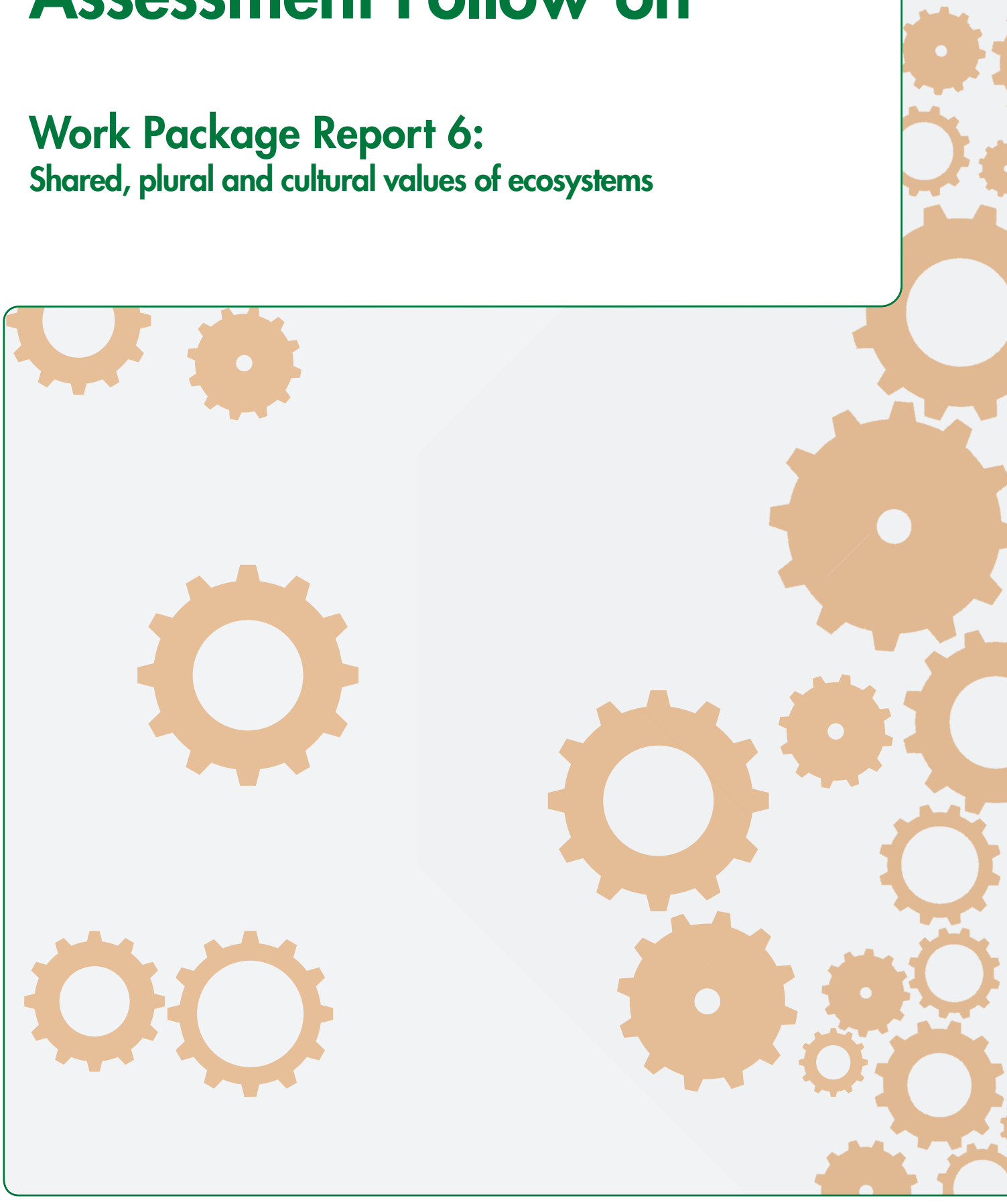
UK National Ecosystem Assessment Follow-on

Work Package Report 6:
Shared, plural and cultural values of ecosystems



Principal investigators: Jasper O. Kenter[1,2]*, Mark S. Reed[3]

Lead authors: Jasper O. Kenter[1,2]*, Mark S. Reed[3], Katherine N. Irvine[4,5], Liz O'Brien[6]

Contributing authors: Emily Brady[7], Rosalind Bryce[2], Mike Christie[8], Andrew Church[9], Nigel Cooper[10,11], Althea Davies[1,12], Anna Evely[13], Mark Everard[14], Ioan Fazey[15], Neal Hockley[16],Niels Jobstvogt[1,2], Claire Molloy[17], Johanne Orchard-Webb[9], Neil Ravenscroft[9], Mandy Ryan[18] and Verity Watson[18]

Affiliations:
[1]Aberdeen Centre for Environmental Sustainability, University of Aberdeen, Scotland
[2]Oceanlab, Institute of Biological and Environmental Sciences, University of Aberdeen, Scotland
[3]Centre for Environment & Society Research, Birmingham School of the Built Environment, Birmingham City University, England
[4]James Hutton Institute, Scotland
[5]Institute of Energy and Sustainable Development, De Montfort University, England
[6]Forest Research, Alice Holt Lodge, Farnham, England
[7]School of Geography and Geosciences, University of Edinburgh, Scotland
[8]School of Management and Business, Aberystwyth University, Wales
[9]School of Environment and Technology, University of Brighton, England
[10]Anglia Ruskin University, Cambridge, England
[11]Diocese of Ely, Church of England
[12]School of Geography and Geosciences, University of St Andrews, Scotland
[13]Project Maya, London, England
[14]Pundamilia Ltd, Great Somerford, England
[15]School of Environment and Centre for Environmental Change and Human Resilience, University of Dundee, Scotland
[16]School of Geosciences, Environment, Natural Resources and Geography, Bangor University, Wales
[17]Department of Media, Edge Hill University, England
[18]Health Economics Research Unit, University of Aberdeen, Scotland
[18] Scotland

* Correspondence to: Jasper Kenter, mail@jasperkenter.com

Reviewers
Jane Ashley (Spiral Delta), Anat Bardi (Royal Holloway, University of London), Stephen Daniels (University of Nottingham), Janet Fisher (Universities of Exeter and Edinburgh), Simon Maxwell (Defra), Diana Mortimer (JNCC), Ece Ozdemiroglu (Eftec).

Report Review Editor
Michael Winter (University of Exeter)

Suggested citation
Kenter, J.O., Reed, M. S., Irvine, K.N., O'Brien, E., Brady, E., Bryce, R., Christie, M., Church, A., Cooper, N., Davies, A., Hockley, N., Fazey, I., Jobstvogt, N., Molloy, C., Orchard-Webb, J., Ravenscroft, N., Ryan, M., & Watson, V. (2014) UK National Ecosystem Assessment Follow-on. Work Package Report 6: Shared, Plural and Cultural Values of Ecosystems. UNEP-WCMC, LWEC, UK.

Acknowledgements
We thank Michelle Pinard (University of Aberdeen) for her essential support in administering the project, University of Aberdeen research assistants Kirsty Nutt, Audrey Verma, Heather Crump, Roseanne McDonald and Katrin Schmidt for their contributions, and Delia Wallace for copy-editing. We thank the members of our advisory board: Sue Ranger (Marine Conservation Society), Kate Studd (Inner Forth Landscape Iniative), Alister Scott (Birmingham City University) and Sue Williams (Natural Resources Wales) for their input and feedback. We thank Simon Maxwell (Defra) for his valuable advice, and Rob Fish (University of Exeter) and Alan Holland (Lancaster University) for their input in the early stages of the project. We thank Kate Studd (Inner Forth Landscape Initiative) and Zoe Clelland and Scott Paterson (RSPB) for the crucial role they played in delivering the Inner Forth case study; Calum Duncan, Jean-Luc Solandt and especially Sue Ranger (Marine Conservation Society) for their essential role in the MPAs case study; and Esther Brown (University of Brighton), Yasmin Ornsby (Hastings Fisheries Protection Society) and Joy Collins (Fisheries Local Action Group) for their considerable help with organising the Hastings Case Study. We would also like to thank the individuals within the four case studies who contributed their time, thoughts, effort and values to this work. This project was funded as a work package of the UK National Ecosystem Assessment Follow-on phase by Defra, the Welsh Government, NERC, ESRC and AHRC. Additional funding for the MPAs case study was received from the Calouste Gulbenkian Foundation through the Marine Conservation Society. Additional funding for the Hastings case study was received through EU INTERREG IVA2 Mers Seas Zeeën as part of the GIFS (Geography of Inshore Fishing and Sustainability) project.

Abbreviations and acronyms

AONB	Area of Outstanding Natural Beauty
AT	Angling Trust
BAP	Biodiversity Action Plan
BSAC	British Sub-Aqua Club
CBA	cost-benefit analysis
CD	coefficient of determination
CE	choice experiment
CES	cultural ecosystem service(s)
CFA	confirmatory factor analysis
CFI	comparative fit index
CV(M)	contingent valuation (method)
DMV	deliberative monetary valuation
DVF	Deliberative Value Formation model
EFA	exploratory factor analysis
ES	ecosystem service(s)
FC(E)	Forestry Commission (England)
FOCI	features of conservation interest
GIS	geographical information system
HSDM	Human-Scale Development Matrix
IFLI	Inner Forth Landscape Initiative
JNCC	Joint Nature Conservation Committee
MA	Millennium (Ecosystem) Assessment
MCA	multi-criteria analysis
MCS	Marine Conservation Society
(r)MCZ	(recommended) Marine Conservation Zone
(p)MPA	(potential) marine protected area
MENE	Monitor of Engagement with the Natural Environment
NEA(FO)	(UK) National Ecosystem Assessment (follow-on phase)
NEP	New Ecological Paradigm
PTO	person trade-off technique
QALY	quality adjusted life year
REA	rapid evidence assessment
RMSEA	root mean square error of approximation
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SD	standard deviation
SE	standard error
SEM	structural equation model(ling)
SNH	Scottish Natural Heritage
SPA	Special Protected Area

SRMR	standardised root mean square residual
SSSI	Site of Special Scientific Interest
SWOT	strengths, weaknesses, opportunities, threats (analysis)
TC	travel cost
TEV	Total Economic Value
TLI	Tucker-Lewis index
TPB	Theory of Planned Behaviour
VBN	Values-Beliefs-Norms theory/model
WP	work package (of the UK NEA follow-on phase)
WTP	willing(ness) to pay

Contents

Abbreviations and acronyms 3
Contents 5
Boxes 8
Tables 9
Figures 11
How to read this report 13
Key findings 14
1 Introduction 25
1.1 Definitions 29
2 Literature review 31
2.1 Preliminary examination of literature 31
2.2 Rapid evidence assessment (REA) 34
2.2.1 How were shared, plural, cultural and social values conceptualised? 35
2.2.2 Values and research context 40
2.2.3 Methods for identifying shared, plural and cultural values 44
2.2.4 Decision-making exemplars 45
2.2.5 Use of shared, plural, and social values in the economics literature 50
2.2.6 Shared values and valuation of health services 51
2.2.6.1 Methods and tools used for valuing health benefits 52
2.2.6.2 Rapid evidence assessment 53
2.3 Context-specific examples 57
2.4 Expert-led literature reviews 63
2.4.1 Expert-led review one: Shared values, cultural ecosystem services and their spiritual and aesthetic benefits 64
2.4.1.1 Conceptualising aesthetic values of nature 65
2.4.1.2 Conceptualising spiritual benefits from nature 67
2.4.1.3 Assessing aesthetic and spiritual values 71
2.4.2 Expert-led review two: Shared and social values in conventional economic valuation 73
2.4.2.1 Plural values and commensurability 73
2.4.2.2 Aggregation of individual values 75
2.4.3 Expert-led review three: Shared values, deliberation and social learning 77
2.4.3.1 Relationship between deliberation/social learning and shared values 78
2.4.3.2 Do deliberation and social learning change the way values are expressed? 78
2.4.3.3 Do deliberation and social learning result in greater sharing of values? 81
2.4.3.4 Implications for eliciting values 82
2.5 Literature review: Synthesis discussion 86
3 Theoretical framework 90
3.1 Dimensions and types of shared values 90
3.2 Shared values and the individual 97
3.3 Shared values and total economic value 98
3.4 Assessment of shared values 99
3.5 The deliberative value formation model 110
4 Case studies 113
4.1 Research design across case studies 116
4.1.1 Deliberative monetary valuation and multi-criteria analysis 116
4.1.2 Participatory systems modelling 117
4.1.3 Storytelling and transcendental ‘value compass’ 117
4.1.4 Psychometric testing 118
4.2 Local case study 1: Inner Forth 122
4.2.1 Background 122

4.2.2 Methods 124
4.2.3 Results 129
4.2.3.1 Stakeholder workshop 129
4.2.3.2 Monetary valuation 131
4.2.3.3 Psychometric testing 132
4.2.4 Discussion 134
4.3 Local case study 2: Hastings 135
4.3.1 Background 136
4.3.2 Methods 137
4.3.2.1 Workshop one (WS1) 138
4.3.2.2 Workshop two (WS2) 139
4.3.2.3 Workshop three (WS3) 140
4.3.3 Results 141
4.3.3.1 Workshop one 141
4.3.3.2 Workshop two 144
4.3.3.3 Workshop three 147
4.3.4 Discussion 149
4.4 National case study 1: Marine protected areas 151
4.4.1 Background 152
4.4.2 Methods 155
4.4.2.1 Monetary valuation 157
4.4.2.2 Multi-criteria analysis 161
4.4.2.3 Subjective well-being indicators 164
4.4.2.4 Preferences for ways of eliciting values 166
4.4.3 Results and discussion 166
4.4.3.1 Monetary valuation 166
4.4.3.2 Multi-criteria analysis 172
4.4.3.3 Subjective well-being indicators 177
4.4.3.4 Storytelling and values compass 180
4.4.3.5 Psychometrics 188
4.4.3.6 Participant confidence and preferences for ways of eliciting values 189
4.5 National case study 2: The coast in the media 190
4.5.1 Background 191
4.5.1.1 News media 191
4.5.2 Methods 194
4.5.3 Results 196
4.5.3.1 Location and area 197
4.5.3.2 Authority and sources 197
4.5.3.3 Threats and risks 197
4.5.3.4 Marine protected areas 199
4.5.4 Discussion 200
4.6 Case studies: Synthesis discussion 201
4.6.1 Changes in values in DMV resulting from group deliberation 202
4.6.2 Changes in values in MCA resulting from group deliberation 204
4.6.3 Mixed deliberative methods, learning and value formation 204
4.6.4 Subjective well-being approaches 206
4.6.5 Deliberative value formation processes 207
4.6.6 The potential of media analysis for assessing shared values 207
5 Concluding discussion 209
5.1 What are shared values? 209
5.2 Individual versus shared deliberated values 210

5.3 Deliberation and value formation 211
5.4 Shared values and cost-benefit analysis 214
5.5 Comparing methods for assessing shared values 215
5.6 Shared values, legitimacy and decision-making 217
6 References 219
Annex 1 Methods to calculate QALY utility weights, and health valuation search terms 242
Annex 2 Economics textbooks used for index search in REA 243
Annex 3 Forth and MPAs psychometric analysis 244
Annex 4 Forth case study stakeholders and participants 247
Annex 5 Forth choice experiment attributes and models 249
Annex 6 Hastings visions 252
Annex 7 Hastings rules of the hypothetical 'European Sustainable Development 2030' fund 254
Annex 8 Hastings SWOT analysis results 255
Annex 9 Hastings conceptual system modelling results 258
Annex 10 MPAs DMV contingent valuation attributes 262
Annex 11 MPAs DMV contingent valuation statistical analysis 266
Annex 12 MPAs DMV contingent valuation model results 267
Annex 13 MPAs well-being indicators: Details of analysis and differences between survey and workshops 270

Boxes

Box 1. Shared values in the real world: Forest privatisation in England..... 57
Box 2. Shared values in the real world: Siting of wind power in the UK..... 59
Box 3. Conceptual considerations: Shared values and the commons. 61
Box 4. Methods: Sources of existing information on shared values..... 62
Box 5. Expanding the ethical envelope within which we value nature. 79

Tables

Table 1. Specific examples of different values as discussed in the reviewed non-economically focused literature. 38
Table 2. Typology of topics for which cultural, shared, plural values are considered. 42
Table 3. Methods utilised to identify shared, cultural, plural and social values. 44
Table 4. Examples of incorporation of values into decision-making with regards to management of the resource. 47
Table 5. Expanded domain of decision-making including questions of who to involve and how to involve value holders. 48
Table 6. Frequency of key terms in indexes of 20 economics textbooks in welfare economics, cost-benefit analysis, environmental valuation, ecological economics 50
Table 7. Number of articles returned by topic searches on key terms in Web of Science Social Science Citation Index (all years) and when restricted to journals in the economics category only 50
Table 8. Health valuation: examples of how studies considered shared values 54
Table 9. Existing sources of information from which insight on shared values could be drawn 63
Table 10. The different kinds of outcomes that can emerge from deliberative/social interaction relevant to the sharing of values. 84
Table 11. Examples of different ways in which values might be elicited relative to the extent to which values are explicitly deliberated. 84
Table 12. Likelihood of changes in values expressed or shared as a result of combinations of different kinds of deliberative interactions. 85
Table 13. Likelihood of changes in values expressed or shared as a result of the extent of social interaction with time. 86
Table 14. Terms that can be used to refer to concepts associated with shared and social values. 94
Table 15. Schwartz values. 95
Table 16. Glossary of terms relating to values 96
Table 17. Main types of shared values with definitions and dimensions along which they can be discriminated. 97
Table 18. Overview of methods that can be used to assess shared values of ecosystems, their potential to address value commensurability and aggregation issues, their suitability for different spatial scales and their relative requirements in terms of resources and timescales. 102
Table 19. Case studies, types of shared values assessed and methods and tools used. 115
Table 20. Psychometric constructs and their indicators used in the Forth and MPAs case studies. 121
Table 21. Forth case study: a hypothetical matrix of stakeholder characteristics. 125
Table 22. Forth case study: variables used in the conceptual system modelling exercise 128
Table 23. Forth case study: outline of the questionnaire for community councillors. 129
Table 24. Forth case study: willingness to pay at the three valuation stages of the workshops: individual valuation before and after deliberation, and group valuation. 132
Table 25. Forth case study: multiple group method analysis and Cronbach's alpha. 133
Table 26. Forth case study: psychometric score means. 134
Table 27. Hastings case study: sectors represented. 138
Table 28. Hastings case study: well-being themes 139
Table 29. Hastings case study: group key goals for Hastings used in MCA and DMV exercises. 144
Table 30. Hastings case study: features to keep and effects to mitigate against for each vision. 149
Table 31. Hastings case study: final 'Hastings 2030' group policy package 149
Table 32. MPAs case study: DMV workshop outline with different valuation stages. 160
Table 33. MPAs case study: CVM questions for individual and group choices 160
Table 34. MPAs case study: monetary valuation follow-up question to identify 'protesting' and strategic bidding 161

Table 35. MPAs case study: main stages in the deliberative MCA workshop design. 162
Table 36. MPAs case study: criteria considered in the MCA and place-based cultural ecosystem service benefits used in the deliberation. 163
Table 37. MPAs case study: MCA options: the three management scenarios used in MPA MCA workshops. 163
Table 38. MPAs case study: subjective well-being indicator statements and *a priori* constructs. 164
Table 39. MPAs case study: individual/non-deliberated vs group/deliberated WTP. 168
Table 40. MPAs case study: effects of deliberative interventions and group-based (vs individual) valuation on WTP for interval regression model. 168
Table 41. MPA case study: mean MCA ratings and rankings given to criteria pre- and post-deliberation and the % of occasions where goals were included in the groups' top 5 goals. 174
Table 42. MPAs case study: ranked loadings of indicators in exploratory factor analysis from survey data. 178
Table 43. MPAs case study: selected quotes from stories that related to well-being themes and emergent transcendental values. 183
Table 44. MPAs case study: psychometric score means and Cronbach's alpha. 189
Table 45. Media case study: Political orientations of UK newspapers 193
Table 46. Media case study: Use of the term 'ecosystem' by UK newspapers 193
Table 47. Media case study: National Readership Survey demographic categories 194
Table 48. Media case study: Circulation, readership and affiliation of sample 195
Table 49. Economics textbooks used for index search in REA. 243
Table 50. Forth case study: list of stakeholders invited to the Stage 1 workshop. 247
Table 51. Forth case study: community councils participating in DMV workshops grouped by county council. 248
Table 52. Forth case study: attributes of the DMV choice experiments as they were presented to participants. 249
Table 53. Forth case study: choice experiment attributes and their levels. 250
Table 54. Forth case study: mixed logit models with demographic interactions (Model A) and with psychometric interactions (Model B). 251
Table 55. Hastings case study: SWOT analysis results. 255
Table 56. MPAs case study: contingent valuation attributes and their levels. 262
Table 57. MPAs case study: marine landscape attribute levels with substrate/habitat combinations 263
Table 58. MPAs case study: contingent valuation interval regression models. 267
Table 59. MPAs case study: variables used in the contingent valuation models in Table 58. 269
Table 60. MPAs case study: well-being results: all survey participants vs all workshop participants, mean factor scores and standard deviations. 271

Figures

Figure 1. Main components and workflow of the work package. 28
Figure 2. Five dimensions of value and seven main types of shared values. 30
Figure 3. Outline of the literature review 31
Figure 4. Number of studies using search term cultural, shared, social or plural values. 35
Figure 5. Number of studies undertaken in or using case study exemplars from different continents or general geographic grouping. 35
Figure 6. Methods used to elicit shared, cultural, social and plural values. 45
Figure 7. Incorporating values into decision-making: who to involve and how. 46
Figure 8. Conceptualisation of domains of data that could provide insights into shared values. 62
Figure 9. Norgaard (2010) illustrates the view that monetising ecosystem services on a project-by-project basis is insufficient to achieve sustainability. 81
Figure 10. The Deliberative Value Formation (DVF) model. 111
Figure 11. Location of workshops held for the Forth, Hastings and MPAs case studies. 114
Figure 12. Representation of the Values-Beliefs-Norms (VBN) theory of environmental behaviour as adapted for this study. 119
Figure 13. Representation of the Theory of Planned Behaviour (TPB) as adapted for this study. 119
Figure 14. Boundary of the Forth case study area. 123
Figure 15. Forth case study: methods outline 124
Figure 16. Stakeholders identifying key components of the Inner Forth system. 126
Figure 17. Community councillors draw a systems diagram. 126
Figure 18. Forth case study: an example choice task that community councillors were asked to judge. 128
Figure 19. Forth case study, stakeholder workshop: system models. 131
Figure 20. Hastings has the largest beach-launched fleet in the UK. 137
Figure 21. Hastings case study: methods outline. 138
Figure 22. Hastings case study: beach walk. 140
Figure 23. Hastings case study: importance of different well-being benefits. 142
Figure 24. Hastings case study: number of times different well-being benefits were referred to during storytelling. 142
Figure 25. Hastings case study: number of participants choosing particular transcendental values as most important 144
Figure 26. Hastings case study: relative importance of goals for Hastings: individual and group ratings. 146
Figure 27. Hastings case study: performance of visions per goal based on group consensus scores. 147
Figure 28. Hastings case study: overall performance of the visions in the MCA. 147
Figure 29. MPAs case study: Participants working in small groups at an MCA workshop. 152
Figure 30. MPAs case study: English recommended Marine Conservation Zones (MCZs) and Scottish potential Marine Protected Areas (MPAs) at the time of the research. 155
Figure 31. MPAs case study: methods outline. 156
Figure 32. MPAs case study: example workshop contingent valuation hypothetical site as presented to participants. 157
Figure 33. MPAs case study: a sample subjective well-being question from the online survey. 165
Figure 34. MPAs case study: selection of decision-making rules for deciding on WTP. 169
Figure 35. MPAs case study: MCA scores per site and scenario. 174
Figure 36. MPAs case study: MCA scores for how changes in management were perceived by participants to influence recreational user values for two of the criteria. 175
Figure 37. MPAs case study: fitted model results for changes across the six well-being dimensions. 180

Figure 38. MPAs case study: transcendental values circled by participants after storytelling. 187
Figure 39. MPAs case study: participant confidence levels in the workshops vs the online survey. . 189
Figure 40. MPAs case study: participant preferences for means of eliciting values. 190
Figure 41. MPAs case study: DMV workshops participant feedback..... 190
Figure 42. MPAs case study: MCA workshops participant feedback..... 190
Figure 43. Confirmatory factor analysis model of the MPA online survey data for two-item VBN/TPB constructs. 245
Figure 44. Structural equation model of the MPA online survey data based on the Values-Beliefs-Norms model..... 246

How to read this report

The UK National Ecosystem Assessment Follow-on Work Package on Shared, Plural and Cultural Values (UK NEAFO WP5) report consists of the following main documents:

- The full report
- A summary to the full report
- A handbook for decision-makers, analysts and practitioners

The summary and full reports both start off with a set of key findings. The summary key findings can be read as an executive summary. The full key findings provide more detailed conclusions and an overview of the evidence that supports each of the findings, with reference to the report sections where one can find further detail.

The summary and full report apply the same section headings and numbering. This facilitates using the documents side-by-side, allowing the reader to dip in and out of the full report where he or she is interested in greater depth or wants to look up references.

The handbook provides a brief explanation of what shared, plural and cultural values are and why they are important to national and local government, business, NGOs, policy-analysts and practitioners. It provides an overview of methods for assessing shared, plural and cultural values and incorporating them into decisions, with short examples and case studies.

In addition to these three documents, WP5 has also produced an interim report titled *The value of potential marine protected areas in the UK to divers and sea anglers*, which can be read independently or as supporting material for the marine protected areas case study in Section 4.4.

Key findings

Finding 1: Shared values resulting from deliberative, group-based valuation are different from individual values. Case study evidence suggests that they are more informed, considered, confident and reflective of participants' deeper-held, transcendental values.

Deliberated individual values were positioned between non-deliberated individual values and deliberated group values. Evidence included the results of monetary valuation models themselves, psychometric[1] measures, correlations between subjective well-being and monetary results, and qualitative evidence. There was a significant shift downward in willingness to pay (WTP) in both the two case studies that contrasted pre- and post-deliberation monetary valuation, preferences were shaped where they were unformed before, and WTP better reflected subjective well-being measures. Even while WTP decreased, biospheric values increased (Inner Forth case study) and egoistic values decreased (marine protected areas [MPAs] case study), reflecting on the one hand that transcendental values became more explicit through deliberative interventions and group discussion, whilst on the other hand participants became more critical and selective in terms of their WTP. Debates by participants tended to focus on: 1) what the benefits really meant, and which benefits were ultimately most important, including in the long term; 2) who would benefit: all of society, only some people, or some people who were particularly in need; 3) competing priorities, both whether money should be spent on this or other environmental projects, or non-environmental social concerns; 4) duties to other species and future generations; and 5) responsibilities, e.g. the notion that local people were responsible for local sites, or that everyone, or every local community, had to take responsibility for 'their bit' towards social goals such as protecting biodiversity.

Targeted deliberative interventions helped to bring out many of these processes. For example, the conceptual systems modelling exercise in the Forth case study helped participants to better understand the wider role of different environmental components in the social-ecological system (e.g. the role of wetlands vs woodlands), while it also brought out competing social demands. Storytelling in the MPAs workshops more clearly brought out the meaning and experiences associated with values. Explicitly asking about transcendental values sometimes brought out notions of fairness and social justice, but more broadly helped people to consider more clearly what was important to them at a more fundamental level.

In the MPAs case study, participants were also asked about where they felt more confident in terms of expressing values. Multi-criteria analysis (MCA) and especially deliberative monetary valuation (DMV) participants felt substantially more confident about their deliberated values in MCA and DMV workshops compared to their values in an online survey. When asked about which values should be used (workshop vs survey), participants strongly preferred the workshop format. There was also a strong preference for using group-based values rather than individual values.

As such, deliberated group values may be a better reflection of real welfare impacts than non-deliberated individual WTP. Of course, group processes have the potential to introduce biases, for example resulting from peer-pressure and group power dynamics. Also, participants will vary in how well they can use deliberation to explore their shared values or the common good. This will particularly be influenced by prior experience in this type of work or setting. However, there is a wealth of evidence from the participatory appraisal, deliberative democracy, stakeholder

[1] Psychometric testing refers to the measurement of psychological phenomena and processes, e.g. knowledge, experience, attitudes, values, beliefs, norms. See Section 4.1.4 for further detail.

participation and social learning literature on good practice for deliberation, which can minimise these potential biases.

Despite on-going improvements in framing and techniques, the Achilles heel of contingent valuation (CV) and similar approaches remains the hypothetical bias and the tendency of participants to overstate in surveys what they would be willing to pay in comparison to real life. Exploration of the potential of DMV to reduce hypothetical bias would be a particularly interesting avenue of research. The notion of a 'fair price'[2] is a particularly useful way to incorporate shared values into economic valuation, because it allows for consideration of other-regarding values without facing the problem of double counting that would occur if other-regarding values were included in individual WTP.

Finding 2: The ethical, moral and justice dimensions of many environmental issues necessitate approaches that allow for the elicitation of shared and plural values.

Key ethical concerns include: 1) providing a space and opportunity for people to identify values that they may find difficult to articulate (e.g. spiritual, identity); 2) recognising that some values cannot be traded without discussion and negotiation (e.g. the legal or felt rights of local people, intrinsic values of other species); and 3) understanding that it is often difficult to isolate valuation from decision-making processes because people feel there are strong ethical or moral issues at stake that need to be debated (e.g. the justice of the process, fairness in the distribution of benefits or disbenefits, responsibility, and issues of sustainability and future generations).

Dominant themes in environmental debates often revolve around a number of key issues. These include but are not limited to: a lack of trust in elected representatives, feelings of powerlessness in the face of globalization, the ethical and social impacts of an increase in certain aspects of technology, and a call for justice and equity in environmental decision-making (Economic and Social Research Council, 2000). Deliberation to allow for discussion and debate about fairness, equity and justice issues concerning shared and plural values thus becomes critical for many environmental questions. This should be a reflexive process in which participants can consider who is missing, how the questions are being framed, and what types of values may be being ignored. They can discuss how values should be weighted, whether there are rights and duties to take into account and what adjustments should be made for assessing values over an extended period of time. They can also discuss and reflect upon how the outcome of their deliberations should be used. These process values are particularly important when considering issues of fairness, equity, and having regard for future generations and non-human species. The case study evidence has shown how, in the Inner Forth, biospheric values and environmental worldviews increased significantly after using a deliberative process, while in the MPAs egoistic values reduced in magnitude. The Hastings case study illustrated debates of social cohesion and social justice with participants stressing the importance of a democratic and fair approach to the allocation of funds in a hypothetical budgeting scenario, as explored in a workshop. The literature review showed a wide range of methods, qualitative and quantitative, being used within non-economically focused research to elicit values that allowed for consideration of ethical and moral issues. The examination of health valuation literature identified nascent methods that are attempting to bring in societal values and social rather than individual WTP as well as 'communitarian' approaches to health drawing on deliberation of community preferences.

[2] Here, participants consider what they believe would be a fair price to ask a member of their group (e.g. the public, a specific interest group) to pay for a good or bundle of goods. In our case studies, participants were asked what would be a fair price to ask a member of their local community (Forth case study) or divers and anglers (MPAs case study) for improvements in ecosystem services.

Crompton (2010) argued that certain values such as consideration of future generations, empathy and the recognition of the importance of relationships with others and nature should be strengthened by a focus on frames that move beyond an individualistic approach to be other-regarding. Deliberative approaches can play an increasingly important role in relation to this, focusing on issues of long-term sustainability rather than satisfaction of individual short-term preferences. This would address a substantial concern with conventional valuation identified by Norgaard (2010). That author convincingly demonstrated that if we 'just' apply a 'project by project approach' consisting of various types of market-based ecosystem service (ES) projects, this is unlikely to lead to a truly sustainable outcome. In his analysis, markets in ES can improve the efficiency of their delivery but cannot achieve sustainability in terms of ES provision trade-offs between current and future generations. This arises because of the fundamental problem that we cannot 'see' ES from within the perspective of a sustainable economy; instead we understand and value them from within the current unsustainable context. Case study research showed how deliberative methods can provide an opportunity to more explicitly consider future scenarios and needs, and to incorporate these into preferences and decisions.

Finding 3: Catalyst and/or conflict points can play a key role in the emergence and articulation of values at a societal or community level that have not previously been outwardly or explicitly articulated.

Catalyst and conflict points can be symbolic and are often linked to wider contested issues and meanings about who is involved in decision-making, whose voice counts and who receives the benefits or disbenefits of environmental change. These catalyst points can potentially be connected to feelings of powerlessness that give rise to concern and protest. By recognising transcendental societal and communal values (the deeper-held and overarching values held by society and communities), it becomes possible to make these values explicit and incorporate them in decision-making to better anticipate and manage conflicts.

Societal debates in the UK around the formerly proposed forest privatisation and siting of wind power (as discussed in **Box 1** and **2**, Section 2.3) have illustrated how conflicts can come to the fore due to specific decision-making contexts. These examples have highlighted the different kinds of values that can be attributed to the environment. The siting of wind farms has illustrated the complexity of competing demands for land use for economic reasons, and also between environmentalists with differing visions of creating renewable resources and protecting landscapes from visual and noise impacts (Hedger, 1995). Beyond a UK context, examples in indigenous contexts involved conflicts between the desire to conserve traditional practices and livelihoods, conservationists' desire to conserve particular species, habitats and biodiversity, or government requirements to encourage economic growth via the extraction of natural resources. These conflicts bring transcendental values explicitly into discussion and debate and often include issues of justice, ethics and fairness. They often have a distributional dimension concerning who is affected, with the poor and powerless potentially being marginalised (O'Neill *et al*. 2008). These conflicts can also bring strongly held contextual values to the fore. For example, in responses to the proposed forest privatisation in England, 2011, members of the public identified specific woodlands that held meaning and were valued by them as special places, such as the woods near to where they lived, the woods they used and accessed as children, or the woodlands that they visited on holiday with friends or family.

The increasing use of social media provides opportunities for mass protest and action to be coordinated in many arenas, not just environmental (e.g. the Arab Spring, the 'Occupy' movement).

Social media use in the forest privatisation connected online petition signing to instructions on how to contact local members of parliament and to rallies being organised in forests in different parts of England.

Bengston (1993) in the early nineties called for forests to be managed for multiple values rather than multiple uses, and Milbrath (1984) argued that we need to learn 'value impact analysis' as there is a greater requirement to be more aware of the values people hold. This approach to plural values clearly is more inclusive and insightful than traditional approaches that underestimate the diversity of values and their importance to people. Decision-makers can find it difficult to deal with the emotional responses made by publics to environmental management decisions and may try to dismiss these responses as irrational, or based on NIMBYism (not in my back yard), or on the belief that people do not like change (Vinning & Schroeder, 1987). So called 'intangible values' can be those that are most important to people and yet these can be left out of valuation processes as they are difficult to quantify in monetary or biophysical terms (Daniel *et al*. 2012).

O'Neill *et al*. (2008) have talked about the importance of understanding history and narrative which can provide evidence of the symbolic meanings associated with particular places or objects. Schama (2004) has highlighted how in Western society we have not got rid of our nature myths yet; *"…our landscape tradition is a product of shared culture… built from a rich deposit of myths, memories and obsessions"* (p14). Understanding the significance of this requires explicit assessment of the plurality of shared values. This could include deliberative approaches involving rigorous stakeholder analysis, participatory mapping and desk-based approaches such as media analysis or a cultural-historic study.

Finding 4: There is a diversity of ways in which shared, plural, cultural and social values are used, but they are rarely conceptualised.

There is a healthy debate attempting to provide greater specificity and delineation through the development of new theoretical frameworks or typologies of values in relation to ecosystem assessment, but so far there has been little headway made in terms of conceptualising and classifying shared values. The theoretical framework and typology developed in this report is the first to focus specifically on these values. In order to consider different types of shared values for the purpose of identification, elicitation and measurement, we discriminate five *dimensions* of values: (i) the value concept; (ii) the value provider; (iii) the process used to elicit values; (iv) the scale of value; and (v) its intention (**Figure 2**, p30). This allowed us to understand how the different terms that have been used in the literature relate to one and another, and to relate issues to clearly identified types of shared and social values.

In terms of the *concept of value*, values can be differentiated between guiding principles that transcend specific situations (*transcendental values*), values that are dependent on an object of value and hence contextual and attitudinal (*contextual values*), and measures of the worth of something (*value indicators*). Because transcendental values are often associated with ethics and normative beliefs, which are shared culturally, it is these values that are sometimes characterised as shared, social or cultural values, in contrast to contextual values that are more allied with attitudes and preferences. Transcendental values are considered to be relatively stable, while contextual values are more changeable and can be more easily shaped by deliberation.

We distinguished four *providers of value*: individuals, groups (in a valuation setting), communities, and societies as a whole. Societies as a whole share *cultural* and *societal values* that consist of shared principles and virtues as well as a shared sense of what is worthwhile and meaningful. Within

societies there are smaller social groups that share *communal values*, including local communities, faith groups, groups of people that share an activity such as recreational users of the environment, communities of practice, etc. In addition, there are the ad-hoc groups associated with research, such as a discussion group of stakeholders or a focus group with members of the public, which can come to collective value outcomes that we term *group values*, for example in techniques such as citizens' juries, MCA or DMV. Here we conceived of shared values as values that are *expressed* collectively, regardless of whether they are *held* individually or collectively. In this way, while we briefly touch on this debate (Section 3.2), it is not necessary to come to a final conclusion on whether, ultimately, anything other than individuals can hold values.

The dimension of *elicitation process* distinguished between *non-deliberated* and *deliberated values*. In terms of *scale*, we distinguished the individual scale and the 'social' scale that has bearing on *value to society*. The dimension of *intention* related to whether values are *self-regarding* or *other-regarding values*. *Intention* differs from the *scale* dimension, as values for others are not necessarily values in relation to society.

Emerging from these dimensions, shared or social values could refer to transcendental values, communal, societal and cultural values, group values (the outcomes of group-based valuation), deliberated values, other-regarding values and value to society. With regard to plural values, values can be plural in the sense of multidimensional across the dimensions we have stated above, but the term may also refer to the notion that individuals will have multiple sets of values, not always fully consistent, depending on framing and mode of elicitation. The term is also associated with the notion of incommensurability (Sections 2.2 and 2.4.2).

The proposed range of value types was both identifiable and distinguishable within the case study results. This suggests the framework provides a useful basis for operationalising shared values for decision-making and a foundation for further research.

Finding 5: Shared and social values in the sense of value to society is conceptualised very differently by conventional economics and other disciplines.

Neoclassical[3] economists have generally undertaken valuation by equating social value with the aggregate of individual values. Whether something has value to an individual would depend on his or her wants. These wants are expressed as preferences of one thing over another, with an assumption that individuals maximise satisfaction of these preferences through rational choice. Through the notion of marginal utility, these values are considered fundamentally commensurable. In environmental valuation, the framework of what constitutes recognised wants has been extended to the concept of Total Economic Value (TEV), which includes things such as altruistic values (the value of knowing that someone else benefits), bequest values (the value of knowing that future generations benefit) and existence values (the value of knowing that something can continue to exist regardless of any other benefits that might bring). Nonetheless, the notion of value in TEV is strictly speaking still individualistic and self-regarding. Economic theory conceives that it is the personal satisfaction that one gains by being altruistic that is considered the source of value (Section 3.3). Beyond TEV, neoclassical economists have only had limited interest in shared and cultural values. They are usually conceived of as a public good from which all members of that culture benefit (e.g. honesty) or as 'tastes' that impact on preferences.

Conversely, the non-economic literature implicitly considers values as plural not just in the sense that multiple things have value, but also that there are multiple dimensions to value that cannot necessarily be captured in a single metric. Review of the literature highlighted that there are some values considered to be transcendental, associated with ethical and moral issues, key beliefs and spiritual values that are part of individual and community identity. It is these values that are more likely to be viewed as incommensurable and give rise to protest if people are asked to monetise them, reduce them to a single metric or trade them off, as they may be considered sacred, spiritual, protected or taboo. However, also contextual values (i.e. the worth of nature) were seen as strongly linked to the meanings related to specific places. For example, symbolic, spiritual and meaningful sites/landmarks provide social continuity, contribute to collective memory and reinforce people's identification with specific values and particular traditions and practices. While there were few sources that provided explicit exemplars, *all* of the non-economic papers asserted the importance of including multiple dimensions of values in the process of decision-making.

Within mainstream economics, the difficulties associated with establishing value to society have long been recognised, though perhaps also been neglected, although ecological economics and other heterodox economic schools continue to raise them. This brings into play shared values in the form of social welfare functions, i.e. transcendental values about how to make trade-offs between different dimensions of value and how to aggregate them. Perhaps the most promising area for debate between economic and non-economic views on values is therefore the discussion on the normative nature of value-aggregation.

Although shared values were mentioned by some of the natural science papers covered in the rapid evidence assessment (REA), they tended to be mentioned briefly towards the end of the articles as a form of 'social' value that could in future complement values based on natural science research.

[3] While neoclassical economics is heterogeneous, there are common fundamental assumptions that render economic approaches neoclassical. These include: a positivist, deductivist perspective on social reality (Lawson, 2013); the assumption that this reality can be captured in mathematical equilibrium models (Hahn 1984; Hodgson, 1999; Arnsperger & Varoufakis, 2006); the notion that individuals act on rational preferences (Hahn, 1984; Weintraub 2002); that preferences are given and fully informed (Hodgson, 1999; Weintraub 2002); that preferences are utilitarian (Weintraub 2002; Arnsperger & Varoufakis, 2006); and that all explanations can be couched solely in terms of individuals (Hahn, 1984; Weintraub 2002; Arnsperger & Varoufakis, 2006). For a more detailed discussion see Lawson (2013).

Although shared values appear to be perceived as not falling within natural science disciplines, they appear implicitly in many natural science studies where different components of natural systems are valued differently by researchers from different disciplines.

Given the extent to which shared, plural and cultural values play into decisions about the natural environment, the fact that these concepts tend to be the domain of non-economic social science and interdisciplinary endeavours may be linked to the epistemology implicit in these concepts. Most notions of shared, plural and cultural values are hard to reconcile with strongly positivist and reductionist epistemologies.

Finding 6: A mixed method approach is required to elicit the multiple dimensions of shared values and to translate deeper-held, transcendental values into contextual values and preferences.

Monetary valuation is limited to quantifying values. Other methods are needed to understand their meaning or content, and the communal, societal and transcendental values that underpin them. Psychometric, non-analytic and interpretive methods (e.g. storytelling) can reveal those shared values. They can be combined with deliberative-analytical methods (e.g. DMV and MCA) to provide a comprehensive valuation that can quantify values, understand their individual and shared meanings and significance, and better include ethical dimensions. As is also pointed out by the UK NEAFO *Arts and Humanities Report on Cultural Ecosystem Services*, the monetary and non-monetary, quantitative and qualitative are often assumed to be dichotomous, but can be closely related.

