

Support for incorporating ecosystem-services into Environmental Impact Assessment

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Purpose of this support document

The purpose of this support document is to provide practitioners, consultees, stakeholders and policy-makers who are assessing, developing or contributing to projects that require EIAs how their assessment may be improved by incorporating the concept of ecosystem services into the assessment.

The guidance is structured to provide:

- **What is EIA** – introduction to EIA and the questions it seeks to answer
- **Why ecosystem services improves EIA** – rationale for the inclusion of ecosystem services within EIA
- **How to use ecosystem services within EIA** – an introduction to a choice of broad approaches for using ecosystem services within EIA
- **Case studies** – to illustrate the potential.

This document is not intended to be guidance on undertaking EIA generally or on how to ensure that your EIA is compliant with the EIA Directive and relevant UK legislation based on your particular context. Rather it is about introducing ecosystem services within EIA and exploring how it might be relevant to your particular EIA and what the benefits of its inclusion may be.

What is Environmental Impact Assessment?

EIA is a tool that allows developers and decision makers to understand the impact of a project on the environment and how they can avoid nor reduce any negative environmental effects whilst maximising the opportunities presented by the natural environment.

EIA is a legal requirement under European and UK law that requires that certain development proposals that are felt to have potentially significant environmental effects are examined in detail using the EIA process. More information on when EIA is required is available online.

SEA can help you to answer the following policy questions:

- What are the likely and most important environmental effects, good and bad, of my plan or programme?

- What do the public and other stakeholders think of the environmental effects of my plan or programme?
- How can I reduce negative environmental effects?
- How can I make the most of the benefits provided by the natural environment?

It is intended that this support document should be used at the earliest possible stage of the policy decision making process set out on the EATME tree. It is also designed so that it is relevant across all the stages and iterations:

Ideas ---- Survey ----- Assess ----- Plan ----- Act ----- Evaluate

Why include ecosystem services in EIA?

There are a number of reasons why EIA practitioners, project proponents, consultees and other stakeholders should consider how ecosystem services can contribute to EIA.

Ecosystem services is about the multiple benefits we receive from the environment – including this in EIA is a more accurate and effective way of describing and thinking about the environment.

Ecosystem services is about why the environment, and hence why the EIA matters – too often EIAs are a tick box process. Using ecosystem services in EIA has the potential to explain to decision makers why the environment matters and to demonstrate that EIA can add value to the plan or programme making process. This profile raising potential should result in a more integrated and valuable EIA process and outcome.

Using ecosystem services flips the idea that the environment is a constraint to development - using ecosystem services in EIA allows us to consider how the environment supports the delivery of our project and how the project can support this. This can lead to more resilient, risk proofed projects.

Ecosystem services is part of the policy landscape – as mentioned much of the UK’s natural environment policy, and other areas like spatial planning (including the National Planning policy Framework and some Local Plans) and water, refer to or uses the concept of ecosystem services.

Ecosystem services is an integrating concept that can support assessment of cumulative effects - the range of ecosystem services are relevant across the different EIA topics. This integrated nature can be used to consider effects across the topics in a way that can support consideration of inter-relationships and cumulative effects. Cumulative effects have in the past been poorly dealt with in EIA and thinking about ecosystem services may help improve this and provide a way of considering cumulative effects more consistently in EIAs.

Research and practice indicates that ecosystem services in EIA is particularly effective when:

- Describing the environment in a way that is more accurate and effective (scoping and baseline stages of EIA).
- Identifying and evaluating significant effects (assessment and alternatives).
- Considering cumulative effects (assessment and alternatives).

- Engaging and consulting stakeholders and the public (across the whole EIA process but particularly at consultation points).

An ecosystem services approach to EIA is not itself a panacea or something that instantly results in a perfect EIA. Due process and reference to existing guidance and support, including the [Regulations](#) and [Directive](#) is required to ensure effective, compliant EIA. Using ecosystem services in EIA is not a gold plating addition. EIAs which use ecosystem services can be cost and outcome effective. The process set out here does not necessarily require additional steps or processes and can be easily integrated into existing EIA planning.

