

Integrating ecosystem service assessments and valuation: mixed methods or mixed messages?

Despite numerous calls for the integration of methods that elicit ecological, social and economic values (e.g. de Groot et al. 2010, Lopes and Videira 2013), most ecosystem service assessments focus on just one of these approaches, or combine biological assessments with some form of monetary or non-monetary valuation. Attempts to integrate the outputs from biophysical, socio-cultural and monetary approaches using empirical data are rare (Martín-Lopez et al. 2014). Research into mixed-methods, however, indicates that multi-strategy approaches to research can bring more understanding than can be gained from the individual approaches alone (Bryman 2006). Effort is therefore needed in understanding how the different approaches to ecosystem service assessment and valuation support each other, or not, as the case may be.

Using the Dogger Bank, a shallow sandbank in the North Sea, as a case study this paper retrospectively explores the complementarities between three approaches to ecosystem service assessment and valuation: 1) a biological assessment, which identified and quantified, where possible, indicators for ecosystem services delivered by the case study site and explored how these services may change according to two future scenarios, 2) a choice experiment, which assessed the willingness-to-pay of members of the UK public for improvements to a sub-set of ecosystem services provided by the Dogger Bank as a consequence of hypothetical management plans, and 3) a facilitated processes of deliberation that allowed members of the UK public to explore the uses of the Dogger Bank and the conflicts and dilemmas involved in its management. By exploring the complementarities between these approaches this paper *“seeks elaboration, enhancement, illustration, clarification of the results from one method with the results from another”* (Greene et al. 1989, p. 259).

The assessment of complementarities was undertaken in two stages. The first stage explored the complementarities between the methods themselves and the way they were applied. This involved examining the complementarities between the work steps taken in the application of the methods, followed by a matrix cross-tabulation, in which each method was compared against a set of criteria. Criteria ranged from what is being valued and how value is expressed, to the philosophical underpinnings of each method, the interaction between methods and the approach to data analysis and interpretation. The second stage focused on the complementarities between the results. This drew loosely on Greene (2007) and involved data transformation, whereby all quantitative findings from the biological assessment and choice experiment were expressed as a narrative to facilitate comparison with the outputs from the deliberative valuation. Using matrix cross-tabulation, the relationships between findings were examined. This focused on the complementarities between findings, convergences, divergences, weaknesses and strengths.

Results indicate complementarity between the work stages, facilitated by good levels of communication between members of the research team. In this case preparatory stages were common across different methods. For example, exploratory semi-structured interviews set the baseline for both the choice experiment and deliberative valuation, and ecosystem service indicators were used to guide the three methods applied. In terms of methodological complementarity, the different stages of the ecosystem service assessment can be used to support each other. For example, the data gaps emerging from the biological assessment were used to direct the choice experiment and the deliberative valuation, and each method covers a different aspect of value or

covers a different number of ecosystem services. Despite limitations in data availability, the biological assessment was the broadest in scope. In contrast, the choice experiment and deliberative valuation provided greater detail about a more focused set of services.

The findings show complementarities between results and areas of convergence, but some degree of contradiction is also apparent. Conservation priorities were clearly demonstrated in the choice experiments and deliberative valuation workshop. This complemented the findings of the biological assessment, which suggested a more positive future for ecosystem services under the more conservation centric scenario. The main area of divergence focused on fisheries management. The biological assessment indicates that fisheries closures would be beneficial for Dogger Bank ecosystem services; however, the choice experiment results suggest that in terms of willingness-to-pay, restrictions to net fishing (to protect charismatic species) would be preferred over restrictions to bottom trawling (to protect species diversity). In contrast, the deliberative valuation indicates that fishing should be prioritised over other uses of the Dogger Bank, such as wind farm development. Despite this divergence, complementarities were evident as the favouring of fishing in the deliberative valuation could provide an explanation of why the species diversity attribute was the least valued in the choice experiment. The outcome of the search for complementarities is therefore a more comprehensive understanding of the potential changes facing the ecosystem services of the Dogger Bank and the preferences held by society for these changes.

One particularly important lesson that has arisen from this retrospective integration is that the actual application of the three assessment and valuation methods, and in the case of the biological assessment the availability of relevant data, strongly affects the outcomes and the complementarities identified. Different method combinations and additional data may therefore have led to different complementarities emerging. To make the most of an integrating stage such as this, it needs to be planned from the outset. This includes understanding what is required of the integration approach and what the different integration approaches hope to achieve.

References

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