Evidence in this report from both literature review and case studies has illustrated that a wide range of methods are being used to elicit and outline the plurality of values of different groups within society. There has been much work critiquing 'conventional' monetary valuation, outlining its limitations and pointing out the need to go beyond the narrow conception of people as individuals with pre-formed values, assigning utility weights and willingly trading-off different types of values (Section 2.4.2). It is now time to move beyond this debate to acknowledge that a mixed method approach is required to comprehensively elicit values, to understand what values mean, why particular values are held, to allow for reflection and in-depth consideration of values, to elicit and reflect values that are implicit, and to recognise multiple value-domains.

The case studies detailed in this report illustrate this effectively through the diversity of methods employed and by showing that participants mostly preferred workshop formats to surveys, and group-based rather than individual decisions. As discussed above, values can be incommensurable; they can apply to different philosophical categories such as goodness, truth, beauty and meaning and they can be bound to utility, rights, duties and virtues, the extrinsic and intrinsic values of nature, and self- versus other-regarding values. While the Forth and MPAs case studies demonstrate that participants were able to consider these multiple dimensions in coming to decisions in DMV and MCA, the Hastings case study suggests that an adaptive mixed method approach allows most leeway for coming to negotiated values and decisions between stakeholders.

More broadly, different methods support different aspects of the deliberative process as conceptualised in the Deliberative Value Formation (DVF) model developed by this work (Section 3.5). Visioning (Hastings) and systems modelling (Forth and Hastings) provided an effective means to orientate towards joint analysis, consider complex linkages and consider future uncertainties. Discussion of different elements of well-being and sense of place in relation to transcendental values using a 'values compass' (Section 4.1.3) allowed for bringing together values and experience (MPAs and Hastings). This was supported by storytelling, which also proved a useful method to understand experiences that are otherwise difficult to appreciate, allowing the story to express the way a place

can make someone feel (*cf.* Chan *et al*. 2012). Bringing together narrative and deliberation allows people to better understand what is worthwhile and meaningful to both themselves and others, and gain a sense of empowerment from their voice being heard.

Finding 7: Deliberative and social learning processes help people to understand the values held by others; they can lead to increased sharing of values and/or to greater acceptance of the decisions emerging from such processes.

Deliberation clearly affects what values are expressed compared to non-deliberated processes (Key Finding 1). There is also a growing body of theoretical and empirical research suggesting that deliberation has the potential to affect how people understand and shape the values of others. Although rarely considered in the economic literature, the concept of social learning (Section 2.4.3) helps explain some of the processes involved in deliberation.

The extent to which deliberation or social learning helps participants express and shape values will depend upon the frequency and depth of interactions and the time-scale over which interactions occur. Such time frames can be short (e.g. deliberation in a single workshop), medium term (e.g. multiple deliberation sessions spread out through a month) or much longer (e.g. throughout a persons' lifetime). It also depends on the diversity and initial preferences of participants in a deliberative process, the way in which interactions are managed (in particular the management of group power dynamics e.g. via professional facilitation), characteristics of individuals involved (e.g. different personality traits and ways of understanding issues), and the level of prior experience in engaging in deliberation or expressing values. Such processes can result in greater sharing of values, greater learning about working with the plurality of values in the absence of consensus, or in polarisation of positions depending on how the processes are managed and context-dependent circumstances.

Values are shaped by processes over time through social interactions in society more generally. Transcendental values that are individually held can become shared through various mechanisms that can over time become embedded in society as cultural norms. Society evolves by expansion of the 'ethical envelope', which is progressively cemented into cultural norms and institutions through the development of constraining levers including regulation, modification of markets, a range of statutory and near-statutory protocols, and an evolving body of common law (Everard, 2011). This ethical envelope expands through social learning, often over generations, and may eventually become institutionalised as part of a set of new societal values and norms. Deliberative processes and social learning that require people to express and reflect on their values therefore are inevitably embedded and shape wider spheres of influence. Greater attention to deliberation, the underlying dynamics involved and relationship to value formation and sharing is therefore important for understanding how to move society towards more sustainable and just outcomes. Only a shift in cultural values (e.g. less emphasis on material wealth) reflected in societal institutions (e.g. changes in the indicators used to measure national progress) is likely to achieve sustainable outcomes in the long-term. This requires a challenge to the dominant paradigm of economic growth and recognition that a new cultural narrative is needed that is more aligned with living on a finite planet (Rees, 2010). Overall, further research is needed on how to maximise the potential learning and value aspects and benefits of deliberation, including understanding how to harness the potential for using social media as a deliberative platform.

Finding 8: Media analysis is a promising avenue for characterising different types of shared values at a large scale, as well as assessing the conflicts between the communal values of different sectors of society.

There has been a marked increase in public interest in environmental issues over the last decade, which is reflected in increased media coverage of these topics. Media content and discourse analysis is able to distinguish and characterise the plurality of cultural, societal and transcendental values and their interrelationships, and can offer a picture of the self- and other-regarding values that underpin environmental issues and conflicts.

While influential in setting the agenda for public debate on environmental issues, news media also gives key insights into public responses to those issues (Boykoff & Mansfield, 2008; Boykoff, 2011; Jaspal *et al*. 2012). News media therefore functions as part of the on-going public deliberative process whereby reporting of issues such as erosion, pollution and littering elicit the expression of values. This does not assume that news media reporting is always scientifically accurate; indeed, previous studies have demonstrated that in relation to environmental issues media representations have been misleading (Boykoff, 2013). Nonetheless, mass media shape the public debate, amplify particular positions and while *"the media don't tell people what to think […] they tell them what to think about"* (Boykoff, 2009, p444). For this reason, media analysis can increase understanding of the changes in public values and give an accurate snapshot of the collective expression of values at any given time.

National news media can function to reinforce transcendental values, especially where those values relate to collective identity and security. The expression of transcendental values is entangled with the communication of material and symbolic risks in news coverage on environmental stories. In this way, environmental risks simultaneously convey a material risk to property, land, livelihood and so on, *and* a symbolic risk to collective national identity and security. Stories that communicate tensions between different stakeholders also reveal self- and other-regarding values, often setting them in opposition to one another. The assignment of self- and other-regarding values to stakeholders is linked to the reporting of expert claims. In reporting on conflicts over environmental issues, the alignment of self- and other-regarding values with particular stakeholders is normalised and reinforced in relation to who is quoted in the article, whose knowledge claims are given precedence and which authority is constructed by the newspaper as trustworthy (Boykoff, 2013).

Analysis of the frames and discourse of news stories is therefore a particularly fruitful avenue for enquiry into the expression of shared values. Media analysis can characterise societal and cultural values at a large scale and consider changes in values over time. Future research could investigate the potential of media analysis informing the framing of deliberative valuation and deliberative work with stakeholders and of social media as a further forum for understanding societal and communal values surrounding environmental issues.

Finding 9: Aesthetic and spiritual values of ecosystems have a strong non-instrumental component. While they benefit human well-being, they should not simply be classified as just 'services' or 'benefits'.

Many spiritual discourses about nature resist talk of consequentialist benefits and economic analysis. These discourses counter assertions of the disenchantment of the world, which is associated with an instrumental environmental ethic and the commodification of nature. Allowing the possibility of enchantment can be a richer way of understanding our experience of nature and

alerts us to the limitations of using economic models for valuation and informing decisions about these profound cultural ecosystem 'services'

For example, in the MPAs case study, divers and anglers portrayed profound experiences of beauty, fascination, magic, and connectedness that provided a deep layer of meaning to the places they visited that would have been invisible if the study had only focused on monetary outcomes. For example, in the storytelling part of one of the deliberative workshops in the MPAs case study, one diver related, *"I ticked all of these [values] and more, I added religious which is strange really because I am an atheist. I was in one place and visibility opened up and it was like a cathedral, with jewel anemones lighting up everywhere. I felt like I was in the presence of God, if there is such a thing. I was crying when I came out of the water"*. Some spiritual experiences in nature can thus be linked to particular locations or landscape features. There is also evidence that aesthetic and spiritual experiences are co-emergent.

Aesthetic benefits from nature are often viewed as related to the pleasure people derive from nature or the arts. As such, they are commonly understood in hedonic terms, as relating to what humans might take from the environment for their own pleasure. However, aesthetic value has been conceptualised by philosophers, both historically and in contemporary debates, as non-instrumental and focused on the 'aesthetic object' for its own sake; hence, in aesthetic valuing of the arts, 'art for art's sake' (Brady, 2003). More recently, environmental aestheticians have tried to articulate the other-regarding character of aesthetic value by thinking through what it could mean to aesthetically appreciate nature 'on its own terms'. To conceive of aesthetic appreciation in this way is to incorporate a kind of respect for nature into aesthetic appreciation, and thus to consider appropriate forms of natural aesthetic benefits as those which resist sentimentalising, humanising, or anthropomorphising nature. This 'aesthetic preservationism' approach has been viewed by some philosophers as feeding into attitudes of care and concern for the environment (Hettinger, 2008).

Following this approach, natural beauty or sublimity may serve as a reason to save or protect some part of nature; indeed there are cases of communities united by shared aesthetic values of their local environment. To what extent such applications of aesthetic preservationism are self- or other-regarding is questionable (e.g. the pitfalls of NIMBYism), but it is possible to see how both individual and shared values around the aesthetics of nature can potentially support protection of the natural environment. Aesthetic valuing of nature that incorporates respect overlaps to some extent with notions of reverence and caring expressed by spiritual values and also stands in opposition to the commodification of nature.

As such, incorporation of spiritual and aesthetic values into decision-making needs to go beyond aggregation of individual preferences and recognise the importance of intersubjectivity in their assessment, recognizing convergence between particular or individual judgements and values. Valuation needs to include discussion of people's aesthetic and spiritual experiences and showing others the aesthetic and spiritual qualities perceived, as well as the transcendental values and norms that we associate with them. Faith communities have experience of using these non-utilitarian values in their own decision-making and so they provide models that could be adapted for use in environmental decision-making in a diverse society like Britain. The MPAs case study, where spiritual and aesthetic values were elicited through a combination of subjective well-being indicators, storytelling and group discussion, also provided examples of different non-monetary valuation techniques.

Key finding 10: Subjective well-being measures provide a useful means of assessing 'intangible' cultural ecosystem services and their benefits.

Different user groups associate common elements of subjective well-being with environmental settings, providing opportunities for development of standardised measures.

Our MPAs case study developed a novel quantitative non-monetary instrument that was able to provide a ranking of different marine sites in terms of their subjective well-being value. Multiple facets of well-being associated with environmental settings across the two different user groups were identified. These included: engagement with nature (incorporating elements of getting to know and being connected to nature, feeling inspired and touched by its beauty, and taking care of a place); therapeutic benefits (including physical and mental aspects of health and a sense of freedom); place identity (including a sense of belonging to and identity from a place); spiritual value (in the sense of feeling part of something larger than oneself); social bonding with others; and memorable and transformative experiences. In addition to quantitative indicators, storytelling was used to gain a richer description of experience.

Despite different uses, marine places provided similar benefits to the two groups. Engagement with nature and therapeutic benefits were most strongly endorsed. Both groups described engaging in caretaking behaviour. Divers spoke of their engagement with nature in relation to being completely surrounded and within the place and the coming face-to-face with nature that can occur through such an immersed interaction. Amongst anglers, this connection derived from being an observer of, rather than being immersed in, the natural environment. And for anglers, it is this solitary, observant quality of the activity that creates opportunity to derive a sense of rejuvenation and respite from the places they visit.

Through further empirical work that extends use of the well-being instrument used in the case studies to different user groups and different environmental settings, there is potential to develop it as a useful standardised tool for large-scale non-monetary assessment of CES.

1 Introduction

The continued exclusion of the many societal values of nature from economic and governance systems lies close to the root of the sustainability challenges facing our future. Social valuation of ES and public policy alternatives is one of the greatest challenges facing ecological and environmental economics today (Parks & Gowdy, 2012), but it is also creates an opportunity to better understand societal and cultural values of ecosystems and incorporate them into decision-making.

Conventional approaches to valuing benefits of the environment, and the welfare economic theory on which these methods are based, understand value as ultimately individual. The value to society of the benefits provided by ecosystems is typically considered through aggregation of individual preferences that are considered to comprehensively reflect underlying values (Klamer, 2003). The values that people have are assumed to be pre formed and are usually revealed through markets or elicited through surveys. However, the UK NEA (2011) considered that these approaches do not fully reflect the collective meanings and significance ascribed to natural environments, potentially missing out on important, shared dimensions of value.

Neoclassical economics explicitly does not concern itself with communal and other-regarding values. Although valuation may consider such things as altruistic, existence and bequest values within a TEV framework (Pearce & Moran, 1994), ultimately it is conceived to be the personal satisfaction that one gains by being altruistic that is considered the source of value. This assumption of the self-serving, value-maximising individual is also a requirement of Bergson-Samuelson social welfare functions, which are conventionally used to establish social welfare from a given set of individual preferences or welfare rankings. From this perspective, if the full value of ecosystems is not incorporated into economic accounting and decision-making, this is fundamentally considered a technical, rather than philosophical problem that requires better methods to address market failure, not changes in how value is conceived of. Others argue that choices concerned with the environment are fundamentally ethical and social, because the preferences we hold as individuals are both influenced by our socialisation within a particular society and by the environmental impact we have on others and the environmental risks we expose others to. As Vatn (2009, p2210) states, *"Through the physical linkages existing in nature, a social interconnectedness is forced upon us. In this context one may ask whether individual preferences are the best basis for social choice."*

It is also increasingly argued that more theoretical and methodological plurality is needed to understand and account for the full value of biodiversity and ES to human well-being (Bebbington *et al.* 2007; Parks & Gowdy, 2012; TEEB, 2010; UK NEA, 2011; Wegner & Pascual, 2011). Deliberative and participatory approaches to environmental valuation and appraisal are increasingly advocated as a way to better recognise the multidimensional nature of value, though the debate is still open as to whether these methods should augment, complement or replace cost-benefit as the principal tool for welfare assessment (e.g. Bebbington *et al.* 2007; Holland, 2002a; O'Neill, 1996; Parks & Gowdy, 2012; Price, 2000; Vatn, 2009; Wegner & Pascual, 2011). In relation to resource management, increased attention to notions of communal values and 'collective intentions' give rise to the need to fulfil communal needs and obligations in parallel with strategies to maximize individual welfare (Ishihara & Pascual, 2012). Understanding shared and social values is increasingly seen as necessary for decision-makers to better handle conflicts over natural resources, assess the likely social impacts of policy options and develop effective environmental management strategies (White *et al.* 2009; Fish *et al.* 2011b).

To account for these concerns, recent frameworks for ecosystem valuation, such as that of TEEB (2010), the UK NEA (2011), the Valuing Nature Network (VNN)[4], and the Common International Classification of Ecosystem Services[5] (CICES) (Haines-Young & Potschin, 2012) include 'shared', 'social' or 'shared social' values as a distinguishable value category, and there is increasing interest from the UK Government in quantifying social and shared values for nature (Fish *et al*. 2011a; 2011b; Fujiwara & Campbell, 2011; Maxwell *et al.* 2011). However, in the literature, these terms (and related terms such as cultural and plural values) refer to a wide range of overlapping concepts. Such concepts have neither been clearly established theoretically in relation to valuing nature, nor is there much empirical evidence that assesses their significance. Given this lack of consistency in usage, for the purpose of brevity we will use the term 'shared' values as shorthand for shared, social and cultural values in their various forms and guises unless stated otherwise.

Thinking about shared values inevitably leads to questions about the relationship between values in the sense of guiding principles and more contextual values in the sense of worth or importance of something. It also raises questions about: how preferences are shaped; whether there is an identifiable category of values that are shared socially and are not simply the aggregation of individual values; whether or when such values should be elicited as shared values in a deliberative group setting; and when it is sufficient to aggregate individual values to capture a collective sense of significance. Further questions raised are whether or when shared values can be sufficiently accounted for by adapting and improving neoclassical economic valuation methods such as CV and cost-benefit analysis (CBA), or whether new or additional approaches are needed to value the full contribution that ecosystems make to human well-being.

While there has now been decades' worth of valuation evidence produced with the explicit aim of enabling policy-makers to take better account of environmental benefits and costs, this has largely not translated into tangible improvements in terms of environmental outcomes (Baveye *et al*, in press; also see UK NEAFO WP8). The issue is not just one of knowledge gaps, but also of knowledge utilisation and conceptual framing. Some consider that environmental valuation and appraisal on the basis of aggregated individual values has reached the limits of welfare economics, and that a more social approach to valuation has the potential to provide more convincing and legitimate conceptualisations and evidence (Farber *et al*. 2002; Parks & Gowdy, 2012) or form a complementary assessment that can provide a more comprehensive suite of evidence (Fujiwara & Campbell, 2011; Sagoff, 1998).

This work package of the UK NEAFO will discuss the concept of shared values and related concepts, chiefly within the context of the valuation of ecosystems. Here we distinguish *valuation* from *valuing*. In this report we use valuing to refer to an informal, largely implicit process not bound to any particular setting, while valuation relates to formal research or policy processes where values (of various types) are explicitly expressed (e.g. surveys or workshops) or deduced (e.g. content analysis of media). The purpose of valuation, as discussed here, is to provide knowledge on the value of ecosystems and their services as part of environmental decision-making, monitoring and management processes.

Within this context, our aim was to establish a clear conceptualisation of shared values and provide means to assess these for decision-making at multiple scales. Key objectives of our project were to develop effective monetary and non-monetary valuation methods and to deliver empirical results that contrast shared values with values elicited through conventional individual survey-based

[4] http://www.valuing-nature.net/news/2012/valuing-nature-network-conceptual-framework.
[5] This draft framework is currently in preparation for the European Environment Agency and UN Statistics Agency.

methods. Thus, the core of this report is focused on operationalising shared values, with a theoretical framework that serves to clarify what may be meant by shared values-related terms and how types of shared values interrelate in valuation processes that can be used to assess them. By necessity, our discussion of the extensive debates on the nature of value, as considered in a wide range of disciplines, is incomplete. The focus of this work (and the expertise of the team that was selected) was based on what was deemed most relevant in relation to the applied goals of the UK NEAFO. **Figure 1** depicts the workflow of this project.

In addition to the key findings that preceded this introduction, this report consists of five main sections. In the remainder of this Section, we will define seven main types of shared values, and key related terms. In Section Two, we review and reflect on existing literature in light of this conceptualisation. The literature review consists of a REA and three expert-led reviews. The REA details results from structured literature searches, supplemented by context-specific examples around the societal forest privatisation debate, siting of renewables, shared values and the commons (the cultural and natural resources accessible to all members of a society), use of existing data sets for assessing shared values. The three expert-led reviews consider: shared values in relation to cultural services and particularly the spiritual and aesthetic values associated with environmental settings; how conventional economic approaches to valuing the environment consider social values and critiques thereupon; and shared values in relation to deliberative and social learning processes.

Following the review, Section Three establishes a theoretical framework that develops a typology of shared values, discusses the relation between shared values and the individual, and proposes a model for the assessment of shared values in deliberative processes (the DVF model). This theoretical framework around shared values was established in outline at the start of the project to provide a theoretical basis for framing the review and development of empirical case studies. It was then further developed as we gained insights over the course of the work.

Section Four reports on the four empirical case studies conducted as part of our investigation; two local- and two national-scale. Three of the case studies revolved around deliberative valuation workshops: 1) the *Inner Forth* (Scotland), DMV with community councils; 2) the marine environment around *Hastings* (England), DMV and MCA with a wide range of stakeholders; 3) potential *marine protected areas* (pMPAs) across the UK, DMV and MCA with divers and sea anglers. As well as using DMV and MCA as deliberative-analytical valuation methods, the workshops included a wide range of techniques to support deliberation and elicitation of values, including systems modelling and storytelling. They were also supported by psychological tools to better understand how values change as a result of deliberation and a new instrument for non-monetary valuation of intangible CES benefits. The fourth and final case study used a very different methodological approach, media analysis, to assess cultural/societal values of the coast and of marine conservation. The broad range of approaches in our case studies allowed us to consider how various different types of shared and cultural values might be best assessed.

Section Five synthesises previous sections, evaluates the conceptual framework in light of the review and empirical results, and discusses what might be fruitful research avenues to better understand and elicit shared values of nature.

While this report frames issues around shared values within the field of valuing ecosystems, shared values are of course relevant to a wider range of policy decisions. Thus, the discussion here will be relevant to all areas where there is a need to incorporate social impacts and well-being into decisions.

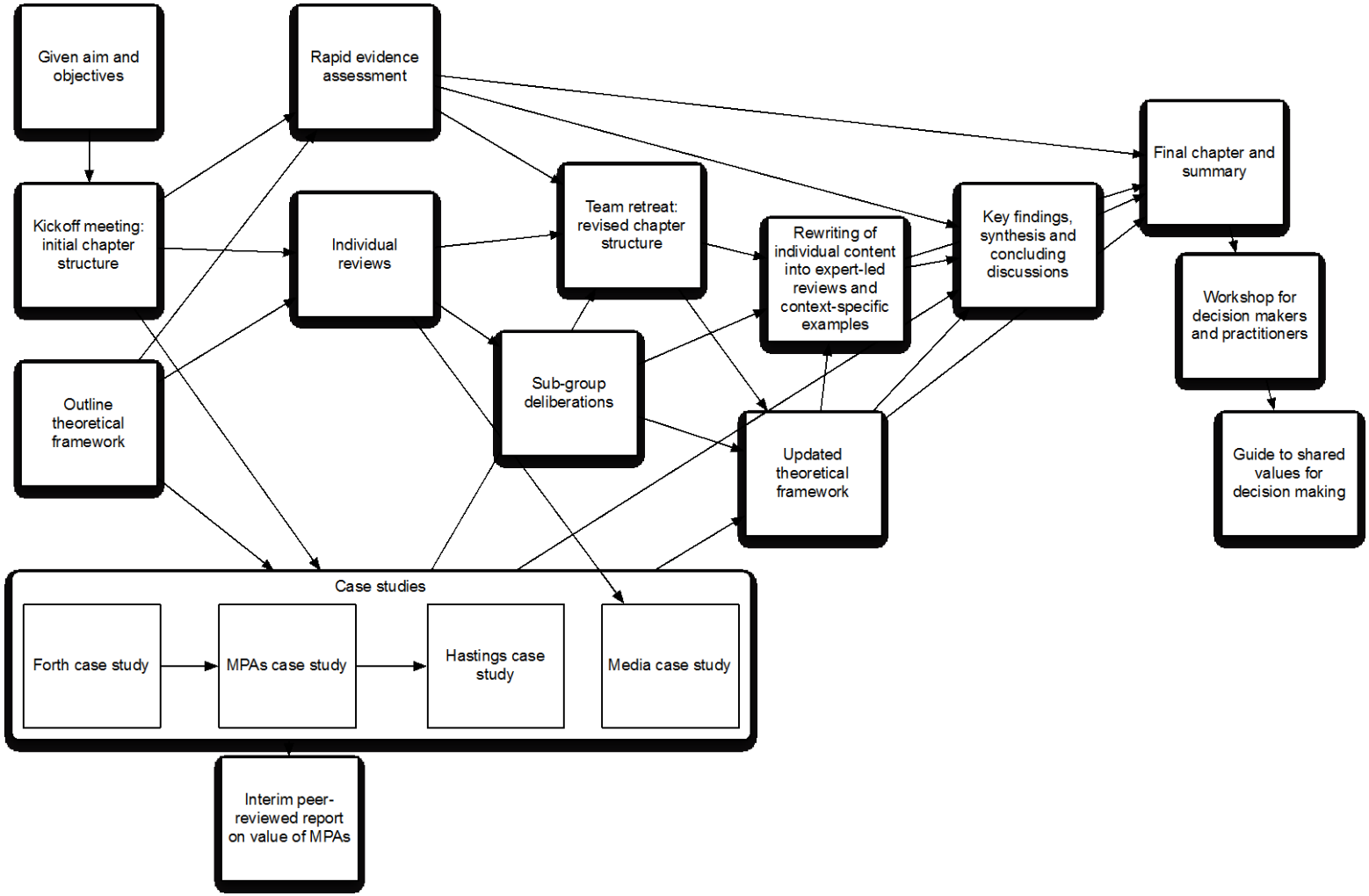


Figure 1. Main components and workflow of the work package. Supporting the workflow throughout was also the use of a range of tools for online discussion between team members.

1.1 Definitions

As will be illustrated by the literature review, the terminology associated with shared values can be interpreted in many ways. To reduce ambiguity and distinguish these different interpretations, we discriminate five *dimensions* of values: (i) the value concept; (ii) the value provider; (iii) the process used to elicit values; (iv) the scale of value; (v) and its intention (**Figure 2**). Considering these five dimensions, which will be discussed in more detail in our theoretical framework (Section 3), we establish seven, non-mutually exclusive main *types* of shared values:

1. *Transcendental values*: principles and conceptions about desirable ends that go beyond or transcend specific situations. Transcendental values are a deeper held type of value; they are often shared between communities or within society and thus termed as shared or social values. Within psychology, transcendental values are seen to be relatively stable.
2. *Cultural* or *societal values*: culturally shared principles and virtues as well as a shared sense of what is worthwhile and meaningful. Cultural values are grounded in the cultural heritage and practices of a society and pervasively reside within societal institutions. They may include both transcendental and contextual values. Societal values are the cultural values of a society; societies may be more or less homogenous, so there may be multiple sets of cultural values in one society that overlap to a greater or lesser degree with each other.
3. *Communal values:* values held in common by members of a community (e.g. geographic, faith/belief-based, activity-based, community of practice, etc.) again including shared principles and virtues as well as a shared sense of what is worthwhile and meaningful.
4. *Group values:* the values expressed through a group as a whole within a valuation context, e.g. through consensus or majority vote, or more informally.
5. *Deliberated values*: Value outcomes of a deliberative process; typically, but not necessarily, a deliberative group process that involves discussion and learning.
6. *Other-regarding* values: the sense of importance attached to the well-being of others (human or non-human), or regard for the moral standing of others.
7. *Value to society*: worth or importance to society as a whole.

Further points of definition involve the values that are generally not considered to be shared. We contrast transcendental values with *contextual values*, which are context dependent. For example, one might value peacefulness (transcendental) and also value the Scottish Highlands (contextual), perhaps because one might experience them as a peaceful place. Contextual values are considered more changeable than transcendental values. Beyond transcendental and contextual values, there are *value indicators*, including monetary values. Cultural, societal, communal and group values can all be contrasted with individual values, deliberated with non-deliberated values and value to society with value to the individual (see **Figure 2** and Section 3).

With regard to the term 'plural values', values can be plural or multidimensional across the dimensions we have stated above, but the term may also refer to the notion that individuals will have multiple sets of values depending on framing and mode of elicitation. The term is often associated with the notion of incommensurability, as will be discussed in more detail in the next part of this report.

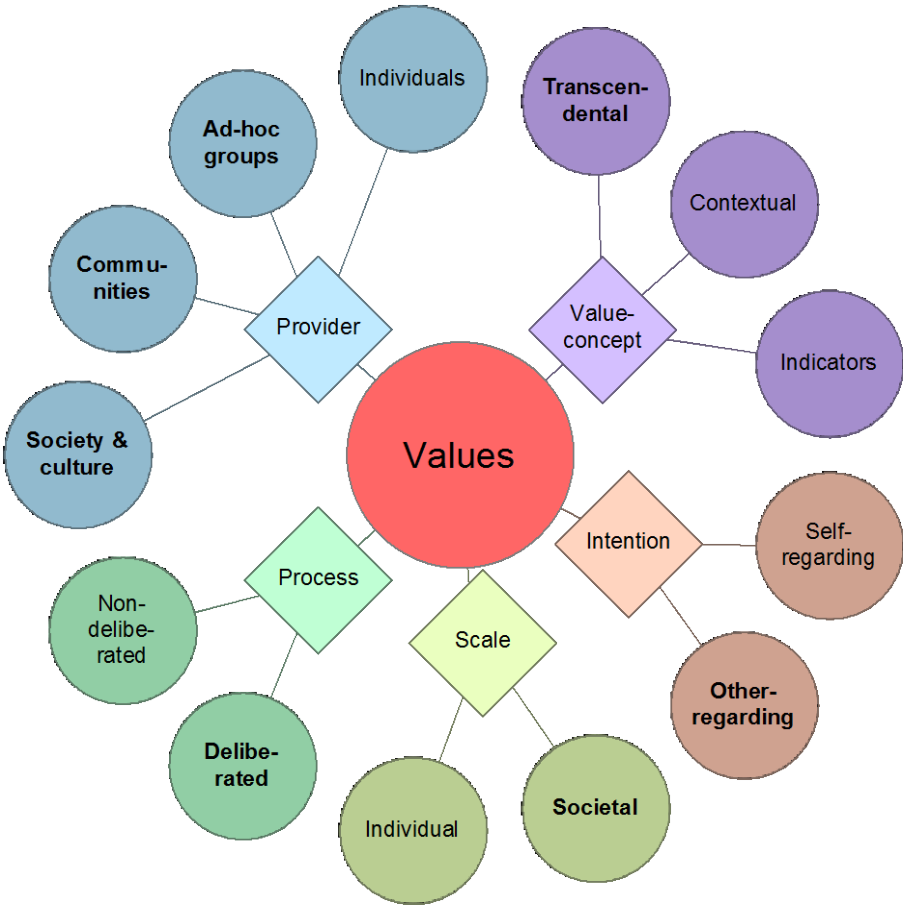


Figure 2. Five dimensions of value and seven main types of shared values. Dimensions are depicted as diamonds. Emerging from the dimensions, we can differentiate between types of values that might be termed shared, social, or shared social values (circles with bold text); and other types of values (other circles). For example, *provider* is a dimension that indicates who may provide values in a valuation setting; societies, cultures, communities and ad-hoc groups provide *societal*, *cultural*, *communal* and *group* values, which are all distinct types of shared values. Individuals also provide values, but these are not termed shared, unless they can be classified as such on a dimension other than that of value-provider.

2 Literature review

The literature review conducted for this work package focused on three key questions. It first considered how shared values were conceptualised. It then looked at the processes and methods used to discover, uncover or identify these values. Finally, it explored how values have been incorporated into decision-making processes.

To address these questions we undertook a multi-pronged approach to our review using four complementary methods (**Figure 3**)**:** 1) a preliminary expert-led review (outlined in Section 2.1) to assist in the development of the seven main types of shared and social values (detailed in Sections 1 and 3) and to act as a basis for framing the case studies and the full literature review; 2) a REA (Section 2.2); 3) provision of context-specific examples that explore real world, conceptual and methodological issues associated with shared values (Section 2.3); and 4) expert-led reviews of some of the more challenging and contentious issues related to valuing cultural services focussing on spiritual and aesthetic benefits (Section 2.4.1), assessment of shared values in conventional economic valuation and critiques thereupon (Section 2.4.2), and deliberation and social learning (Section 2.4.3). Given the relatively recent emphasis on the terminology around shared values (coming to the fore largely through the UK NEA) and an initial examination of the literature, we reasoned that a formal meta-analysis or systematic review would necessitate filtering out all but a small proportion of studies, thus unduly restricting our review. The REA approach incorporated principles of a systematic review into a time-limited period while the addition of focused expert-led reviews facilitated more in-depth examination of specific areas considered germane to the research questions that might not emerge through a standardised keyword search approach. The overall approach to the review was both iterative and interactive; it included a shared online space for collective critique and a two-day facilitated retreat drawing on the teams' expertise, knowledge and reflexive thinking to add value to the review process (also see **Figure 1**). Deliberative dialogue was incorporated in order to clarify focus of articles and sense making of the literature. The interdisciplinary team drew in expertise from sociology, environmental psychology, philosophy, economics, theology, education, political science, communication studies and ecology.

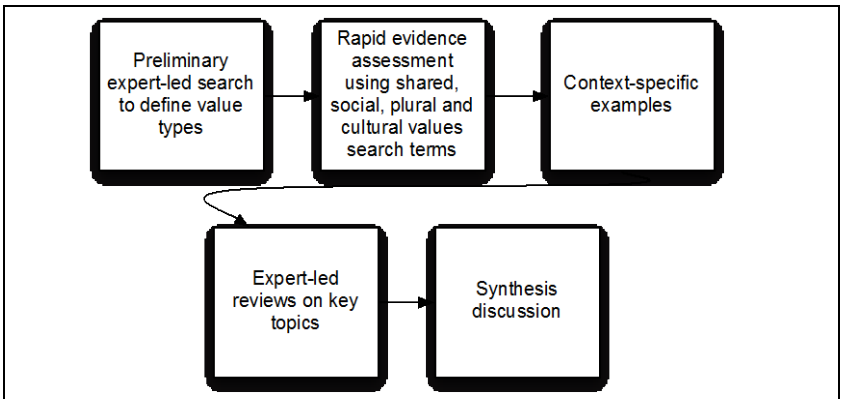


Figure 3. Outline of the literature review

2.1 Preliminary examination of literature

The preliminary review was undertaken in parallel with a series of four expert workshops as part of the Valuing Nature Network 'BRIDGE: from values to decisions' project[6] and focused specifically on the usage of the terms 'shared', 'social' and 'shared social' values. Within the fields of ecosystem assessment and environmental valuation, these terms have come to indicate a wide variety of

[6] http://www.valuing-nature.net/projects/bridge

different interpretations. For example, they might refer to the sum of individual values or aggregated WTP, values associated with certain social and cultural contexts, values that individuals only hold in social situations, values resulting from group processes during valuation, altruistic values, and meta-values, i.e. 'shared' values about how values should be treated, such as fairness norms and other procedural values such as respect or justice. Use of these terms was extremely 'fuzzy' and they were often ill defined. To give an indication of the diversity of interpretations we provide some examples of how these three different terms have been conceptualised in the literature.

Shared values: The term 'shared values' often referred to guiding principles and normative values that were shared by groups or communities, or to cultural values more generally. It also, however, referred to the contextual values or preferences of groups and the values that arise as a result of a social process. For example, Stein *et al.* (1999) investigated both contrasting and shared values around landscape management in the Upper Midwest of the United States that were held in common by urban and rural groups of stakeholders. By understanding what values were shared within groups, and what values were shared between groups, land managers were better able to identity mutual goals and improve cooperative planning. De Vente *et al*. (under review) - demonstrated how participatory processes that enable participants to deliberate over their values can lead to more beneficial outcomes for the natural environment, in addition to social benefits for participants (such as learning, increased trust and reduced conflict). However, the authors emphasised that these benefits are conditional on well-designed and facilitated deliberative processes. Daily *et al.* (2009) discussed shared values of ecosystems to refer to underlying cultural values that might help shape the institutions necessary to make the ES framework operational. In their view, an important aim of ES valuation is to better align decisions by individuals and public and private sector to these shared values of ecosystems.

In an examination of policy analysis and aggregation of values, Sagoff (1986) discussed shared values as synonymous with what he also called 'public values', *"goals or intentions the individual ascribes to the group or community of which he is a member; they are his because he believes and argues they should be ours; he pursues them not as an individual but as one of us"* (p302). For example, many people consider that wilderness should be preserved even when it has no benefit to them or to others; they believe in this goal because it aligns with their idea of the shared values of a good society. Thus the type of values that Sagoff described is normative and transcends particular situations. This makes them different from components of economic value that have been termed 'bequest' and 'existence' 'value', which are the (self-regarding) welfare gains to an individual attached to the knowledge that something will remain for future generations, or attached to the knowledge that it exists for its own sake, respectively. A further characteristic of the shared nature of these public values described by Sagoff is that they are 'impersonal' and hence deliberative and political processes are required to adequately identify them. Thus, the conception of shared values as implicit, communal or public values, and shared values as values that originate from a deliberative social process, appear to be closely related.

Social values: 'Social values', as a term, was also used in a bewildering number of ways. It might refer to the values of a particular community or the cultural values and norms of society at large, but the term was also used to refer to the public interest, values for public goods, 'altruistic' values and feigned altruistic values, the values that people hold in social situations, contribution to welfare or well-being, the WTP of a group, the aggregated WTP of individuals, or values derived through a social process.

Kennedy *et al.* (1995) discussed social values about natural resources as, on the one hand, values deriving from the 'social system' and, on the other, they described social values as the wider norms

that are expressed through laws, political action, media and other institutions. As such, the authors suggested two layers of social values; 1) a cultural layer that influences, and 2) contextual values in relation to natural resource management. TEEB (2010) also used the term social values (sometimes socio-cultural values) both to indicate overarching cultural values and more specific contextual values, as a broad category of values that was not sufficiently covered by economic valuation.

Sherrouse *et al*. (2011) and Brown (2013) discussed social values in a participatory Geographical Information Systems (GIS) context. In these papers social values were made equivalent to 'landscape values', which were conceived as non-monetary place-based values categorised by type, e.g. spiritual, aesthetic, subsistence. These were contrasted to 'economic values'. For Bryan *et al.* (2010a, b) the term was used to refer to any kind of use or non-use benefits that people derive from ecosystems. This is in contrast with 'ecological values' which these authors characterised as a score based on multiple ecological attributes regardless of human benefits. Aggregate 'social values', assessed using a participatory GIS approach were then constituted as a non-monetary measure of value to society.

Parks & Gowdy (2012) also discussed social value as the sum benefit to society, but in the context of a critique of individual-based economic valuation. Conventionally, according to these authors, it is assumed that individual values are a function of the revealed and stated preferences of *"self-regarding, narrowly rational individuals"* (p1). A key problem with this is that there is no logically infallible way to aggregate these preferences (this will be discussed further in Section 2.4.2). Estimating social value directly through a deliberative group process would, according to the authors, avoid this issue, as the outcome can be established through discussion and negotiation.

A further way of interpreting the term social values in economics was to describe judgments we make about how individuals' welfare can be aggregated and the weight that should be attached to welfare gains and losses. Welfare economic analysis uses a social welfare function to aggregate individual welfare changes into a single societal welfare change. Thus such social values could be seen as 'meta values', high level values that determine how more specific values are aggregated (Hockley, in press).

Shared social values: The amalgam 'shared social values' can be used to refer to subsets or combinations of these concepts. For example, 'social' can be used to refer to societal context while the 'shared' adjective can indicate group values. Norton & Steinemann (2001), in a discussion of community-based environmental management using multi-criteria approaches, related social values to aspirations, as the societal values that reflect hopes and dreams of the public. Within the multi-criteria analysis context, social values drive individuals to pick criteria and indicators and, through deliberative processes, sets of widely shared social values and appropriate indicators for these values can then be identified.

Stagl (2004) also referred to shared social values in relation to multi-criteria evaluation, in a more theoretical discussion in the context of deliberative decision-making, complexity and post-normality. She described shared social values as the outcome of the processes of effective social interaction, open dialogue and social learning. In her view, shared social values were closely allied to shared meanings and effective policy for a society depends on the creation of these among cultural groups, as they do not exist *a priori*. Stagl saw the formation of shared meaning and shared social values as a social learning process, where, in the words of Webler *et al.* (1995) *"...individuals [learn] how to solve their shared problems in a manner that is responsible to both factual correctness and normative consent"* (p445). Reed *et al.* (2010) took a somewhat different view on this, considering it *"a change in understanding that goes beyond the individual to become situated within wider social units or communities of practice through social interactions between actors within social networks"*

(online). The relationship between individual values and values of wider social units will be discussed in Section 3.2.

This brief discussion illustrates that while the terms shared and social are often used interchangeably, there was a different emphasis, with 'shared' more generally referring to those holding or providing the value, whereas 'social' was a qualification of the type of value. 'Shared' suggested a type of cultural value, common principle or more generally the values held in common by a group, community or society. The 'social' adjective often referred to a social scale, a social intention or a social process. Thus the term 'shared social values' is not necessarily tautological, as certain types of social values (e.g. other-regarding values) can be held on an individual basis.

2.2 Rapid evidence assessment (REA)

A REA using standardised search methods (Government Social Research Service, undated) was conducted to identify relevant literature and build on the preliminary expert-led review. The REA itself was divided into three parts, the first concentrated on non-economic literature, the second specifically examined economically-focused literature, and the third considered shared values in the field of health valuation; these are presented separately. The health review was included given that there are considerable parallels between environmental and health service valuation, assessments and appraisal both in concepts and methods.

For the non-economically focused REA we used the databases Scopus[7] and ISI Web of Science[8], which provided access to international literature over multiple decades across a broad range of disciplines including natural and social sciences as well as the humanities. Search terms included combinations of 'plural values', 'shared values', 'cultural values', 'social values' paired with 'nature', 'ecosystem' and 'natural environment'. Our search was restricted to English language peer-reviewed literature including those that were in press as well as conference papers. Articles were included if one or more value term was mentioned in the title, abstract or keywords; our search was conducted from January 2013 to March 2013. This approach yielded primarily academic papers with a small number of published reports, books or editorial letters, a total of 192 items. The identified items were further examined to exclude literature where: (i) the setting to which values were associated was not the natural environment (e.g. computing, organisation, political) (18%, n=35); (ii) the focus was primarily ecological with only a brief mention of the value term of interest in the abstract or a single sentence in the discussion (6%, n=12); (iii) an additional set of articles (15%, n= 28) were identified as directly pertinent for the expert-led reviews and were thus provided to the individual(s) leading each of these areas. 17 papers were classified as economically-focused and included in the separate assessment of economic literature assessed (Section 2.2.5).

Details for the final set of 117 non-economically focused papers were entered into a spreadsheet. These details included information such as the type of paper (e.g. conceptual, empirical), value term(s) discussed (i.e. shared, cultural, social, plural), geographical location of empirical studies or case exemplars discussed, aims and objectives, context, methods (e.g. questionnaire, participant observation, value mapping), and degree to which the incorporation of values into decision-making was illustrated. This process provided opportunity for reviewing and refining our understanding of the identified papers. We specifically examined the literature along the following parameters: value term discussed, geographical location, focus (drawing on aims and context to identify categories of issues or areas in which these values are considered), and decision-making.

[7] Scopus provides access to the social sciences, life sciences, physical sciences, health sciences and the arts and humanities.
[8] Web of science includes the social science citation index, the arts and humanities citation index and the science citation index.

2.2.1 How were shared, plural, cultural and social values conceptualised?

Over half (57%, n=67) of the non-economically focused 117 papers used the term cultural values; the terms shared values or social values were each found in under a quarter and the phrase plural values occurred in only four papers (**Figure 4**). In all but one instance plural values were discussed in conjunction with cultural values. Terms were often used interchangeably and frequently within the same paper. Approximately half of the papers discussed values in relation to the ecosystems of Europe and North America, with 52% (n=61) reporting studies from these regions (**Figure 5**).). The environments of Asia, Australasia, South America and Africa represented a third (35%, n=41) with the remaining articles discussing values with respect to more general area reference. Of those articles specifically focused on cultural values associated with a particular indigenous group, there was a broad geographical spread including the Americas, Australasia, Asia and Europe.

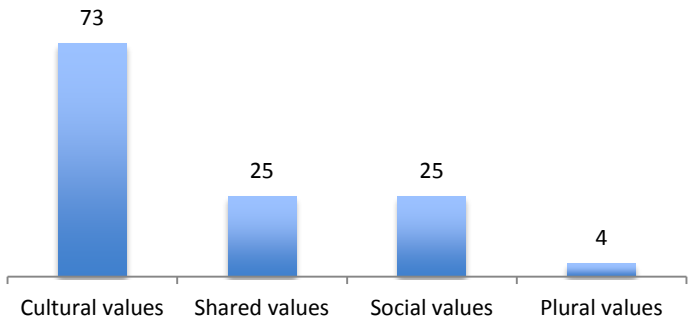


Figure 4. Number of studies using search term cultural, shared, social or plural values. Where a study used more than one value term, each term was separately included (n_{total}=127).