How to consider ecosystem services in EIA

There are felt to be ends of a spectrum to incorporating ecosystem services into EIA. This spectrum is based on how much technical information is required as shown in the Figure below.

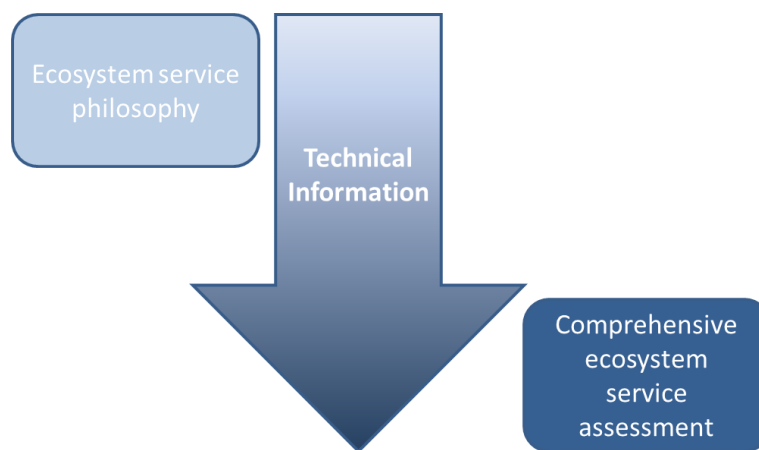


Figure 1: Range of approaches and relationship to technical information

These two broad approaches, the ecosystem services philosophy (adapting current approaches) and comprehensive ecosystem service assessment (a more systematic approach building from first principles) are highly related. In effect the EIA of any projects that relies or impacts, to a greater or lesser degree, on the natural environment could draw on the 'ecosystem services philosophy' approach as an initial starting point. For projects that are identified via scoping as being very reliant or having a greater impact on the natural environment it may be appropriate to promote the integration of ecosystem services to the point of a comprehensive ecosystem services EIA. The reason being that the scale of reliance or likely impact is sufficiently large to justify using more technical information to better understand the type and level of ecosystem service provision within your area.

However even within comprehensive ecosystem service EIA there is a need to incorporate non ecosystem services aspects as appropriate – for example relating to heritage, deprivation and non-ecosystem services health issues.


A summary of these two approaches is presented below.

The ecosystem-service philosophy

The ecosystem services philosophy is more about the use of ecosystem services as framing or description of the environment within your EIA. As such it starts from existing practice and relies on a changing the language and emphasis of your EIA.

Traditionally EIA focuses on describing the environment as a ‘thing’, something to include as part of the baseline inventory. The ecosystem-service philosophy seeks to develop this description: from things, to benefits and uses. ‘Benefits’ and ‘uses’ avoids the problem of ‘ecosystem services’ and related terminology which is quite technical.

The Figure below demonstrates these three terminologies and their differences. Using this approach provides a framework that shows how and why the environment matters and has a language which complements traditional terminology. The ‘benefits’ language allows for effective description about the role of the environment in supporting policy when the audience is policy makers. The ‘uses’ language can be used when talking to members of the public and community and is an effective way to promote knowledge exchange between the EIA process and the public, for instance identifying priority areas or services based on how people are using the environment. More information on how to use this concept is set out in the next section.



Things	Benefits	Uses
Area of Beech (<i>Fagus sylvatica</i>) dominated wood parkland	Area that provides benefits to society, namely: <ul style="list-style-type: none">• Food production;• Cultural and spiritual;• Carbon sequestration and storage;• Water and flood regulation;• Soil formation;• Noise reduction;• Ornamental resources;• Biological control;• Pollination.	Area that can be used in a variety of ways, namely: <ul style="list-style-type: none">• Walk the dog;• Get ivy for Christmas;• Build a jump for bike;• Go for a stroll;• Gets flooded in the winter;• Get some peace and quiet;• Harvest nuts and mushrooms;• To meet as part of a community group.

Figure 2: Example of using ecosystem service philosophy to described the environment¹

¹ Sheate, W.R., Eales, R.P., Daly, E., Baker, J., Murdoch, A., Hill, C., Ojike, U., and Karpouzoglou, T., (in press) Spatial Representation and Specification of Ecosystem Services: a Methodology Using Land Use/Land Cover Data and Stakeholder Engagement. Journal of Environmental Policy Assessment and Management Vol:14, Pages:1-36.

