicated is a pertinent lesson. Moreover, Work Package 6 examines deliberative valuation methods around shared values. This Work Package (9) shows that more traditional valuations are rarely present in appraisals, which may have implications for the consideration of shared and shared social values. The policy scenarios work associated with Work Package 7 and the wind tunnelling of policy options in Work Package 8 can benefit from some of the broader lessons from Work Package 9 relating to how the ESF is handled by policy making and implementing institutions, as policy outcomes are ultimately shaped by the institutions in which they are developed. There are also important comparisons that can made between the barriers observed in Work Package 7 and this Work Package.

In a similar vein, Work Package 5, 6 and 10 can draw lessons from the analysis of institutional culture and behaviours as barriers and enablers. However, they also provide comparative insights on how the ESF is, and can be, embedded in other knowledge venues beyond appraisal. For instance Work Package 5, is concerned with indicators which could be incorporated into an appraisal processes or could be used as a stand-alone tool for policy evaluation, with case studies of cultural ecosystem services in practice. Likewise Work Package 10 examines and develops different tools to employ the ESF in spatial planning and local decision making contexts, incorporating a number of tools including appraisal.

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