Appendix 1 Methodology

Literature reviewed

Literature which is relevant to the evidence base for the economic benefits of the natural environment was reviewed for this evidence package. Much of this was economic literature, but natural and social science literature is also included.

Methodology – economic literature

Peer reviewed literature was preferred where available. All economic research articles were fully reviewed, and the footnotes next to the reference provide transparency as to the extent of review. Literature was accepted or rejected based on whether it met Treasury Green Book standards (HM Treasury 2003) for economic evidence. However, be warned, some of the economic articles have been deconstructed and only the evidence which is defensible and useful has been included. Therefore quoting from a study does not mean that all of the study is defensible and useful.

Methodology – natural and social science literature

For natural and social science literature selection was based on the research quality hierarchy, where peer reviewed academic journals are given the greatest weight, followed by government research and then evidence from third-party organisations. The text highlights what particular pieces of research have controlled for, to help you assess the strength of the evidence[140]. Again the footnotes provide transparency as to the depth of review. This second evidence package has greatly benefited from peer reviews provided by the following Natural England staff:

- Blane, Edward
- Burn, Alistair
- Butterworth, Tom
- Cathcart, Rob
- Collins, Tim
- Green, Mike
- Lusardi, Jane
- Money, Russ
- Morecroft, Mike
- Stone, Dave
- Waters, Ruth
- Wyatt, Gordon

[140] Sometimes in research the relationship we are looking for between two variables is obscured by a third relationship we call the confounding variable. For example it is possible to draw a graph which relates shoe size to IQ provided children are included! We can avoid this confusion though by 'controlling' for age which means that we only compare shoe size and IQ for people of the same age. Once this is done the apparent relationship disappears.

Selecting evidence

Selection of evidence to make the case requires judgment, and cannot easily be reduced to an automatic hierarchy. For example a peer-reviewed article from Canada may be less powerful than a government document from the UK, if the issue under concern is expected to vary contextually. Where international evidence refers to human characteristics which are thought to be shared globally[141], these have been included as part of the evidence. The review also incorporates international evidence which refers to biological properties of the natural environment and is not expected to vary significantly. However, where the research refers to societal and social factors, which can be expected to vary significantly from place to place, they are not included as a core part of the evidence for the logic chain, but may be referred to as interesting. With regard to examples and figures, English based case studies are preferred, but where this is not possible, international ones have also been used.

Research has been included on the basis that it is of good quality. There is therefore a great deal of literature which was reviewed for this evidence package which is not referred to in this document. Clearly, with such a large subject, time limitations have also meant that not all the relevant literature has been reviewed.

Relationship with biodiversity, landscape and culture

This package is focused on environmental services which provide benefits of significant policy interest. For this reason landscape and biodiversity feature primarily as inputs to the services, rather than in their own right[142]. This means that the package does not engage with the intrinsic value of nature and biodiversity. In principle the package could include research into 'non-use values' – (value placed on the existence of species and landscapes irrespective of their usefulness to those interviewed), but this is beyond the scope of this version (2.0).

Furthermore benefits have only been included if economic quantification is at least under discussion. For example the contribution of green infrastructure to social cohesion is difficult to quantify but under discussion, whereas the spiritual benefits of access to nature are not[143]. Equally, personal and cultural attachments to particular landscapes may produce important wellbeing benefits, but there is not currently a significant discussion about valuing this economically.

It is important to be clear that in an English context the term 'natural' environment requires significant qualification. Some of our most valued landscapes are the product of hundreds of years of modification and cultivation. Here, 'natural' environments have been, and continue to be, heavily shaped by people.

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[141] This means that the literature proposes that this human characteristic is cross-cultural which implies a shared root in human evolution.

[142] The importance of biodiversity for providing ecosystem services is complex. Some species provide particularly services directly (for example, pollination) in which case it is sensible risk management to retain a range of species which can deliver the service. Other services are provided by whole ecosystems, nevertheless there may be a strong link between a species and ecosystem service – for example many of the properties of blanket bog are dependent on Sphagnum moss. Some ecosystem processes such as productivity or decomposition increase as diversity increases: Potts, S. G., J. C. Biesmeijer, et al. (2010). "Global pollinator declines: trends, impacts and drivers." Trends in Ecology & Evolution **25**(6): 345-353.

[143] Which should not be taken to mean that the spiritual benefits of access to nature are not important, or that it is wise for decision making to ignore that which is difficult to quantify or subject to uncertainty. The opposite is the case, and work to improve decision aiding frameworks is required. However, the focus of this evidence package is on quantified evidence which can feed in to the currently dominant decision aiding frameworks, particularly economic impact, cost : benefit analysis and value for money assessments.

References

HM Treasury. 2003. The Green Book: Appraisal and Evaluation in Central Government. HM Treasury. London.

Potts, S. G., J. C. Biesmeijer, et al. 2010. "Global pollinator declines: trends, impacts and drivers." Trends in Ecology & Evolution **25**(6): 345-353.

Natural England works for people, places and nature to conserve and enhance biodiversity, landscapes and wildlife in rural, urban, coastal and marine areas.

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