For more about using this approach in EIA see the Heysham Road EIA Case study and support and guidance at the end of this document.

[Comprehensive Ecosystem Assessment](#)

Comprehensive ecosystem services is marked by the more quantitative approach to ecosystem services – this may include a systematic identification of ecosystem service supply and demand across an area and may extend to the monetary valuation of ecosystem services (assigning monetary values to the benefits we receive from the environment).

Regardless it builds on the ecosystem services philosophy and involves a much more detailed analysis of the type and nature of ecosystem services being provided within the scope of a project and assessing their contribution to supporting the project. For more about using this approach in EIA see the Wareham Managed Realignment Case Study and support and guidance at the end of this document.

Ecosystem service proofed EIA process

The following includes a run through the EIA process and how ecosystem services may be included. The schematic of the process includes key considerations that should be asked in each stage to support the consideration of ecosystem services into your EIA.

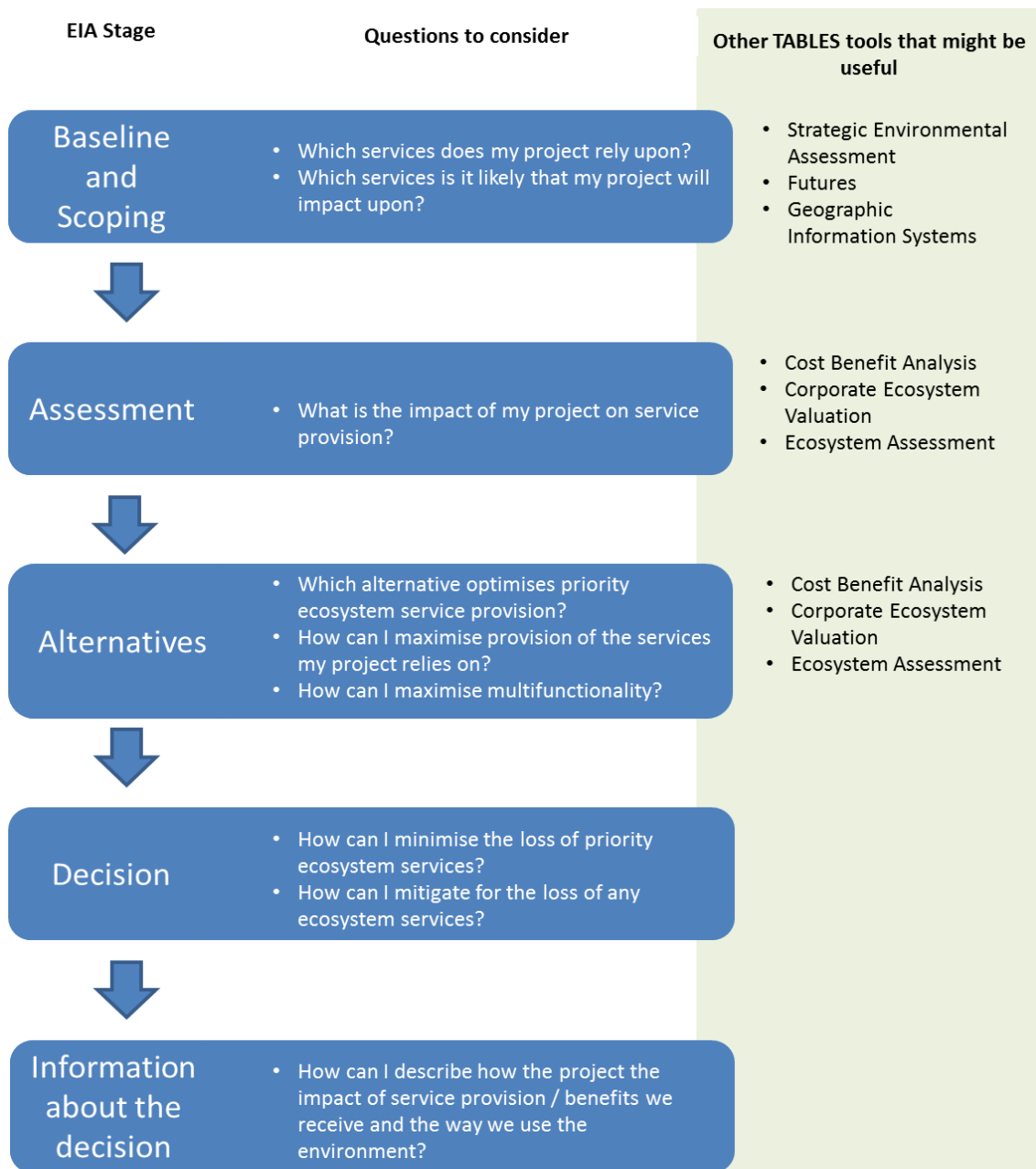


Figure 3: EIA process and ecosystem service considerations

Support and guidance

Support for undertaking EIA

Document and link	Relevance
Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment	<ul style="list-style-type: none"> • Directive text • Directive seeks to ensure that private and public projects likely to have significant effect on the environment are subject to systematic environmental assessment
Report on the application and effectiveness of the EIA Directive (COM (2009) 378 final)	<ul style="list-style-type: none"> • The report reviews the application and the effectiveness of the EIA Directive in the European Union. It gives a general overview on how Member States established the EIA regime and points out these regimes' potential shortcomings. The report also emphasises the overall benefits of the EIA Directive. Moreover, it gives an overview on the link between EIA and other legislation, with special regard to SEA, Habitats and Birds Directives and IPPC. The report devotes a section for the link between EIA, biodiversity and climate change