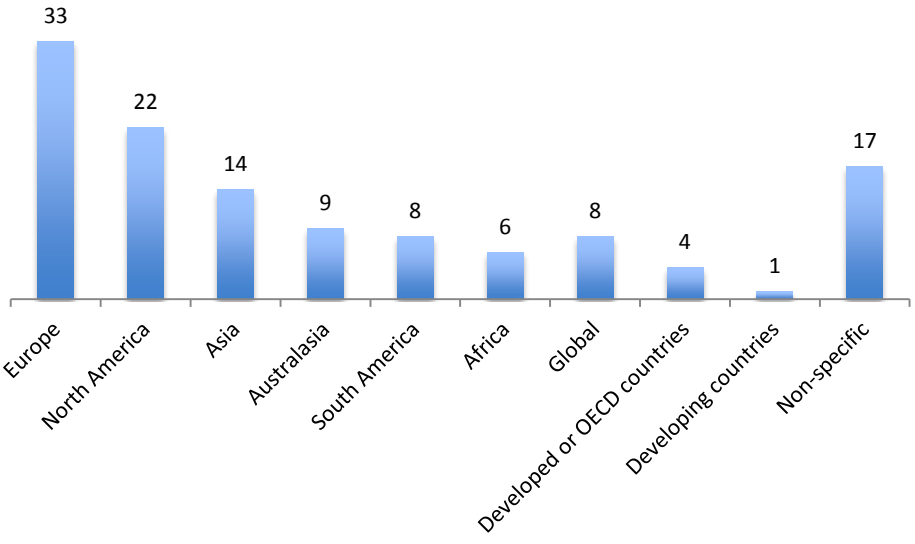


Figure 5. Number of studies undertaken in or using case study exemplars from different continents or general geographic grouping. Where a study investigated more than one geographical location, each location was separately included (n_{total}=105)

Table 1 provides specific examples of the ways in which the terms cultural, social and shared values were used within the literature. In most papers no specific definition was provided; rather, the authors outlined what the terms they use included or how the type of value manifested in a given context. Throughout the literature, it was suggested that quantification of these values is

problematic and that it is difficult to map them onto the physical landscape as well as across different communities.

Social and cultural values were described in similar ways. Within the discussion of cultural values, Klain & Chan (2012) outlined that these include sense of place and spiritual value. Chan *et al*. (2012) argued that the terms 'services', 'benefits' and 'values' were being conflated within the literature and within debates concerning values, valuation and the natural environment and suggested that while this remains the case these values will continue to be poorly represented in decision-making. The labels of 'intangible' and 'imagined' values were sometimes used to denote cultural values (Kanoswki & Williams, 2009). Robinson *et al.* (2012) in their discussion of cultural values made the distinction between 'held values' – described as fundamental, universal, principles and ideals – and 'assigned values', ones that are associated with an object, and/or were place- or culturally-based; this distinction, first made by Rokeach (1973), has resonance with the concepts of transcendental and contextual that were put forward in Section 1 and will be discussed in more detail in Section 3 of this report.

Social values were also not specifically defined, although some authors outlined what they included, for example aesthetic, recreation, or therapeutic values (Sherrouse *et al*. 2011). For Pike *et al*. (2011), social values were a contested concept; their conceptualisation included aesthetic and recreation values, similar to Sherrouse *et al.* (2011). As with cultural values the label intangible – as distinct from tangible – was used in relation to social values. Cultural values were also related to institutions, where they were seen as more problematic. Rees (2003, 2010) discussed cultural values in relation to the prevailing growth-oriented global development paradigm, noting that to achieve sustainability the world community must write a new cultural narrative designed for living on a finite planet.

Shared values related to issues of ethics and fairness, shared responsibility and shared meanings. Hoekveld & Needham (2012) highlighted this in terms of the need for development of an ethic for spatial planners based on shared values of the profession, while Cantrill & Senecah (2001) emphasised the role that a shared sense of 'selves-in-place' could play in the process of attending to or embracing conservation orientated practices. The term plural values, when explicitly stated, was used as a concept to denote when multiple, potentially incommensurable, dimensions of values were identified such as aesthetic, heritage, moral, social value, etc. For example, Trainor (2006) identified 10 realms of value that included aesthetic, cultural and social. In their discussion of sustainable development planning, Barbanente & Khakee (2003) highlighted the plurality of values underlying decision-making surrounding the formation of future-focused policies. This same multiplicity of values was highlighted with regard to ideological drivers of biodiversity conservation initiatives, including intrinsic value of nature, traditional values of indigenous peoples, equity within and across generations, and economic well-being (Robinson, 2011). While the term plural value was not explicitly used in many of the papers, the concept of a plurality of values cuts across the literature as authors identified in their research a wide range of values related to nature, e.g. spiritual, recreational, aesthetic, place-based values. Thus, when looking at how the terms shared, cultural, social and plural values were conceptualised, it seems that, overall, they were not always specifically defined; rather, they were identified by the categories within them. These values can be contested and there also seemed to be some overlap in what the terms covered and included.

Table 1 and the wider non-economic literature reviewed through the REA process highlight links to the theoretical framework of shared values types detailed in Section 3. For example, Klain & Chan (2012) suggested that CES such as sense of place, stewardship obligations and spiritual value of nature are often linked to fundamental transcendental values about moral concerns that can motivate people to protect and restore ecosystems (see Section 2.4.1 for a more detailed review of

this literature). The concepts of shared responsibility, fairness and justice as outlined by Evans *et al.* (2008) and Arlinghaus (2006) relate to three of the value types in the conceptual typology, i.e. other-regarding values and communal values as well as transcendental values. Pike *et al.* (2010, 2011) argued that the identification of social values necessitated community participation in order to effectively uncover the existent communal values, ideas akin to the idea of communal, group and deliberated values articulated in theoretical framework. Anthony *et al.*'s (2009) discussion of social values highlighted a category of tacit values (such as sense of place, informal local traditions and spiritual appreciation) that are difficult to articulate. To the extent that these tacit values are collectively held (*cf.* Cantrill & Senecah, 2001), these may relate to contextual communal and cultural values within the conceptual typology defined in more detail in Section 3.

Table 1. Specific examples of different values as discussed in the reviewed non-economically focused literature.

Value term	*Described as…*	*Observations made…*	*Manifestation through…*	*Contribute to…*	*Links to theoretical framework – Types of shared values*	*Example literature*
Cultural	Sense of place Stewardship obligation Recreational Aesthetics Education/scientific Cultural/historical Spiritual, sacredness To live in a place Re-inhabiting Insideness	Frequently discussed as/in conjunction with ES Moral dimension Difficult to map across different communities	Place names Performing arts Oral traditions Rituals/festivals Knowledge Traditional craftsmanship	Place-based identity Spiritual connection to land	Other-regarding values Cultural or societal values Transcendental values	Klain & Chan, 2012 Kanowski & Williams, 2009 Daniel *et al.* 2012 Chiesura & de Groot, 2003 Kato, 2006
Social	Recreational Aesthetic Biodiversity Future generations Life sustaining Therapeutic	Contested concept Some more easily quantified Some more influential than others (Tacit – more influential because they 'derive from and shape individual experiences & beliefs') Differing degrees of influences on experience, belief, behaviour Perceptions are filtered through social values (e.g. different perceptions of 'rural' influence social value of land protection)	Tourism Real estate Recreational fishing Research studies Landscape painting Performing arts Sense of place Childhood play & discovery	Civic engagement in decision-making	Cultural or societal values Group values	Pike *et al.* 2010, 2011 Anthony *et al.* 2009 Sherrouse *et al.* 2011 Dirksmeier, 2008

Value term	***Described as…***	***Observations made…***	***Manifestation through…***	***Contribute to…***	***Links to theoretical framework – Types of shared values***	***Example literature***
Shared	Fairness Care Justice Shared senses of 'selves in place' Nature's creativity of processes provides human opportunities for expressing universal values Resilience Shared responsibility Normative principles for a profession Core beliefs providing perspectives on severity, causes of habitat degradation	Ethical principles needed for professions that modify the landscape (e.g. planning) These are or need to be across multiple stakeholders Distinction between core beliefs & preferences; preferences considered secondary beliefs	Set of principles or professional standards Shared vision across multiple groups Civic engagement Shared values may be recognised through deliberative approaches	Professional ethics standards Collective sense of ownership Increased feelings of responsibility Increased participation & engagement	Transcendental values Other-regarding values Value to society	Arlinghaus, 2006 Norton, 2000 Hoekveld & Needham, 2012 Cantrill & Senecah, 2001 Evans *et al.* 2008 Lipsky & Ryan, 2011

2.2.2 Values and research context

An additional way in which we sought to understand cultural, shared and plural values was through an examination of the aims and objectives along with the specific context within which the article was situated in order to identify domains of issues or areas in which these values were considered. Four broad issue domains were distinguished (**Table 2**). The vast majority could be classified as focusing on the identification of shared, cultural or plural values associated with the natural environment (43%, n=50) or management of the environmental setting (41%, n=48). The remaining two domains, while they could be considered sub-themes within the larger two, represented distinct issues, that of conflict (6%, n=7) and of participation (3%, n=3). In all but a few instances articles could be classed within one issue domain with little cross-classification.

Articles within the first domain focused primarily on identifying, characterising and/or mapping the values that people or groups have in relation to specific places or ecosystems, such as near-shore (Lipsky & Ryan, 2001), coastal (Anthony *et al.* 2009) or the interface zone between the built and more natural environment (Kil *et al.* 2012). Several authors suggested that to adequately account for cultural values, these must be mapped alongside other more ecologically oriented values with examples of efforts at the national scale (e.g. Ihse & Lindhal, 2000; Bearden *et al.* 2006) and local such as urban green areas (Elmqvist *et al.* 2004). There was an emphasis on the need to understand the differences and similarities between values held by scientists and those of indigenous peoples (Lynch *et al.* 2010; Department of Environment and Climate Change NSW, 2010) with some authors arguing the need for new narratives all together, for example, ones grounded on principles of sustainability (Rees, 2003; 2010; Norton, 2000). Thus, as a whole, the focus was on both a mapping of values onto the ecological landscape as well as an understanding of what the values were across different groups of people or different communities.

Literature within the management domain examined the integration of shared, cultural and plural values into management strategies, plans and policies. While most articles discussed these values in general terms, Cantrill & Senecah (2001) highlighted the need to incorporate sense of place into natural resource management while more recently Ishii *et al*. (2010) examined the importance of both recreational and aesthetic values in long term management strategies for forests located around Japanese temples or shrines. Additionally, these articles explored different strategies for integration of social and ecological values such as co-management for urban parks (Elmqvist *et al*. 2004), catchment-based integrated resource management for water resources (Wallace *et al*. 2003) or the use of Specially Protected Areas in Turkey (Taşeli, 2007). Zweig & Kitchens (2010) provided a more conceptual discussion of the challenges presented by social values for successful restoration ecology while Robinson (2011) raised questions about the focus of management in general, arguing that context rather than ideology should drive management decisions and that within context lie cultural, shared and plural values.

Participation in decision-making is an oft called for necessity and one that raises interesting questions about who to involve and how this can be done with success and for whom or what it is successful (e.g. Kenter *et al*. 2013b; Reed, 2008; de Vente *et al*. under review). Nonetheless, only three papers discussed participation in decision-making in any detail. These authors examined factors that can facilitate or hinder the process, such as the presence – or lack – of shared values amongst participants, or culturally important features (e.g. trees). Barbercheck *et al*. (2011) and Evans *et al*. (2008) evaluated the impact of participation from a bespoke community group; the former highlighted the increased knowledge and appreciation gained by both the researchers and the institutional organizational structure. Increased knowledge also occurred for the community members involved in the coastal project examined by Evans *et al*. (2008) along with increased feelings of responsibility, meaningful action and motivation for future involvement. While Dandy *et*

al. (2012) discussion was more conceptual than empirically-based, they highlighted the potential of urban street trees as a motivator for citizen involvement in urban greening efforts, arguing that this engagement can develop and enhance values such as care, respect and shared responsibility. Section 2.4.3 provides a more detailed discussion of the broader literature on deliberation.

The papers within the conflict category, while few, were illustrative of the contested space that can surround cultural, social, shared and plural values. Sarkar & Montoya (2011) provided an instance where participation and engagement was disregarded by government in order to serve national interests. The paper detailed a situation in Peru whereby strategic alliances between local communities and the state were a component of protected area management in order that communal and indigenous rights are recognised. Years of extensive negotiations and meetings with indigenous groups led to the establishment of a number of protected areas. This recognition of traditional rights was then negated by the Peruvian government who opened up part of the areas for hydrocarbon and mining activity by trans-national companies. This action led to conflict and protest by thousands of indigenous people in which a state of emergency had to be declared in 2009. One of the resulting consequences of this situation was that local people no longer trusted the government, arguing that protected area status did not guarantee conservation of natural resource or their territories.

10 articles within the REA specifically focused on indigenous peoples. Perhaps unsurprisingly these fell primarily within the identification of values domain, although three papers focused on resource management. An interesting example of the tensions between traditional practices and approaches to conservation found in a number of these papers was identified by Kato (2006) who used a case study of Shirakami-sanchi World Heritage Area in Japan to illustrate a local community's long term conservation commitment and everyday interactions with nature. In the Shirakami, a remote mountain range, people were committed to their land and successfully pushed for conservation, which saved the area from inappropriate development and road building and gave it an array of designated protection such as World Heritage Area and Wildlife Protection Area (WPA). However, the success of these efforts led to restrictions on the traditional practices of the local people as the WPA imposed a complete ban on hunting and traditional harvesting practices. Members of the community felt betrayed and questioned the protected conservation status that prevailed. A 'Nature School' was established by some community leaders to develop environmental outdoor education and green tourism catering for urban school groups. The school offered programmes that detailed and explained the traditional practices of the Shirakami people and provided a new way for the community to maintain some of their cultural connection to the land, albeit in a very different way than previously.

Table 2. Typology of topics for which cultural, shared, plural values are considered.[*]

Topic Category	*Description*	*Examples*
Mapping/Identifying	Focus on eliciting/identifying people's values or mapping them (physically on the landscape or conceptually across different groups of people)	• Global climate change and management of coastal ecosystems using four case studies to highlight need to consider values in the management (Anthony *et al.* 2009). • Looks at measurement of national cultural values by using Values Survey Module via large-scale survey (Bearden *et al.* 2006). • Introduces typology to understand and identify sociocultural critical natural capital using a functional approach (Chiesura & de Groot, 2003). • Examines ES - both ecological and social – provided by urban green areas; social domain focuses primarily on recreational/cultural values (Elmqvist *et al.* 2004). • Survey in Sweden representing a new approach in nature conservation where natural and cultural values were inventoried and analysed (Ihse & Lindhal, 2000). • Investigates the influence of place meanings on visitors' desired experience from and preferred natural features in wildland-urban interface areas in Florida (Kil *et al.* 2012). • Examination of stakeholder values, preferences and potential coalitions surrounding near-shore restoration in Puget Sound in United States (Lipsky &Ryan, 2011). • Identifies the minimal degree of overlap between indigenous cultural significance/values of flora/vegetation and species lists developed by conservation scientists. Highlights the potential for better management practices if the two complementary knowledge systems were overlaid (Lynch *et al.* 2010). • Critiques the two dominant theories for considering nature's value - based on utilitarian value or intrinsic value – and suggests the need to think more adaptively about the people-nature relationship. Derives an alternative theory of shared values of nature which emphasises protecting processes rather than objects and acknowledges the variety of ways humans might value nature (Norton, 2000). • Explore how the perceptions, use, behaviours of people from different countries, cultures and socio economic levels differ or coincide in relation to urban nature and landscapes (Priego *et al.* 2008) • The prevailing growth oriented global development paradigm is incompatible with long term ecological and social sustainability, solutions to the problem fly in the face of contemporary cultural values (Rees, 2003). • To achieve sustainability the world community must write a new cultural narrative designed for living on a finite planet (Rees, 2010).
Planning/Management	Focus on management of a resource	• A focus on the tension that often develops between the desires of local stakeholders and land use advocates (e.g. NGOs). Outlines how sense of place can be incorporated into natural resource management efforts (Cantrill & Senecah, 2001). • Shrine/temple forests have social and cultural values (i.e. recreation and aesthetic) as well as ecological value. Discussion of these values should be considered for long term management planning (Ishii *et al.* 2010). • Coastal and inland fish stock conservation in context of recreational fishing in Central Europe (Arlinghaus, 2006). • A focus on the concept of protected area management which often curtails resource use and means of livelihood and how this effects, often fundamentally, indigenous people (Negi & Nautiyal, 2003). • Identifies the relationships between and influence of, the demographic, economic and cultural values of landholders on their retention and management of native trees (Seabrook *et al.* 2008). • Explore the importance of how social values interact with ecological theories and affect the success of restoration (Zweig & Kitchens, 2010). • Need for adaptive co-management – including monitoring, evaluation and modelling of different management options - of urban

Topic Category	*Description*	*Examples*
		green areas by managers and user groups (Elmqvist *et al.* 2004). • Examines the relationship between landscape park style design principles and the biological conservation value of parks; uses an historical UNESCO world heritage park in Germany as a case study (Kümmerling & Muller, 2012). • Argues the need to adopt pluralistic approach to biodiversity conservation allowing context to be the determinant of management strategy rather than ideology (Robinson, 2011). • Assesses the implementation of Special Protected Areas in Turkey identifying problems and potential solutions (Taşeli, 2007). • Describes catchment-based integrated water resources management as mechanism for greater inclusion of both ecological and social dimensions for equitable water policies (Wallace *et al.* 2003).
Participation	Specific emphasis on engaging people/groups	• Evaluates effectiveness of stakeholder involvement for the individuals and for the decision-making process with regards to organic agriculture research in the United States (Barbercheck *et al.* 2011). • Examines how street trees might be used to generate social action and to 'pull people in' to participate in the expansion and improvement of green networks. (Dandy *et al.* 2012). • Details involvement of a specified/designated/bespoke volunteer community group in gathering information (ecological, social, cultural, historical) about and developing management recommendations for a local coastal environment that have informed national, regional and local management plans (Evans *et al.* 2008).
Conflict	Specific focus on resolution/addressing conflicts over values	• Use of frame analysis to understand environmental conflicts over a Dutch woodland showing how contending stakeholders refer to different representations of nature in the framing of local conflicts (Buijs *et al*. 2011). • Examines potential for conflict in how locals and urban in-migrants value the rural landscape in Bavaria. Contrary to research conducted in English-speaking countries, there was no conflict in values over the need for land protection; similar to previous research, conflict existed over the 'image' of 'rural' (Dirksmeier, 2008). • A focus on the change in environmental consciousness by analysing environmental conflicts in Finland that have arisen over the conservation of wilderness and virgin forests. Outline importance of studying those social actors who participate in defining environmental problems (Rannikko, 1996). • Identified four distinct 'visions of nature' associated with a Chicago urban park landscape designated by scientific experts to undergo ecological restoration – nature as designed landscape, nature as habitat, nature as recreation, nature as pre-European settlement landscape – with different landscape features holding different cultural meaning for different stakeholders (Gobster, 2001). • Discusses potential of deliberative/collaborative decision-making for addressing incommensurability across values (Trainor, 2006). • Outline of conflict between indigenous groups and government over traditional and land use rights (Sarkar & Montoya, 2011) • Examines how differing stakeholder groups, including scientists, consider scientific credibility, highlighting the underlying values associated with these views and the need to identify and co-create shared values through strategic facilitation and social learning (Yamamoto, 2010).

* Articles included in the table were chosen by selecting every fifth article after ordering alphabetically by surname of first author within topical category. All articles considered illustrative of *conflict* and *participation* were included.

2.2.3 Methods for identifying shared, plural and cultural values

Figure 6 and **Table 3** provide an overview of the range of methods or tools being used across the reviewed empirically-based non-economic literature to uncover, identify and examine shared, plural, cultural and social values. In addition to literature reviews, methods draw on standard qualitative approaches, such as focus groups, interviews and participant observation as well as quantitative methods such as questionnaires and ecological surveys. Analysis of text-based documents as well as archive or historical analysis had also been undertaken. These latter approaches have been used, for example, to examine or illustrate how values may have changed over time, for instance with regard to management of forests in the United States (Kennedy *et al.* 2001).

Many of these studies drew upon multiple and mixed qualitative/quantitative methods, combining and integrating them for both practical and innovative benefit. For example, Fagerholm *et al.* (2012) incorporated aerial photos into semi-structured interviews with individual community members to identify and map 'indicators for landscape services'; the collated results were then incorporated into a workshop for further discussion with the community. Haines-Young (2011) combined future scenarios with Bayesian Belief Networks to examine the latter's effectiveness at integrating and visualising different types of information (qualitative, quantitative) and values across multiple stakeholders and disciplines to facilitate a deliberative-analytical approach to values identification. A number of researchers experimented with the use of GIS to co-map ecological and social values of the landscape often through participatory interactive efforts (e.g. Bryan *et al*. 2010a, b; Ihse & Lindahl, 2000). While a promising approach, Klain & Chan (2012) noted the difficulty of and in some cases reluctance of individuals to map intangible values such as cultural or shared values during a participatory mapping exercise.

Table 3. Methods utilised to identify shared, cultural, plural and social values.*

Methods	*Shared values*	*Cultural values*	*Plural values*	*Social values*
Literature review	6	13	0	3
Interviews	11	21	0	6
Focus/discussion groups	0	4	0	1
Photo elicitation (participants taking their own photos, commenting on photos taken by others usually researchers or commenting on aerial photos)	1	4	0	1
Participant observation/accompanied visits to nature	3	5	0	1
Historical/archive analysis	3	8	0	2
Textual analysis	1	9	0	0
Survey questionnaire	5	11	0	2
Ecological survey (including GIS)	0	4	0	1
Workshops/meetings	3	3	1	0
Social/participatory mapping (including GIS)	1	6	0	4
Case study description to illustrate an issue or argument, drawing on existing data and literature.	1	10	1	3

* Conceptually focused literature was not incorporated if it did not include empirically-based findings. We identified three conceptual papers focused on shared values, eight on cultural values, three on plural values and five focused on social values. GIS: geographical information system.

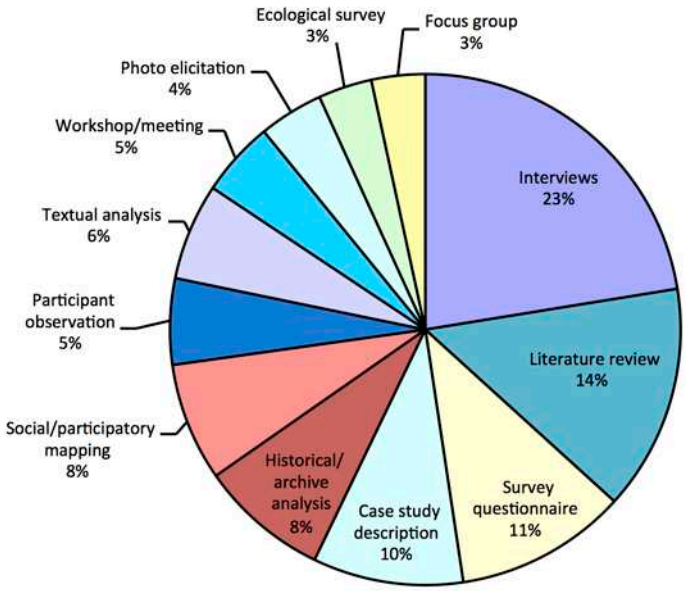


Figure 6. Methods used to elicit shared, cultural, social and plural values.

2.2.4 Decision-making exemplars

Figure 7 provides a conceptualisation of how we explored the extent to which values expressed by differing groups were taken into account in decision-making. Only a limited number of papers (6%, n=7) demonstrated explicit or substantive integration of cultural, shared, social and plural values into decisions about the management of ecosystems (**Table 4**). For example, Robinson *et al.* (2012) illustrated incorporation of cultural values through the inclusion of local dialect and local words into conservation plans. By broadening the idea of what decision-making might entail to include the explicit consideration of whose values to include and how to involve those value holders (individuals, communities, stakeholders) into the decision-making process, a further five papers were identified (**Table 5**). The McGinnis (1995) example detailed the successful identification and involvement of a wide range of different groups in a regional restoration effort that nonetheless, in the end, failed due to lack of cooperation, despite stakeholders having a number of shared values. Barbercheck *et al*. (2011) illustrated the inclusion of stakeholders from the farming community in not only the research itself but also in framing the research questions, while Schultz *et al*. (2007) used a range of techniques to involve stakeholders and highlighted the importance of a 'bridging' organisation to coordinate links between different groups. Despite the small number of exemplar papers, the importance of including multiple dimensions of values in the process of decision-making was strongly asserted by all 117 papers.

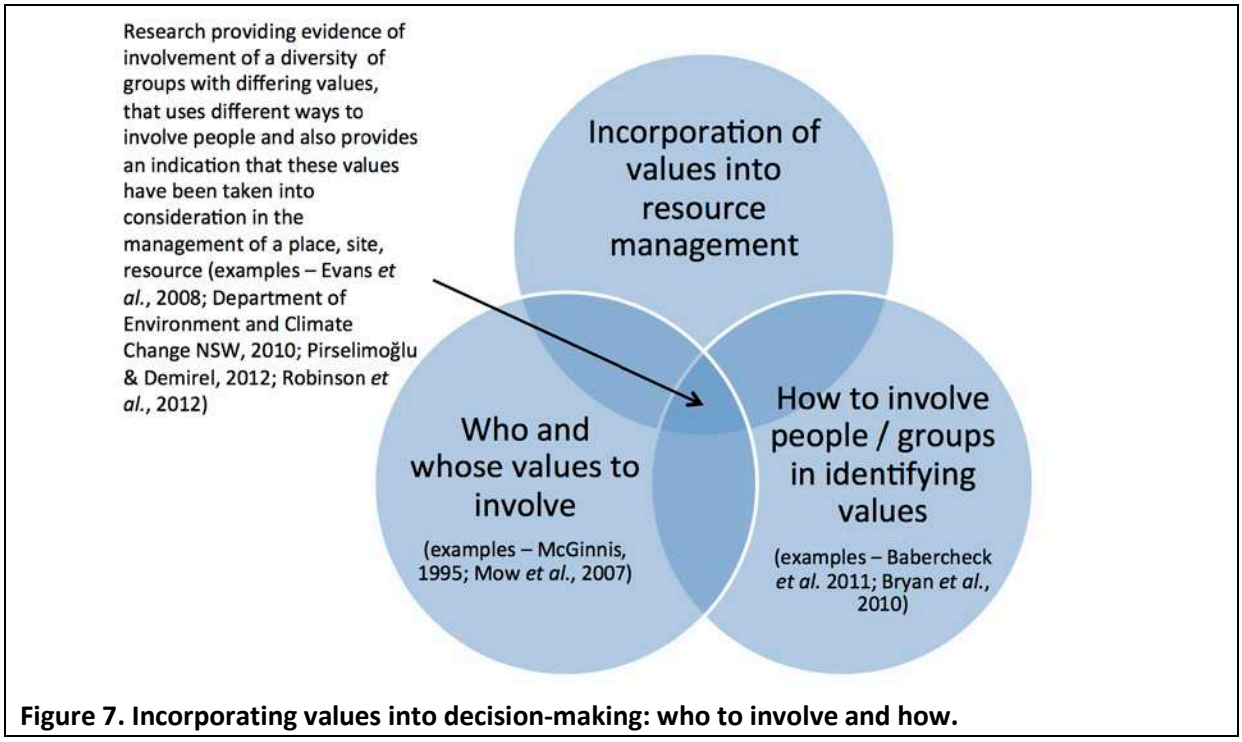


Figure 7. Incorporating values into decision-making: who to involve and how.

Table 4. Examples of incorporation of values into decision-making with regards to management of the resource.

Exemplar	*Context*	*Who*	*Methods/techniques*	*Values and value-types*	*Outcome/decision with regards to resource*
Evans *et al*. (2008)	Coastal heritage management, UK	Local community	Bespoke community-based project group Questionnaire Meetings/workshops with wider community	Aesthetic Historical	Conservation management proposals submitted to national government Incorporated into local planning processes Practical conservation efforts at local level
Ihse & Lindahl, (2000)	Conservation of natural and cultural heritage in agricultural landscape, Sweden	Researchers Planners	Mapping ecological and cultural heritage physical components of the landscape	Physical cultural heritage (e.g. stone walls, hedges)	Cultural heritage incorporated into management agreements with farmers, regional scale conservation & national policy
Dept. of Environment and Climate Change NSW (2010)	Conservation of ecological and cultural diversity via Cultural Connections Model, New South Wales, Australia	Indigenous communities Government officials	Long term community-government partnership Ecological mapping Cultural values mapping Educational training Business & employment development Visitor trails	Cultural values	Incorporation into & implementation of biodiversity mapping plans
Robinson (2012)	Governance of protected areas; case studies in Canada, Ghana, Tanzania	Indigenous groups/local residents Village leaders Funding agencies NGOs Government Academic institutions	Interviews Focus groups Meetings/workshops	Held (fundamental, universal, transcendental principles, ideals) Assigned (contextual, object-related, place/culturally based)	Local taboos, local dialect incorporated into conservation plans, bylaws, constitutions
Gobster (2001)	Restoration of urban park in Chicago, Illinois USA	Community groups of users	Focus groups	Symbolic/iconic	Values incorporated into restoration management plans
Pirselimoğlu & Demirel (2012)	Focus on natural and cultural values for recreation and tourism, Turkey	Local community Tourists Local authorities Public authorities	Interviews SWOT/TOWS Analysis (strengths, weaknesses, opportunities, threats)	Historical Scenery Local architecture, traditions, culture	Identification of areas to enhance for tourism, recreation

Exemplar	*Context*	*Who*	*Methods/techniques*	*Values and value-types*	*Outcome/decision with regards to resource*
Davies & White (2012)	Natural resource governance related to deer management, Scotland	State agencies Land owners	Collaborative partnership, i.e. Collaborative Deer Management Group	Shared responsibility Respect for animal welfare Balanced land use	"Fostered a sense of respect and acceptance of differing objectives but struggled to achieve progress" (p168) Suggest that "collaborative governance has the potential to help reconcile statutory obligations with stakeholder empowerment" (p168)

Table 5. Expanded domain of decision-making including questions of who to involve and how to involve value holders.

Exemplar	*Context*	*Who*	*Methods/techniques*	*Values and value-type*	*Outcome/decision with regards to resource*
Who to involve					
McGinnis (1995)	Conservation of endangered wild salmon in Pacific Northwest, USA	Public agencies (state, regional, federal) Indigenous communities Interest groups (recreational) Private sector Environmental NGOs	Federally mandated interstate compact among regional and local stakeholders	Reverence Humility Care Respect Responsibility	Restoration was unsuccessful due to failure to cooperate despite shared values
Mow *et al*. (2007)	Collaborative planning and management of San Andres Archipelagos coasts and marine resources, Columbia	Interest groups Tourism associations Private sector Environmental NGOs Indigenous communities	Multi-pronged approach: Inventory of resource users - (e.g. fishers, marinas, water taxis) Initial meeting Interest-based working groups Surveys Interviews Social mapping Public outreach - Inventory of community-level groups (e.g. churches, neighbourhood associations)	Cultural livelihood traditions Equity	Resulted in proposal to establish a locally managed MPA

Exemplar	*Context*	*Who*	*Methods/techniques*	*Values and value-type*	*Outcome/decision with regards to resource*
How to involve					
Barbercheck *et al*. (2011)	Organic agricultural research	Organic farmers who have leadership roles within agricultural community	Workshops Advisory board	Shared values (learning, evidence-based information, educational institutions engaging with farming community)	Framing of research questions On-going advisory input on research
Bryan *et al.* (2010a, b)	Natural areas conservation, Australia	Community members with knowledge of natural resource management (e.g. community-based regional agency)	Interviews Mapping social values	Recreational cultural, educational, bequest intrinsic	Social values combined with 31 ES to identify success of different conservation strategies based on alignment between social and ecological values
Schultz *et al*. (2007)	Participatory adaptive ecosystem management of a river basin, Sweden	Local steward groups (e.g. hunters, fishers, private forest owners, farmers, birders)	Socio-ecological mapping of groups already engaged in management or monitoring of the ecosystem Interviews, participant observation, document analysis	Aesthetic Recreational Inclusivity Responsibility Care	Integration of local knowledge, skills, values into multilevel (local, regional, national, international) collaborative network for landscape scale ecosystem management. Highlight importance of a 'bridging organisation' to coordinate linkages between the local and other levels

2.2.5 Use of shared, plural, and social values in the economics literature

A second part of the REA review examined the use of key terms specifically in the economics literature. The goal was to quantify the frequency of usage of the terms 'shared', 'plural' and 'social' values and to understand the way in which they were used. A more discursive assessment of shared and social values in conventional economic valuation and critiques thereupon is presented as part of the expert-led reviews (Section 2.4.2).

To assess frequency of use, we conducted an index search of economics textbooks (**Table 6**; textbooks are listed in Annex 2) and a search using standardised search methods of ISI Web of Science Social Science Citation Index (**Table 7**). Search results for plural and shared values found very low rates of usage, including in disciplines such as ecological economics (**Table 6** and **Table 7**). The term social values (and derivatives thereof) was, however, more widely used. This concept is particularly pertinent here, as explained below.

Table 6. Frequency of key terms in indexes of 20 economics textbooks in welfare economics, cost-benefit analysis, environmental valuation, ecological economics.

Term	*Frequency*
Plural valu*	0
Shared valu*	0
Social valu*	3
Social welfare (function)	12
Social cost/benefit	5
Social rate of discount/time preference	4
Social appraisal	1
Social CBA	1
Social capital	1
Social choice	2

Table 7. Number of articles returned by topic searches on key terms in Web of Science Social Science Citation Index (all years) and when restricted to journals in the economics category only.

Term	*Social Science Citation Index*	*Economics category only*
Plural valu*	13	3
Plural values	11	3
Shared valu*	453	11
Shared values	413	9
Social valu*	2,107	289
Social values	1,145	65

As well as assessing the frequency with which terms were used, we considered the way each term was conceptualised in the economics literature. In the case of plural and shared values, we reviewed all accessible articles published in journals in the Web of Science economics category. Because of the very large number of references to social value or values, we did not conduct an exhaustive review, but aimed to capture what we believe is the commonly accepted use of the term in economics.

Plural values: The existence of plural values was sometimes asserted, without being defined (e.g. Kenyon, 2007). Spash (2007) stated that *"a new economics is required in which human well-being is addressed as a multifaceted concept which involves a plurality of values"* (p712). Of course, there is nothing in economics that prevents respondents considering their well-being as a multi-faceted concept (indeed, this is widely assumed). However, mainstream economics does assume that individuals can (or at least *do*) trade-off (at the margin) different facets of their well-being. This assumption would seem to be supported by considerable empirical evidence as well as personal

introspection. However, the nature of these trade-offs, and whether they mean that facets of well-being are in some sense *commensurable* (both within, and between, individuals) are more contested. The term plural values is therefore perhaps best translated into mainstream economics terminology as 'incommensurable values' and positioned within this debate about commensurability, and its implications for economic analysis and valuation (e.g. Beckerman & Pasek, 1997[9]).

Shared value(s): This term was also quite rarely used, but less problematic. Where it appeared, the usage seemed quite consistent: that is, values held by more than one person, particularly transcendental values such as fairness, honesty, etc. In this sense shared values may be conceptualised by economists in a similar way to culture and seen as a public good (i.e. something both non-rivalrous and non-excludable) from which all members of that culture benefit. For example, honesty as a shared value allows greater trust between individuals, in turn allowing social interactions on a larger scale, including trade. Interestingly, Van Swol (2011) found that the perception of shared values made 'decision-makers' more likely to take advice from 'advisors' on judgmental tasks (those without a correct answer) though not on decision tasks of a factual nature. Beyond this, shared and cultural values were conceived of as 'tastes' that impact on preferences.

***Social value(s)*:** The term social value was widely used in economics, with a reasonably well understood meaning: in essence 'social value' may mean 'total value' i.e. the value of something (a project or policy) aggregated across multiple individuals or to society. *Social choice* is the study of ways in which values might be aggregated and a particular approach to aggregation (e.g. utilitarian, Rawlsian) can be described by a *social welfare function*, which sets out precisely how individual net benefits should be aggregated over multiple individuals. Although in principle social welfare functions might take an infinite number of forms, the vast majority of applied economic analysis adopts a utilitarian social welfare function whereby social welfare is the arithmetic sum of net benefits across individuals[10]. Of course, most economists acknowledge that there is no objective reason to favour any particular social welfare function (e.g. Turner, 2007; Just *et al*. 2004) and the justifications for the *status quo* are at best pragmatic. A further discussion of key issues around conventional economic approaches for estimating social value is provided in the expert-led review in Section 2.4.2.

2.2.6 Shared values and valuation of health services

Assessment and valuation of the social benefits of health interventions is a field that is closely allied to environmental valuation in terms of policy contexts and methods used. The benefits of health services, like the benefits associated with ES, are often non-marketed. Increasingly, these benefits are valued using stated preference methods for use in cost-benefit and cost-utility analysis. However, like the environment, health is a morally and emotionally charged subject and shared values, meanings and significance may be ascribed not just by individuals but also by communities of beneficiaries. In this section, we will consider how shared values are conceptualised in valuation of health services and whether there are advances in the health field that could inform ecosystem assessment. This short review will first discuss the most common methods used in health valuation. Then we will report on the results of an REA exercise on shared values in the health valuation field.

[9] Note however, that although the authors devote the entirety of their paper titled "Plural values and environmental valuation" to discussions of incommensurability, they do not provide a clear definition of plural values and indeed question the usefulness of the term.

[10] A subset of such analyses may weight net benefits by the income/wealth of the individual, to take account of the diminishing marginal value of money (i.e. the fact that income/wealth affect WTP). These are still utilitarian social welfare functions, however.

2.2.6.1 Methods and tools used for valuing health benefits

The most widely applied valuation method in health economics, at the policy level, is the *Quality Adjusted Life Year* (QALY). For example, the National Institute for Health and Care Excellence (NICE) in the UK recommends valuations be based on QALYs (NICE, 2008) and similar recommendations are made by the Scottish Medicine Consortium, the Canadian Agency for Drugs and Technologies in Health, the Australian Pharmaceutical Benefits Advisory Committee and the Australian Medical Services Advisory Committee. QALYs are also commonly used in randomised controlled trials to measure the benefits of health technologies or procedures (Richardson *et al*. 2009). It has been argued that valuation of health care benefits should take account of both the quantity and quality of life. That is, individuals may prefer to be in health state A for 8 years than health state B for 10 years, if health state A is preferred to health state B. By eliciting preferences of individuals (or societies) for trading off quantity of life for quality of life for a health state, a 'QALY weight' or 'utility weight' can be derived. This utility weight is on a scale from 0 to 1, where 0 represents death and 1 represents full health; states worse than death have a negative value. The length of time in the health state (life years) is multiplied by the utility weight (quality of life adjustment) to calculate the number of QALYs. The main techniques used to calculate utility weights are discussed in Annex 1.

Debates in the 1990s extended the definition of what constitutes benefits to consider dimensions beyond health outcomes e.g. 'non-health outcomes' (information, reassurance, etc.) and 'process factors' (waiting time, location of treatment, continuity of care, etc.). It was recognised that the QALY approach to valuing benefits would not be sensitive to such non-health outcomes and process attributes. This led to the re-introduction of CV to the health economist's toolbox and to the application and development of *choice experiments* (CEs) in health economics. Both these techniques have the advantage that they can value dimensions of benefit beyond health outcomes, thereby deriving a more holistic measure of value. Using CV, individuals are presented with a choice between not having the benefit being valued, and having the benefit but forgoing a certain amount of money. The money that they are willing to forgo in order to have the commodity is their WTP for that commodity. Using CEs, individuals are presented with choices that involve different combinations of a good or service and for each choice, they state which they would choose or prefer.

As indicated above, QALYs have dominated at the policy level. Further, it is assumed that a QALY is a QALY is a QALY, regardless of how it is distributed throughout society and regardless of any characteristics of the recipient (Schwappch, 2003). The techniques used to calculate QALYs are conducted by asking individuals to imagine themselves in specific health states and to make decisions based on what he or she would prefer (see Annex 1). It is widely accepted that the aggregation of these values will reflect societal preferences. However, research has shown that society does not explicitly follow the health maximisation rule and that there are other factors that are valued by society that should also be considered when making health care allocation decisions. The main flaw of the QALY is that it might not pick up these additional social values, mainly due to the fact that QALYs are derived from decisions at the individual level. It has therefore been argued that QALYs might be a poor proxy for social preferences (Dolan & Green, 1998).

As a result, the person trade-off (PTO) method has been suggested as a more appropriate way of incorporating values in relation to society. The PTO allows for consideration of distributive issues, i.e. who to treat. The societal value of a given health care intervention is derived by multiplying the utility gain from a given health care intervention by a social weight. This is established by asking individuals how many outcomes of one kind *x* are equivalent in value to society to *y* outcomes of another kind. These descriptions will vary with respect to the distributive aspects which are

considered important i.e. severity and potential for health, though others may be added. Thus, a question may ask, 'if there are *x* people in adverse health situation A and *y* people in adverse health situation B, and if you can only treat or cure one group, which group would you choose?'; *x* and *y* are varied until the respondent is indifferent between the two. The two states are then compared to each other in terms of undesirability: B is *x*/*y* times as undesirable as A. The PTO evaluation method asks the respondent to think as if he or she were a government or health authority and asks them to make decisions for another group of people, rather than getting them to imagine they themselves were in a particular health state as an individual (Nord, 1995). To date, the method has relied on surveys and has not been applied using deliberative approaches, though Nord (1995) drew attention to the potential benefits of this.

2.2.6.2 Rapid evidence assessment

An REA was undertaken that assessed discussion of 'shared', 'social', 'cultural' and 'plural' values in the health valuation literature. To achieve this, a three-stage process was employed: a database search, a citation search, and addition of papers through expert knowledge. Firstly a literature search was conducted of the above valuation methods mentioned along with social, cultural, shared and plural values in Medline (Ovid), for literature between Jan 1949 to June 2013. Search terms are given in Annex 1. The two search sets combined gave a total of 102 results. None of these papers dealt with plural, cultural or shared values. Out of the 102, after examination of the abstracts, 11 papers could be selected that discussed social values in relation to health valuation. The second stage was a citation search conducted for a literature review paper (Dolan *et al*. 2004) that had been identified in the initial literature search. From this citation search an additional four papers were identified as contributing to the question regarding social values in the allocation of health care resources. 15 further papers were identified by expert knowledge, seven of which discussed communitarianism, a nascent approach to valuation in health economics that is based on community preferences and deliberation, using methods such as citizens' juries.