Guidance on EIA – EIS Review. (European Commission, 2001)	<ul style="list-style-type: none"> • Guidance providing background information regarding the legal aspects and effectiveness of EIA
Guidance on EIA – Scoping. (European Commission, 2001)	<ul style="list-style-type: none"> • Guidance providing background information regarding the legal aspects and effectiveness of EIA
Guidance on EIA – Screening. (European Commission, 2001)	<ul style="list-style-type: none"> • Guidance providing background information regarding the legal aspects and effectiveness of EIA
Interpretation of certain project categories on annex I and II of the EIA Directive. (European Commission, 2008)	<ul style="list-style-type: none"> • Guidance providing background information regarding the legal aspects and effectiveness of EIA
The State of EIA Practice in the UK (IEMA 2011)	<ul style="list-style-type: none"> • Summary of EIA practice in the UK
Conclusion from Conference for the 25th anniversary of the EIA Directive: Successes – Failures – Perspectives (European Commission, 2009)	<ul style="list-style-type: none"> • Summary of the 25th anniversary conference including presentations and papers on EIA practice

Support on ecosystem services in EIA

Document and link	Relevance
TEEB for local and regional policy makers. (TEEB, 2010)	<ul style="list-style-type: none"> • Report that considers how EIA could seek to include ecosystem services.

Considering Ecosystem Services in EIA (IEMA 2012)	<ul style="list-style-type: none"> • Briefing on the potential role of ecosystem services in EIA
Ecosystem Services and Environmental Impact Assessments (EIAs) (World Bank, 2011)	<ul style="list-style-type: none"> • Summary page presenting results of extensive EIA practitioner survey and links to WRIs work in this area.
An introductory guide to valuing ecosystem services (Defra,2009)	<ul style="list-style-type: none"> • Defra guide on how to undertake the valuation of ecosystem services, includes reference to EIA

Case Studies

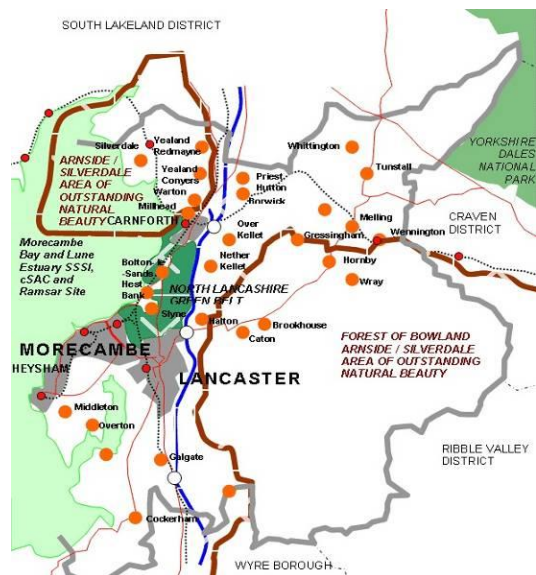
Case Study 1 Heysham Road EIA

Relevant to

- Use of early scoping with stakeholders
- Multifunctional nature of green spaces
- Use of ecosystem services
- Value of considering impacts across the system

Key Message

A 2007 study examined ways in which an ecosystem-based approach (EBA) could be applied to the EIA of a link road development project. This study recommended that the concept of ecosystem goods and services should replace the more fragmented, topic-based approach taken by the EIA for the project, for the project to be sustainable in the long-term. Well-planned stakeholder participation is also crucial to identify the benefits arising from local ecosystem goods and services, assess their 'value', and ensure that they are secured into the future. Furthermore, extending the scope of the EIA beyond the immediate siting of measures and infrastructure may be required to adequately map and quantify the supply and quality of ecosystem goods and services.



Type and description of project

In 2007, the UK's Department for Environment, Food and Rural Affairs (Defra) commissioned a study on the application of the ecosystem-based approach (EBA) in the EIA of an important infrastructure development project, the Heysham M6 link road in Lancashire, England.

The planning application upon which the EIA was conducted proposed a trunk road to improve connectivity between the Heysham port, Morecambe and the M6 motorway. This design, which was first proposed in the 1940s, has traditionally been controversial due to environmental concern and divided public opinion among local communities. On the one hand, the area is of undisputable environmental value (SSSI, Special Protection Area, Special Area Conservation and Ramsar sites, fishing resources, etc.) and thus potentially vulnerable to any major infrastructure developments. On the other hand, economic regeneration in the area significantly depends on industrial development, which would in turn benefit from better connections with the Heysham port.

This study was part of a series of research projects commissioned by Defra with a view to efficiently incorporating the EBA into future policy and implementation measures. This follows the rationale that the EBA can provide a more robust framework for decisions requiring stronger integration and assessment of social, economic and environmental issues. The two main questions that the study sought to answer are the following:

1. How well does the procedure that has been followed for the proposed Heysham M6 link deliver the EBA?
2. To what extent can the information collected to assess the impact of the Heysham M6 link, together with other information already available, be used to successfully use the EBA?

To do so, the study checked the EIA against the twelve tasks set out in the guidelines published by the Convention on Biological Diversity (CBD): The Ecosystems Approach Advanced User Guide (<http://www.cbd.int/ecosystem/sourcebook/advanced-guide/>)

Benefits of incorporating the EBA into EIA processes

The study presented a retrospective discussion of the potential benefits that the adoption of an EBA throughout the planning process might have yielded.

First, it would have favoured a stronger consensus at local level as well as greater ownership of the adopted decisions. This would make the process more inclusive and participatory, which appears to be a key issue given the recurrent delays and opposition that affected the Heysham M6 link project in the past.

Second, adopting the EBA would have warranted 'a solution that optimises local benefits whilst meeting regional, national and international priorities'.

Third, it would have resulted in a more holistic mitigation strategy focusing on ecosystem functions and limits, thus helping ensure the sustainability of project-related outcomes.

Fourth, it would have resulted in a stronger framework for ongoing management and monitoring of the mitigation strategy.

Adopting an EBA for EIAs: lessons learned

The overarching conclusion of the ADAS study was that the EBA, i.e. 'having a clear strategy for and commitment to the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way', should form the basic framework for the planning process rather than serve as a mere tool or set of techniques. Furthermore, the study concluded that, while many of the tools and methods used in the EIA process were to some extent compatible with the EBA, 'there are significant tensions and incompatibilities that need overcoming in the current planning system, which still remains adversarial in nature'. In other words, the EBA must inform both policy delivery planning and the culture of the organisation/expert in charge of carrying out the EIA.

At a more concrete level, the study issued a number of recommendations to favour the adoption of EBA in EIAs. What follows is a summary of the most relevant ones.