The terms 'plural', 'cultural' and 'shared' values do not appear to be used in relation to valuing health care. The REA process identified a total of 30 papers that discussed social values. Important themes in these papers were individual vs societal decision-making and inclusion of QALYs only vs a range of values, including equity, responsibility and severity of the illness. **Table 8** presents a selection of representative papers. Social values were considered as either the values *of* society (societal values) or as aggregate value *to* society. Inclusion of broader societal values appeared to be of increasing concern in priority-setting in health care (Dolan *et al.* 2004; Smith & Richardson, 2005; Brouwer *et al*. 2008; Green & Gerard, 2009; Linley & Hughes, 2013). Societal values were seen as a multidimensional construct in opposition to the single dimension of maximising health itself, as is measured in QALYs. They consisted of a mix of transcendental values such as equity (Brouwer *et al*. 2008; Schwappach, 2003) and contextual values such as the relative weights assigned to severity of illness and valuing end-of-life care (Richardson *et al.* 2007; Green, 2009; Koonal, 2009; Koonal *et al.* in press). To assess these, participants were asked to respond from a societal rather than individual perspective and as if they were a decision-maker. There was evidence that respondents were willing to give up maximising health gains if it meant that a more equal distribution of resources could occur (examples include Schwappach, 2003; Green, 2009). Another theme that is beginning to appear in the literature is responsibility (Bobinac *et al*. 2012; Edlin *et al*. 2012; Singh *et al*. 2012), though as of yet there is little empirical evidence on its importance as a key factor for making health care allocation decisions and further research is needed in this area.

The PTO method is increasingly used to consider societal values, putting respondents in the shoes of the decision-maker (Prades, 1997; Dolan& Green, 1998; Schwappach, 2002; Richardson *et al*. 2007; Brazier *et al.* 2007). CEs were also being explored that use social rather than individual WTP (i.e.

'how much should society pay') (e.g. Schwappach, 2003; Green & Gerard, 2009; Lancsar *et al.* 2011; Norman *et al*. 2013; Linley & Hughes, 2013; Koonal *et al*. in press).

Whilst the above studies have moved to a broader measure of social value, moving away from the summation of individual values to asking respondents to make societal decisions, they have not used deliberative methods. An alternative approach is *communitarianism* (Mooney, 1998; 2000; 2005). The approach is concerned with what principles or values the community want decision-makers to consider when making resource allocation decisions (e.g. age, gender, capacity to benefit, socioeconomic status, and geographic location). An important element of this approach is eliciting community preferences through deliberation and the use of methods such as citizens' juries (Mooney & Blackwell, 2004). This approach has been explored in the context of Australian indigenous health (Mooney *et al*. 2002; Wiseman & Nona, 1998; Wiseman *et al*. 1999) and resource allocation decisions in the treatment for HIV/AIDS in South Africa (Cleary *et al*. 2010). Although not coined in these terms by the proponents, the benefit of this approach is that transcendental and communal values can be taken into account more fully when establishing the value to society of different health care interventions and policies.

In conclusion, there is increasing interest in the field of healthcare valuation in moving beyond the conception of value as purely individual and utilitarian. Though the notion of plural values was not explicitly discussed, there was an increasing conception of health value as multidimensional, including a wide range of concerns that are both specific to health and related to broader, transcendental values such as fairness and responsibility. As in the field of environmental values, health values were largely elicited through survey-based techniques. While there was increasing interest in the possibilities that more deliberative methods offer to elicit and allow the inclusion of shared and plural values, there was a lack of empirical experience and best practice. In the environmental field, there is significantly more experience with techniques like multi-criteria analysis that could usefully facilitate more 'communitarian' approaches in health. Similarly, the theoretical framework, methods development and case study evidence that will be outlined in the latter parts of this report can also usefully inform health valuation. Both CEs using social WTP and PTO methods offer interesting approaches to asking respondents for their values across multiple dimensions and at the social scale that has, to our knowledge, not been exploited in the environmental field. The PTO studies reviewed here also suggested that the societal priorities of participants distinctly differ from individual and aggregated individual values, corroborating evidence that will be presented in Section 4. Communitarianism is clearly rooted in a shared values approach, drawing on deliberation and community preferences. Its epistemological and methodological links with deliberative methods for valuing nature, as will be discussed in Sections 2.4.3 and 3.4 and applied in Section 4, provide an interesting opportunity for learning across fields and disciplines.

Table 8. Health valuation: examples of how studies considered shared values.

Author	*Year*	*Title*	*Aim*	*Perspective*
Dolan & Green	1998	Using the PTO approach to examine differences between individual and social values.	To use the PTO method assess whether two treatments that are of equal value to an individual are also of equal value to same individual when making choices for society.	*"Imagine there were 10 people who would spend ten years in state…another 10 people who would spend ten years in state…respondents were presented with two possible treatments [T]…and were asked to choose if they would choose T1, T2 or whether they wouldn't mind which one was chosen"* (p309).

Author	*Year*	*Title*	*Aim*	*Perspective*
Green	2009	Investigating public preferences on 'severity of health' as a relevant condition for setting health care priorities.	To consider the empirical evidence for the use of severity of illness as a criterion for allocating health resources, as well as, exploring the broader interpretation of the evidence that shows that there is a preference to offer treatments to those groups who are more severely ill.	*"Imagine an illness A that gives severe health problems, and an illness B that gives moderate health problems. Treatment will help patients with illness A, a little, while it will help patients with illness B considerably. The cost of treatment is the same in both cases. An increase in funding is available but we are unable to treat both patient groups. Which of these three views come closest to your own?"* (p2249).
Green & Gerard	2009	Exploring the social value of health care interventions: a stated preference discrete choice experiment.	To explore public preferences for health care interventions based on a set of generic social value judgments.	*"[…] Put themselves in the position of an NHS decision-maker forced with difficult priority setting decisions"* (p958).
Koonal *et al*.	2013	Valuing health at the end of life: an empirical study of public preferences.	To discover whether or not the policy outlined by NICE to give priority to life-extending and end-of-life treatments compared to other types of treatment, is consistent with societal preferences.	*"[…] Two hypothetical patients (patient A and patient B) who have been diagnosed with illness. Both patients could benefit from treatment but the respondents were asked to assume that the health service had enough funds to treat one but not both of them"* (p3).
Lancsar *et al*.	2011	Deriving distributional weights for QALYs through discrete choice experiments.	To propose a new approach to derive distributional weights for QALYs based on characteristics of the beneficiaries such as age and severity.	*"[…] Who would they prefer to treat"* (p469).
Linley & Hughes	2013	Societal views on NICE, Cancer Drugs Fund and Value Based Pricing criteria for prioritising medicines: A cross-sectional survey of 4,118 adults in Great Britain.	To study societal preferences for the prioritisation criteria used by NICE as well as those proposed under 'Value Based Pricing'. To investigate the UK governments justification for the introduction of the Cancer Drugs Fund. Lastly, to discover how society values treatment for rare diseases compared to more common diseases.	*"[…] Express their preferred way for the NHS to allocate resources between two competing hypothetical populations"* (p949).
Mooney *et al*.	2002	Staking a claim for claims: a case study of resource allocation in Australian Aboriginal health care.	Adoption of an approach based on health claims and basic needs where the emphasis is on the explicit recognition of a range of values associated with notions of equity in allocation of resources across groups.	*"If policy on equity is ultimately to be directed to determining the allocation of resources, the relative claims of parties within society should be established with respect to the prevailing resource constraints. The basis for claims should be determined by community standards of fairness (which in turn may be determined by community preferences). […] Equity is essentially about how individuals/groups within society are to be treated relative to one another."* (p1660).

Author	*Year*	*Title*	*Aim*	*Perspective*
Norman *et al*.	2013	Efficiency and equity: A stated preference approach.	To identify the key characteristics that affect public preferences of health gains accruing to groups with those characteristics. To discover the effects of these characteristics independent of one another. To produce a set of equity weights for these characteristics for use in health care valuations.	"*If you were asked to choose one of the following two programs, each of which would impact on the health of 100 people, which would you select?"* (p572).
Prades	1997	Is the Person Trade-off a valid method for allocating health resources?	A pilot study to test the superiority of the PTO technique in making resource allocation decisions. Another aim was to compare different frames of the PTO.	*"If you could only treat one of them, who would be first, the second, etc.?"* (p75).
Richardson *et al*.	2007	Severity as an independent determinant of the social value of a health service.	To review the evidence that the initial health state of a patient might be an important factor determining the social value of healthcare interventions, while this factor is not picked up in individual valuations. The initial health state of a patient before treatment is the severity of an illness.	"[…] *Adopt a social perspective*" (p15).
Schwappach	2002	The equivalence of numbers: The social value of avoiding health decline: An experimental web-based study.	To investigate the public's preferences for the "direction" of a change in health when concerned with health care intervention. By "direction" of change the author means: does society prefer measures that will avoid future health decline or does it prefer measures associated with cure and treatment. A second aim of the study is to test whether preferences elicited by the standard gamble method of valuation can also reflect social value.	*"[…] Imagine they were health authorities whose task is to decide which healthcare interventions to offer to the public"* (p4).
Schwappach	2003	Does it matter who you are or what you gain? An experimental study of preferences for resource allocation.	To study societal preferences for the distribution of scarce health care resources and estimate the relative weights attached to the associated criteria.	"[…] *Imagine that they were a health authority whose task it was to allocate a finite budget on new treatments for different patient groups"* (p259).
Singh *et al*.	2012	Does responsibility affect the public's valuation of health care interventions? A relative valuation approach to health care safety.	To investigate whether society value safety-related healthcare interventions (such as a service to prevent hospital associated infections) more highly than other types of healthcare interventions where the health care system is not held responsible (such as life style related disease and sports injuries).	"[…] *Asked to make a choice between two services (A and B) that would benefit 1,000 people each, and the health gain per person costs to the NHS for both programs were said to be identical"* (p692).

2.3 Context-specific examples

We provide four examples that investigated how dimensions of shared, social, cultural and plural values have been conceptualised and applied in different arenas and decision-making processes. These context-specific examples cover three key areas: methodological, conceptual and real world examples. The first two are real world examples and provide reflections on the effort to part privatise public forests in England and the siting of wind turbines in the UK countryside; the former (**Box 1**) provides an opportunity to consider how and when these types of values emerge within the public sphere while the latter examines the reasons for and against such siting through the lens of the values typology identified in this report (**Box 2**). The third is a conceptual example and explores shared values and the commons (**Box 3**). The final example is methodological and considers what information and data already exist that might provide further insights into these types of values (**Box 4**).

Box 1. Shared values in the real world: Forest privatisation in England.

In 2011 the UK government published a consultation to propose selling (to private companies and/or community groups) or handing over (to charities) the public forest estate (PFE) in England rather than have Forestry Commission England (FCE),[11] a government body, manage the forests. This consultation acted as a catalyst point in which values for woodlands not normally articulated as part of everyday discourse became a topic of debate and discussion across society. The values for the public forests were conceptualised as public goods and a shared resource for all members of society – 'we own them already' was a phrase used by some on social media. The values of these woods were also conceptualised as important to the individual, with people drawing on their childhood experiences of climbing trees for example. Woodlands were talked about as important for different groups of people (e.g. children and families) and for future generations. They were also seen as important for communities and a part of cultural heritage and identity, particularly in places such as the New Forest and the Forest of Dean. The pro-active approach taken by FCE over the previous decade to encourage use of the PFE, to engage with a broader cross section of society by providing an ethos of welcome and quality of access, led to support from many against the proposed privatisation. FCE had created a range of programmes and interventions to encourage access and engagement such as art trails, health walks, mountain biking, music concerts, educational activity as well as improved infrastructure and signage in many of the public forests. The debate seemed to draw on both people's core transcendental values such as connections to public ownership, access to and the importance of nature, trees as representations of nature; and to their contextual values related to the worth of local woodlands that people use, enjoy and care about.

The methods used to elicit the values for the PFE were both formal and informal. The response to the public consultation was formal, as were the letters people wrote to their Members of Parliament to protest. Newspapers at both a national and local level ran articles about the proposed privatisation and debated what it meant for access to woods and the potential for new business and housing development on forest land. Social media was effectively used to gain half a million signatures against the privatisation but also to provide links to protests in local woodlands. New groups were formed such as 'Hands off our forests' and 'Keep our forests public' and existing groups mobilised to campaign for the continuation of the forests as a public resource. Celebrities,

[11] The Forestry Commission was devolved in the early 2000s. The recent debate concerning the forest privatisation in 2011 only applied to the public forests in England. The debate about privatization of public forests mentioned, later in this box example, in the early nineties occurred before devolution when the Forestry Commission covered forestry in Great Britain.

led by the archbishop of Canterbury, wrote a key letter to the Sunday Telegraph.

The scale of protest seemed to take the government by surprise as these values for woodlands were not part of everyday discourse. However, woodland cover in England is low at about 10% of land area and while the PFE comprises only 18% of the woodland area in England it provides over 40% of the access to woodlands. A wide range of existing literature (e.g. Schama, 1996) outlines the range of meanings and values associated with trees and woods through history. The protests concerning the privatisation came from all sections of society. The government took the decision to cancel the public consultation after three weeks, when it should have run for 12 weeks. It set up an Independent Panel on Forestry (IPF) and gave the panel a remit to look at not just the PFE but at forestry more generally in England. The IPF travelled across England and talked to a wide range of communities and stakeholders to formulate their response, which was delivered to the government. The report talked about the wide range of benefits delivered by woodlands and called for a new woodland culture where these broad range of social, economic and environmental benefits are recognised (IPF, 2011). The government responded to the recommendations of the IPF by producing a new forestry and woodlands policy statement. This outlined that the public forests would not be sold off, instead a new 'trust' would be set up to manage them for the future. However, this body will be charged with generating more of its income through commercial activity.

The events provide an example of how values came to the fore due to the catalyst of the privatisation, how they were conceptualised across individuals, communities and society, the range of methods that were used to elicit and articulate values and how they affected the decisions of the coalition government. This example highlights the importance of understanding the deeper held values that are not identified via methods such as the CBA that the government undertook in relation to the proposed privatisation. A historical analysis (e.g. media analysis and Hansard[12]) of the past two decades would have revealed a previous privatisation attempt of the PFE proposed by John Major's government in the early nineties (see the media case study in Section 4.5 as an example of this type of approach). Widespread protest at that time resulted not in PFE privatisation but in the creation of Forest Enterprise as an agency of the Forestry Commission (FC) - tasked with commercially managing the PFE at arm's length from FC. A narrative-based study approach that included understanding of trees and woods in art and culture would have revealed a strong connection in Britain to myths, poems, stories and legends associated with trees and woodlands (see UK NEAFO WP4 and *Arts and Humanities Perspectives on Cultural Ecosystem Services* report) and deliberative and participatory methods could have revealed how people would have felt these cultural values to be threatened by privatisation.

[12] Hansard provides the official published reports of the British parliament.

Box 2. Shared values in the real world: Siting of wind power in the UK.

Amidst general public support for the idea of wind power, the siting of wind farms within the UK landscape has proved controversial. As has been noted by others, we take the view that the oft cited 'not in my backyard' (NIMBY) attitude as an explanation for opposition is largely unhelpful as it provides little insight into why someone might oppose the siting of a wind farm in their local area. While rarely couched in terms of shared, plural or cultural values, themes present in the literature nonetheless suggest a presence of these values. Here we examine the debate over wind farms through the lens of the proposed conceptual typology of values. A Web of Science search conducted May 2013 using the terms 'plural values', 'shared values', 'cultural values' and 'social values' paired with 'wind farm' and 'wind energy', identified one article only that specifically used the value terms under discussion in this report (Jessup, 2010). There is, however, a growing body of literature that applies social science theories to understanding the social dimension of renewables. Couched in terms of attitudes (including examination and critique of NIMBY), cultural heritage, planning processes and the role of community, it is from the authors' knowledge of this wider literature – limited to UK-focused studies due to differences in culture and spatial scale – and the single article identified that included the term 'plural values' from which we drew for this analysis.

Transcendental values: A multitude of principled, transcendental values are present within the debate over wind farms. Concerns over the negative effect of wind farms on future generations have a moral dimension. Matters related to the distribution of negative and positive effects as well as the process (e.g. is the decision made in an unbiased manner; how are stakeholders treated) highlight equity, fairness and justice values. The desire to protect beauty or tradition in relation to the landscape - powerful symbolism of the rural idyll - also represent transcendental values. Conversely, the conception of renewables as a symbol of a sustainable society suggests a different desirable end that transcends specific situations. Also represented within the debate are principles of self-determination (e.g. a community's desire to set their own agenda, to maintain control over their own destiny) as well as normative beliefs that renewables are important for the greater good (e.g. one's country, environmental protection). Transcendental values may also include a kind of 'meta-values' - values on how values should be treated and aggregated; e.g. from a utilitarian perspective, the greater societal good should overrule other, lesser values, whereas from a deontological perspective local communities may have inalienable rights.

Cultural and societal values: A long history of concern for and protection of landscapes, particularly those that are remote and tranquil, exists within the UK (e.g. Beatrix Potter's protection of the hill country landscape of the English lake district; the work of Viscount Addison, John Dower and Sir Hobhouse resulting in creation of National Park system; see Box 4 for further perspective on this idea). The landscapes within which wind farms would be most successful from a technical perspective are frequently those upland areas that have some form of protected status or may symbolize the idea of 'wild' in a densely populated country. Thus concerns over the effect of wind farms on the landscape may be grounded in cultural or societal values for landscape protection. Similarly, concerns over the 'fit' between a wind farm and the landscape may stem from a cultural aesthetic, an aesthetic conceived of as more holistic than one centred solely on the visual (see Section 2.4.1) or be linked to a collective sense of place within the British landscape.

Communal values: Within the wind farm debate sit multiple stakeholder groups including but not limited to local community members, renewable energy industry, developers, environmental or conservation groups, environmental groups, recreation groups, and government (local, regional, national). Within each of these groups exists a set, or sets, of values held in common by members of that community. This value – or these values – may consist of different types of shared communal values, e.g. a sense of responsibility to future generations (transcendental value) may

be held by members of an environmental group, landscape preservation (a cultural contextual value) may be expressed by a heritage conservation group while the value of recreation for society may be held by a recreation group. Jessup's (2010) analysis of the discourse of the wind farm debates within the UK and Australia identified a mix of values held within a single group. For example, the renewable energy industry might use both a utilitarian argument (e.g. green jobs) as well as a deontological argument (e.g. rights of future generations).

Group values: Formal processes generally ask interested parties to evaluate proposals and projects either as individuals (expressing individual values) or as interest groups (expressing communal values). These individual or communal values are then fed into the decision-making process, one that is generally based on a representative democracy where elected members evaluate the expressed views in line with professional planner recommendations to come to a group verdict through negotiation and majority vote. These recommendations are derived from analysis of development plan policies that may be seen as a proxy for societal values, some of which may be transcendental (e.g. equitable distribution). It is the interplay of these different values that can cause the conflict that typifies present planning debates over wind farms. The literature however shows little to no evidence of instances whereby a group of individual members of the public or individuals from different stakeholder groups come to express a collective value as a whole through processes such as consensus or majority evaluation or verdict.

Deliberated values: While a substantial amount of deliberation within and between stakeholders and decision-makers takes place during the siting of wind farms, the literature shows no examples that reflect these processes, give examples of how deliberation might change values, lead to greater sharing of values, or to social learning processes.

Other-regarding values: Concerns raised over the effect of wind farms for birds, for future generations, for the impact on sense of place – both individually and collectively – incorporate both contextual and transcendental other-regarding values.

Value to society: At the contextual level benefits that can be considered to have value to society have been incorporated into some wind farm developments[13]. Examples include education, employment or energy security. In a society that places value on access to and the benefits of recreation or on the cultural heritage of a traditional landscape, the placement of wind farms in the landscape may also have a negative value to society. Both sides of the camp use gain or loss of value to society as an argument that trumps the interests of geographic or interest-based groups.

The siting of wind farms has moved steadily toward consideration of community. Our analysis begins to frame the issue within the realm of shared values. This not only highlights the plurality of shared value types present within and across the debate, e.g. transcendental, cultural, but also identifies potential directions forward. Having knowledge of the types of values that may underlie concerns over and/or support for wind farms and where within the debate these values exist (e.g. societal, communal) could facilitate development of mutually beneficial solutions or, at the least, provide greater depth of understanding on differing perspectives. At present, there are no examples within the literature of the use of deliberative approaches or deliberation of group values, which could provide useful to future discussions about and siting of wind farms.

[13] These have typically occurred through Section 106 of the Town and Country Planning Act of 1990 for siting in England and Wales, and in Scotland through Section 75 of the Town and Country Planning (Scotland) Act 1997.

Box 3. Conceptual considerations: Shared values and the commons.

The contemporary idea of the common evokes a form of universal or ontological ground that suggests a 'natural' relationship between people and particular spaces that has become marginalised through capture and enclosure by capitalist systems. This has been very much the rallying cry of the recent 'Occupy' movement, for example, which has sought to 'reclaim' institutionalised spaces (material, cultural and political) by invoking what it sees as 'feelings in common'; that 'we are all in this together' and that we have shared values that transcend narrow individualised economic values. The archetype of the English common as an open green space where commoners could tend their cattle has been described by Thompson (1991) and Fairlie (2009) as a space of shared values in which individuals organised their farming at least partly in common with others. In contrast, Rodgers *et al*. (2011) have written about the contested nature of common land in the UK, in terms of culture, law and environment. Notwithstanding its enduring relevance as an effective form of agrarian management in many parts of the World (FAO, 2012), marginalisation of 'commoning' in the West has, for the last half century, been organised around a contrived moral panic known as the 'tragedy of the commons' (Hardin, 1968; Common Land Forum, 1986). In his original essay, Hardin argued that the commons would be subject to degradation as each commoner sought to pursue self-interest. Although, following a critique by Ostrom (1990), Hardin sought to qualify this to reflect the position of unmanaged commons (Hardin, 1994), the moral panic caused by the original essay contributed to a demonization of shared values as an inefficient basis upon which to organise the management of natural resources such as land. The apotheosis of this panic has been the recent institutionalised land-grabbing that has undermined communal shared value approaches to managing land in favour of avowedly individualised ones (see Large & Ravenscroft, 2009; Pearce, 2012). An example of this has been the eviction of many small-scale indigenous Mapuche farmers from substantial areas of Patagonia, Argentina, in order for international capital to 'convert' the land to more economically advantageous uses such as large-scale cropping for biofuels. Recent attempts by the Mapuche peoples to regain their ancestral lands has so far proved fruitless (Large & Ravenscroft, 2009).

Although often associated with land, the term 'common' refers to a broad range of social, cultural and natural resources that are produced and/or consumed collectively, largely outside the regulatory framework of conventional markets (Warmoth, 2002). The commons are, then, emblematic of an ideal about, and a practice of, sharing; they thus encompass multiple sites including air, water, land, literature, music, arts, design, film, video, television, radio and the internet, as well as public services such as law enforcement. Rather than the aggregation of individual price/quantity relationships governing supply and consumption, the common aspects of these sites are that they are organised through institutional arrangements (Rodgers *et al.* 2011) that honour the existence of shared values (Ostrom, 1990). This conceptualisation suggests that the commons are a metaphor for the shared aspects of human existence; they are the 'moments' when people step away from their individuated forms to participate in 'practices of the common' that are founded in the shared values of experience, knowledge and time. While this may imply a degree of social unity that is not routinely present in the competition of markets, Rodgers *et al*. (2011) caution that the implications of shared values are often contested by those involved. This means that suitable governance systems are as necessary for the commons as they are in conventional market-based situations.

Box 4. Methods: Sources of existing information on shared values.

There is a growing body of available existing data that could be utilised in order to provide insights into various types of shared values (**Figure 8**). For example, existing surveys of outdoor recreation and nature visits, such as those outlined in **Table 9**, gather data on a range of areas related to these values. These surveys provide data on the type of destination, frequency and duration of the visit, main activities undertaken as well as benefits and motivations for a visit to the natural environment. This information would primarily identify cultural benefit values along with the plurality of values associated with nature engagement. The Greenspace Scotland Survey and the Pubic Opinion of Forestry Surveys also include questions not only with regard to the benefits gained at a personal level but also on the importance of green space or forests to the public or the local community where people live, thus capturing an aspect of communal and societal values.

The designation of natural areas can illustrate a manifestation of shared values at the societal, regional or local level (see also discussion in **Box 2**). These efforts often involve a range of consultations and discussions with a variety of stakeholders and sometimes citizens before designation takes place. A critical examination of these designations and analysis of associated documents could facilitate deeper understanding of the types of shared values associated with different 'scapes' and/or any changes in values that have occurred over time at different scales. Examples of these types of datasets are included in **Table 9**.

A third set of data pertains to interventions, programmes and funded projects in nature. Frequently associated with a specific locale, these could provide data on shared values related to specific places and/or activities; many of these initiatives identify the co-production of benefits. For example the Neroche landscape partnership scheme in South West England involved a locally appointed community group working with NGOs and statutory organisations to develop a variety of projects that would engage people with their local landscape (Carter *et al.* 2011). Interventions such as these (examples are provided in **Table 9**) can highlight a plurality of cultural, social and shared values associated with particular places that are communal, deliberated and other-regarding.

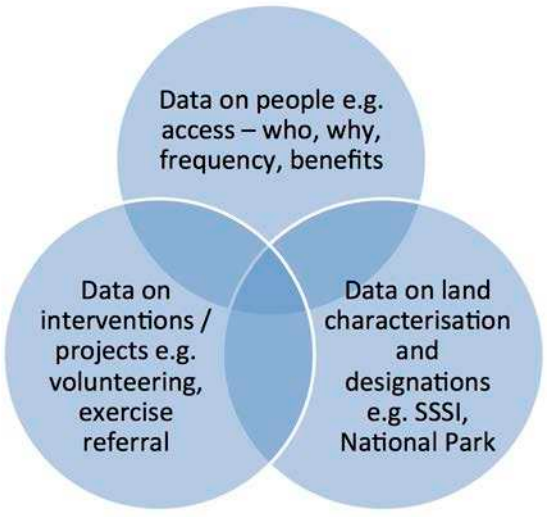


Figure 8. Conceptualisation of domains of data that could provide insights into shared values. E.g. survey data about people's access to nature, land designation data, and data concerning interventions that enable and encourage engagement between people and nature.

Table 9. Existing sources of information from which insight on shared values could be drawn.

Datasets per domain	*Potential shared value-related indicators*
Use/access-type/attitudes (country)	
Monitor of engagement with the natural environment (MENE; England)	Type of destination (i.e. park, wood), frequency of use, duration of visit, main activities, motivations to visit, benefits of visit (MENE is discussed in detail in NEAFO WP4)
Scottish outdoor recreation survey (Scotland)	Type of destination (i.e. park, wood), frequency of use, duration of visit, main activities, benefits of visit
Welsh outdoor recreation survey (Wales)	Type of destination (i.e. park, wood), frequency of use, duration of visit, main activities, benefits of visit
Greenspace Scotland survey	Quality of local green space, importance of green space to local community
Public opinion of forestry (UK)	Use of woodland, frequency of visits, benefits of visits to the individual, the benefits of woodlands to the public
Living in Wales survey (Wales)	Attitudes to the environment, environmental activities undertaken such as recycling, encouraging wildlife in gardens
Public attitudes and behaviours towards the environment (England)	Beliefs, attitudes towards the environment, and environmental behaviours
Scottish environmental attitudes and behaviours survey (Scotland)	Attitudes to the environment, environmental activities and behaviours
Designations/categorizations of 'scape' (country)	
Local nature conservation sites (Scotland) Local Wildlife sites and Local Geological sites (England)	Locally important nature and landscapes, important for educational purposes, historical value, aesthetic value
Areas of outstanding natural beauty (AONB) and heritage coasts (England and Wales)	Significant landscape value, natural beauty, distinctive character, historical and cultural associations, flora and fauna
National parks (England, Wales and Scotland)	Nationally important countryside shaped by those who live and work there, cultural heritage, natural beauty, aesthetic value
National character areas (England)	Unique combinations of biodiversity, landscape, geo-diversity, cultural and economic activity
Intervention-type dataset (country)	
Mentro Allan (Wales)	Health and well-being of at risk groups improved through using the natural environment
Green Gym (UK)	Health and environmental improvements by undertaking voluntary conservation activity in nature
Nature amprovement areas (England)	Improving nature at a landscape scale through a shared vision of a better future for people and wildlife
Landscape partnership schemes (UK)	Conserving distinctive landscape character focusing on heritage, people and communities
Woodlands in and around town (Scotland)	Improving quality of life in towns and cities through woodland improvements and community engagement

2.4 Expert-led literature reviews

The expert-led reviews addressed three areas considered germane to the three overarching review questions. The first considered how the spiritual and aesthetic values of nature have been conceptualised, and how this may then inform decision-making. The second reviewed limitations of economic valuation approaches to evaluating shared values, and the third explored the role of deliberation and social learning in shaping and expressing shared values. Expert-led reviews were conducted in areas where there was a specific contribution to make to our understanding of shared, plural and cultural values in relation to ecosystems that might not emerge through the standardised keyword search approach undertaken in the REA. Identification of literature was driven by the expert knowledge and experience of the authors for each area using the following methods; keyword searches (e.g. combining 'spiritual value' with 'ecosystem'; 'shared aesthetic value'), opportunistic searches through relevant reference lists, and drawing on known bodies of literature

within relevant disciplines (e.g. economics, social learning, religious studies, philosophical aesthetics).

2.4.1 Expert-led review one: Shared values, cultural ecosystem services and their spiritual and aesthetic benefits

The UK National Ecosystem Assessment defined CES as "*the environmental settings that give rise to the cultural goods and benefits that people obtain from ecosystems*" (UK NEA, 2011, p634). It is challenging and often contentious to measure the value of these goods and benefits in purely monetary terms. The Millennium Ecosystem Assessment (MA; 2005) describes many cultural services, notably spiritual and aesthetic benefits, as 'non-material benefits' and others have attempted to group these benefits under 'non-consumptive use' and 'non-use values' (e.g. TEEB, 2010, p196). The MA attempts to reduce these to merely psychological benefits such as 'spiritual enrichment' and 'aesthetic experiences' ('aesthetic information' in TEEB, 2010, p26). Yet aesthetics and spirituality have traditionally been understood to transcend the instrumental understanding as expressed by the notion of services and benefits, thereby standing as an implicit critique of the utilitarian approach. The spiritual and aesthetic often relate directly to transcendental values of nature, in the sense of over-arching, guiding principles that are adhered to or sought. These transcendental values, norms and virtues are expressed and experienced through the contextual values that people associate with environmental settings. The spiritual and aesthetic for many can be seen as posing the stark challenge: *ask not what nature can do for you, but what you can do for nature*. Though this is seen as balanced by the recognition that nature nurtures us with many blessings that we should be thankful for and not take for granted. The spiritual can be as much about the absence of satisfaction as its presence (consider fasting in Ramadan). Spiritual practice may deepen a longing that in some paradoxical way both brings an un-sought satisfaction alongside a continuing ache for a world in distress, a losing of the self in something far greater than the human project. Spiritual value may also be experienced as duty more than as a benefit, even if a joyful one. Many religions have a strand of teaching that lays a responsibility on humans to care for what is often expressed as God's creation (Palmer & Finlay, 2003). Thus spiritual values include transcendental values that express how we wish to relate to nature in ways beyond the instrumental.

Nevertheless, the UK NEA (2011) pointed out that there are some aesthetic and spiritual benefits that can be approximated in economic terms (e.g. the effect of the aesthetic characteristics of certain locations or the proximity of a church on house prices) and aesthetic and spiritual values even have aspects that could be considered consumptive use (e.g. picking flowers to decorate churches). However, quantifying spiritual and aesthetic benefits presents monetary valuation with particularly challenging technical, philosophical and ethical issues: even if it were possible fully to describe the value of spiritual and aesthetic benefits from environmental settings derived by different groups of beneficiaries, there are philosophical objections to placing a monetary value on benefits that are regarded as 'priceless' (e.g. Fourcade, 2011). In CV exercises respondents often refuse to provide a figure on how much they are willing to pay, put in protest bids or are insensitive to scope (the 'embedding' problem) (TEEB Foundations, 2010, p203; also see Section 2.4.2). The UK NEA (2011) therefore proposed that a combination of monetary, non-monetary, and deliberative approaches may offer qualitative and quantitative information to decision-makers about the relative and changing value of goods and services from different environmental settings to different groups as well as their differing degrees of commitment to the protection of nature.

To elicit these transcendental aesthetic and spiritual values, particularly in specific contexts such as proposals affecting environmental settings or sites, deliberative, participatory and narrative-based methods are valuable tools. At a larger scale, many of these transcendental values will be shared

across British and Irish societies and will have deep historical roots, e.g. the development of the concept of the sublime as an aesthetic category, interlinked with spiritual experiences of nature (Nicolson, 2011). There are thus also cultural values evinced in social practices as diverse as rambling and landscape painting, as discussed in detail in UK NEAFO WP4. These values may also be contested and different ones held by different groups within society, e.g. the contrasting approaches to Christian sacred sites of Protestants and Roman Catholics (Inge, 2003), i.e. differing 'communal values' in the terminology of this report.

Black and Minority Ethnic (BME) communities, whose members have largely come to the UK in the past sixty years, are often associated with the religions of their place of origin. However, the frequent bonds to nature and sacred sites associated with these religions can become dislocated when brought to a British landscape. This is particularly the case as many BME groups have settled in urban areas where access and engagement with nature can be difficult to achieve. Surveys in England (2009 to 2012) show that BME population members visit nature 27 times per year on average, which is 62% fewer visits than the rest of the population (Natural England, 2012). Organisations such as the Black Environment Network (that claims to be a unique organisation, recognised nationally and internationally as the pioneer working for ethnic environmental participation [BEN, 2013]) work with statutory bodies to engage ethnic minorities in the appreciation of nature and its conservation. The Sacred Land Project of the Alliance of Religions and Conservation record specifically religious successes such as two projects reported in the UK NEA (Church *et al*. 2011). Other projects include Mosaic, run in England's National Parks to encourage BME groups to access and experience quality landscapes (Campaign for National Parks, 2013). The Faith Woodlands Communities Project in Luton and Bedfordshire[14] aims to promote mutual understanding between people of all faiths with a sacred space being created in Maulden Wood for prayer, contemplation and meditation.

Using deliberative and non-monetary methods, alongside a familiarity with the iconic literature, e.g. Schama (1996), it may be possible to make tensions between cultural and other ES more explicit in decision-making processes, assisting in a better understanding of the likely social impacts of future policies. This is important because decisions that are apparently benign or beneficial in material-environmental or economic terms may have unanticipated negative social impacts because they compromise spiritual or aesthetic values held by certain groups. This observation is akin to talk of ethical constraints, where the maximizing of welfare may be constrained by some absolute rights or duties (e.g. preventing extinction of other species). If decision-makers can describe these compromises, it may be possible to make more creative and robust decisions that are less likely to be challenged on the basis of their social consequences.

Given the inappropriateness of quantifying certain spiritual and aesthetic values for decision-makers, and the importance of better incorporating these values in decision-making processes, the rest of this section considers how aesthetic and spiritual values are conceptualised in different literatures, as a basis for thinking about how such values might be elicited using non-monetary and deliberative techniques. This then lays the foundation for the following section which considers methods for assessing the value of benefits and methods that allow for a conceptualisation of the spiritual and aesthetic without constraining them to an instrumental framework.

2.4.1.1 Conceptualising aesthetic values of nature

As a cultural service, aesthetic experiences of local places and socially valued landscapes provide enjoyment, inspiration and contribute to human well-being (UK NEA, 2011). Aesthetic contextual

[14] http://www.faithwoodlands.org.uk

values are judgements produced through the interaction of transcendental aesthetic values, linked to psychological predispositions, with the aesthetic qualities of specific environmental settings. Philosophical conceptions of aesthetic values link them to multisensory qualities and formal qualities (such as pleasing shapes and patterns), where those values – commonly theorised as a type of non-instrumental value – are linked to pleasure experienced from such qualities (Brady, 2003; Parsons, 2008, 2010; Selman & Swanwick, 2010). Although this pleasure may be considered a benefit to those who experience it, pleasure is not the motivating aim of the experience, but rather the outcome of close aesthetic perception of the world. This 'aesthetic pleasure' is intimately connected to the particular, individual, aesthetic qualities that we attribute to some natural thing. In this way, the qualities are appreciated for their own sake, for their distinctiveness. In this respect, the interest we take is focused on the natural thing in question, rather than on our own satisfaction (Stecker, 2003). So, although aesthetic value involves pleasure, that pleasure cannot be detached from the object-centred appreciation of aesthetic qualities in the natural world.

Aesthetic value can also act as an indicator of a non-instrumental value that justifies a duty of care for the natural world, irrespective of human benefit (Hargrove, 1988; Hettinger, 2008). Understood in these terms, aesthetic value is conceptualised as a thicker and richer category of value in contrast to the narrower, visually focused 'scenic value' (Carlson, 2009). Aesthetic experiences may also involve feelings and emotions connected to particular aesthetic qualities (Carroll, 1993; Natural England, 2009).

In empirical studies of landscape perception, aesthetic value is construed more narrowly as visual or perceptual value, related principally to visual features in the landscape and, as indicated above, sometimes more narrowly as 'scenic value' (Selman & Swanwick, 2010). Also, while aesthetic value may be considered a component of 'landscape value', the latter is a much broader concept (Brady, 2003). Indeed, Scott *et al*. (2009) emphasise the role of sounds, smells and touch in landscape perception, in addition to visual aesthetics.

There is little literature addressing 'shared aesthetic value'. Although there is vast literature on visual preferences and landscape perception, this does not accurately capture 'aesthetic' in its more specific sense as a cultural service. Selman & Swanwick (2010) outline the differences between visual preferences, landscape perception, and aesthetics and carve out a place for aesthetic value as more specifically tied to natural beauty in landscapes. This review is therefore more targeted; its aim is to address aesthetic value in a specific sense and to offer a path through the literature on how aesthetic value has been linked to broader values and concepts (e.g. landscape perceptions).

In philosophical aesthetics, the notion of 'shared aesthetic value' is commonly conceptualised via theories that posit the objectivity of aesthetic value. This objectivity need not amount to claims about the universality of aesthetic value. More generally, objective theories of aesthetic value range from weaker forms, e.g. 'intersubjectivity', to stronger forms of 'aesthetic realism' (Brady, 2003). Carlson's 'scientific cognitivism' argues for aesthetic judgments as having objective force on the condition that they are informed by scientific knowledge (Carlson, 2000, 2009). Brady (2003) proposes a form of intersubjectivity of environmental aesthetic judgments, while Parsons outlines the possibility of pluralism, although he himself adheres to a form of scientific cognitivism (Parsons, 2008). Intersubjectivity describes individual aesthetic judgments, which may have their own particular inflections based on the person's specific background knowledge, experience, emotions, etc., yet nonetheless finding agreement and connections with other individual aesthetic judgments of the same aesthetic object. Pluralism advances the view that there is a range of legitimate grounds for aesthetic judgments of nature, from scientific knowledge to emotional and imaginative responses, as long as these judgments can be linked to actual aesthetic qualities in nature. As discussed in the *Arts & Humanities Perspectives on Cultural Ecosystem Services* UK NEAFO report, it

has been argued that the aesthetic judgments which form the basis of aesthetic values may be supported through forms of testimony and proof anchored in the perception of aesthetic qualities.

In the interdisciplinary area of landscape studies, Selman & Swanwick's (2010) UK study of the meaning of natural beauty in both landscape legislation and individuals used qualitative methods to examine the meaning of natural beauty. The results showed a range of individual expressions and more common themes about 'natural beauty' in landscapes. For example, convergent themes included: "*a feeling that natural beauty is related to 'importance' and 'specialness of place'"; "the significance of intangible qualities such as tranquility, remoteness, sense of freedom, inspiration, 'magic'";* and *"the importance of a 'diversity' of attributes and 'combination' of qualities'"* (p19). 'Sublimity is an aesthetic category which has, historically, been interlinked with spiritual experiences of nature' (Nicolson, 2011). In geography and environmental psychology, quantitative research shows an evolutionary, systematic, cross-cultural basis for our aesthetic preferences in respect of particular kinds of natural or semi-natural landscapes, e.g., savannah-like landscapes of parks, because they provide feelings of safety or 'prospect and refuge' (Appleton, 1975; Porteous, 1996), as well as other positive responses (Dutton, 2003). Key work in environmental psychology more broadly linking aesthetics and landscape preferences includes studies by Orians (1986), Stephen Kaplan (1987, 1995), Rachel Kaplan (2001), and Swanwick (2009). There are also studies showing how natural beauty functions to produce feelings of inspiration, harmony, peace and security (Kellert, 1993; Grinde & Patil, 2009), emotions also often associated with spiritual encounters.

Cultural geographers have analysed the ways that landscapes are associated with various social groups and messages (e.g. Cosgrove, 1984; Cosgrove & Daniels, 1988; Wylie, 2007). The National Trust, for instance, is described by Short (1991) as founded to save the countryside and make it accessible to town dwellers. Short goes on to claim that in its second fifty years, the Trust has become concerned with the preservation of the landscape of power; "*The landscape of power has become the power of landscape to embody 'national' sentiments of former glories, past power and world dominance."* (p80). A romantic view of natural landscapes is in danger of colluding with economic forces that wish to divert concern from their own activities (Womack, 1989; Katz & Kirby, 1991). *"Nature Reserves are ghettos where we can segregate unused species, terrain too wild to be useful, and images of a bygone era."* (Cooper, 2000) Nevertheless, these landscapes remain popular, and not just with the rich and powerful. Discursive engagement with all the diverse communities that relate to a landscape of concern will help to tease out these symbolic meanings and facilitate an understanding of their political power.

2.4.1.2 Conceptualising spiritual benefits from nature

A review of the literature on the spiritual and ecosystems (105 papers) confirmed a pattern similar to an analysis of the MA, in which there are 348 occurrences of the word 'spiritual' (Cooper, 2009). The uses of the word fall into several categories or frames, though the term 'discourses' may indicate more clearly that these are different ways of talking about the spiritual in nature.

Firstly, there are economists trying to get to grips with the 'spiritual' and relating it to non-use values, though advancing little beyond raising it as an issue. TEEB (2010, p205) at one point even equates spiritual benefits with existence value. Layke (2009) found no measures of spiritual or religious benefits from nature, and this review has found no new monetary techniques for valuing these benefits. There is also a tendency to view the spiritual phenomenologically, e.g. what psychological or social function 'spiritual' encounters play. This reduces what those who are religious believers would consider real in its own right, (e.g. nature possessing intrinsic value attributed by the divine valuer or the worship of God present within nature), to a function that is only concerned with the increase in human well-being in some way, i.e. an instrumental value as argued by Passmore

(1980). Those who are not religious but who speak of a spiritual connection with nature are likely also to affirm its value as more than instrumental, i.e. in the generation of human well-being; the choice of the word *spiritual* over alternatives says as much.