1. Work with communities and local authorities to introduce a new 'quality of life' language into the planning system context for EIA, so that 'defining the problem' is a more integrated, holistic process. The study points out that EIAs, especially those for road schemes, tend to

focus solely on the impact of the proposed route and neglect more sustainable options (e.g. non-road and alternative routes).

2. Work with relevant agencies and partners to find meaningful and accurate ways of mapping and quantifying the supply and quality of ecosystem goods and services. This requires a flexible mapping tool to develop scenarios for different land use combinations based on inherent soil fertility, ecological functions and nutrient cycling abilities for successfully adapting to environmental change, e.g. climate change impacts and pressures from farming and forestry.
3. Account for the costs of changing natural resource systems (and their supplies of ecosystem goods and services) resulting from each option considered in the EIA. This may require extending the scope of the EIA beyond the immediate siting of measures and infrastructure.
4. Develop economic valuation of aspects of the natural environment that people relate to and use on a daily basis. This would help people understand the benefits and losses they may incur from a project, thus contributing to a more informed consensus around decision making.
5. Retrieve and take into account local knowledge, concerns and aspirations for the area under study. This would lead to both more robust and sustainable decision-making, and better design and mitigation strategies for approved schemes.

Sources of further information

- **Case study to develop tools and methodologies to deliver an ecosystems approach – Heysham to M6 link Defra research project nr0110, December 2007:**

http://randd.defra.gov.uk/Document.aspx?Document=NR0110_7329_FRA.pdf

- **Convention on Biological Diversity (CBD), Ecosystems Approach portal (also available in French and Spanish):**

<http://www.cbd.int/ecosystem/>

- **Lancashire County Council, Heysham to M6 Link portal:**

<http://www.lancashire.gov.uk/corporate/web/?siteid=6092&pageid=35076&e=e>

Case study 2: Wareham Managed Re-alignment (UK) - Green infrastructure in environmental assessment (EIA/SEA)

Relevant to:

- Ecosystem services
- Valuation
- Consideration of alternatives

Key message:

It is possible to value ecosystem services but there are potential issues. Also demonstrates how to effectively consider alternatives and integrate this into decision making.

Introduction

Work was undertaken for the UK's Environment Agency to provide an approach for incorporating the economic values of green infrastructure provided ecosystem services related to flood and coastal management into traditional forms of EA (EEA, 2011)

Elements of good practice / key lessons from the EIA:

Guidelines produced for the Environment Agency suggest that, supported by EIA/ SEA, it is possible to provide economic values for the environment that can be incorporated into traditional cost benefit analyses. The guidance suggests an initial investigation of the available economic value data followed, (where appropriate) by value transfer producing quantified economic information. What this study suggests is that EIA/ SEA can be supplemented where appropriate by the economic valuation of green infrastructure.

This was applied to a flood and coastal erosion project, the Wareham Managed Re-alignment. This study demonstrated certain barriers to the use of valuing ecosystem services in assessment. For instance there was found to be significant additional uncertainty surrounding the absolute value of the environment due to the uncertain nature of the physical changes and the socio-economic context that determines the value of these.

This suggested that absolute values may not be that relevant, rather it would be more feasible to assess the relative magnitude of changes across different options to ascertain which delivered the most ecosystem-services. This was done within the project and was considered to provide a useful analysis as to which of the options would have the least impact on the biophysical status of the environment and the related ecosystem services. In addition the case study found that decisions had to be made as to the cost effectiveness and appropriateness of ecosystem service valuation i.e. what level of detail was required and would the results of such valuation be suitably 'robust'.

The project identified some specific policy benefits, for instance the project provided support for the public expenditure of funds on a scheme which without the inclusion of valued ecosystem services may appear to have low cost-benefit ratios, therefore removing funding hurdles for projects related to ecosystem services (Defra, 2009).

Source of further information:

- Eftec (2010) *Economic Evaluation of Environmental Effects* [Online] Available from <http://publications.environment-agency.gov.uk/pdf/GEHO0310BSFH-e-e.pdf>
- Defra (2009) An introductory guide to valuing ecosystem services (case study from page 49) [Online] Available from: <http://www.defra.gov.uk/environment/policy/natural-environ/documents/eco-valuing.pdf>