Perhaps lying behind this economistic approach is an understanding of the conception of spiritual value in the tradition of Transcendentalism (Nash, 1982), although this is rarely named as such. This western spirituality is very individualistic – hardly a 'shared value' in the full sense; it is also instrumental to the degree the person seeking a wilderness experience sets out seeking a spiritual high, a peak experience. This may make it more amenable to individualistic evaluation techniques such as travel-cost methods. Throughout the TEEB reports phrases appear such as 'spiritual experience', 'enrichment' and 'renewal' that are typical of this approach. Ashley (2012) gives a good summary of this type of 'wilderness spirituality'. A more profound and critical analysis is provided by Kohak (1984).

Consistent with this conception, Natural England (2009) includes the following definition of the spiritual in a UK context: "*a deep-seated, harder-to-access value, often delivered in more solitary moments; could be delivered by iconic wildlife, or a single feature tree, as well as by more traditional features such as burial mounds, standing stones, or churches. Also associated with water (still lakes or slow-moving streams and rivers) and with high places; can be created by the weather, such as a dramatic shaft of light or particular colours*" (p6). This approach is similar to that of Radford & James (2013), who look for features such as greenness, openness, and natural sounds to determine the likely spiritual significance of an environmental setting. A study to elicit the views of the public as to what they perceive is the spiritual in environmental settings has, however, yet to be conducted. The UK NEA terminology of 'environmental settings' and 'places' is deliberately neutral and colourless, but this makes it harder to elicit intense spiritual meanings that people might be more alert to if more loaded terms such as *countryside* or *landscape* were used (Wylie, 2007). There is also very little work on the spiritual value of wild species diversity, as opposed to specific species (*cf*. *Flora Britannica* by Mabey, 1996) or individuals, such as veteran trees (*cf. Meetings with Remarkable Trees* by Pakenham, 1996).

In contrast to the instrumental discourse, spiritual values can to a considerable degree be characterised as transcendental values, in that they are fundamental conceptions of the relationships of humans and nature. Sometimes people may not be aware that they hold these values until they are evoked by an apparent threat or until they are elicited by sensitive group work (see Section 2.4.3). People may also be reluctant to express them for fear of social embarrassment or shame in talking about religion in public or of ridicule for holding such views in an increasingly secularist society.

There is a widespread awareness of transcendental values in the recognition of the spiritual value of ecosystems to indigenous peoples. Observations are made of the respect for sacred natural sites, of sacred species, of natural resources used in spiritual practices, and of a general respect for nature. These values are essentially shared by a group or tribe. There are several publications that advise on how to co-operate with local people, building on this sense of the sacred (e.g. Pungetti *et al.* 2012). Because many current residents can trace their ancestry back many centuries in Britain and Ireland there are aspects in common with this approach that are appropriate to the UK (Cooper, 2012). For example, artisan fishermen in Hastings (Section 4) regularly quote that their ancestors fished those waters for over a 1,000 years. Those concerned with managing ecosystems in Britain, as in other developed nations, benefit from listening carefully to local people and working in collaboration with them (Reed, 2008; de Vente *et al.* under review).

A distinction should be made between engaging with local people of faith and engaging faith leaders and institutions. The social distance between a local congregation in a Church of England parish and the national Church is very great. Even at national level there will be important differences such as the notable case (Harries, 1992) in which the then bishop of Oxford challenged the Church Commissioners (one of the main investment arms of the Church of England) in the High Court, arguing only partially successfully that ethical considerations should apply to church investments. The recent debates on fracking illustrate this tension in approach to ES. The 'official' position of the Church of England has been broadly positive, coming as it does from a person who was chair of Ofwat until 2012 (Fletcher, 2013), pointing out its economic benefits. This prompted a 'clarification' by the Church Commissioners (2013a and 2013b) about their intentions over their substantial rural landholdings. Letters to the *Church Times* in the weeks following the Fletcher announcement suggests considerable unease among the wider membership of the church at this embrace of economic perspectives over concerns around environmental impacts.

Looking beyond the ecosystem literature, there are several ways the spiritual value of nature is talked about, without recourse to ecological terminology. Judging by popular publications on 'Sacred Britain' (e.g. Palmer, 2012), the public remains attached to sacred sites. This may have its roots in native paganism or it may be more of a reinvention. This attachment is associated with a fascination with the mysterious and 'superstitious' with varying degrees of scientific underpinning. The sacred sites that are identified are often where our 'ancestors' left their mark on nature or are where relatives are buried. The practice of scattering human cremated remains in wild or beautiful spots is a relatively recent development. Allied to these locations are Christian sites and churches, and a renewal of interest in outdoor worship, pilgrimages (e.g. Maddrell, 2013) and even in being hermits. Traditionally religious houses were often in remote locations and contemporary retreat houses are also often in beautiful countryside. The 'Quiet Garden Movement' encourages people to open their gardens for people to reflect in (Bowden-Pickstock, 2009), while 'Caring for God's Acre' is a national movement to care for churchyards. The Christian conservation organisation A Rocha has at least one project, at Minet Country Park belonging to the London Borough of Hillingdon, where it has been given the task of relating to the other faith communities in the borough. In recent decades there has also been a resurgence of interest in Celtic Christianity, with its intimate relationship with nature (Bradley, 1999). Usher (2012) pulls much of this together under the themes of attentiveness (being in landscapes can help people sense the spirit of God around them) and anchorage (to our personal and cultural history of divine encounter). According to Hay & Hunt (2000) awareness of a sacred presence in nature in the British population increased from 16% in 1987 to 29% in 2000.

There is also a degree of overlap with aesthetic values, as the British Romantic movement found spiritual value in the beauty of nature (D. Brown, 2004; Clarke, 2011). Today there is still a tradition of nature writing, painting and photography that maintains this bridge. This has some similarity to American Transcendentalism in its interest in the way nature inspires the individual. However, in the UK this group usually embraces a cultural landscape as much as hunting for a lost wilderness, but the reinvigorated tradition of British nature writing is diverse (Cowley, 2008). Most in this tradition do not conceive this value as merely a personal benefit, but as evidence of values that should be protected from the depredations of economic calculi. The term 'enchantment' is sometimes used to express this transcendental value (Curry, 2012; Monbiot, 2013), a dimension that resists the incorporation of nature into instrumentalism, economics and commodification. Somewhat anticipating the Romantic Movement and to a degree parallel with it, was the development of natural history. This was not just science, but a way of viewing the world to discover a message about the meaning of life; reading the 'Book of Nature' alongside God's other book of Scripture (Brooke, 1991). Surprisingly, perhaps, this trajectory from the seventeenth century Physico-Theology of John Ray, through Derham, White and Paley that led to Darwin and from Darwin to Dawkins, maintains a religious dimension. Contemporary natural history retains a spiritual dimension, some in

a vocal, hostile and atheistic way, some with a more traditional religious slant such as the ornithologist David Lack (Anderson, 2013) and many others with a spiritual dimension to their work, e.g. Jane Goodall (1999). Nature is still seen to hold a message about the meaning of life – or it's non-meaning. It is striking that the main justification for the protection of environmental sites in the mid-twentieth century was this scientific discourse, hence Sites of Special Scientific Interest (Evans, 1997).

However, a more profound role for the spiritual value of ecosystems may lie in its transcendental power, helping to shape the way a culture thinks about nature and its duties towards it. There may be profound underlying fears that our mistreatment of the natural world will turn it into a hostile god, leading to our judgement, retribution and downfall. Rachel Carson's depiction of the silent spring provided such a challenge at the start of the modern environmental movement, as much this side of the Atlantic as in her homeland. This apocalyptic world is the realm of religion (Skrimshire, 2010) and the triumph of hope over fear is a key spiritual and transcendental value. This is not examined directly in the ecosystem literature, but is explored theologically and in the literature about the psychology of communicating climate change (e.g. Ereaut & Segnit, 2006). Although there is a powerful draw to this apocalyptic discourse, this literature suggests that people are less receptive to messages about the value of nature if these messages are perceived as threatening their psychological needs of autonomy (e.g. because they feel manipulated or coerced), happiness (e.g. environmental campaigns based on fear), reputation (e.g. because they feel implicitly criticised or patronised) and self-esteem (e.g. because they start to feel responsible for or guilty about environmental degradation) (Sutton *et al*. 2012). There is a deep human need to belong and be connected to something bigger than ourselves (what some would define as 'spirituality') and to perceive the groups and social systems to which we belong as basically good and just. When evidence of environmental damage challenges the norms of these groups and systems, there is a strong motivation to deny that damage is occurring, unless these groups and systems recognise and effectively 'sanctify' a change in attitudes and behaviour (Sutton *et al*. 2012). This is just one example of how these profound values may influence behaviour more than price signals derived from economic analysis. Some even argue that using financial incentives is counter-productive in that it undermines other-regarding values, which are needed to address negative environmental change (Crompton, 2010).

In understanding both aesthetic and spiritual values and their status as shared values, one route is to move beyond the assigning of intrinsic and instrumental values, as put forward by O'Neill, Holland and Light in their book *Environmental Values* (2008). They argue for a pragmatic, narrative approach, which focuses on meaningful relations and interactions between humans and nature. They emphasise how contextual understandings, including narratives of past, present and future, can help us to grasp what is significant and, in this manner, shape environmental policy. This approach makes value pluralism central to any conception of environmental values.

In the area of environmental ethics, the pragmatic approach has emerged as a response to the view that assigning intrinsic values to natural items is overly abstract and has meant that environmental ethics has not engaged sufficiently with the actual relationships that particular people have with particular natural places over time. This new 'environmental pragmatism' is intended to move on from more wilderness-oriented environmental ethics favoured by philosophers writing largely from a North American perspective where the concept of wilderness has, historically, been more influential on environmental ethics, attitudes and policies.

For this approach, the narratives told of a specific place and the significance of human-nature interactions to its identity are key, rather than some attempt to erase cultural influences. These ideas hold some promise for conceptualising where aesthetic and spiritual values sit among shared,

plural and cultural values. The narrative view captures the context-specific character of individual engagements with actual places, attempts to articulate the particular meanings such places have for people over time and how those meanings contribute to managing change. So, in this way, it may better elicit the richness of aesthetic and spiritual valuing and just what is valued (as for example illustrated by the stories told in our case study on the value of MPAs, Section 4.4.3.4). However, narrative-based approaches to value can also be criticised on various counts. For example, how do we adjudicate between different narratives of the same place (different stories or histories) and how do we decide which narrative is the best one to continue (McShane, 2012)? Here deliberative and participatory methods, so long as they involve relevant social and stakeholder groups, can explore whether a consensus answer to these two questions can be built or help to manage contested narratives and visions and the plural values associated with the understanding of a place.

2.4.1.3 Assessing aesthetic and spiritual values

None of the papers that were reviewed addressed spiritual values or the value of spiritual benefits alone and all the methods mentioned covered a spectrum of cultural values. Many used well-known techniques such as interviews, questionnaires and focus groups. Of particular interest are spatial mapping methods, such as that developed by G. Brown (2004), where people, either individually or in groups, were invited to mark up maps with significant places, e.g. spiritual or sacred sites. These were then amalgamated using GIS. This is relatively straightforward to administer in a localised area and can inform spatial planning. For example, Bryan *et al*. (2010a, b) found significant spiritual values that varied across the landscape in a variety of environmental settings in Australia. These exercises all address contextual values and concern particular landscapes or sites. UK NEAFO WP4 provides detailed participatory GIS case studies of the North Devon Nature Improvement Area and of the Inner Forth, a joint case study where participatory mapping (detailed in WP4) was used in conjunction with DMV (detailed in this report, Section 4).

Aesthetic and scenic qualities are a component in various UK scenic designations or designations where natural beauty is a component (National Parks, AONB, NSA), and they also play some role in Landscape Character Assessments (Selman & Swanwick, 2010). Within policy literature, shared aesthetic values are often understood in terms of aesthetic preferences, with shared aesthetic values, more specifically, being more difficult to identify and utilise in policy and decision-making. Natural England (2009) linked qualities of openness and remoteness in landscapes to people feeling calm and relaxed. Aesthetic features valued by people in uplands, for example, have been shown to include remoteness, bleakness, tranquillity, open space, and the diversity of plant and animal life (Scottish Agricultural College, 2005). The Countryside Commission for Wales commissioned a report on the meaning of natural beauty, which contains some discussion of shared aesthetic values as expressed through common themes noted above (e.g., natural beauty as related to a ‘combination’ of qualities (Swanwick *et al.* 2006; Selman & Swanwick, 2010).

The discussion in this review shows that aesthetic values are conceptualised as grounded in close attention to qualities appreciated for their own sake, where such appreciation involves pleasure linked to those qualities. Aesthetic valuing is thus best understood as involving non-instrumental valuing which may have various benefits for humans, e.g. enjoyment of natural places for their interesting diversity of plant and animal life. Also, understanding aesthetic values only in terms of aesthetic preferences would not reflect the richness of this form of value and the possibility of forms of intersubjective agreement and shared communal values among various aesthetic experiences. In policy making, understanding these points may enable serious consideration of this type of value, and the development of methods which are able to elicit the richness of individual ascriptions of aesthetic value and the convergence of such ascriptions. Further support for this can be found in the UK NEAFO *Arts & Humanities Perspectives on Cultural Ecosystem Services* report, which emphasises

that cultural meanings and values emerge from particular contexts over time. As such they are rich and complex, resisting reduction to metrics and money values.

No evidence was found of the direct use of spiritual values or any consideration of the value of spiritual benefits from ES in policy making. However, the spiritual may be very influential through other channels. Consider the example, as described in **Box 1**, of the decision in 2012 to part privatise publically owned forests in England. The decision failed to account for the role that forests play in people's sense of place, national identity and the spiritual and aesthetic values they place on forests - would this have happened if the decision-makers had been familiar with Schama (1996)? -, which many sections of the public perceived to be threatened by the privatisation of the public forest estate. It was in this context that the government asked an Anglican bishop, the bishop of Liverpool, to chair the Independent Panel on Forestry.

Historically religions such as Christianity and Islam have been very critical of a financial approach to life, generally preferring in ethical decision-making to emphasise duties and responsibilities or the development of the virtues (Brown, 2010). One tradition in Christianity has been that of casuistry that has persisted in the training of clergy (e.g. Kirk, 1999), but brought to a wider audience by Jonsen & Toulmin (1988). This case-based approach to moral reasoning sidesteps the debates between utilitarians and, say, the upholders of human rights, turning instead to paradigmatic cases where most people would share a common judgement. From these cases, lines of analogy are drawn to the case at hand, with the help of various maxims. This is not an alien procedure to anyone brought up on British common law and its use of precedents. Cooper (1995) illustrates how this might be applied in nature conservation.

Crompton (2010), followed by Blackmore & Holmes (2013), describe a tension between 'intrinsic' and 'extrinsic' values. Intrinsic value is used in a different way here to intrinsic value attributed by some to nature; for these authors the difference in these terms is more akin to other-regarding, social virtues versus self-regarding utility maximisation. They describe how these contrasting poles of values are strengthened by their social affirmation or diminished by the affirmation of the opposite value. Religious communities usually put a lot of emphasis on other-regarding values, even if not specifically nature-regarding ones. This affirmation is exercised across most religious traditions in corporate worship, sermons, and shared communal tasks. When a collective decision needs to be made by a religious community an implicit process may be undertaken that can be understood by reference to the well-known 'prisoners dilemma' in game theory. Two questions can be asked: acting as a self-regarding individual, what decision would I prefer? Having acknowledged that, what if I presume we are all other-regarding, what would my decision be now? A particular striking model of this is provided by the Religious Society of Friends (Quakers) in seeking the 'sense of the meeting' after everyone has expressed their individual views. This can make decision-making time-consuming and costly, as it often aims to be a shared process in which attempts are made to listen to conflicting views, recognising the powerful emotions of anger, grief and shame and yet reach some sort of consensus on a way forward. This may lead, not to some simplistic 'trade-off', but *"In a meeting rightly held a new way may be discovered which none present had alone perceived and which transcends the differences of the opinions expressed"* (*Quaker Faith and Practice,* Section 3.06[15]). This tradition emphasises the importance of shared values, mutual discussion and shared learning, and group decision-making over an aggregation of individual preferences and as such has links to conceptions of social learning and deliberation that will be discussed in Section 2.4.3 and some of the deliberative valuation methods used in our case studies in Section 4.

[15] http://www.quakerweb.org.uk/qfp/qfp3-06.html

Finally, one of the main aims of the *Arts & Humanities Perspectives on Cultural Ecosystem Services* UK NEAFO report was to articulate the ways in which the arts and humanities can contribute to a better understanding of CES. That understanding assumes that CES arise from complex interactions between humans and nature over time and that aesthetic and spiritual values, for example, should not be consigned to the 'intangible' and 'immaterial', when these terms are viewed as problematic for ES. Arts and humanities perspectives underline, generally, that complexity and richness ought to be embraced in developing the best strategies for incorporating CES into decision-making processes. Similarly, WP4 introduces a range of interpretive and narrative-based methods for non-monetary valuation of CES, and our overview of methods in Section 3.4 and case studies in Section 4 introduce group-based interpretive techniques such as storytelling and desk-based approaches such as media analysis.

2.4.2 Expert-led review two: Shared and social values in conventional economic valuation

In terms of value in the sense of worth (contextual values), mainstream economists have generally gone about valuation by equating social value with the aggregate of individual values. Whether something has value to an individual would depend on his or her wants and these wants are expressed as preferences of one thing over another within different contexts, with an assumption that individuals maximise satisfaction of these preferences through rational choice. In environmental valuation, the framework of what constitutes valid wants has been extended to the concept of TEV, which includes things such as altruistic values (valuing something for the sake of another), bequest values (valuing something for the sake of future generations) and existence values (valuing the knowledge that something exists for its own sake). Nonetheless, as noted in the introduction to this report and as will be discussed in more detail in Section 3.3, under neoclassical economic assumptions, the notion of value in TEV has to be self-regarding. Ultimately it is conceived to be the personal satisfaction that one gains by being altruistic that is considered the source of value. Thus, from a preference utilitarian perspective, it is possible to consider these things within the domain of utility maximisation, as long as it is assumed that these are part of what drives people's self-regarding, individual preferences and demand. It is also assumed that people trade these things off in the same way as any other goods; they need to be commensurate in the same monetary terms. When aggregating preferences, such as in CBA, some kind of agreement is needed on how to aggregate within dimensions (i.e. how much does each individual count) and across dimensions of valuation (i.e. how are different value criteria to be made commensurate). Hence, critiques of conventional welfare economic approaches to valuation and appraisal typically concentrate on assumptions around commensurability of different values and utility maximisation, on the equation of value with satisfaction of preferences, and on the aggregation of individual values to 'social value'. It is also important to realise here, that these critiques are not just to do with CV, stated preference techniques or non-market valuation in general, but apply to any attempt to derive a measure of social value through aggregating individual preferences based on WTP and its counterpart, willingness to accept.

2.4.2.1 Plural values and commensurability

Much of the discussion about shared social values has been focused on moving beyond the narrow conception of individual, pre-formed values that people assign utility weights to and willingly trade-off against each other. Certainly, the discussion of different types of shared and social values across multiple dimensions, as we have seen throughout this literature review, already suggests a plural nature to value. If this plurality of value, which can include non-utilitarian moral sentiments, cannot be made commensurate in a single utility function, then the notion of making trade-offs between preferences to maximise value does not make sense (Beckerman & Pasek, 1997; Holland, 2002b;

Sagoff, 1998). This is problematic, because there is no single established way of weighting or trading off over more than one dimension of valuation relevant to a choice (D'Agostino, 2000; O'Neill, 1996). Take, for example, appraisal of a hypothetical proposed mining project in a local area where traditional people have historical rights. Dimensions of value could be the usual costs and benefits (expected revenue, construction and operational costs, etc.), the livelihoods of people, the cultural impact of the project, and impacts on local biodiversity. In CBA, environmental impacts could be valued through the ES framework and local people suffering from the mining could be compensated for environmental damage and impacts on their livelihoods and culture. If the benefits outweigh the costs after compensation, the project would be 'efficient' in the sense that it would deliver a net value to society (even when these compensations don't actually take place). However, this framework enforces a set of assumptions that the ecological, social and cultural dimensions of value can be compensated fully and justly. There is also an assumption that the property rights of the local people can be trumped by the assumed collective net benefit. Unless all parties completely agree about how different dimensions should be traded-off against each other, it is not possible to come to any single conclusion on what scenario might deliver the highest net value to society.

A further complication is that individual WTP, which is treated in aggregation as one-dimensional, can in practice reflect a variety of motivations beyond utility maximisation. For example, Desvousges *et al*. (1993), in a study looking at WTP for wire-nets to reduce bird mortality in oil companies' waste oil settling ponds, found that some participants considered they were paying for a consumer benefit, others considered it as a charitable contribution, a third group considered their (higher than average) stated WTP more as a signal for their moral or political beliefs and a final group could not come to terms with the framing and made a number up. Vadnjal & O'Connor (1994) asked participants how much they would be willing to pay to avoid a hypothetical development on Rangitoto Island near Auckland, New Zealand, an important landmark for local residents. They concluded that a large proportion of respondents stated WTP not as an accurate measure of their value but as a political gesture. This links to a wider debate around what WTP signifies and whether it is a reflection of welfare or of attitudes (Kahneman *et al.* 1999; Ryan & Spash, 2011; Spash *et al.* 2009). Certainly, some of these issues may relate to methodological issues around framing in CV, but it is also evident that values are often complex and multi-faceted, particularly in situations where it less straightforward to grasp costs and benefits, which makes it difficult to trade them off because they might consist of a mix of transcendental and contextual values, norms, attitudes, concerns and beliefs that may not be commensurable.

Clark *et al.* (2000) contrasted their own study on values for a nature conservation scheme with a study by Brouwer and colleagues (1999) that had a similar objective and cultural and geographical context. Clark *et al*. (2000) found that the values stated in their in-depth discussion groups alongside a CV survey were complex and heterogeneous, with most feeling that they were not meaningfully able to identify their values without carefully considering impacts, ethics and wider policies and contexts, and deliberating on this with others. Participants themselves proposed that valuation should be implemented as a democratic decision-making process, so that a plurality of values and moral considerations that could not be captured in a single monetary metric, could be debated. In contrast, Brouwer *et al.* (1999), focusing on values for flood alleviation, found from focus groups held in conjunction with CV that the vast majority of participants felt that their WTP reflected their true values and that the CV process was an appropriate way of capturing these to improve decision-making. Clark *et al*. (2000) considered that these different outcomes could be attributed to two things. First, the flood alleviation context was more easily grasped by participants compared to less tangible cultural benefits of the landscape. Second, their use of in-depth discussion groups, rather than more superficial focus groups by Brouwer *et al.* (1999), provided more opportunity for participants to express and discuss complex considerations, allowing participants to discuss issues connected to self-regarding and other-regarding values. Although they felt that the conventional CV

process had been valid and legitimate, participants from the study by Brouwer *et al.* (1999) nonetheless favoured a more deliberative and participatory approach to inform the environmental decision-making process as to better consider their answers. Here, the question about what constitutes value and how it should be measured appeared to be intimately intertwined.

It appears to us that questions around commensurability and plurality of values and motivations are most important with valuation of complex and intangible goods. Reflecting back to the typology of values that we have developed in Section 2, it appears that in these cases in particular, preformed contextual values appear to be absent or uncertain and this leads to a 'plural' outcome, where different value types are mixed. In stated preference exercises, some participants will consider their utility, some respond with random votes, others with protest bids because they feel uncomfortable with the way they are asked to express their values, and others will bid in a way that they feel corresponds most to their environmental attitudes and social norms. Hence this plurality of values in fact reflects a plurality of value types, with stated outcomes a mix of transcendental and contextual values, and also beliefs and concerns. In such a case it would appear particularly appropriate for valuation participants to be able to consider and discuss their transcendental, ethical and cultural values and considerations such as equity, fairness, rights and responsibilities, alongside discussions of costs, benefits and trade-offs, uncertainties and risks, in order to come to a more meaningful constitution of their contextual values. Finally, if such discussions are appropriate, then these contextual values need to be translated into some kind of weighing of the options or issues at stake. This requires valuation to be conceived as a shared social process of value construction and in this sense the elicitation of shared social values can be seen as a way to address critiques of incommensurability. In Section 3, we will introduce a model to aid in the design of such a process, which will be illustrated by case studies in Section 4.

2.4.2.2 Aggregation of individual values

Further issues with the neoclassical approach to establishing value to society that we discuss here relate to the assumption that this value constitutes the degree to which the aggregate of individual preferences is satisfied. In hedonic utilitarianism, happiness is considered an intrinsic good and its increase an obvious aim for public policy. In contrast, modern-day economic utilitarianism is not concerned with the reasons why individuals might want to satisfy particular preferences. This has at least two problematic assumptions: (i) that satisfaction of preferences (individually and collectively) is a good; (ii) there is an obvious single, correct way to aggregate preferences.

In terms of the first problem, critiques highlight that it is not evident that the sum of self-interested preferences necessarily equates to the good of society as a whole. As Mauss (1954, p75) wrote: "*The mere pursuit of individual ends is harmful to the ends and peace of the whole ... and hence in the end to the individual*". Mauss distinguished a 'group morality' that exists separately from individual preferences; a concept that is similar to Sagoff's (1986) notion of 'public values' discussed previously. Both authors considered that the public good should be derived directly from these societal values and that deriving them from the sum of individual preferences expressed on markets is nonsensical. Sagoff (1986) pointed out that many such preferences are sadistic, envious, racist, unjust, coercive or related to addictions, such as in the case of wanting cigarettes. It is philosophically and practically problematic to determine whether such preferences truly reduce well-being (perhaps resulting from information or cognitive deficits) or reflect genuinely divergent preferences. However, even for more harmless consumer preferences, according to Sagoff, it is not self-evident that there is any intrinsic social good in trying to maximise their satisfaction: "*Why is it good in itself that a person who wants a Mercedes succeed in getting one? Having a preference is a reason for the person who has it to try to satisfy it. Why should it be a goal of public policy, however,*

to satisfy that preference?" (1986, p303). In other words, to maximise social well-being it does not make sense for society to simply allocate resources to those willing to pay the most for them.

Sagoff added that preferences for individuals are often uncertain and transient and that well-being and happiness come from outgrowing many of our wants more than from satisfying them. Farber *et al.* (2002) also noted how the absence of given preferences poses a challenge to the derivation of the social optimum from the aggregation of individual preferences: *"If tastes and preferences are fixed and given, then we can adopt a stance of 'consumer sovereignty' and just give people what they want. We do not have to know or care why they want it; we just have to satisfy their preferences efficiently. However, if preferences change over time and under the influence of education, advertising, changing cultural assumptions and variations in abundance and scarcity, etc., we need a different criterion for what is 'optimal'."* (p380). To resolve these various issues, Sagoff (1998) posited that valuation should seek to elicit not consumer preferences based on an "I want", but citizen values around notions of "society should" (p215), determined through shared democratic deliberative processes.

Others follow a different line of argument. In stated preferences, as shown by the examples in the previous section, but also in actual markets, behaviour and WTP is in part-determined by other-regarding values and moral norms (Peacock, 1997; Keat, 1997). Thus, it goes beyond the selfish utility maximisation assumed of individuals by welfare economics. Additionally, as Posner (1983) pointed out, valuation of welfare in the economic sense is equated with WTP for having something, rather than the well-being derived from having it, which are not necessarily the same thing. Some authors have used these arguments to point out that CBA cannot actually establish value to society: if individual preferences are not solely about one's own welfare, by necessity summing their overall satisfaction does not equate to a measure of social welfare (Foster, 1997; Keat, 1997). Thus, while CBA can be used to compare the relative benefits and costs of different options, it is not able to establish which option has a higher social value.

A second fundamental issue surrounding the doctrine of preference satisfaction is that there is no logically infallible way to aggregate the preferences of diverse individuals (Feldman, 1987). Arrow's impossibility theorem (1950) proved that for any method of deriving social choices by aggregating individual preference patterns, individual preference patterns can exist such that it is impossible to derive a social ranking that meets certain minimal conditions: consistency, non-dictatorship, universality, monotonicity, and independence. As a consequence, social choice theory calls into question whether aggregation of preferences across individuals in valuation and CBA[16] can lead to a single consistent ranking of policy alternatives and why many environmental economists continue to uncritically employ aggregation methods that have long been shown to be problematic (Parks & Gowdy, 2012).

In conclusion, it is common practice in welfare economics to attempt to estimate value to society by aggregating the preferences of disparate individuals, expressed through willingness to pay or accept. However, critiques point out that we cannot blindly assume that values are commensurate, or that the adding up of individual values is a meaningful measure of social value. Within mainstream economics, the difficulties associated with establishing value to society in relation to issues of commensurability and aggregation have been long recognised, though they have perhaps also been neglected. An interesting area for future debate between economic and non-economic views on values may be the normative nature of value-aggregation.

[16] Note that this issue is not particular to economics; Arrow's impossibility theorem applies to any situation where a social preference is derived through aggregating individual preferences.

2.4.3 Expert-led review three: Shared values, deliberation and social learning

Deliberation is essentially a process by which something can be considered, evaluated or appraised. Deliberation can be done by an individual (e.g. a person deliberating over some kind of personal decision) or through some form of social interaction (e.g. a group of people discussing or arguing about how to spend money). It can also be a wider process of decision-making, such as Habermas' ideals of 'communicative rationality' where discussion and making sense of information is considered to generate new knowledge (McCrum *et al.* 2009) and enhance democratic processes (Lo, 2011). In the ecological economics literature, deliberation is mostly referred to as some form of social process that aims to enhance the elicitation of preferences and values rather than deliberation by individuals in the absence of social interaction (e.g. Christie *et al*. 2013; Kenter *et al*. 2011, 2013b; Spash, 2007). However, group settings for eliciting values do not necessarily equate with deliberative processes, as group processes can vary significantly in the level of deliberation that occurs. When considering deliberated values, the emphasis is on the process through which values are elicited, not the context in which they are elicited e.g. people may express values in a group setting without deliberation and individuals may express values that they have reached through deliberation with others e.g. via social media.

Deliberation typically consists of the following steps or elements (based on Habermas, 1989; Daniels & Walker, 1996; Bloomfield *et al*. 1998; Bessette, 2001; Abelson *et al*. 2003; Patel *et al.* 2007; Elwyn, 2010; Mummery & Rodan, 2013; Halpern and Gibbs, in press):

1. the search for and acquisition of information, gaining knowledge (by learning about the information acquired) and forming reasoned opinions;
2. the expression of logical and reasoned opinions (rather than exerting power or coercion), as part of dialogic and civil engagement between participants, respecting different views held by participants, being able to openly express disagreement, providing equal opportunity for all participants to engage in deliberation, and providing opportunities for participants to evaluate and re-evaluate their positions;
3. identification and critical evaluation of options or 'solutions' that might address a problem, reflecting on potential consequences and trade-offs associated with different options; and
4. integration of insights from the deliberative process to construct preferences for different options, and determining a preferred option, which is well informed and reasoned.

As will be discussed in more detail in our theoretical framework (Section 3.4), deliberative methods can be classified broadly as:

- *deliberative*: techniques that allow stakeholders to "confer, ponder, exchange evidence, reflect on matters of mutual interest, negotiate and attempt to persuade each other"; (Stern & Fineberg, 1996, p73), e.g. citizen's juries; or
- *analytical-deliberative:* involving more structured processes that integrate deliberative techniques with more formal decision-making tools, and express the outcome in monetary terms or as a quantitative ranking or rating, e.g. DMV and MCA (Fish *et al*. 2011a).

Compared to 'deliberation', there is very little use of the term social learning in the economic and non-economic valuation literature. However, social learning may help explain how values are shaped and shared through deliberative processes. There are many different definitions and ways of conceptualising social learning (Ison *et al*. 2013; Reed *et al*. 2010; Rodela, 2012a). In some definitions the term 'social' refers to the process that results in learning (i.e. it could be just a single person learning) while in other definitions it refers to a learning process that occurs across a wide number of individuals. A recent definition (Reed *et al*. 2010) described social learning occurring when: 1)

there is some change in the relationship between a person and the world (i.e. change in understanding); 2) that this change in understanding occurs through social interaction; and 3) that the learning should occur across more than one person, at the scale of social units or communities of practice. Social learning can build and strengthen relationships, enhance participants' understanding of other perspectives, and trigger systemic thinking (Fazey *et al*. 2010; Johnson *et al*. 2012) and in contemporary settings can have long lasting effects beyond an initial participatory approach (Bull *et al.* 2008).

It is therefore clear that deliberation and social learning are closely related concepts. Deliberation may be seen as part of the process by which social learning occurs (Cundill & Rodela, 2012). For example, deliberation through workshops and stakeholder participation is often used to co-produce new knowledge and insights about the value of the natural environment (Steyaert *et al*. 2007). However, deliberation also requires participants to learn from each other, to form reasoned opinions, evaluate and re-evaluate positions and reach an informed decision, implying that social learning is part of a deliberative process. Importantly, deliberation and social learning both suggest that social interactions have potential for helping elicit values that may be difficult to access.

2.4.3.1 Relationship between deliberation/social learning and shared values

There is no literature that directly discusses how social learning relates to shared values and very little that specifically addresses relationships between deliberation and shared values. However, deliberation and social learning as concepts are widely used to understand or facilitate changes in understanding, behaviours, practices, and decisions. Importantly, there is no doubt that social interaction provides opportunities for people to learn about the values of others and thus how much their values are shared (e.g. Kenter *et al*. 2011; Klamer, 2003; Lo, 2011; Spash, 2007). For example, groups engaging in social learning may learn about the values inherent in an organisation (Brummel *et al*. 2010; Hanson, 2012). This does not, however mean that the values of individuals necessarily change through interaction, but it does imply potential for developing shared values. This leads to two key questions: 1) Can deliberation/social learning processes change the way in which values are expressed?; and 2) Does deliberation/social learning affect the extent to which values become shared, help people come to a consensus on values, or help them work with the diverse values expressed?

2.4.3.2 Do deliberation and social learning change the way values are expressed?

There is mixed thinking about whether social interactions and reflection can change how values are expressed. Some argue that all forms of deliberation and social learning are implicitly interactions about values (Goldstein, 1981; Gastil *et al.* 2008). However, while these interactions may change how people understand or approach a situation, they do not necessarily result in changes to their values (Goldstein, 1981). Others argue that people do not always have pre-formed contextual values; rather, they tend to form these values through deliberation with others (Kenter et al. 2011, 2013b; Spash & Hanley, 1995).

Although widely used in literature about deliberation and social learning, shorter term processes (e.g. workshops) do not guarantee shifts in attitudes and preferences (McCrum *et al*. 2009), but the values expressed can change depending on how deliberations are framed and designed. Examples include changes in stated monetary values and greater recognition of political views (Gastil *et al*. 2008) or the 'true' value of ES (Kenter *et al*. 2011). This implies that the design of deliberative processes for eliciting values will have a significant impact on the values expressed.

In the medium term (e.g. through a process of on-going political negotiation over weeks or months) deliberative processes may lead to the formation of shared values by enabling a person to *"be swayed by rational arguments and to lay aside particular interests and opinions in deference to overall fairness and the common interests of the collectivity"* (Miller, cited in Bennett & Smith, 2007, p2 489). Lehoux *et al.* (2009) suggest that this may happen because deliberation may make values more explicit and contestable, so that they can be openly evaluated and discussed. These deliberations are particularly important for things that do not always have direct obvious monetary value (e.g. art and various aspects of the natural environment). During deliberations (e.g. in a planning process to make decisions about public expenditure), values change through a process of 'valorisation' where people may come to greater consensus about what they consider to be important and thus how a decision should be made (e.g. about public expenditure) (Klamer, 2003).

Values are also clearly shaped by longer term social learning processes, such as development of morals in children through education or modelling adult behaviour (Bandura, 1969; Brody, 1978) or intergenerational and community based interactions that promote cultures with particular social norms, values and behaviours (Rist *et al*. 2003). These processes are termed 'socialisation' in the sociological and anthropological literature and can occur at diverse social scales and formations (e.g. group, racial, gender, professional) and at different ages (e.g. Grusec, 2011; Sabari, 1985; Singh-Manoux & Marmot, 2005). The values that people hold for the natural environment therefore appear to be continuously shaped and moulded by social processes over time, depending on the cultures and ways in which social interactions occur.

Box 5 illustrates how regulation, markets, laws and cultural norms can evolve over time and change and modify the ways in which we understand and value nature and the natural environment. For example, the Millennium Ecosystem Assessment and UK NEA are leading to more holistic ways of considering, valuing and managing the natural environment by providing a framework to explicitly identify its wide range of services, and how they are interlinked.

Box 5. Expanding the ethical envelope within which we value nature.

Transcendental values that may be individually held can become shared through various mechanisms that can over time then embed these values in society as cultural norms. Society evolves by expansion of the 'ethical envelope', which is progressively cemented into cultural norms and institutions through the development of constraining 'levers' to, as Leopold (1949, p168) put it, accept "…*limitation on freedom of action in the struggle for existence*…". These levers include 'hard' regulation, modification of markets, a range of statutory and 'near-statutory' protocols, an evolving body of common law (and related civil law in other jurisdictions), various market-based instruments, and a variety of cultural norms including taboos, rituals and consensus views (Everard, 2011). This ethical envelope expands through social learning, often over generations and may eventually become institutionalised as part of a set of new social norms. Examples of such social learning processes include the transition of slavery from 'honourable trade' to pariah activity, the development of 'rules of engagement' for military combat under the Geneva Conventions, the increasing protection of wild birds and valued habitats, and changing attitudes towards drink driving.

Everard & Appleby (2009) reviewed significant progress throughout the twentieth century in expanding this ethical envelope in Western cultures to value non-human species and appreciate an increasingly wide range of services provided by nature that underpin human survival and well-being. Initially, property rights conferred largely unconstrained resource use rights, yet by the century's end the freedom of action of landowners was substantially influenced by environmental, industrial and other legislation, growing case law concerning impacts on other people, incentives to manage the land in certain culturally-preferred ways, novel markets such as biofuel production, catchment management strategies favouring water-sensitive land uses and measures to secure public access.

ES offer a systemic framework for assessing which elements of our supportive environment are currently within society's ethical spectrum and which as yet elude it, with negative consequences for service beneficiaries and the resilience of the ecosystem itself. Everard & Appleby (2009) observed that, though incremental transitions were not framed specifically in these terms, the observed societal transformation throughout the twentieth century in Western culture was founded on safeguarding various socially valuable ES provided by environmental settings, much of which was in private ownership and formerly managed largely for private benefit. This has increasingly gone beyond the material benefits humans can derive from provisioning services such as food and fibre, to appreciate the regulating and supporting services that underpin and sustain these more obvious and direct benefits.

This expanding ethical envelope represents an evolutionary journey from emergent, often individually held values which may then become progressively confirmed and consolidated with other people, potentially progressing though a range of transformations towards institutionalisation in one or more of society's 'levers'. Without understanding the essentially social nature of values and the importance of inclusive deliberation and collective action necessary to moderate and elevate them, it is unlikely that proportionate action will cement them into the mainstream of societal practice and norms.

Norgaard (2010) points to the importance of expanding the ethical envelope in the context of valuing ecosystems. The author argues that if we 'just' apply a 'project by project approach' consisting of various types of market based ES projects, this is unlikely to lead to a truly sustainable outcome. In his analysis, markets in ES can improve the efficiency of their delivery, but cannot achieve sustainability in terms of the trade-off of ES provision between current and future generations. This is because of the fundamental problem that from our current vantage point, we cannot 'see' ES from the perspective of a sustainable economy, and instead understand and value them from an unsustainable context. Only by a shift in cultural values reflected in societal institutions, including recognition that a considerable decrease in consumption of ES is necessary, can we achieve a sustainable outcome (**Figure 9**) (Norgaard, 2010). Thus, ecological economists stress that accounting for non-market values of ecosystems is not a panacea and a paradigm shift of acknowledging biophysical limits and ethical principles within economics is also necessary (Faber, 1996, 2008; Jones & Jacobs, 2008; Norgaard, 2010).

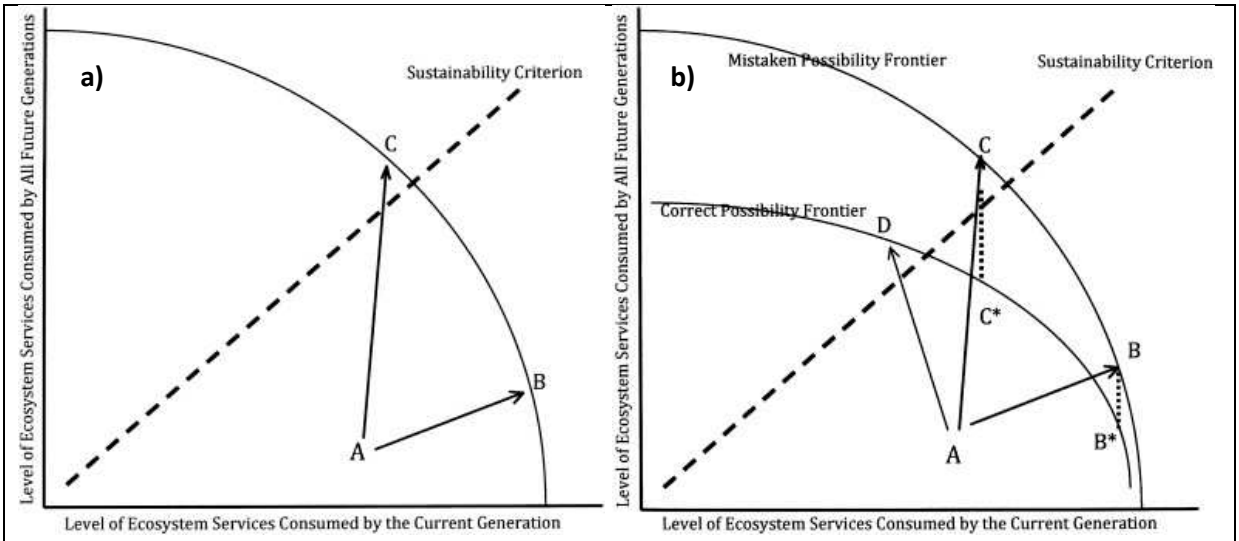


Figure 9. Norgaard (2010) illustrates the view that monetising ecosystem services on a project-by-project basis is insufficient to achieve sustainability. ES can be consumed by the current generation (x-axis) and by future generations (y-axis). The curved line indicates the possibility frontier for trade-offs between them, where consumption is efficient in the sense that neither current nor future generations could consume more without the others consuming less. The sustainability criterion crosses the point where future generations have equal use of ES as current generations. Norgaard posits that our current environmental governance structure puts us at somewhere around point A in a), which is both unsustainable and inefficient. If this is true, internalising ES into markets on a project-by-project basis could move us to point B at best. Here, both current and future generations are better off, but sustainability has not been achieved. Only changes in the institutional context would allow movement towards point C, which is both efficient and sustainable. However, given recent evidence in climate science and elsewhere, the possibility frontier has shifted inward b). This means that at the same level of consumption of ES by current generations, potential consumption by future generations has decreased. This means that society now needs to move to point D to achieve sustainability, while attempts to move to point B or C would likely lead to future generation ending up at B* or C*, neither of which would be sustainable.

2.4.3.3 Do deliberation and social learning result in greater sharing of values?

There is mixed thinking about whether social interactions and reflection can change how values are expressed. Some argue that all forms of deliberation and social learning are implicitly interactions about values (Goldstein, 1981; Gastil *et al.* 2008). However, while these interactions may change how people understand or approach a situation, they do not necessarily result in changes to their values. A key question then arises about the extent to which social interaction can result in greater consensus or sharing of values. Unlike knowledge, which social learning theory suggests can spread through social networks beyond the deliberative context in which it is formed (Reed *et al*. 2010), there is less likelihood that values will operate in the same way. Values are similar to higher order aspects of cognition. Changes in transcendental values are most likely to occur through double or triple loop learning mechanisms, where people re-evaluate the assumptions that underlie their positions, leading to changes in attitudes that may in some cases lead to a shift in their values in relation to the environment (Fazey *et al*. 2005; Keen & Mahanty, 2006; Reed *et al*. 2010).

There are two key factors that may enhance the likelihood that social interactions affect the sharing of values. First, the diversity and initial preferences of participants in a deliberative process may significantly determine the extent to which values are shared or shaped by participants. Wright & Rowe (2011) and Cuppen (2012) found that the extent to which participants learned from each other in deliberative processes was dependent upon the diversity of perspectives held by those who

engaged in the process. Similarly, Newig & Fritsch (2009) found that the composition of groups engaging in deliberative processes and their associated preferences strongly influenced outputs and outcomes of the process. This suggests that greater convergence of values may occur when a greater diversity of values are expressed and deliberated, although it is also possible that diversity of values can result in disagreements and polarization. This means that how social interactions are designed in a deliberative process will affect the extent to which convergence or divergence of values is likely to occur.

Second, careful management of interactions will be required if people are likely to move towards greater sharing of values. Deliberative inequalities may arise from inequalities in power and communication, and mechanisms are needed to avoid 'dysfunctional consensus', biasing outcomes or exacerbating conflict (Bohman, 1996; Reed, 2008; Lehoux *et al*. 2009). For example, De Vente *et al*. (under review) found deliberative processes that led to conflict resolution (implying either a change towards sharing of values or greater acceptance of the values of others) were significantly more likely to be professionally facilitated, include face-to-face sharing of information between participants, and enable participants to speak freely and participate in discussion and decision-making. Facilitation must be impartial and independent, as far as possible, for these benefits to be seen, otherwise facilitation may exacerbate power inequalities and bias outcomes.

Thus, the extent to which social learning and deliberative processes are likely to lead to greater sharing of values depends on the extent to which power dynamics are effectively managed. One of the most significant ways that power can influence such processes is the way that power is used to decide who and what information is included or excluded from a deliberative process (Fazey *et al*. 2013). Viewing it in this way, power can be seen to operate at the level of groups rather than individuals, as groups create norms that privilege certain types of knowledge over others (e.g. scientific over local knowledge) and that may exclude certain voices or narratives that challenge the group's norms (Barnes,1988). Foucault & Gordon (1980) describe this notion of power as the 'distribution of knowledge' to empower or disempower. This then emphasizes the need to include and respect the knowledge claims of all involved in a deliberative process, explicitly including and empowering marginalized groups, so that it becomes possible for values to be expressed and potentially become shared as a result of engaging in deliberation. Participatory action research approaches suggest that values can be better addressed when a range of stakeholders and members of marginalised groups are involved in all aspects of deliberative research including the design, implementation and dissemination phases (Pretty, 1994; Chambers, 1997).

Importantly, consensus may not be achievable or even in some cases desirable. The deliberative democracy literature, for example, recognises that societies are characterized by divergent and irreducible values and that decisions may be built on respect for reasonable differences rather than consensus of values (Lo, 2011), where values are shaped by a process of contestation (Dryzek, 2000). Here consensus may not be necessary if the aim is to improve the capacity for greater cooperation in the presence of considerable disagreement about values (Lo, 2011; Spash, 2007). This implies that in many cases social interactions may not result in shared values, but instead may help people to work with the plurality of values. There is therefore a need to find better ways of taking into account and for working with the diversity of values held by different social groups and to ensure that a diversity of perspectives are incorporated in decisions about the natural environment.

2.4.3.4 Implications for eliciting values

From the above discussion, it is possible to extract five key factors that affect how values are expressed and shared. These need to be carefully considered in the design of deliberative processes to elicit values:

1. Extent to which people are able to make their values explicit and/or deliberate around certain tasks (e.g. education, social-economic status).
2. Context in which the social interaction occurs (e.g. how questions are framed or how power dynamics are managed).
3. Extent to which the deliberation or social interaction occurs (e.g. intensive, less intensive).
4. Extent to which values are explicitly considered in deliberative processes (e.g. the degree to which values are discussed directly will affect the extent to which participants reflect on which values are important).
5. The length of time over which social interaction occurs.

Ultimately, all of the above factors influence how social learning or deliberative processes might be designed to elicit values. This elicitation process can have different outcomes that have implications for shared values (**Table 10**), depending on the extent to which social interaction/deliberation occurs and the extent to which it explicitly considers values (**Table 11**). **Table 12** considers how these design features are likely to affect values and **Table 13** considers the role of the timescale over which deliberation occurs.

In summary, there is limited research that directly considers how deliberation or social learning influences how values are shaped or shared. However, it seems clear that values are shaped by social interaction and the norms and cultures in which these interactions are embedded. Deliberative and social learning processes therefore provide opportunities for helping people understand the values of others and, if designed appropriately, can lead to increased sharing of values or greater acceptance of the decisions that emerge from such processes, even if the values that underpin those decisions are not shared.

Finally, although not explicitly linked to the role of deliberation in eliciting and shaping values, UK NEAFO WP8 considers the different decision-making scales at which ES may be incorporated into appraisal processes and argues that it is important to facilitate learning across appraisal types and scales. It identifies a number of institutional and cultural barriers to knowledge exchange and social learning about ES (and barriers that prevent putting what has been learned into practice). It suggests that communication between those who generate and those who use knowledge is key and propose the creation of neutral spaces where actors from different policy sectors and governance levels can generate more integrated approaches to environmental issues together. The evidence reviewed in this section would suggest that it may be beneficial to design opportunities for deliberation into these spaces; Section 3 of this report considers how such processes might be designed.

Table 10. The different kinds of outcomes that can emerge from deliberative/social interaction relevant to the sharing of values.

Outcome	***Explanation***
Improve people's understanding of the values of others.	When people deliberate and discuss values, they are more likely to understand the values of others and the extent to which their values are shared. However, this does not have to result in changes in the values expressed compared to non-deliberative approaches or greater sharing of values. Understanding the values may, however, help people to understand that there are multiple ways people express value, with potential for greater acceptance of a decision even if it is not aligned to their own values.
Change in the contextual or transcendental values elicited.	A social interaction may enhance ability for people to express latent values or those that are difficult to articulate while also enhancing opportunities for people to discuss them. There is therefore a change in the values that are elicited relative to not using deliberative techniques but not in ways that result in the greater sharing of values. This can occur for either contextual or transcendental values.
Change in the contextual or transcendental values expressed in ways that result in greater sharing of values.	The social interaction and deliberation helps people elicit values and discuss them, resulting in changes in the values expressed in ways that that people conform to the values of others. Note that it is also possible for people to change the values expressed in divergent ways.

Table 11. Examples of different ways in which values might be elicited relative to the extent to which values are explicitly deliberated.

	Strong social interaction/deliberation	***No or weak social interaction/deliberation***
Explicit consideration of values	A deliberative workshop/process where people directly discuss their own values and how this impacts their decisions before stating preferences. This discussion could be about contextual or transcendental values.	People may be asked to consider key questions about their values before they state preferences (e.g. on a survey), but such processes may not include any deliberation/social interaction.
Implicit or no consideration of values	Deliberative workshops that discuss an issue (e.g. providing information about biodiversity) which then ask people to state their preferences individually. Note that there may be no discussion about value.	People consider key information (e.g. about biodiversity) in ways that are not related to values (e.g. information about how ES originate), but this may not include any deliberation/social interaction.

Table 12. Likelihood of changes in values expressed or shared as a result of combinations of different kinds of deliberative interactions.

		Strong social interaction/ deliberation	***No or weak social interaction/ deliberation***
Explicit consideration of values	Improve people's understanding of the values of others.	Likely	Likely
	Change in the contextual values elicited.	Likely	Unlikely
	Change in the transcendental values elicited.	Possible	Very unlikely
	Change in the contextual values expressed in ways that result in greater sharing of values.	Possible	Very unlikely
	Change in the transcendental values expressed in ways that result in greater sharing of values.	Possible	Very unlikely
Implicit or no consideration of values	Improve people's understanding of the values of others.	Possible	Unlikely
	Change in the contextual values elicited.	Possible	Very unlikely
	Change in the transcendental values elicited.	Unlikely	Very unlikely
	Change in the contextual values expressed in ways that result in greater sharing of values.	Possible	Very unlikely
	Change in the transcendental values expressed in ways that result in greater sharing of values.	Unlikely	Very unlikely

Table 13. Likelihood of changes in values expressed or shared as a result of the extent of social interaction with time.

	Short-term	***Medium-term***	***Long-term***
Examples	E.g. deliberative valuation workshops	E.g. negotiations in yearlong decision-making in a local authority	E.g. moral development in children, values and practices operating in adaptive cultures
Likelihood of Impacts			
Improve people's understanding of the values of others.	Likely	Likely	Likely
Change in the contextual values elicited.	Possible	Possible	Likely
Change in the transcendental values elicited	Unlikely	Possible	Likely (but not necessarily)
Change in the contextual values expressed in ways that result in greater sharing of values.	Possible	Possible	Likely
Change in the transcendental values expressed in ways that result in greater sharing of values.	Unlikely (but possible)	Possible	Likely (but not necessarily)

2.5 Literature review: Synthesis discussion

The literature review conducted for this work package focused on three key questions: it considered how shared values were conceptualised, it looked at the processes and methods used to discover, uncover or identify these values, and it explored how values have been incorporated into decision-making processes. There were four methods used for the review: 1) a preliminary review of literature which drew on discussions from four workshops held as part of the Valuing Nature Network Bridge project; 2) three separate REAs of non-economically focused, economically-focused and health valuation literature; 3) provision of context-specific examples; and 4) expert-led reviews of spiritual and aesthetic benefits, shared values in conventional economic valuation, and deliberation and social learning. The expert-led reviews relied on the knowledge and experience of these specialists to identify relevant literature from a wide range of sources and disciplines.

Findings from all aspects of the literature review illustrated the plurality of ways in which shared values are conceptualised. The review highlights a lack of clarity of meaning, a fuzziness of concept and an interchangeability in usage with regard to the terms shared, cultural, social and plural values. Within the fields of ecosystem assessment and environmental valuation, the terms shared values, social values, and shared social values were used to indicate a wide variety of different meanings.

Plural values, while a term that was infrequently used explicitly, was nonetheless implicitly present, reflecting the multidimensionality of values both within (e.g. citizen vs consumer values) and across value holders, and across different dimensions of value. As such, it may be fruitful to distinguish it as a distinctly different category from the other sets of terms, one that highlights plurality rather than specific types of values. Incorporating this plurality is a critical dimension in both the research about values and the management of specific places.

While no single definition emerges and the terms are frequently used interchangeably, a healthy debate is attempting to provide greater specificity and delineation between the different types of values associated with the natural environment (e.g. Trainor, 2006; Anthony *et al*. 2009). Similarly, important questions are being raised with regards to conflation of terminology (e.g. Chan *et al*. 2012; Daniel *et al*. 2012) and empirical studies from the 1990s through to the current decade provide useful guidance into the ways in which these dimensions of values that exist for different ecosystems and amongst different stakeholders could be described and recognised under different circumstances and situations. The geographical distribution of papers from this review raises interesting and challenging questions about the lens through which values and nature were being considered, as the environments were predominantly those found in northern latitudes with values less related to livelihoods and more focused on CES.

These empirical studies also demonstrate the wide range of methods being deployed to elicit and understand the values held by different individuals, groups, and communities for nature. Indeed, the many non-economic approaches being undertaken recognise the plurality of environmental values present and seem particularly useful for the identification of non-market and intangible values and those values related to CES. Daniel *et al*. (2012) argue that there is often overlap in CES (they provide the example of aesthetics contributing to recreation experiences). This overlap highlights their importance to the human experience of the natural environment and makes them difficult to fully address in assessment and management, and in economic valuation, which has a strong focus on avoiding double counting. The UK NEA and NEAFO try to address some of these issues by clearly distinguishing between services on the one hand and benefits on the other, and by developing a place-based approach to CES. The UK NEA defined two types of CES: *wild species diversity*, and *environmental settings* (e.g. gardens, beaches, forests), retitled more simply as *places* by UK NEAFO WP4. These give rise to a range of benefits through practices and experiences situated within these places. Each of these categories (services/places, practices and experiences and their benefits to human well-being) can have their own associated indicators, which allow clearer and more informative evaluations for management and decision-making. However, both the REA and expert-led review on spiritual and aesthetic values showed that there is a strong link between transcendental values and cultural 'benefits'. Value ascribed to places does not necessarily flow from receiving benefits, but can be inspired by duty and virtue. Alternatively, value can arise in a relational way. Whether or not because these cultural 'benefits' are hard to frame into a utilitarian framework, the lack of integration of CES into decision-making is starkly evident. While some examples do exist (see **Table 4**), the majority of papers provide little specific evidence, rather they focus on providing recommendations that these types of values need to be taken note of by decision-makers. NEAFO WP8, which focused on decision-making and behavioural and institutional obstacles to integration of ES into decisions, has come to similar conclusions, noting that in appraisals CES are the least picked up of the different components of ES frameworks.

The papers that focus specifically on indigenous groups highlighted different epistemological understandings related to how one can 'know' nature. For example for some, nature is viewed as knowable - it can be described, modelled, and the cause and effect of different processes can be identified. A reductionist positivist approach to studying nature is often taken and is considered to be a true reflection of what nature is. For others, nature is conceptualised as both physical and spiritual (holistic and not reducible to component parts) suggesting that the history of the people is inseparable from the history of the land (Adamowicz *et al*. 1998). This latter conceptualisation was frequently found within the literature on indigenous communities and values.

Box 3 highlights the 'commons' as a space for shared social values and practices that aligns closely to the indigenous concept of holism, traditional practices and knowledge of the land through long term engagement that can be passed on from generation to generation.

This review has highlighted that there are many values considered to be 'transcendental'; these include ethical and moral issues, key beliefs, and spiritual values that are part of individual and community identity. It is these values that are more likely to be viewed as incommensurable and give rise to protest if people are asked to monetise them, reduce them to a single metric or trade them off, as they may be considered sacred, spiritual, protected or taboo. 'Contextual' values (i.e. the worth or importance of nature) are strongly linked to the meanings related to specific places. These include landmarks and markers that can "*operate as symbolic devices for community narratives and shared values"* (Ansary, 2007, p546). These symbolic, spiritual and meaningful sites/landmarks provide social continuity, contribute to collective memory and reinforce people's identification with specific values and particular traditions and practices. The expert-led review on spiritual and aesthetic values provides insights into both their importance but also the paucity of research, particularly about what is perceived to be the spiritual value of different environmental settings. Many spiritual discourses about nature resist talk of consequentialist benefits and economic analysis. These discourses counter assertions of the disenchantment of the world associated with the commodification of nature. Making allowance for the possibility of 'enchantment' as a way of approaching our experience of and connection to nature alerts us to the limitations of economic models for valuation and decisions about CES.

In the REA, deliberation in the form of social interaction between different groups through workshops, focus groups and social and participatory mapping was used to discuss the values held for particular places and practices. These studies did not generally fit the conception outlined in the expert-led review where deliberation goes a step further to include identification of options or solutions. These approaches did, however, help participants understand and learn about the values of others and about why they held those values, although the evidence did not address whether this understanding and knowledge led to a change in the participant's values or not. As identified in the expert-led review, the type, framing and facilitation of the elicitation process is crucial in determining process outcomes, and any changes in values are more likely to come about through strong social interaction and deliberation processes that explicitly consider and debate values.

The review highlighted the range of disciplines that are attempting to understand this plurality and investigate the complexity of values associated with the natural environment. Reduction of values to a single metric was largely absent from the non-economic literature with empirical studies employing multiple methods, integrating them for both practical and innovative benefit. Within the broader economics literature, value plurality is largely discussed in terms of (in) commensurability – the possibility or otherwise of aggregating different value types. Therefore there are key conceptual differences between the non-economic and the economic literatures based on fundamentally differing epistemologies. The non-economic literature implicitly considers values as plural not just in the sense that multiple things have value, but also that there are multiple dimensions to value that cannot necessarily be assessed through a single metric. There is a willingness to accept this plurality and multiplicity and a focus on identifying these values; sometimes from groups whose voices are not always heard, such as indigenous groups or the marginalised. Within mainstream economics values are epistemologically considered singular. They are therefore considered commensurable and a single metric (money) can be applied to them; they can be aggregated from the individual to provide a value to a community or society as a whole. More broadly, the difficulties of aggregation bring into play 'social values' in the sense of the form of social welfare functions, i.e. transcendental and contextual values about how to make trade-offs between different dimensions of value and how to aggregate them. Similar issues, e.g. (in)commensurability, trade-offs, aggregation of individual

values, were present within the literature on health valuation although there appears to be a growing recognition of the multidimensionality of health values and the need to incorporate other values besides utilitarian values and health maximisation into analyses. Perhaps one of the more promising areas for debate between economic and non-economic views on values is therefore the discussion on the normative nature of value-aggregation, an issue which has been recognised by but perhaps been neglected in mainstream economics (Section 2.4.2).

Although shared values were mentioned by some of the natural science papers covered in the REA, they tended to be mentioned briefly towards the end of the articles as a form of social value that could in future complement values based on natural science research. Although shared values appear to be perceived as not falling within natural science disciplines, they appear implicitly in many natural science studies where different components of natural systems are valued differently by researchers from different disciplines. For example, in a wetland re-wetting project, plant ecologists may call attention to the negative effects of blocking drainage ditches on plant species diversity, while ornithologists might value the increase in invertebrate and bird diversity. Although each share the same language and criteria for ecological or conservation value (e.g. species richness, rarity, vulnerability), each brings a distinct set of ecological value criteria that are very different from economics (where values revolve around utility and efficiency) or philosophy (which would cast them in moral terms e.g. rights, virtues, etc.). Such contrasting, plural values are often discussed in more interdisciplinary and transdisciplinary natural science endeavours, which engage with stakeholders whose values may be rooted in culture and tradition and linked to their identity as a member of a particular social group. Although rarely referring to the concept of shared values, the adaptive management and adaptive co-management literature (which originated in ecological work by Holling, 1973) views stakeholders as part of an inherently linked social-ecological system. It therefore attempts to reconcile the different values held by stakeholders through a process of iterative, active experimentation in which stakeholders try ideas out in collaboration with researchers and learn from their experience. Given the extent to which shared, plural and cultural values play into decisions about the natural environment, the fact that these concepts tend to be the domain of social science and interdisciplinary endeavours may be linked to the epistemology implicit in these concepts. Ideas of shared, plural and cultural values are hard to reconcile with more positivist, reductionist epistemologies that seek a single universal truth.

3 Theoretical framework

Our literature review showed that there is a healthy debate attempting to provide greater specificity and delineation through the development of new theoretical frameworks or typologies of values in relation to ecosystem assessment, but so far there has been little headway made in terms of conceptualising and classifying shared values. In this section, we provide a theoretical framework in four parts. The first part clearly defines the multiple dimensions of shared values. This then allows different types of these values to be discriminated. The second part of our framework discusses the relation between shared and individual values. Informed by these first two parts, the third part of our framework considers how shared values may be assessed and the fourth part develops the DVF model, which provides a theoretical ground for deliberative valuation processes such as those used in our empirical case studies, and their relation to the different types of shared values.

The theoretical framework presented here arose in outline from a series of four transdisciplinary expert workshops during February – July 2012 that were part of the *BRIDGE: from values to decisions* project[17], part of the *Valuing Nature Network*, in which most of the authors participated. It was then further developed during the UK NEAFO and published in Kenter *et al.* (2013b; under review). As our literature review pointed out, there is a wide diversity in conceptions of value and our aim is not to assimilate all of these in a single framework. In particular, our framework only to a limited extent encapsulates the moral philosophical literature and questions in relation to sources of value and ethical standing. Instead, the theoretical framework that we develop here focuses on teasing apart different types of shared values phenomenologically, differentiating them from individual values, and considering their role in deliberative processes.

3.1 Dimensions and types of shared values

In order to consider different types of shared values - for the purpose of identification, elicitation and measurement - we identify five dimensions of differentiation: (i) the value concept; (ii) the value provider; (iii) the process used to elicit values; (iv) the scale of value; and (v) its intention (**Figure 2** in Section 1.1). This allows us to understand how the different terms that have been used in the literature are connected and to relate issues to clearly identified types of shared values. **Table 14** provides an overview of the different terms that have been used in the literature to refer to a range of value concepts associated with shared values, along these five dimensions, and terms that could be used to disambiguate between these different concepts.

Value-concept: In terms of the concept of value, we make a distinction between values in the sense of *"criteria that people use to select and justify actions and to evaluate people (including the self) and events"* (Schwartz, 1992, p1), values in the sense of opinions about worth or importance, and the worth of something itself, often expressed in monetary terms. Another way of looking at this is that values can be differentiated between guiding principles that transcend specific situations, which we will call *transcendental values*, values that are dependent on an object of value and hence contextual and attitudinal, which we will call *contextual values*, and measures of the worth of something, which we will call *value indicators*. Although some of these distinctions are occasionally made (e.g. Dietz *et al*. 2005), they are not usually clearly termed.

Because transcendental values are often associated with ethics and normative beliefs, which are shared culturally, it is these values that are sometimes characterised as shared, social or cultural values, in contrast to contextual values that are more allied with attitudes and preferences (**Table**

[17] http://www.valuing-nature.net/projects/bridge

16). In sociology, these values are considered as learned, epistemologically grounded, relatively enduring, emotionally charged and representing moral conceptualizations that assist us in making judgements and in preparing us to act (Frey, 1994). Following Schwartz' conception of this type of values (Schwartz, 1992; Schwartz & Bilsky, 1987), transcendental values include more than just ethical principles and also include things that can be characterised as desirable end states, such as 'a varied life', 'family security', or 'mature love' (**Table 15**). Transcendental values in the sense of principles/virtues and in the sense of end-states have been distinguished as instrumental vs terminal values (Rokeach, 1973). However, we find this problematic, because if principles are seen as virtues, by definition they are in themselves also terminal. Finally, transcendental values are not necessarily explicit (Frey, 1994) and in relation to the environment are often latent (Niemeyer, 2004).

Contextual values are closely associated with, but different from, preferences and attitudes (definitions of these concepts can be found in
Table 16). While preferences are a stated or revealed ranking or rating of outcomes, contextual values can be conceived as an opinion of worth. For example, one might consider A to be of greater value than B, but prefer B because it is cheaper. The difference between a contextual value and an attitude is that a contextual value expresses an opinion of worth, while an attitude is an opinion of favour. Contextual values may be influenced by information and beliefs, but also by norms, needs, traits and roles (**Table 16**).

Beyond these two concepts of values, there are also value indicators. The most obvious of these are amounts of money. Ultimately, monetary values are not values themselves, but expressions of values in commonly understood units, which indicate the trade-offs that people are prepared to make. Although ontologically they are not, we classify these indicators as a value-concept, because our typology mainly serves to reduce ambiguity of terms. Of course, value indicators need not be monetary or even quantitative (e.g. ratings, rankings, indices, qualitative expressions), though non-monetary indicators are not as often referred to as values but as indicators, criteria or outcomes. A further confusion about the term values, particularly in relation to the valuation of the environment, is the conflation between (contextual) values, value indicators and the benefits produced by ecosystem services (Chan *et al.* 2012).

To provide more clarity on this plethora of relations between all these concepts, consider, for example, a proposal to restore wetlands to improve water quality. We can identify water purification as a *service*, improved health as a *benefit* and one's perception of importance about this as the *contextual value*. Contextual values will depend on *beliefs*, such as about the state of current water quality, but also beliefs about other's beliefs and norms about this. If one then considers something ought to happen (a *norm*), one might then have a favourable *attitude* towards restoration of wetlands. If one is then asked for one's view on a proposal to raise taxes by a certain amount so that the wetland can be restored, one might then have a *preference* for this to happen over a status quo scenario. The monetary value attached to this might then be a WTP of £5 per annum. Overall, contextual values, attitudes and preferences could be positively influenced by health as a broader, *transcendental value*, but also other values such as family security and harmony with nature, which are all closely related to one's overarching *worldview* (**Table 16**).

Differentiation of values on this axis bears some resemblance to the differentiation of values into 'held' and 'assigned' by Rokeach (1973). Here, held values are the things that we hold as important while assigned values are the values that we assign to things. However, that distinction is problematic, because it is unclear into what category opinions about the worth of something fall.

Provider of values: A second dimension is the provider of values. We distinguish four providers of value: individuals, groups (in a valuation setting), communities, and societies as a whole. Societies as

a whole share *cultural* and *societal values,* which may be considered shared principles and virtues as well as a shared sense of what is worthwhile and meaningful. Societal values are the cultural values of a society; societies may be more or less homogenous, so there may be multiple sets of cultural values in one society that overlap to a greater or lesser degree with each other. However, this is largely beyond the scope of our discussion, and we use the terms cultural and societal values more or less interchangeably.

Cultural values are grounded in the cultural heritage of a society and pervasively reside within societal institutions (Frey, 1994). These include both transcendental and contextual values. For example, British culture values politeness (transcendental) and it is a culture of tea-drinkers (contextual). Cultural values are expressed through media (see Section 4.5), political processes, and institutions, and are also reflected in the values of individuals, as will be discussed in more detail in Section 3.2.

Of course, within societies and cultures there is a wide range of social groups that express distinct *communal values*, including local communities, faith groups, groups of people that share an activity such as recreational users of the environment, communities of practice, etc. In addition, there are the ad-hoc groups associated with research, such as a discussion group of stakeholders or a focus group with members of the public, which can come to collective value outcomes that we term *group values*, for example in techniques such as citizens' juries, multi-criteria analysis (e.g. Section 4.4.3.2) or mediated modelling (e.g. Section 4.2.3.1). The difference between on-going communal groups and ad-hoc process groups, is relevant, because for communal values the focus of valuation will likely be on shared experiences, practice and institutions, while for group values the focus is on process (e.g. coming to consensus). Communal and group values can overlap, for example when communal values arise in a deliberative valuation workshop.

We refer here to *value providers* rather than *value holders*, as the aim of our discussion is to develop a useful typology in relation to *valuation* of nature (as opposed to the broader and more informal valuing of nature). By focusing on provision of values, we also avoid the need to come to a final conclusion on whether, ultimately, anything other than individuals can hold values. We can then conceive of shared values as values that are *expressed* collectively, regardless of whether they are *held* individually or collectively. In terms of non-market valuation of the environment, the usual providers are individuals, but with increasing interest in deliberative approaches to valuation, group value expressions (through consensus or majority vote) are becoming more common (Fish *et al*. 2011a; Kenter *et al.* 2011; Spash, 2008; Zografos & Howarth, 2010).

Elicitation process: While the distinction between group and individual 'settings' is generally made in the deliberative valuation literature (Lo & Spash, 2012; Spash, 2007), we introduce a third dimension, the elicitation process, to distinguish between *non-deliberated* and *deliberated values*, as valuation may take place in group settings where the group or workshop setting does not include significant deliberation. For example, Christie *et al.* (2010), in a large-scale study on the value of the UK Biodiversity Action Plan (BAP), used group settings as a means to inform participants and to ensure they were familiar with complex concepts related to biodiversity before conducting choice experiments. The elicited values from individuals in these types of group settings may be characterised as *informed individual values* (or *informed individual WTP* in monetary valuation), which are different from *deliberated individual values* and *deliberated group values*, because it is not just the group setting but also the process that determines whether a value can really be considered 'shared'.

Scale of values: This dimension relates to the scale of valuation. We can distinguish the individual scale and the 'social' scale, which has bearing on *values to society*, or in relation to society. An

example is that one might highly value enjoyment and a varied life for oneself (e.g. reflected in consumer behaviour), but in relation to society other values such as fairness or responsibility might be more important (e.g. reflected in voting behaviour). In terms of monetary valuation, the social scale refers to either *aggregate WTP* or *social WTP.* For example, if a population of 100,000 people has a mean individual WTP of £10 to restore a wetland, one possible aggregate WTP would be £1 million. However, one might also ask how much the government should spend on this wetland instead of on other social priorities; if respondents would state an amount of £1 million, this would constitute a *social WTP*. To distinguish here from previous dimensions: if this £1 million were to be determined as a group decision, this could be termed *group social WTP*, and if this were also through a deliberative process and if we wanted to completely avoid all ambiguity, we would call this *deliberated group social WTP.*

Intention of values: The dimension of *intention* relates to whether values are self-regarding or are other-regarding, altruistic values. For example, I may value my own life enjoyment (self-regarding), but also that of my neighbour or that of future generations. *Intention* differs from the *scale* dimension, as values for others are not necessarily values in relation to society.

Neoclassical economics explicitly does not concern itself with other-regarding values, on the argument that this would constitute double counting. Although valuation may consider such things as altruistic, existence and bequest values within a framework of TEV (Pearce & Moran, 1994), ultimately it is conceived to be the personal satisfaction that one gains by being altruistic that is considered the source of value. The relation between shared values and TEV will be discussed in more detail in Section 3.3.

Relevant to the dimensions of both intention and scale, it has been posited that people have multiple sets of values and preferences: a self-regarding set at the individual scale, where people maximise their personal utility according to their consumer preferences (‘I want’) and another set of other-regarding ‘citizen’ values (‘society should’) that are underpinned by a broader set of transcendental values and motivations, including deontological and virtuous motives, and which may need to be brought out through a deliberative process (Lo & Spash, 2012; Niemeyer, 2004; Sagoff, 1998). We discussed this idea of value plurality previously in Section 2.4.2. Now, we will consider the dynamic relation between the values of individuals and shared and cultural values.

Table 14. Terms that can be used to refer to concepts associated with shared and social values. Different dimensions of value are given in bold in both rows and columns. Underlines indicate the term that we propose can be used to reduce ambiguity; where these have not commonly been used in the literature they are also italicised.

Value-concept	**Transcendental – transcending specific situations**			**Contextual – sense of importance, worth**			**Monetary value indicators**		
Value provider	**Individuals**	**Groups or communities***	**Societies**	**Individuals**	**Groups or communities***	**Societies**	**Individuals**	**Groups**	**Societies**
Intention of value									
Self-regarding	(Individual) values *Self-regarding transcendental values*	Shared values *Group self-regarding values* Consumer values *Communal self-regarding values*	*Self-regarding cultural/societal values* Shared values Common values	Values Consumer values *Self-regarding contextual values*	Shared values *Self-regarding group contextual values*	n/a	WTP	Group WTP	n/a
Other-regarding	Altruistic values *Other-regarding transcendental values* Social values	Shared values (Shared) social values Citizen values *Group other-regarding values*	*Other-regarding cultural/societal values* Shared values Common values	Citizen values *Other-regarding contextual values*	Shared values Citizen values *Other-regarding group contextual values*	n/a	Charitable contribution†††	Group WTP/charitable contribution (individual scale) ¶ Group social WTP(social scale)	n/a
Scale of value									
Individual	Personal values Ethical values *Personal transcendental values*	Shared values (Shared) social values *Group transcendental values* *Communal transcendental values*	Cultural/societal transcendental values Shared values Common values Public values	Personal values Consumer values *Personal contextual values*	Shared values *Contextual group values*	Shared values Cultural values Public values Contextual societal/cultural values	Value WTP Disaggregated value	Fair price WTP Disaggregated value	n/a
Social	Social values Societal values Public values Citizen values *Transcendental values in relation to society*	Shared values (Shared) social values Societal values *Group/communal values in relation to society*	Cultural/societal transcendental values Shared values Common values Public values	Social values Societal values Socio-cultural values Citizen values *Contextual values in relation to society*	Social values Societal values Citizen values *Contextual group values in relation to society*	Shared (social) values Cultural values Public values Contextual societal/cultural values	Social value Speculative value Social WTP Aggregated value	Social value Societal value Arbitrated Social WTP (Deliberated)Group social WTP Aggregated value	Social value Value to society Aggregated value
Elicitation process									
Non-deliberated†	(Individual) values *Individual transcendental values*	(Shared) social values Common values *Transcendental group values* *Transcendental communal values*	Shared values Common values Cultural/societal values ‡	(Individual) contextual values	Contextual group values Contextual communal values	Shared (social) values Cultural values Public values Contextual societal/cultural values	(Individual) value WTP	Group value Group WTP Group values (monetary) Social value/WTP	Social value Value to society
Deliberated†	(Individual) values Deeper held values *Deliberated individual transcendental values*	Group values Shared values (Shared) social values Deeper held values *Deliberated transcendental group values*	n/a	(Individual) values Deliberated (individual) contextual values	Group values Deliberated group values Shared values Shared social values	n/a	WTP Informed exchange price Arbitrated WTP Deliberated WTP/Charitable contribution ¶	Group value/WTP Social value/WTP Fair price (individual scale) Arbitrated social WTP Deliberated social WTP (social scale)	n/a

WTP: Willingness to pay. Where reference is made to WTP, equal reference could be made to willingness-to-accept.

* 'Groups' refer to a group-based valuation setting; 'communities' refer to communities of people who may express values that are associated with their community (=communal values), e.g. geographic communities, faith communities, communities of people involved in similar activities, etc.

† Deliberation is used in the context of a deliberative valuation process, i.e. a targeted process above and beyond on-going or day-to-day 'deliberations'.

‡A further use of the term 'cultural values' is to refer to the importance of ecosystems for culture; confusion can be avoided here by either referring to 'cultural ecosystem values' or the 'benefits of cultural (ecosystem) services'.

¶ It has been suggested that WTP for individuals in deliberative settings is more akin to charitable contributions than to an exchange price (Sagoff, 1998; Spash 2007, 2008, 2012).

Table 15. Schwartz values. An overview of key transcendental values identified by Schwartz (Schwartz & Jerusalem, 1994; Schwartz, 1992; Schwartz & Bilsky, 1987). Schwartz argues for a 'universal' structure in values across cultures, which consists of a range of dimensions (italics) across four main axes (headings).

Self-transcendence	***Self-enhancement***	***Openness***	***Tradition***
Universalism	*Power*	*Self-direction*	*Tradition*
Protecting the environment	Social power	Creativity	Devout
A world of beauty	Authority	Curious	Respect for tradition
Unity with nature	Wealth	Freedom	Humble
Broad-minded	Preserving my public image	Choosing own goals	Moderate
Social justice	Social recognition	Independent	Accepting portion in life
Wisdom			Detachment
Equality	*Achievement*	*Stimulation*	
A world at peace	Successful	Daring	*Conformity*
Inner harmony	Capable	A varied life	Politeness
	Ambitious	An exciting life	Honouring parents and elders
Benevolence	Influential		Obedient
Helpful	Intelligent	*Hedonism*	Self-discipline
Honest	Self-respect	Pleasure	
Forgiving		Enjoying life	*Security*
Loyal			Clean
Responsible			National security
True-friendship			Social order
A spiritual life			Family security
Mature love			Sense of belonging
Meaning in life			Reciprocation of favours
Healthy			

Table 16. Glossary of terms relating to values. Terms referring to categories of shared and social values are given in Table 17.

Term	*Definition*
Values	1. Transcendental values: Conceptions about desirable end states or behaviours that transcend specific situations and guide selection or evaluation of behaviour and events (Schwartz & Bilsky, 1987). 2. Contextual values: Opinions about the worth of something (Dietz *et al.* 2005). 3. Value indicators (e.g. monetary values): The worth of something expressed in units of another or as a rank. E.g. WTP expresses how much an individual values something in terms of the money they would give up to get it.
Concerns	Concerns include values, but also accounts for the perceived risk to what is valued. Consequently, one may value an element of the environment but not be concerned with it if one does not perceive it to be at risk (Schultz, 2001).
Attitudes	Favourable or unfavourable evaluations of an object, person or issue (Eagly & Chaiken, 1993). One may value wilderness and be opposed to constructing a dam in a natural area; the latter is an attitude. The difference between a contextual value and an attitude is that a contextual value expresses an opinion of worth, while an attitude is an opinion of favour.
Traits	An enduring disposition of personality (Hitlin & Pitliavin, 2004).
Norms	'Ought to' statements regarding specific situations (Hitlin & Pitliavin, 2004).
Needs	Biological demands on an individual (food, shelter, reproduction, etc.) (Hitlin & Pitliavin, 2004).
Preferences	Rankings or ratings of possible outcomes (Dietz, 2005).
Beliefs	Any proposition that is accepted as true (Colman, 2001). Whereas an attitude must be evaluative, a belief does not imply value judgement.
Worldviews	Generalised beliefs about the state of the world (Dietz, 2005).
Roles	Differing ways of behaviour and decision-making depending on the social situation. Weight of values may differ across roles (Dietz, 2005).

Table 17. Main types of shared values with definitions and dimensions along which they can be discriminated.

Type of shared values	*Definition*	*Associated dimension*
Transcendental values	Conceptions about desirable end states or behaviours that transcend specific situations and guide selection or evaluation of behaviour and events (Schwartz& Bilsky, 1987).	Value-concept
Cultural and societal values	Culturally shared principles and virtues as well as a shared sense of what is worthwhile and meaningful. Cultural values are grounded in the cultural heritage and practices of a society and pervasively reside within societal institutions (Frey, 1994). Societal values are the cultural values of a society; societies may be more or less homogenous, so there may be multiple sets of cultural values in one society that overlap to a greater or lesser degree with each other.	Provider
Communal values	Values held in common by members of community (e.g. geographic, faith/belief-based, activity-based, community of practice, etc.), including shared principles and virtues as well as a shared sense of what is worthwhile and meaningful.	Provider
Group values (within valuation)	Values expressed by a group as a whole (e.g. through consensus or majority vote, or more informally), in some kind of valuation setting.	Provider
Deliberated values	Value outcomes of a deliberative process; typically, but not necessarily, a deliberative group process that involves discussion and learning.	Process
Other-regarding values	As contextual values: the sense of importance attached to the well-being of others (human or non-human). As transcendental values: regard for the moral standing of others.	Intention
Values to society	Worth or importance to society as a whole.	Scale

3.2 Shared values and the individual

There has been a considerable amount written on how individuals adapt transcendental and cultural values through implicit and explicit socialisation processes. In sociology the formation of values, both cultural and individual, is seen as a socio-cultural phenomenon. This formation refers to "*emergent value articulations as they are being shaped, reproduced or changed by social action*" (Bachika & Schulz, 2011, p109). These values at the societal level are acquired over time and become embedded within the culture of a particular society. There can be catalyst or conflict points (from terror acts to highly-contested political issues such as road-building in the UK in the 1990s, or the recent debate on forest ownership), where societies debate values and these are potentially moments of re-valuation or recognition of values that were previously not outwardly or explicitly articulated. Schwartz (1999) discusses a universal set of values that operate at the cultural/societal level as well as at the individual level. At the societal level values "*represent the implicitly or explicitly shared abstract ideas about what is good, right and desirable in a society*" (Schwartz, 1999, p25). Societal values are promoted, imparted, transmitted, changed and maintained in a variety of ways such as through exposure to formal and informal customs, laws, norms, cultural traditions and societal institutions (Bourdieu, 1972; Markus & Kitayama, 1994) (see Section 2.4.3). At the interface between the societal and individual level, we may talk about the operation of values referring to the role that values play and how they are articulated in the life of individuals and society (Bachika & Schulz, 2011). Individual values are therefore a product of cultural values, but are also interpreted through each person's own individual experience. Schwartz (1999) posits that we can infer these collective values by aggregating the values of individuals as they will point to underlying common values and are a product of shared culture. However, others argue that deliberation through the

public sphere, public debate, and consultation are needed to articulate shared social values. Habermas' concept of 'communicative rationality' operates when there is no scientifically rational solution to the problem being considered or when any expert solution may only be applied if agreement can be achieved among a range of diverse interests (Calhoun, 1992). Such an assumption posits that citizen or stakeholder values should be articulated through constructive dialogue and communication if they are to be accounted for as legitimate factors. Through this process, people listen to arguments and use reasoned judgment in a deliberative forum to come to an agreement or decision, which brings more democratic outcomes than simple aggregation of private preferences. Therefore deliberation in the public sphere and public spaces is a key part of political as well as social theory (Dobson, 2012).

Box 1 described the example of the recent attempt to part privatise the public forests managed by FCE. This example illustrates the dynamics between shared values and the individual. Individual values were articulated with people often drawing on their own experiences of visiting specific woodlands as a child and as an adult. Communal values were also articulated, with woodlands seen as important aspects of local communities, particularly in areas with strong historical and cultural connections to woods such as the New Forest and the Forest of Dean. At the societal level the debate covered benefits at an individual scale, e.g. woodlands are good for children and families, but also how we should value not only woodland as a society but nature more broadly, and about justice and who should have access to land.

The articulation of values at the communal and societal level was thus not just about the aggregation of individual values, but came about through debate and dialogue through social discourse. Also, transcendental values that were previously implicit were activated through deliberation, which ultimately led to a re-evaluation of the policies that had been proposed on assumptions around benefits and cost based on aggregation of individual welfare measures. Consequently, although individual values reflect shared cultural and communal values, value to society is not necessarily a reflection of the sum of individuals' values, because individuals' values are subject to shared societal, community and group processes.

3.3 Shared values and total economic value

Section 2.4.2 reviewed a range of issues in economics that were raised to challenge the notion underpinning CBA and allied techniques that individual preferences could be aggregated to establish a measure of social welfare. Here some of the key issues were the multidimensionality of value, and how to deal with concern for others when trying to derive social welfare by aggregating self-regarding preferences. It is commonly perceived by both users and producers of valuation evidence that other-regarding values are addressed by environmental economic analysis through assessment of TEV. TEV includes 'altruistic' value (for people alive now), 'bequest' value (for future generations), and 'existence' value (for other species). These value-components together make up 'non-use' value, which, along with direct and indirect use value, completes the framework (see UK NEAFO WP3b for a more detailed description of TEV).

However, the theory of conventional welfare economic appraisal assumes that values of individuals are purely self-interested. This assumption is a requirement of Bergson-Samuelson social welfare functions that are used to aggregate individual to 'social' values (value to society as a whole) (Hausman, 1993). From this perspective, WTP, revealed preferences in markets, and altruistic, bequest and existence values are conceived to only relate to the personal satisfaction ('warm glow') that one gains from knowing that others might benefit from some environmental good. If this were not the case, there would be a danger of double counting, as satisfaction of an individual's preferences may be counted by both that individual and by others. Thus, CBA is theoretically

incapable of evaluating social welfare impacts if one believes that altruistic, bequest and existence values exist as something more than warm glow alone. There is even a debate on whether warm glow should be excluded from welfare measures and CBA (Hausman, 1993; Nunes & Schokkaert, 2003).

Conversely, if one interprets TEV less strictly and its non-use components as other-regarding, TEV can be linked in various ways to the different types of shared values. First, bequest, existence and altruistic values may be seen as various components of other-regarding values. Second, TEV-components may be underpinned by various transcendental values, such as justice and fairness in relation to others or other species and harmony with the environment. Third, these values may be associated with communal values, stemming or being strengthened by being part of a community where these kinds of values are held in common. Fourth, similarly, they may be supported by societal and cultural values. Fifth, they may become more or less important or articulated when elicited through a deliberated process, and sixth, they may be expressed as a group verdict, rather than as individual values.

In practice, in using conventional valuation methods, most types of shared values (transcendental, cultural, societal, communal, and other-regarding) would be implicitly elicited within any TEV-based assessment; neither stated nor revealed preferences can avoid being influenced by them. However, using conventional means, it is likely that they are both incompletely captured and poorly understood.

When attempting to establish TEV on a shared values basis, DMV, which can consider a pre-aggregated, social WTP (i.e. 'how much is this worth for society to pay for?' or 'how much should society allocate to priority X as opposed to Y?') would be able to establish a measure of social welfare through debate and negotiation, rather than arithmetic means, allowing better incorporation of transcendental, other-regarding and cultural values in relation to the different components of TEV, as well as rights, duties and virtues that are extrinsic to the TEV framework. This way, a measure of value to society can be established without the problematic assumptions of CBA (also see Sections 2.4.2 and 5.4). Non-monetary deliberative methods such as citizen's juries also avoid the constraints of conventional economic methods. These methods will be discussed in more detail in the next section.

3.4 Assessment of shared values

There exists a wide range of methods available to elicit ES values. Traditionally, economists have used survey-based techniques (questionnaires, interviews, semi-structured interviews and focus groups) without significant deliberative components in valuation. There has been a presumption in standard economic approaches that preferences are pre-existing and stable. However, as was also discussed in Section 2.4.3, it is increasingly argued that preferences and contextual values are not pre-formed but need to be generated through some kind of transformative process of deliberation and learning (Christie *et al*. 2012; Kenter *et al*. 2011, 2013b; Parks & Gowdy, 2012; Schlapfer, 2009; Spash, 2007, 2008). Participatory and deliberative processes are appealing in that they provide participants of valuation studies with time to learn about the good under investigation, as well as time to reflect upon (and construct or potentially modify) their preferences (Christie *et al*. 2006; Macmillan *et al*. 2002; Spash, 2007). Furthermore, if the deliberation is undertaken as a group process, participants have the opportunity not only to express and debate their own knowledge, views and perspectives, but also to learn about and consider the values of those of others in the group (see Section 2.4.3). In particular, discussions might address rights, responsibilities, equity, fairness and other moral and political considerations. Furthermore, deliberation provides a crucial opportunity to better consider issues around uncertainties and risks (Zografos & Howarth, 2010). A

group learning process is also particularly important with respect to bringing out cultural and communal transcendental values (Kenter *et al.* 2011) and coming to decisions on group contextual values and common preferences (Niemeyer, 2004). Such group values might be expressed as a consensus or majority view on what the group believe to be in the best interest of society. In DMV, this could be translated in an appropriate welfare measure at the individual scale (e.g. what might be a fair price for individuals to pay), or at the social scale (a deliberated social WTP, or the worth of something to society). However, consensus views are not always achievable or desirable (Sagoff, 1998). A deliberative process could also result in the recognition of a diversity of values, where outcomes are achieved that account for reasonable differences (Lo, 2011). Of course, it is important to consider the potential for power dynamics to bias outcomes towards more powerful (e.g. vocal) members of a group and there is now a robust evidence base for best practice deliberation to minimise such effects, as was previously discussed in Section 2.4.3.

Lo & Spash (2012) provide a useful framework in which they set out three approaches to incorporating deliberation into valuation: preference 'economisation', 'moralisation' and 'democratisation'. Preference economisation primarily seeks to utilise deliberation to ease the respondent's cognitive burden associated with expressing stated preference monetary values. Thus, information and group discussions are primarily focused to nurture value elicitation at the individual level. Preference moralisation seeks to use deliberation to bring out transcendental values and deliberation is extended to address non-economic considerations including social norms, rights and procedural fairness. According to Niemeyer (2004), this is particularly important for valuation of nature, because environmental values are often latent and require a moralisation process to be brought out. Within our conceptual framework, moralisation can be seen as a value construction or translation process where transcendental values are brought in and related to a context, so that contextual values can be formed. Building on a conception of transcendental values as much broader than just ethics, including a wide range of life goals and aspirations, moralisation becomes a broad process. For example, values associated with cultural identity are often intertwined with aspects of environmental settings (Church *et al.* 2011) and deliberation on the importance of nature for cultural identity can significantly change contextual values and preferences (Kenter *et al.* 2011).

Lo & Spash (2012) consider that effective deliberation processes contain both information-oriented and moralisation aspects, but should also seek 'choice democratisation' as an approach that is consistent with deliberative democratic principles and value plurality. Rather than following standardised procedures, such an approach centres on key principles and requirements in relation to process. Here the expression of value outcomes is not predetermined, but based on the needs of participants. However, the authors provide little indication of how this would work in practice.

In terms of classifying actual deliberative methods, Fish *et al*. (2011) identified two broad groups of methods: 'Deliberative' methods and 'Analytical-deliberative' methods. Deliberative methods, such as in-depth discussion groups and citizen's juries, include a range of techniques that allow stakeholders to *"confer, ponder, exchange evidence, reflect on matters of mutual interest, negotiate and attempt to persuade each other*" (Stern & Fineberg, 1996, p73). Through this deliberative process, individuals are encouraged to express and develop their views as different evidence and perspectives are considered. The outcomes of deliberative methods are often qualitative and might include priority lists, recommendations and verdicts. Analytical-deliberative methods such as DMV and MCA tend to involve more elaborative approaches that integrate deliberative-based techniques with more formal decision-making tools. Outcomes from such methods are often expressed in monetary terms or other type of quantitative ranking or rating. The UK NEA discussed these as 'hybrid' valuation methods, as they incorporate some of the benefits of both survey-based monetary valuation and deliberative methods.

An overview of methods, their relation to different types of shared values and their potential to address the commensurability and aggregation issues associated with conventional monetary valuation and appraisal raised in Section 2.4.2, are listed in **Table 18**. As this table shows, particular deliberative methods relate to the different types of shared values both in terms of outcomes of the process (contextual values and indicators such as a deliberated group verdict, a group ranking or deliberated group WTP) and in terms of values that arise through the process. Different methods generate different types of shared value outcomes and indicators, while both the method and implementation of the deliberative process determines the types of values that arise within the process, e.g. whether or not transcendental and other-regarding values are made explicit, which determines to what degree the outcomes of the process are 'moralised' and 'democratised'. These processes will be discussed in more detail in Section 3.5.

Interpretive and psychometric methods also have potential to address particular types of shared values. Interpretive and narrative based methods can reveal communal and transcendental values, while the latter can also be assessed using psychometric survey-based methods and interviews (**Table 18**). Societal and cultural values at a larger scale can be assessed through ethnographic methods, media content and discourse analysis, and other interpretive methods. Participatory mapping is particularly useful for assessing communal contextual values. Some of these approaches will be applied in conjunction with deliberative methods or independently (media analysis) in Section 4, while a broader discussion of interpretive methods and participatory mapping can be found in UK NEAFO WP4.

Previously, referring to Lo & Spash (2012), we indicated that the main aims of deliberation in deliberative valuation exercises have usually been to inform preferences, to moralise or to politicise them. A key aspect of such discussions is whether deliberative processes are primarily meant to be a process to contribute to a more democratic approach to valuation (e.g. in the way that they influence how people's perspectives are taken into consideration) or whether they are primarily a means to better elicit values and preferences by encouraging social interaction. This then also relates to the discussion of whether deliberative approaches are meant to augment, complement or replace conventional welfare economic methods, CV in particular, which will be taken up in more detail in Section 5. In our empirical work in the Section 4, we use both DMV on the basis of CV and CEs, as well as a more politicised form of DMV and MCA as a non-monetary deliberative-analytic method. Here, our main interest is in the degree to which different types of deliberative processes are able to effectively elicit different types of shared values.

Table 18. Overview of methods that can be used to assess shared values of ecosystems, their potential to address value commensurability and aggregation issues, their suitability for different spatial scales and their relative requirements in terms of resources and timescales.

Technique		*Description*	*Types of shared and social values that may be elicited*	*Potential to address commensurability and aggregation issues.*	*Spatial scale*	*Resources required*	*Timescales*
Deliberative	In-depth discussion groups	Group (usually 4 – 8 people) discussions (often repeated), during which participants shape the terms of discussion, develop themes in ways relevant to their own needs and priorities*.	*Process*: Cultural/societal, communal, transcendental, group, deliberated, other-regarding, values in relation to society. *Outcome*: Deliberated group or individual, transcendental and/or contextual values.	High – Deliberation process not restrictive of the type of values that are expressed, though lack of structure can lead to omission of latent/implicit values. Equitable means of aggregation can itself be made a topic of deliberation.	Any, mostly used locally/regionally	Low (local scale) to high (national scale) – In contrast to some other deliberative methods there is no set structure, thus process and outcomes are uncertain and highly dependent on the quality of facilitation.	Short to medium - Highly flexible though dependent on number of groups and iterations.
	Citizen's juries	A small cross section of the general public who come to a considered judgement about a stated policy issue/problem through detailed exposure to and scrutiny of, the relevant evidence base. Group responds by providing a recommendation or 'verdict'*.	*Process*: Cultural/societal, communal, transcendental, other-regarding, values in relation to society. *Outcome*: Deliberated group contextual values (verdict).	Medium to high – Deliberation structures are not restrictive of the type of values that are expressed. Aggregation method pre-determined.	Any	Low to medium - Quality depends on availability of evidence and witnesses (which may drive up cost).	Medium - Depending on complexity of issue, an iterative approach may be required.
	Deliberative opinion polls	Technique designed to observe the evolution of the views of a large citizen test group as they learn about a topic. Typically the group votes on the issues before and after an extended debate*.	*Process*: Cultural/societal, communal, transcendental, group, deliberated, other-regarding, values in relation to society. *Outcome*: Deliberated individual indicators (vote counts).	Medium - Process may restrict the type of values that are expressed. Aggregation method pre-determined.	Any	Medium to high - Mobilising large sample may require considerable effort. Large-scale application can be facilitated through digital resources.	Medium to long - Mobilising large sample may require considerable effort/time

Technique		***Description***	***Types of shared and social values that may be elicited***	***Potential to address commensurability and aggregation issues.***	***Spatial scale***	***Resources required***	***Timescales***
Analytical-deliberative	Participatory modelling	The involvement of stakeholders in the design and content of analytical models that represent ES and their benefits under different spatial and temporal conditions*.	*Process*: Cultural/societal and communal contextual values. Other-regarding and transcendental values only likely to be made explicit if prompted through reflection/deliberation process. *Outcome*: Deliberated group contextual values and indicators (relative importance of different parameters and their relationships).	Low to medium – A highly structured process is likely to restrict the type of values that are expressed unless additional deliberate exercises are incorporated.	Any, system bounds can be established either spatially or contextually.	Low to high, depending on complexity of model, whether models are conceptual or also quantitative and computer based. Complex processes require elaborate facilitation.	Short to long, depending on complexity.

Technique		*Description*	*Types of shared and social values that may be elicited*	*Potential to address commensurability and aggregation issues.*	*Spatial scale*	*Resources required*	*Timescales*
	Deliberative monetary valuation	Techniques that use formal methods of group deliberation to come to a decision on monetary values for environmental change*. May be allied to survey-based techniques (CV or CEs) or use a non-econometric approach to establish values (e.g. incorporating citizen's juries).	*Process*: Cultural/societal and communal contextual values. Other-regarding and transcendental values only likely to be made explicit if prompted through reflection/deliberation process. *Outcome*: Deliberated and/or group indicators (Deliberated individual or group WTP, deliberated individual or group fair price, Deliberated individual or group social WTP).	Low to high – Strongly dependent on focus of deliberation (economisation, moralisation or both), degree to which the process restricts or inhibits elicitation of plural value types and motivations, and degree to which value convergence is enforced. Group-based decision-making and use of 'fair price' or social WTP as payment terms can address some of the issues around aggregating individual preferences.	Any	Econometric DMV requires the advanced quantitative and survey design skills needed for applying CV or CEs, plus facilitation skills. They also require a substantial sample size. Large-scale DMV can be costly though is potentially more efficient for valuation of complex goods, than a conventional individual interview approach. Non-econometric approaches do not require statistical expertise or large samples but do require substantial facilitation and process design skills.	Econometric approaches - medium to long, dependent on sample size. Non-econometric: short to medium - dependent on complexity.

Technique		***Description***	***Types of shared and social values that may be elicited***	***Potential to address commensurability and aggregation issues.***	***Spatial scale***	***Resources required***	***Timescales***
	Deliberative multi-criteria analysis	Techniques that involve groups of stakeholders designing formal criteria against which to judge the non-monetary and (sometimes) monetary costs and benefits of different management options as the basis for making a decision*.	*Process*: Cultural/societal and communal contextual values. Other-regarding and transcendental values only likely to be made explicit if prompted through reflection/deliberation process. *Outcome*: Deliberated contextual individual or group values and indicators (ratings/rankings/scores).	Low to high – Strongly dependent on focus of deliberation (economisation, moralisation or both), degree to which the process restricts or inhibits elicitation of plural value types and motivations, and degree to which value convergence is enforced. Group-based outcomes can avoid issues around aggregating individual preferences.	Any	Low to medium - MCA processes can range from simple to complex, and thus facilitation, design and statistical expertise required varies. Sample size requirements lower less than those of econometric DMV.	Short to medium - dependent on complexity.
Interpretive, potentially deliberative	Participatory mapping/GIS	A group of stakeholders consider or create a physical or digital map to indicate landscape features that are valuable (and/or problematic). Participants may also rate or rank these features for importance. Map layers can also incorporate photo, video, artwork, poetry, etc.	*Process*: Communal contextual values, if features are important/assessed on a larger scale: contextual cultural/societal values. *Outcome*: As above. If features are deliberated and decided upon or rated/ranked by groups, these take the form of deliberated group contextual values and indicators.	High - Using group-based approaches, there is no need to make features of value commensurable across a single metric or aggregate them through an arithmetic means.	Any, so far used mostly locally/regionally.	Low to medium – depending on the complexity of number of workshops needed and the GIS. Resources needed increase with scale.	Short to medium – increases with scale and complexity.

Technique		*Description*	*Types of shared and social values that may be elicited*	*Potential to address commensurability and aggregation issues.*	*Spatial scale*	*Resources required*	*Timescales*
	Storytelling	Participants are asked to tell stories about their experiences of or in relation to places. These may be reflected upon in a group setting to discuss values related to these experiences.	*Process*: Communal contextual values, if features are important/assessed on a larger scale: contextual cultural/societal values. Other-regarding and transcendental values only likely to be made explicit if prompted through reflection/deliberation process. *Outcome*: As process. If stories are deliberated in a group setting, these may take the form of deliberated group values. Number of times particular themes or values are expressed can provide indicators.	High – in interpretation/analysis, values are generally treated as subjective and incommensurable	Any	Low to medium – depending on transcription requirements and complexity of coding.	Short to medium – depending on number of individuals/groups.
	Interviews	Participants are interviewed about their values, beliefs and preferences. Group interviews allow for deliberation and are similar to in-depth discussion groups. However, in group interviews, terms are set by the interviewer rather than the group.	*Process and outcome*: as storytelling.	High – in interpretation/analysis, values are generally treated as subjective and incommensurable.	Any	Low to medium – depending on transcription requirements and complexity of coding.	Short to medium – depending on number of individuals/groups.

Technique		***Description***	***Types of shared and social values that may be elicited***	***Potential to address commensurability and aggregation issues.***	***Spatial scale***	***Resources required***	***Timescales***
Interpretive	Media analysis	Use of a range of textual analysis tools (particularly content, frame and discourse analysis) on (mass) media outputs and social media content over a selected period of time.	*Process*: n/a. *Outcome*: transcendental, communal, societal and cultural values, other-regarding-values.	High - interpretive methods generally consider that values are subjective and plural and cannot be made commensurable in a single metric.	Any	Low to medium. Media analysis can be a cost-effective and relatively rapid approach for large-scale assessments for assessment of societal and cultural values.	
	Desk-based cultural history study	This approach can be used effectively as a first option to quickly scan existing literature over a specified period of time to identify values connected with the decision being considered. The study can cover academic and grey literature, as well as creative writing (prose and poetry). Historical analysis can deliver understanding of past value and belief conflicts that can help to better manage present issues and mitigate risks.	*Process:* n/a *Outcome*: transcendental, communal, societal and cultural values, other-regarding-values.	Idem	Any	Low to medium, depending on depth of investigation.	Short to medium, depending on depth of investigation

Technique		***Description***	***Types of shared and social values that may be elicited***	***Potential to address commensurability and aggregation issues.***	***Spatial scale***	***Resources required***	***Timescales***
	Other interpretive methods	A wide range of qualitative techniques including ethnography and participant observation, genealogy, life history methods, dramaturgical analysis textual analysis of various sorts including discourse, content and frame analysis.	*Process*: n/a. *Outcome*: Variable, can be particularly suited to transcendental, communal, societal and cultural values.	Idem	Variable	Variable	Short to medium (textual analysis, life history methods), long (ethnography), variable (others).
Psychometric deliberative	Values compass	This method asks participants to consider which of their individual transcendental values are most important by ranking or rating them, and then asks to discuss the degree to which these values are important for one's community, culture or society. Values can also be ranked or rated on a group basis. It is based on the values typology developed by Schwartz (Section 4.1.3).	*Process*: transcendental individual, communal, cultural and/or societal values. *Outcome*: As process, plus group and deliberated values.	High, different values are considered separately and compared but not aggregated.	n/a	Low	Short

Technique		***Description***	***Types of shared and social values that may be elicited***	***Potential to address commensurability and aggregation issues.***	***Spatial scale***	***Resources required***	***Timescales***
Psychometric	Subjective well-being indicators	These can be used to assess how and the degree to which places contribute to one's well-being, and are thus highly suitable for assessing the value of cultural ecosystem services using a quantitative non-monetary metric.	*Process*: n/a *Outcome*: communal, societal and cultural contextual values.	Low to high, different kinds of indicators can be considered separately or averaged and aggregated.	Any, highly suitable for large-scale assessments, though there is a need for standardised scales.	Medium - statistical expertise and sample size requirements. Establishment of new instruments is complex and time consuming. Using proven instruments can be relatively inexpensive and rapid.	Short to medium, dependent on complexity and sample size.
	Other psychometric	Psychometric testing refers to the measurement of psychological phenomena and processes, e.g. knowledge, experience, attitudes, values, worldviews. Psychometric models (e.g. Values-Beliefs-Norms, Theory of Planned Behaviour) can be used to better understand the impact of deliberative processes on values.	*Process*: n/a *Outcome*: standard scales exist for transcendental values, and can be developed on a case-by-case basis for contextual communal, cultural and social values. Statistical models can be used to relate psychometric variables (e.g. transcendental values) to contextual values and indicators such as WTP.	n/a	Any	Idem	Idem
* Method description adapted from Fish *et al.* (2011a).							

3.5 The deliberative value formation model

The values, beliefs, norms, etc. that can surface in a deliberative process can be wide ranging. The notion of 'moralisation' as described above suggests that carefully designed deliberative processes that explicitly aims to bring out tacit values can make transcendental values explicit more formally. This allows participants to apply them to a concrete context, on which information and beliefs (e.g. on the consequences of actions, on responsibility, and on behaviour control) are also exchanged, which is likely to lead to formation of norms (Stern, 2000). This influences the formation of contextual values, which in the case of monetary valuation are then debated leading to establishment of individual or group monetary value indicators: deliberated individual or social WTP[18]. In non-monetary methods such as MCA, indicators would be rankings or ratings, or a verdict in a citizens' jury. **Figure 10** provides a simplified model of this process, which we have called the Deliberative Value Formation (DVF) model. It should be noted that in the real world, certain stages may be missed or may be ordered differently. Considering the relation between individual and group/shared values as a dynamic interplay (Section 3.2), we can then identify a range of processes that are responsible for shaping value outcomes:

a) adjustment or development of views as a result of changing understanding, resulting from exposure to new knowledge, e.g. on the state of the environment or of ecological processes or the impacts of behaviour or choices (*cf.* Bardi & Goodwin, 2011). Changing understanding is not always positive, e.g. when people are 'misinformed'.
b) adjustment or development of views after considering the reasoning of others, which can lead to the group moving to a more common (consensus or majority) perspective.
c) arising of implicit layers of values, e.g. as a result of debate or deliberative exercises, participants realise things that are of (potentially profound) importance to them that they had not realised explicitly previously. It can be conceived that participants hold previously 'dormant' values that are triggered through deliberation.
d) adjustment or development of views as a result of group dynamics, including peer pressure and power dynamics. This can lead to either adaptation (including the inverse of 'c', where participants feel they are unable to express certain values) or to entrenchment of individuals' points of view when they feel they need to guard their interests.
e) consideration of others' values and needs can lead to an increased felt sense of responsibility and concern for others compared to the pre-deliberated state, leading to increased realisation of other-regarding values. This may be paired with an increased sense of 'common cause' and development of a joint, mutual or reciprocal moral motivation, which can lead to increased willingness to sacrifice personal interests. In the words of Sagoff (1998), this would constitute a shift from 'consumer' to 'citizen' values.
f) adjustment of views as a result of social desirability bias, which may include a 'feigned' version of e.

Clearly, not all deliberative valuation processes will lead to all of these effects. This depends on the aim of the process (information sharing, moralising or both), the design of the process and the degree to which it sufficiently uncovers or triggers dormant values, group composition and prior relations between participants, and the quality of facilitation. In practice, however, these processes tend to operate together and are interdependent. In social-psychological theory, including Ajzen's Theory of Planned Behaviour (TPB), and Stern, Dietz and colleagues Values-Beliefs-Norms (VBN)

[18] Social WTP is an expression of how much one believes society should pay, and is thus a reflection of one's preferences for different societal choices, e.g. if society should be WTP £100 million to improve health services, those resources would not be available to invest elsewhere. The Hastings case study in Section 4 provides an example of deliberative monetary valuation using social WTP.

theory of environmental behaviour (Ajzen, 1991, 1985; Stern, 2000; Stern *et al.* 1999), it is conceived that changes in behaviour and preferences result from changes in norms (beliefs about what is right) and attitudes around the environment. In VBN, the relation between values and norms is mediated by beliefs that depend on knowledge, e.g. beliefs and knowledge about the consequences of actions for objects of value. For example, someone who has strong biospheric values may not have strong preferences for a marine protected area if he does not believe that fisheries activities are harmful for the underwater environment. In TPB, preferences and behaviour are thought to be strongly influenced by the norms of others, but also by their beliefs about the control people have over circumstances: again, beliefs that relate to knowledge. Bardi & Goodwin's (2011) Value Change Model adds that values and beliefs can be altered by new circumstances, or challenged by a new environment. Considering these various models, it becomes clear that it is difficult to isolate learning processes from moralisation processes, because knowledge itself can lead to changes in norms.

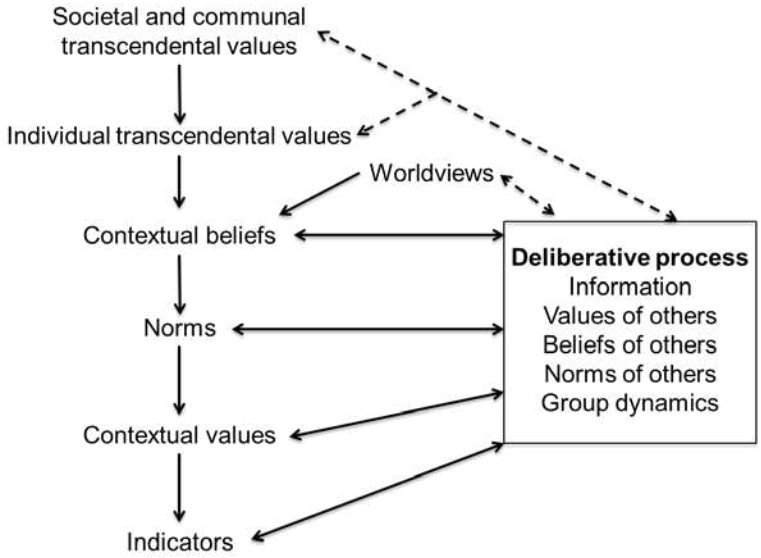


Figure 10. The Deliberative Value Formation (DVF) model. The DVF provides a conceptual model of the process of value formation from societal and transcendental values to contextual values and value indicators, in relation to the deliberative process. Arrows indicate the direction of influence. Solid arrows indicate potential for value change or formation in short-term processes. Worldviews and transcendental values, while they influence the deliberative process, are assumed to be relatively enduring and are only likely to change as a result of long-term and repeated deliberative processes (dashed arrows).

As previously discussed in Section 2.4.3, the concept of *social learning* considers that learning is (ultimately) socially-mediated and that values are influenced by the socio-cultural context in which we learn (Bandura, 1977). Thus values are likely to be influenced and formed through deliberation with others in a social network (Reed *et al.* 2010). Whether because people are more likely to form social ties with those who already share similar values (homophily of values) or because people are influenced by those they are already socially connected to, this can lead to the formation of 'communities of practice' united by common goals, values and practices (Wenger, 1998). For example, in UK uplands, where there are conflicting values in relation to the use of land to produce livestock and game versus a wider range of ES, Prell *et al.* (2009) found people's values in relation to upland management were more likely to match the values of those they had social ties with, than others within their institution, despite many of the institutions involved having strong value positions in relation to the issues being considered. Similarly, in a group-based valuation exercise of rainforest ES in the Solomon Islands, Kenter *et al.* (2011) demonstrated that learning strongly contributed to the formation of what could be called shared 'citizen values' around environmental

issues. In a series of participatory action research interventions, participants debated the impacts of their behaviour on the environment, the use values of different environmental goods, the ways in which their cultural identity was dependent on the environment, and complex social-ecological dynamics around cash cropping and the impacts of these dynamics on the lives of future generations. This considerably increased preferences for environmental goods over the benefits of cash crops, and participants' stated learning outcomes were a mix of informational and moral types of learning that were difficult to tease apart.

The diversity of these processes raises questions about the legitimacy and desirability of the deliberated and group values that arise. The literature on deliberative democracy and DMV tends to highlight processes a, b and e, the potential benefits of rational assessment of the evidence and subsequent moral debate, leading to more desirable, 'citizen value' outcomes. However, there has yet to be an empirical evidence base built for valuation of nature where it is demonstrated that these effects are realised rather than adaptation through peer pressure and social desirability. Nonetheless, a considerable and detailed literature exists in relation to stakeholder participation and participatory research in general that has considered these problematic aspects of deliberative processes, and how to avoid them through appropriate process and effective facilitation (Chambers, 2002; Christie *et al*. 2012; Cooke & Kothari, 2001; Evely *et al*. 2011; Fish *et al*. 2011a; Kumar, 2002; Pretty, 1994; Rodela, 2012b).

4 Case studies

This part of the report discusses four case studies based on new research. This empirical research provides examples of:

- how a wide range of different methods can be used for assessing the different types of shared values;
- how shared values may differ from individual/aggregated individual values, both in terms of magnitudes, and ontologically;
- how deliberative processes may affect values through the process of value construction and translation from transcendental to contextual values according to the DVF model discussed in our theoretical framework (Section 3.5).

Two local scale case studies are followed by two national scale case studies, each focusing on values related to marine and coastal environments, testing a mix of deliberative, monetary and non-monetary methods for assessing shared, cultural and plural values. The first local case study is the Inner Forth, which consisted of a regional assessment of a range of ES values using DMV in local communities in the Central Belt of Scotland, to support project design and implementation by an Royal Society for the Protection of Birds (RSPB)-led partnership for a multi-purpose landscape management project, the Inner Forth Landscape Initiative (IFLI). This case study is shared with UK NEAFO WP4.

The second local case study looks at the cultural benefits of inshore fisheries at Hastings, working with the Hastings Fisheries Local Action Group and a wide range of local stakeholders. Fieldwork consisted of three iterative workshops that included a range of deliberative and deliberative-analytic tools, considering the value of the marine environment alongside other social priorities.

The first national case study is an assessment of the value of CES of pMPAs by divers and sea anglers in England, Wales and Scotland, in association with the Marine Conservation Society (MCS), the Angling Trust (AT) and British Sub-Aqua Club (BSAC). The central methods used here were: an online survey that includes a CV exercise as well as well-being indicators for non-monetary valuation of marine cultural services; and a series of workshops using DMV and MCA. Here the deliberated and group values elicited through the workshops could be compared to the individual survey values. Both the Forth and MPAs case study use before-after psychometric testing of transcendental values, beliefs and norms to better understand the impacts of deliberation.

Finally, a second national case study, coastal and marine values in the media, used content and discourse analysis of a wide range of media publications to assess cultural and societal values around marine environments and the coast. The aim of this case study was to evaluate this approach as a means to understand broader cultural and societal values around particular environmental contexts.

Figure 11 indicates the location of workshops held in the Forth, Hastings and MPAs case studies. **Table 19** provides an overview of methods and tools used and how they relate to the different types of shared values identified in our theoretical framework.

This section is structured as follows. We will first provide an overview of methods used across multiple case studies. We will then describe specific methods and results for each individual case study and discuss those results within the context of the case study. A discussion of broader themes and implications will be presented in an overall case studies synthesis discussion in Section 4.6.

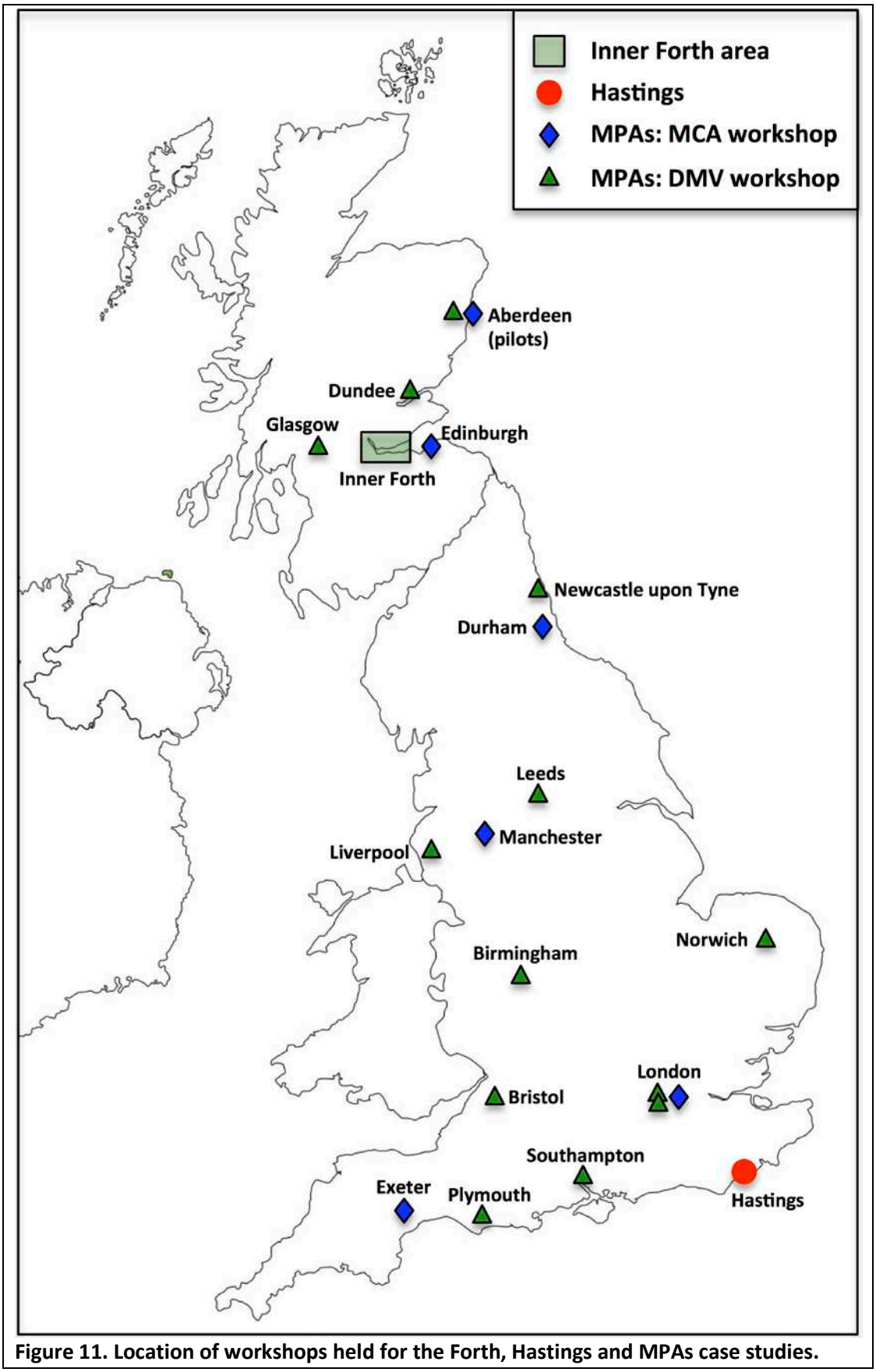


Figure 11. Location of workshops held for the Forth, Hastings and MPAs case studies.

Table 19. Case studies, types of shared values assessed and methods and tools used.

Case study	*Types of shared values assessed*	*Methods and tools used*
Forth	Deliberated values (vs non-deliberated) Group values (vs individual) Communal values Transcendental values Other-regarding values	DMV Participatory systems modelling DMV DMV Participatory mapping/GIS Structured group discussion Psychometrics DMV
Hastings	Deliberated values Group values Communal values Transcendental values Other-regarding values Value to society	SWOT analysis Participatory systems modelling MCA DMV (participatory budgeting) Structured group discussion Informal deliberation MCA DMV (participatory budgeting) Rankings Storytelling Goal ranking Schwartz compass Structured group discussion MCA DMV (participatory budgeting) MCA DMV (participatory budgeting)
MPAs – Online survey	Communal values Transcendental values	Well-being indicators Psychometrics
MPAs – DMV workshops	Deliberated values (vs non-deliberated online survey) Group values (vs individual) Communal values Transcendental values	DMV Structured group discussion DMV DMV Storytelling Well-being indicators Schwartz 'compass' Psychometrics (change vs survey)
MPAs – MCA workshops	Deliberated values Group values (vs individual) Communal values Transcendental values Other-regarding values	MCA Carousel group discussion MCA MCA Psychometrics (change vs survey) MCA
The coast in the media	Cultural and societal values Communal values Transcendental values Other-regarding values Value to society	Content analysis Discourse analysis

4.1 Research design across case studies

The three deliberative workshop-based case studies (Forth, MPAs and Hastings) built on each other in terms of methods development. Central to them were the two 'hybrid' valuation methods highlighted in the UK NEA: MCA and DMV. The Forth case study, which was developed first, combined DMV with participatory conceptual systems modelling and psychometric testing. Elements of the DMV and psychometrics fed into the MPAs case study. The MPAs study added MCA, storytelling and use of a 'values compass' to compare monetary against non-monetary techniques and more effectively elicit transcendental values during deliberation. The Hastings case study took those three elements and also developed the systems modelling exercise derived from the Forth study, whilst adding a novel implementation of DMV on the basis of participatory budgeting. Although MCA and CV based DMV allow for ethical pluralism in terms of the deliberative/participatory process, they generally attempt to reach a single utility measure. These methods therefore imply that it is possible to empirically estimate value, in a similarly positivist way to neoclassical economics. However, the work also included a range of deliberative and narrative based techniques based on a more interpretivist epistemology, for example methods based on storytelling and visioning or where values were discussed in groups and multiple values returned where consensus was not possible.

There was considerable novelty in the design of the case studies, with to our knowledge no previous studies combining monetary valuation with participatory systems modelling or storytelling, only a very limited number of studies linking economic and psychometric models in valuation, no previous studies developing a non-econometric implementation of DMV as in our Hastings study, and no previous studies developing a deliberative MCA or DMV design on the basis of an explicit model of value formation.

4.1.1 Deliberative monetary valuation and multi-criteria analysis

DMV of the environment can encapsulate a wide range of approaches incorporating participatory, deliberative, political and/or social-learning processes, to establish a monetary value for the benefits of environmental goods. In DMV, small groups of participants explore the values that should guide their group decisions through a process of reasoned discourse. DMV can either use an econometric approach for establishing monetary values based on CV (MPAs case study) or CEs (Inner Forth), or it can establish a societal WTP directly through deliberation and negotiation (Hastings). The latter has been explored theoretically and is generally associated with the aim of achieving a negotiated outcome through principles of deliberative democracy (Howarth & Wilson, 2006; Spash, 2007, 2008). However, we are not aware of any previous examples in practice. In the Forth and MPAs case study, we implemented DMV both as deliberated individual values based on individual WTP and deliberated group values based on a 'fair price'. Here participants were asked to act on behalf of the interest group they represent and consider what would be a fair price to ask a member of their local community (Forth) or divers and anglers (MPAs) for improvements in the environment. As far as we are aware, use of DMV using a 'fair price' payment term is limited to a single previous study (Szabó, 2011).

MCA is a decision-support tool for exploring issues and making decisions that involve multiple dimensions or criteria. It allows less tangible cultural benefits related to ES to be systematically evaluated alongside economic, social and environmental priorities, thereby providing a way of valuing criteria upon which it may be difficult or controversial to place a monetary value. It can also help unpick plural values by helping group members make the basis for their values more explicit, for example allowing them to express how relative priorities differ depending on whether the decision is to be made in their role as a householder or as a member of their local community.

Typically, MCA uses an arithmetic means to come to a composite score for the options under consideration, where criteria are used as weights. The UK NEAFO 'NEAT Tree' developed by WP9 provides more detail in 'mini tool reviews' of the DMV and MCA approaches.

A range of deliberative exercises in addition to DMV and MCA were designed to target different elements of the DVF model (Section 3.5), including opportunities to share information and learn from each other (participatory systems modelling, SWOT analysis), share experiences, perspectives and beliefs (storytelling) and moralise the discussion (exercises related to transcendental values). The MCA and DMV itself were framed in such a way as to stimulate 'democratisation' of values, e.g. by asking for a fair price in DMV.

4.1.2 Participatory systems modelling

Systems are a way of describing interrelated sets of elements or entities (van Gigch, 1991). Complex systems, such as social-ecological systems, are characterised by emergent behaviour: complex behaviour, properties and patterns that arise from the relatively simple elements of the system through positive and negative causal feedback loops (Kay & Regier, 2000; Richardson, 2005). In participatory systems modelling (PSM), system models are developed by groups of stakeholders or the public. Motivations for this kind of approach include a desire to pay attention to process as well as content issues, a realisation that identification and description of problems is based on subjective judgement and a desire to negotiate a joint understanding and arrive at an 'inter-subjective' description (Lane & Oliva, 1998). When such agreement is attained this should engender a desire to act to make improvements and to be committed to such actions (Ackoff, 1977; Eden & Sims, 1979; Lane & Oliva, 1998). Thus, participatory modelling exercises can be thought of as a process of learning, but also trust-building and exchange of values and beliefs through structured collaborative analysis.

PSM has been used in a wide array of contexts. Examples include endangered wildlife management (Beall & Zeoli, 2008), climate change adaptation (Bizikova *et al.* 2009), watershed management (Brown Gaddis *et al.* 2007; Videira *et al.* 2009), water resource planning (Cockerill *et al.* 2006; Kallis *et al.* 2006), land use planning (Prell *et al.* 2007; Jones *et al.* 2009), sustainable forest management (Mendoza & Prabhu, 2006; Standa-Gunda *et al.* 2003), tourism management (Patterson *et al.* 2004), balancing conservation and development goals (Sandker *et al.* 2010) and public sector administration (van den Belt *et al.* 2010). Nonetheless, to date there have been no studies to date that integrate monetary valuation and systems modelling using a participatory approach.

In practice, participants consider a system by discussing variables and establishing how they interrelate through causal links. In our exercises, participants not only considered measurable social, economic and environmental variables, but were also encouraged to link these with transcendental values to consider how values 'drive' systems and are affected by them.

4.1.3 Storytelling and transcendental 'value compass'

To actively stimulate research participants to 'moralise' around the environmental issues and questions they were being asked to consider and to make transcendental values more explicit, in the MPA-DMV and Hastings workshops we presented participants with a simple overview of the 56 value items developed by Schwartz and colleagues (Schwartz & Jerusalem, 1994; Schwartz, 1992; Schwartz & Bilsky, 1987). This set of values includes virtuous and normative elements (e.g. honesty, obedience), and a wide range of aspirations that are not necessarily normative (e.g. wisdom, enjoying life) (**Table 15** and Section 3.1). On the basis of substantial empirical evidence, the authors argue for a 'universal' structure in values across cultures, consisting of a range of dimensions that

are more or less closely associated with each other. Our interest here was not so much in the structure of transcendental values, but in presenting a broad spectrum of different values for inclusion in deliberative exercises.

MPAs-DMV and Hastings workshop participants were also asked to relate stories. Stories provide narrative accounts of value. They mix descriptive and normative statements in an organised and engaging manner. The typical format of a beginning, middle and end provides a familiar structure; the ending usually engenders an overall unity (Velleman, 2003). Stories often indirectly, rather than explicitly, communicate value judgements of all kinds (McShane, 2012). As an expression of values, frequently transcendental values, stories can provide affirmation of what is important. Within the psychological literature, value affirmation has been found to support various dimensions of well-being such as identity (Shnabel *et al.* in press) or self- control (Burson *et al.* 2012). Apart from being a valuation approach in its own right by revealing individual and shared meanings and value judgements, within the wider workshop processes in our case studies storytelling also performed the particular function of bridging transcendental and contextual values. Thus, storytelling served as a means to relate transcendental values to experiences in environmental settings, bridging transcendental, normative values and virtues with contextual values, the values we ascribe to things.

In the workshops, participants were asked to think about their favourite marine sites in the UK (MPAs case study) or the Hastings marine environment. Participants were given a minute to reflect on the experiences they had there. To help prompt discussion, they were then asked to indicate, individually, on a sheet if any of the following related to their experiences:

- engagement with nature, getting to know nature, feeling connected to nature;
- place identity: feeling like these places are part of your personal identity, feeling a sense of belonging when you have gone there and missing them when you can't go there;
- therapeutic value: feeling free, feeling healthy and clearing your head;
- spiritual value: feeling connected to something larger than yourself;
- social bonding: bonding with other people;
- transformative value: memorable experiences that have a lasting impact on your life.

This list corresponds to six well-being dimensions that had been derived from the MPAs online survey (see Sections 4.4.2.3 and 4.4.3.3). Participants could also add to the list. They were then asked to share a memorable story of this experience with the group. Sharing then often led to discussion of common themes.

Next, participants were confronted with a 'values compass' consisting of the list of Schwartz values (**Table 15**). Participants first considered the values for themselves, individually, marking which they felt were most important to them and then were asked to discuss them with others in relation to their stories and experiences, and diving and angling as a whole (MPAs), or values of the community as a whole (Hastings). They were also asked to discuss with the group whether these values contributed to their responses in the workshop to that point.

4.1.4 Psychometric testing

To investigate psychometric attributes of research participants, we incorporated sets of questions based on the VBN theory (Forth and MPA case studies), which is specific to environmental values and behaviour, and based on the more general TPB (MPA case study only). The VBN theory was devised by Stern and colleagues (Stern, 2000; Stern *et al.* 1999) and has become increasingly well-established (Hansla *et al.* 2008; Kaiser *et al.* 2005; Steg *et al.* 2005). It considers that values shape environmental worldview, which in turn influences beliefs around awareness of the consequences

(AC beliefs) of actions and ascription of responsibility (AR beliefs). These in turn shape one's personal norms, which determine behaviour (**Figure 12**). The three main value bases thought to determine environmental worldview are self-interest (or egoistic values), humanistic altruism (or simply altruistic values) and biospheric altruism (or biospheric values) (Dietz *et al*. 2005; Snelgar, 2006; Stern & Dietz, 1994; Stern *et al*. 1993). The self-interest and altruism value bases are empirically well established (Dietz *et al.* 2005) and there is also clear evidence for an anthropocentric-ecocentric distinction in value structure (Kortenkamp & Moore, 2001; Milfont & Duckitt, 2004; Schultz & Zelezny, 1999). There is, however, no agreement whether humanistic altruism is more allied with self-interest (Snelgar, 2006) or with biospheric concern (Dietz *et al*. 2005)

The TPB was originally devised by Ajzen (1991; 1985), linking the theory of reasoned action (Ajzen & Fishbein, 1980) with considerations around control that people belief they have over volitional behaviour. Behaviour is seen to be associated with intentions, which are in turn influenced by *attitudes* (positive or negative evaluations of options); perceived *behavioural control* in relation to options, i.e. perception of personal difficulty or ease to realise an option; and *subjective norms*, which reflect the way others evaluate options (**Figure 13**). In relation to the environment, this means that behaving pro-environmentally depends on having a positive attitude to the behaviour, feeling moral support from others, and believing that one can make a difference.

The TPB, like VBN, has been well used extensively in relation to the environment (Fielding *et al.* 2008a; 2008b; Kaiser *et al.* 2005; Spash *et al.* 2009). Nonetheless these psychological models have only been applied to WTP studies in a few cases, even while they have considerable potential for explaining values (Kenter *et al.* 2011; Spash *et al.* 2009). In deliberative valuation, they may have particular use in illustrating how different psychological constructs arise in the deliberative process and how they affect contextual values and WTP (Kenter *et al*. 2011).

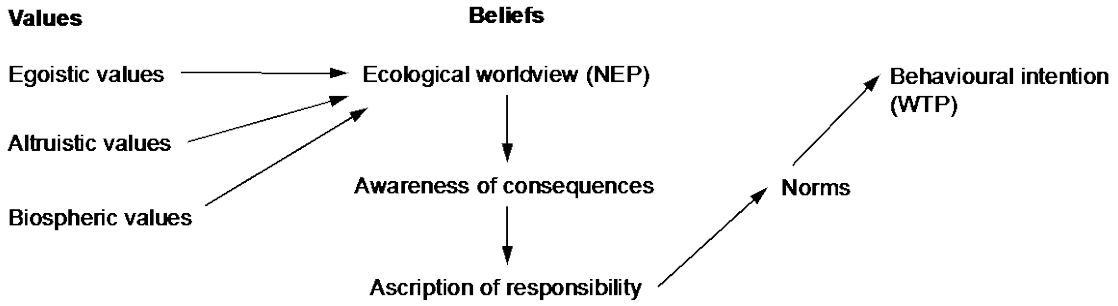


Figure 12. Representation of the Values-Beliefs-Norms (VBN) theory of environmental behaviour as adapted for this study. NEP refers to the New Ecological Paradigm, a psychometric scale for assessing ecological worldview that has come to be associated with the VBN theory (Dunlap *et al.* 2000).

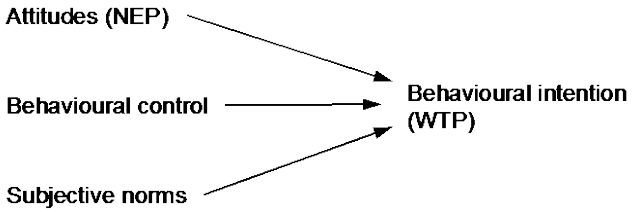


Figure 13. Representation of the Theory of Planned Behaviour (TPB) as adapted for this study.

As the use of the psychometric questionnaires was similar in the Forth and MPAs case studies, we will now briefly detail their use before we discuss the case studies one by one. In the Forth workshops, a VBN questionnaire was completed at the start and end of the workshop. In the MPA

case study, we included a similar VBN questionnaire, but added TPB questions. Participants completed the questionnaire as part of an online survey (prior to attending the workshops) and again at the end of the workshops. Thus, in both case studies, we were able to assess changes resulting from deliberation and the group process. In the Forth and MPA DMV workshops, following Spash *et al.* (2009) and Lopez-Mosquera & Sanchez (2012), we implemented the VBN and TPB by considering WTP as a statement of behavioural intent, including VBN and TPB parameters in econometric valuation models. For the MCA workshops in the MPA case study, we only considered changes in the VBN and TPB test results.

The 'values' component of the VBN questionnaires consisted of a list of three egoistic, three altruistic and three biospheric value indicator statements; participants were asked to judge on a nine point scale from 'not important' (0) to 'of supreme importance' (7), with a further option to choose 'opposed to this value (-1); this is a conventional format for assessing Schwartz values (Steg *et al.* 2005). Value descriptions were drawn from a short version (Stern *et al*. 1998) of the Schwartz universal values scale (Schwartz, 1992). All other indicator statements followed a conventional 5-point Likert scale from 'strongly agree' to 'strongly disagree'. For ecological worldview (VBN) and attitudes (TPB), we developed a shortened, 10 item version of the New Ecological Paradigm (NEP) scale (Dunlap *et al*. 2000) based on recommendations by Hawcroft & Milford (2010). For the Forth study, we used four items for AC and AR beliefs and Norms, adapted from Steg *et al.* (2005) to our context. For the MPA study we used only two items to reduce participant burden in the online survey, which was lengthy as it also included both monetary and non-monetary valuation tasks. There we also used two items each for subjective norms and perceived behavioural control, adapted from Wilson & Irvine (2011). Items and their constructs are listed in **Table 20**.

In the MPA study we analysed the efficacy of the scales and models using *confirmatory factor analysis* (CFA), *structural equation modelling* (SEM), and estimation of *Cronbach's alpha*. The purpose of CFA is to test how well empirical indicator statements measure the underlying theoretical constructs; identified relations among the statements are described in terms of 'factor loadings'. Cronbach's alpha is frequently used in conjunction with factor analysis to assess reliability of the resulting factors; high alpha scores suggest that the indicator statements within a given factor vary consistently and can be considered as a reliable measure of the construct (Cronbach, 1951). SEM combines a measurement part and a structural part of the model. The measurement model is similar to CFA, estimating loadings of the indicator statements to their hypothesised factors. The structural part consists of assumed causal relations between factors, e.g. whether factor A influences B. Each relationship has an associated regression equation and these are all simultaneously estimated. As such, SEM is a useful tool for confirming whether theoretically considered relations exist empirically, though it is only suitable for use with large samples, as are complex CFAs. We applied the CFA and SEM to the online survey data (a large enough sample for these methods, Section 4.4.3 and see Kenter *et al.* [2013a]). For the Forth study, we used the *multiple group method* (MGM), a simple CFA method suitable for small samples. MGM establishes a correlation matrix to examine for each indicator which factor they correlate with most (correcting for self-correlation) (Steg *et al.* 2005). SEM and CFA procedures and results are provided in more detail in Annex 2. To assess differences in scores before and after deliberation, we used paired sample t-tests.

Table 20. Psychometric constructs and their indicators used in the Forth and MPAs case studies. Italicised indicator statements are reverse coded.

Construct	*Theory*	*Parameter*	*Indicator statements: Forth*	*Indicator statements: MPAs*
Egoistic values	VBN	EGO1	Authority, the right to lead or command.	
		EGO2	Wealth, material possessions, money.	
		EGO3	Influence, having an impact on people and events.	
Altruistic values	VBN	ALT1	Social justice, correcting injustice, care for the weak.	
		ALT2	Equality, equal opportunity for all.	
		ALT3	A world at peace, free of war and conflict.	
Biospheric values	VBN	BIO1	Protecting the environment, preserving nature.	
		BIO2	Respecting the earth, harmony with other species.	
		BIO3	Unity with nature, fitting into nature.	
New ecological paradigm (NEP)	VBN, TPB	NEP1	*Humans have the right to modify the natural environment to suit their needs.*	
		NEP2	When humans interfere with nature it often produces disastrous consequences.	
		NEP3	Humans are severely abusing the environment.	
		NEP4	*The earth has plenty of natural resources if we just learn how to develop them.*	
		NEP5	Plants and animals have as much right as humans to exist.	
		NEP6	*The balance of nature is strong enough to cope with the impacts of modern industrial nations.*	
		NEP7	Despite our special abilities humans are still subject to the laws of nature.	
		NEP8	*The so-called "ecological crisis" facing humankind has been greatly exaggerated.*	
		NEP9	The earth is like a spaceship with very limited room and resources.	
		NEP10	*Humans will eventually learn enough about how nature works to be able to control it.*	
Awareness of consequences (AC)	VBN	AC1	In the Forth, many species of plants and animals are under increasing threat from human activities.	Many forms of life in our seas are under a real threat from human activities.
		AC2	Natural habitats are important for our standard of living.	*If the diversity of life in the seas would be diminished, it would not significantly impact on our economy.*
		AC3	Water pollution is a problem in the Inner Forth.	
		AC4	*If the diversity of local wildlife would be diminished, it would not impact on our local economy.*	
Ascription of responsibility (AR)	VBN	AR1	A clean and healthy environment in the Inner Forth depends on the support of people like me.	I feel responsible for the plight of rare or endangered species of plants and animals.
		AR2	I feel responsible for the plight of rare or endangered species of plants and animals.	*I don't feel personally responsible for environmental issues, as they are the responsibility of government and industry.*

Construct	*Theory*	*Parameter*	*Indicator statements: Forth*	*Indicator statements: MPAs*
		AR3	*I don't feel personally responsible for environmental issues, as they are the responsibility of government and industry.*	
		AR4	I am jointly responsible for reducing pollution.	
Norms	VBN	NOR1	We should provide more space for other species to live and thrive in the Inner Forth.	We should protect spaces for other species to live and thrive in our marine environment.
		NOR2	*We should think about the economy of the Inner Forth first and only then about its environment.*	*We should think about the economic importance of the seas first, and only then about environment and conservation issues.*
		NOR3	My generation should feel obliged to leave the Inner Forth environment in a better condition than that we found it.	
		NOR4	*I don't think we should make the environment a priority when we make important decisions about the future of the Inner Forth.*	
Subjective norms	TPB	SUB1		Most people important to me support taking action to protect the marine environment.
		SUB2		Most people important to me think I should support conservation of sea life.
Behavioural control	TPB	BC1		It is easy to take action to support protection of the marine environment.
		BC2		It is difficult for me to do anything significant that would help conservation of sea life.

4.2 Local case study 1: Inner Forth

This case study developed a novel methodology that linked DMV with participatory conceptual system modelling and participatory mapping. The study evaluated proposals associated with the *Inner Forth Futurescape* and Inner *Forth Landscape Initiative* (IFLI) projects. The Futurescape revolved around a number of coastal realignment and conservation habitat creation/restoration proposals. The IFLI focused on community-led regeneration of the landscape mixing cultural and environmental initiatives. The study provides a useful example of the assessment of community values in a local ex-ante project appraisal context.

4.2.1 Background

The Firth of Forth, located in Central Scotland, is the estuary of the Forth, where it flows into the North Sea north of Edinburgh. This study focused on the inner estuarine area, between Stirling and Blackness (**Figure 14**). Historically, the large, flat floodplain provided rich agricultural land and suitable sites for settlements and industry (glass, whiskey and more recently petrochemicals) to grow. However, due to loss of traditional industries and coal mining over recent decades, local

people now suffer from high rates of unemployment. Multiple deprivation in terms of income, health, education, housing, crime, etc. is considerable at various places within the area, with North Stirling, West and North Falkirk, Grangemouth, Tullibody and south east Alloa among the 10% most deprived areas of Scotland (Scottish Government, 2011).

Landscape types in the area include flats, coastal margins, lowland river valley and coastal hills. Key habitats are intertidal mudflat and salt marsh, which are an important roosting and feeding area for tens of thousands of seabirds in autumn and winter. The inner estuary includes Site of Special Scientific Interest (SSSI), Special Protected Area (SPA) and Ramsar designations. In the past, much intertidal habitat has been lost and replaced by artificial sea-defences and engineered coastline. Managed realignment of the coastline could function as both a climate change adaptation measure and a means to restore lost habitat. The RSPB proposes to combine managed realignment and habitat creation in the Futurescape project, which would link biodiversity and climate change adaptation/flood management objectives. The RSPB has also taken the initiative for the wider-ranging IFLI, which involves a range of partners including Falkirk, Stirling and Clackmannanshire councils, the Central Scotland Forest Trust, the Scottish Environmental Protection Agency, Scottish Natural Heritage (SNH), Historic Scotland and Sustrans. This initiative integrates environmental and conservation objectives with measures to improve access, aesthetics, interpretation, cultural heritage and skills, to encourage both ecological and economic regeneration of the area. The project strongly emphasises involvement of stakeholders and local people. The research discussed here feeds into these projects by establishing values for key benefits, and by eliciting the landscape perspectives of local communities in the area.

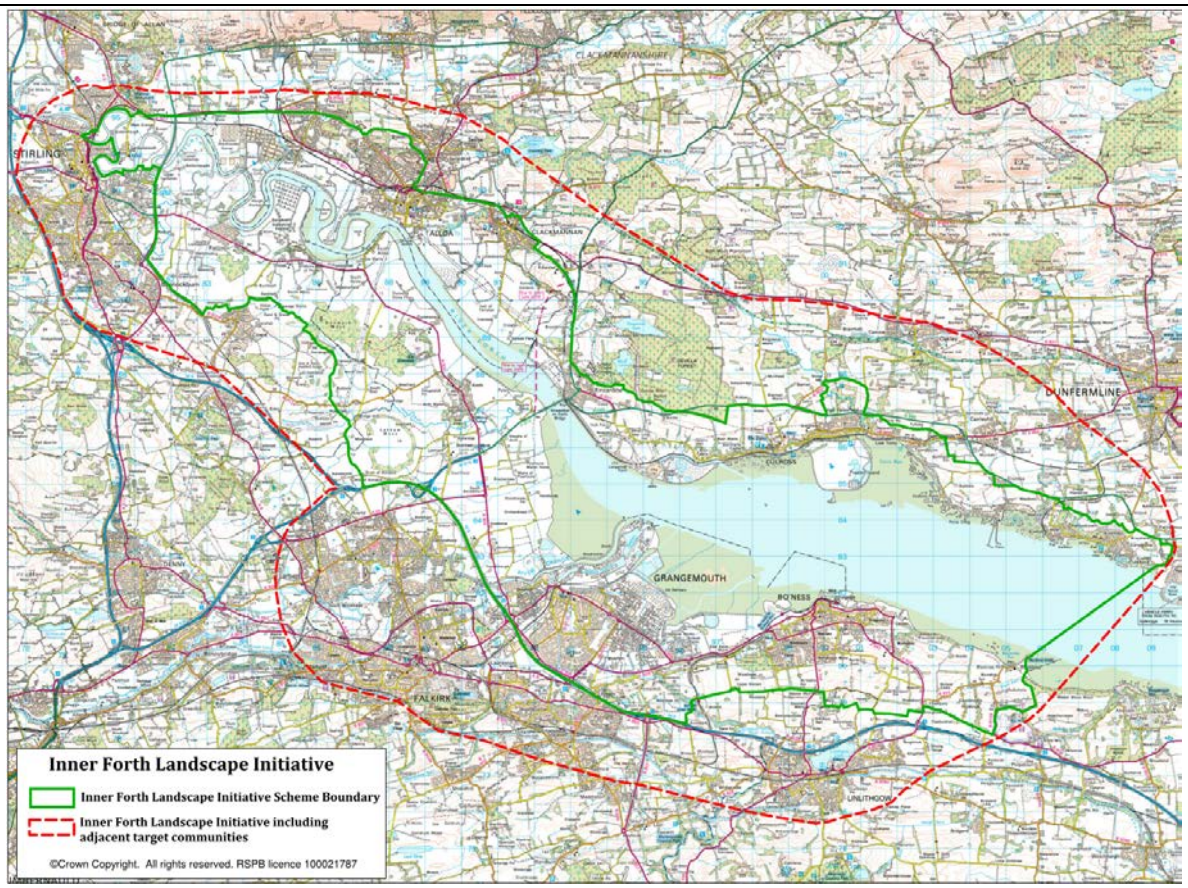


Figure 14. Boundary of the Forth case study area. The green line was used as a delimiter to indicate where conservation and regeneration activities might take place. The red line was used as the target area for recruiting participants for community council workshops.

4.2.2 Methods

This project developed a novel methodology that linked DMV methods with participatory conceptual system modelling. An outline of the methodological approach is given in **Figure 15**. The research started with stakeholder analysis. This was followed by a stakeholder workshop (Stage 1) where 28 stakeholder representatives developed a conceptual system model of the Inner Forth. This was followed by Stage 2, consisting of nine DMV workshops across the region involving 52 community council representatives.

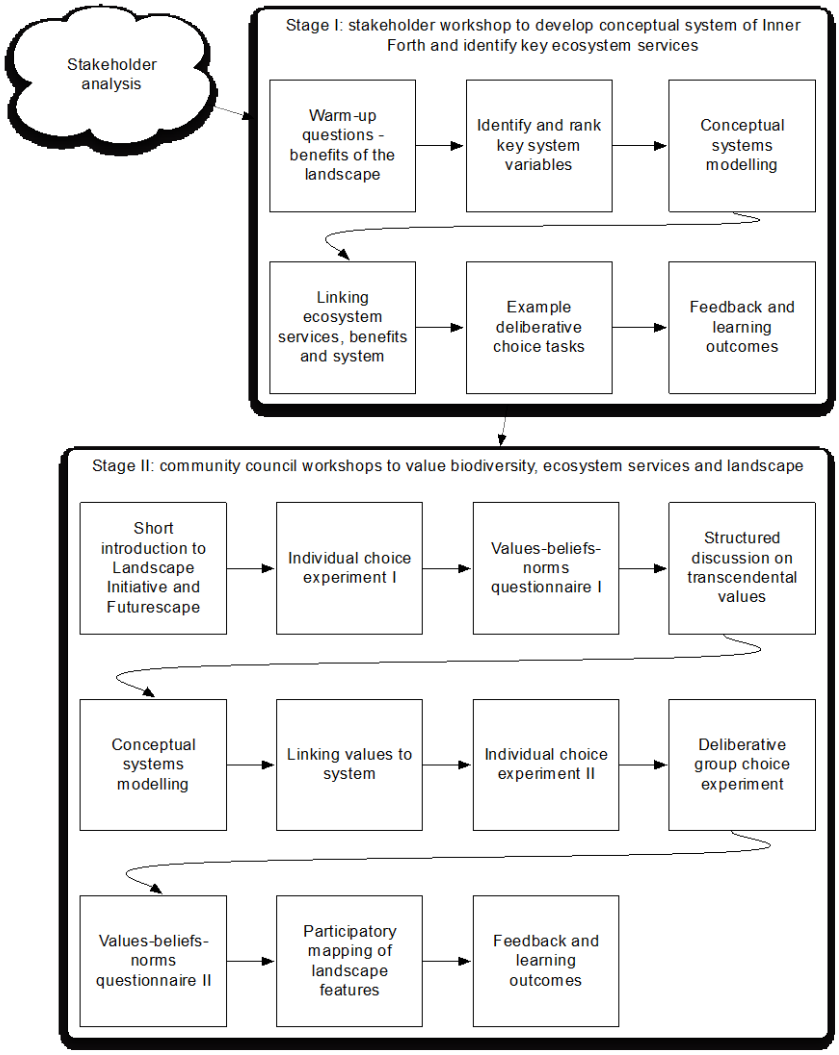


Figure 15. Forth case study: methods outline

Stakeholder analysis: An initial list of stakeholders was drawn up by the RSPB through combining separate lists compiled by the various IFLI partner organisations. Researchers then asked all those on the list if they could suggest other groups and organisations that they thought should be included. This particularly led to improved identification of community groups. In total 64 stakeholder organisations were identified (Annex 4). This comprehensive list was then analysed using an extended influence-interest matrix (**Table 21**) after a format outlined by Varvasovszky & Brugha (2000), with stakeholders' attitudes to each other also summarised.

Table 21. Forth case study: a hypothetical matrix of stakeholder characteristics.

	Interest in the issue	***Influence/power***	***Position***	***Impact of issue on actor***	***Relations and attitudes to other stakeholders***
Stakeholder A	Low	Medium-High	Supportive	Low	Strong influence on other community groups
Stakeholder B	High	Low	Unsure	Medium	Influenced by A
Stakeholder C	Medium	Medium	Unsure but tending to opposed	Medium	Tends to mistrust A

Stage 1: Stakeholder workshop: The first stage of data gathering consisted of a four-hour workshop with representatives from a wide range of sectors, where a number of conceptual models of the Inner Forth, linking economy, environment and society, were developed (**Figure 16**). Out of the 64 stakeholder organisations identified, 23 were represented by 28 participants. Community groups, local and national government and (mostly environmental) NGOs were well represented, businesses somewhat less so (Annex 4). Farmers and landholders were not represented, despite considerable effort on the side of the researchers and stakeholder organisations to mobilise representatives. The group was split into five smaller groups of 4-6 people.

The workshop commenced with a series of warm up questions: what are the things that are most important to people in the Inner Forth; how will climate change affect people; and what are the benefits provided by the Inner Forth landscape and environment. Participants were asked to write their answers on wall posters and throughout the workshop participants were encouraged to add to these.

Next, a conceptual system model was built in a number of steps. First, the five groups of participants developed a list of system components by considering what might be the most important social and community, environmental and economic variables of the Inner Forth. These were ranked by the groups for importance, which was defined as having influence on other components. The groups then each took the variables and looked at whether there were any direct, significant relationships between them. Finally, participants were asked to look for and identify one or more feedback loops within their diagram. Variables from each of the five small group models were coded in order to identify unified variables that could be counted across different models.

After these deliberations, the group as a whole was asked to reflect back on the list of benefits of the landscape and environment, to add benefits if needed and then to rank these by assigning ticks (each participant could distribute three ticks as they saw fit). The three most highly ranked benefits where then inserted in a CE template and several choice tasks were completed as a group, so that participants could get an idea of how their work would be used in stage 2 of the study. The workshop was concluded by asking participants to state learning outcomes and to give feedback.

Figure 16. Stakeholders identifying key components of the Inner Forth system.

Figure 17. Community councillors draw a systems diagram.

Stage 2: DMV workshop: The second stage revolved around a series of CEs in nine workshops with 52 community council representatives in total. The first workshop, with Grangemouth community council, functioned as a pilot exercise, but only very minor modifications to the workshop design were made.

CEs are a valuation method where participants are asked to weigh and choose between different scenarios, with each of the scenarios providing different environmental benefits, at a different cost. Choice tasks consist of a number of attributes, with each attribute being available at different levels. For example, a CE for a new nature conservation area could include water quality; bird populations; recreational benefits and cost as attributes. One alternative would be moderate water quality, an increase in 20% in bird numbers, new paths and interpretation boards and a cost of £40. Another could be good water quality, bird numbers stay the same, new paths and boards but also a bird-viewing hide and a cost of £60. An example of a choice task used in this study in Stage 2 is depicted in **Figure 18**. Participants complete repeated choice tasks, and the choice outcomes are then used to construct a statistical probability model that is used to calculate the relative importance of each attribute and other factors of influence (e.g. age or income). Usually, one of these attributes provides a price tag (monetary, or a proxy measure of value, such as travel time or distance) and this allows the analyst to calculate a marginal WTP for each attribute. The attributes used here were based on the outcomes of the Stage 1 stakeholder workshop and are detailed in Annex 5.

The CEs were repeated three times. At the start of the workshops, participants completed a paper-based CE individually, without discussion, which asked for their individual WTP. Then participants were asked to discuss which transcendental values were most important to them. After this they were given a set of the most important system variables derived from Stage 1 (**Table 22**), and were asked to build a conceptual model of the Forth social-ecological system (**Figure 17**). It was then discussed how the most important transcendental values interacted with the system. A second individual CE followed. Then a third CE took place, but this time choices were made by the group (consensus or majority vote) on the basis of what would be a 'fair price' to ask the public. Thus three sets of monetary values could be compared: individual pre-deliberation; individual post-deliberative exercises; and deliberated group values. In order to be able to make this comparison and to respect minority positions, we modelled individual votes for the group-based valuation. At the start and end of the workshops, individuals also completed a psychometric questionnaire on the basis of the VBN theory of environmental behaviour, so that we could better understand potential changes resulting from deliberation (Section 4.1.4). An overview of the questionnaire presented to participants is given in **Table 23**.

We also considered whether psychometric test scores (values, beliefs and norms; Section 4.1.4 above) would be predictors of WTP. Here we tested for interactions between these scores and the model constant, as well as the species and tax attributes.

The final part of the workshop consisted of a participatory mapping exercise, where small groups were asked to discuss and point out, as a group, which features (natural or man-made) within the IFLI project boundary were interesting, special, or should be conserved, and which features were problematic. The aim of this exercise was to gather practical, spatially explicit information on cultural services that would be of direct use to the IFLI, while also adding a practical and concrete element to the fairly abstract DMV and systems modelling exercises. UK NEAFO WP4 provides more detail on this part of the workshop.

Table 22. Forth case study: variables used in the conceptual system modelling exercise.

• industry, transport and commerce • recreation & tourism • biodiversity & wildlife • intertidal habitat • woodlands, moorlands, rare habitats • pollution • employment and economic benefits • population • agricultural area & production • water quality • energy demand, supply & source • landscape quality • legislation, designations & management quality • level of education*
* Added as a variable by participants in some of the workshops.

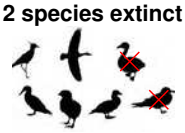
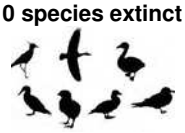
	Plan A	Plan B	Business as usual (C)
Environmental health			
Water quality	**No change** Moderate quality 	**Improvement** Good quality 	**No change** Moderate quality 
Wildlife and biodiversity			
Total number of birds	**No change** 28,000 birds 	**20% increase** 34,000 birds 	**20% decrease** 22,000 birds 
Bird species extinct	**2 species extinct** 	**0 species extinct** 	**7 species extinct** 
Landscape and recreation			
New woodland planted	**Yes** 	**No**	**No new nature conservation area**
Access and interpretation	**Paths, boards and guide available** 	**Paths, boards and hide available** 	
Costs per year			
Increase in council tax per household	**£20**	**£80**	**£0**

Figure 18. Forth case study: an example choice task that community councillors were asked to judge.

Table 23. Forth case study: outline of the questionnaire for community councillors.

Section	*Description*
Background information	Demographic and social-economic information, use of the landscape.
Choice experiment I (non-deliberated individual values)	Explanation of the aims and format of the CE. Information on the CE attributes. Guidelines on how to make choices (base choices on individual interests, no discussion with others, think of real willingness and ability to pay the costs attached to the scenario, consider budget constraints). Four choice tasks consisting of three alternatives, each followed by prompt for level of confidence with which the choice was made on scale of 1-5. Section concluded by a question on how the participant chose between different alternatives.
Values-Beliefs-Norms test I	10 statements testing the environmental worldview of participants following a shortened version of the New Ecological Paradigm scale (Dunlap *et al.* 2000) on a 5-point Likert scale from 'strongly agree' – 'strongly disagree'. Then four statements on 'awareness of consequences' beliefs, four statements on 'ascription of responsibility' beliefs and four statements on norms specifically designed for the Inner Forth Context, using the same 5-point Likert scale. Finally the test included a list of three egoistic, altruistic and biospheric values each which participants were asked to judge on an 8-point scale from 'not important' (0) to 'of supreme importance' (7), with an option to choose 'opposed to this value (-1). Value descriptions were picked from a short version (Stern *et al.* 1998) of the Schwartz (1992) universal values scale. For more detail, see Section 4.1.4.
Choice experiment II (deliberated individual values)	Participants again asked to complete four choice tasks in same way as before. Includes brief reiteration of guidelines on how to make choices.
Choice experiment III (deliberated group values)	Participants again asked to complete four choice tasks but now asked to deliberate for 3-10 minutes per task. Also guidelines have changed asking people to choose the alternative they deem is in the 'best interest of society/the public', and to consider whether the costs attached to the scenario are a 'fair price' to ask in exchange for the benefits.
Values-Beliefs-Norms test II	Retest in the same format as before.
Feedback and learning outcomes	Six statements asking about learning outcomes and five questions asking for feedback on the workshop, again on the usual 5-point Likert scale. The questionnaire concluded with two open questions on learning and two open questions asking for feedback.

4.2.3 Results

Results for the Inner Forth case study will be presented first for the ES benefits and system models considered in the stakeholder workshop and then for the DMV and psychometric tests undertaken in the nine community council workshops.

4.2.3.1 Stakeholder workshop

Within the system models, social-economic and environmental variables were more or less equally influential. Key variables were industry, transport and commerce, recreation and tourism, biodiversity and wildlife, and water quality, which all appeared in all models (**Figure 19**). Notably, landscape quality was seen to be extremely influential in terms of influencing other components of the system, and despite being mentioned in only three of the models it was on average the second most important variable in terms of causal links. Key links were made between industry and

employment on the one hand and pollution on the other; biodiversity and recreation; and habitats and recreation through improved landscape quality. In relation to landscape quality, all subgroups particularly noted the importance of woodlands for recreation, directly and/or indirectly through improved landscape quality.

In terms of the benefits of the landscape, the most important were deemed to be: the landscape as an economic hub (17% of ticks), biodiversity and wildlife (14%), the landscape itself (11%), recreation and leisure activities (10%) (as distinct from tourism, which was somewhat less important at 4%), healthy and productive ecosystems (8%) providing an attractive living place (7%), aesthetic value (5%), and sense of place (5%).

There was noticeable overlap between key system variables and benefits. For example, many of the key benefits relate to landscape quality, and recreation and tourism played a central economic role. There were also differences. For example, cultural heritage was important as a landscape benefit at 4% but was only considered as a system variable by one subgroup. Thus, just because things were deemed valuable did not mean they were necessarily perceived to be of importance in terms of influencing other social-economic or ecological variables.

Learning during the workshop was deemed to be significant by participants. 17 of 22 participants (77%) indicated 4-5 (for a 1-5 scale) in terms of learning about the relationships between society and the environment, 15 (68%) indicated 4-5 in terms of learning about society-economy relationships, and 12 (55%) participants indicated the same for environment-economy learning. For each of these types of learning 6 participants (27%) marked the highest score. 3 participants (14%) felt their values had changed and 4 participants (18%) indicated the workshop had to some degree changed their views on the environment, though 13 (59%) felt the workshop had improved their ability to judge future developments. Qualitative feedback from open questions suggested members of community groups had felt they had learned most from the workshop, whereas government representatives (who are likely to have had greater experience with conceptual exercises) appeared to have experienced the least amount of learning.

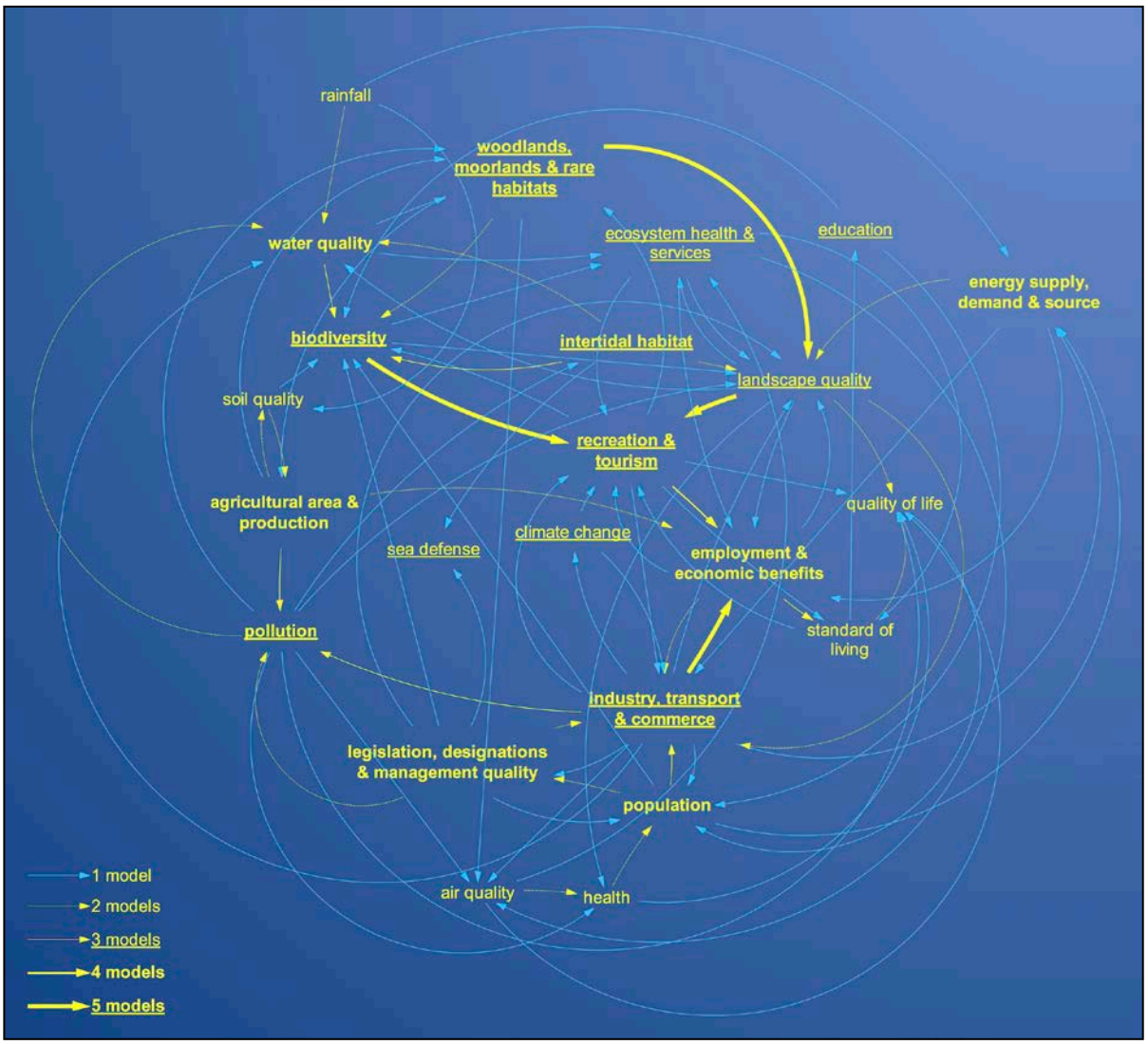


Figure 19. Forth case study, stakeholder workshop: system models. Font style indicates how often variables occurred in the five subgroup models. Thickness and colour of the arrows indicate how often causal links between variables occurred.

4.2.3.2 Monetary valuation

DMV results in terms of WTP for different environmental attributes are given in **Table 24**. Model fit was very good (*pseudo* R^2 =0.45). Full model details are given in Annex 5. In the first round of valuation, individuals were WTP substantially for most attributes. The single most important attribute was prevention of species extinction; individuals were WTP £17.90 for prevention of local extinction of a single species. This was substantially more than WTP for an improvement in the mean overall size of the bird population (£3.31 per 1,000 birds). Participants were not willing to pay significantly for paths or presence of a guide. For a number of options, there were clear regional differences. Participants north of the river had no interest in a bird hide or new woodlands, while south of the river, participants were willing to pay substantial amounts for both (**Table 24**). Stirling participants were also willing to pay for woodland, but not hides. In the deliberative choices later on, people in the north indicated they preferred new wetland to new woodland sites, as there was already a relative abundance of existing woodlands. Conversely, in the south, participants felt there was a lack of woodland and were keen on improvements both for recreation and to support wildlife. Finally, WTP was on average lower for younger participants and for men. Income did not significantly

impact on WTP. Discussions within the groups suggest that on the one hand, higher income participants may have been willing to pay more, but lower income participants were less likely to own a car and hence were more dependent on local nature, having less opportunities to recreate in e.g. the Scottish highlands, increasing their WTP for local benefits.

The different stages of the CE showed substantial changes in terms of WTP, which decreased substantially in Stage 2 (deliberated individual values) and further in Stage 3 (deliberated group values based on a 'fair price'). Relative preferences between the different environmental attributes stayed stable between the stages, with the exception of bird species extinctions.

WTP *decreased* by 56% between the non-deliberated and deliberated individual results for all attributes but extinctions. In the third set of results, WTP decreased by a further 39%, to end up being only 27% of what it was in the first stage. Thus, participant established that a 'fair price' was substantially less than they were willing to pay as individuals. In terms of extinctions, this attribute became somewhat more important as a result of the deliberative interventions compared to other attributes, although WTP for this attribute still decreased by 45%. However, in the third stage, the 'fair price' for preventing species extinction did not significantly decrease. Compared to the non-deliberated individual values, in the group deliberated values, the relative importance of extinctions doubled (for parameter changes see Annex 5).

Table 24. Forth case study: willingness to pay at the three valuation stages of the workshops: individual valuation before and after deliberation, and group valuation.

	Willingness to pay (WTP)		
Attribute	***Individual – before deliberation***	***Individual – after deliberation***	***Deliberated group (fair price)***
Water quality (good vs moderate)	£14.54	£6.33	£3.87
Bird population size (per 1000)	£3.31	£1.44	£0.88
Paths & interpretation boards present	-	-	-
Guide present	-	-	-
Hide present			
North of Forth	-	-	-
South of Forth	£35.37	£15.39	£9.42
Stirling	-	-	-
Woodland planted			
North of Forth	-	-	-
South of Forth	£34.19	£14.88	£9.11
Stirling	£27.75	£12.08	£7.39
Prevent species extinction (per 1)	£17.90	£9.76	£9.53

4.2.3.3 Psychometric testing

In the psychometric tests, there were both changes in mean scores, and changes in the consistency with which people answered across questions that were thought to be associated with the same construct. The results from the 'multiple group model' (Section 4.1.4) differed substantially between the pre-deliberation and post-deliberation data (**Table 25**). The pre-deliberated data showed a poor fit, with half of the AC, half the AR and half the norms indicators not loading onto their *a priori* construct. After deliberation, all items loaded as expected, apart from AR3 ("I don't feel personally responsible for environmental issues, as they are the responsibility of government and industry."), which did not load onto any of the construct and was excluded in further analysis. A similar pattern

could be seen for the *Alpha* scores (**Table 25**). Before deliberation, these were inadequate for all three of these constructs and for egoistic values (<0.6) and marginal for NEP (0.61). After, they substantially improved for all constructs, showing high consistency for NEP (0.79) and altruistic values (0.84), exceptionally high consistency for biospheric values (0.95) and adequate consistency for other factors. Conversely, the consistency of egoistic values dropped further (from 0.53 to 0.31). Overall, it appears participants answered questions more consistently after deliberation, and as a result the psychometric instrument became more reliable.

In terms of values, altruistic (mean 5.25, pre-deliberation, on a -1 to 8 scale) and biospheric scores (4.91 pre-deliberation) scored high in terms of importance, whereas egoistic values were seen to be relatively unimportant (2.84). Biospheric values increased significantly post-deliberation to 5.39 (**Table 26**). NEP scores were moderately pro-environmental (mean 3.60 on a 1-5 scale), and also had a tendency to increase (3.78) after the deliberative exercises. AC and AR beliefs and norms scores also increased post-deliberation, but these differences could not be established as significant with the relatively small sample. Generally, these indicators all scored high, suggesting high environmental awareness of participants and a pro-conservation moral stance.

We also modelled the impact of psychometric constructs on WTP by including psychometric parameters in a choice model. Annex 5 provides model results. Participants with stronger pro-environment norms were willing to pay significantly more for prevention of species extinction. Participants with a greater self-ascription of responsibility for environmental issues were willing to pay more overall. The model was not able to detect whether these interactions changed significantly across stages of the workshops, which is likely to be an artefact of sample size. None of the constructs significantly interacted with the constant.

Table 25. Forth case study: multiple group method analysis and Cronbach's alpha (standardised).

	Pre-deliberation				***Post-deliberation***			
	Alpha	***AC***	***AR***	***NOR***	***Alpha***	***AC***	***AR***	***NOR***
AC1	0.51	0.36	**0.40**	0.20	0.73	**0.55**	0.50	0.43
AC2		0.14	**0.32**	0.30		**0.46**	0.12	0.22
AC3		**0.49**	0.35	0.27		**0.59**	0.19	0.25
AC4		**0.77**	0.02	0.01		**0.78**	0.13	0.43
AR1	0.50	0.36	**0.62**	0.35	0.48	0.07	**0.58**	0.38
AR2	(0.59)*	0.41	**0.67**	0.39	(0.62)*	0.36	**0.68**	0.30
AR3		0.29	0.11	0.13		0.04	-0.04	0.06
AR4		0.10	0.23	**0.45**		0.23	**0.45**	0.43
NOR1	0.50	0.20	**0.50**	0.46	0.69	0.43	**0.54**	0.53
NOR2		0.27	0.24	0.07		0.30	0.24	**0.34**
NOR3		0.12	**0.54**	0.44		0.17	0.51	**0.59**
NOR4		0.09	0.12	0.20		0.33	0.16	**0.40**

Bold face indicates the highest correlation between an indicator and an assumed factor above 0.3.
AC: awareness of consequences beliefs; AR: ascription of responsibility beliefs; NOR: norms. For item descriptions see Table 20. * AR3 dropped.

Table 26. Forth case study: psychometric score means.

	Pre-deliberation		*Post-deliberation*		
	Mean	***SD***	***Mean***	***SD***	
Egoistic values	2.84	.22	2.70	.48	
Altruistic values	5.25	.05	5.63	.10	
Biospheric values	4.91	.02	5.39	.06	*
New Ecological Paradigm	3.60	.38	3.78	.40	T
Awareness of consequences	3.89	.18	4.10	.08	
Ascription of responsibility‡	3.83	.12	4.05	.20	
Norms	4.05	.09	4.16	.12	

* Significant difference between pre- and post-deliberation results at p<0.05 (paired t-test with Bonferroni correction for 7 comparisons); T: tendency at p<0.1; ‡AR3 dropped. Values on a -1 to 8 continuous scale, others on a 1-5 continuous scale. For item descriptions see Table 20.

4.2.4 Discussion

The results clearly distinguished differences between non-deliberated individual values, deliberated individual values and deliberated group values. Discussions by participants during group decision-making can provide more insight into the impact of deliberation and why group values were different from individual values. We will reflect here on the results in light of participants' considerations, and draw some conclusions on the evidence in relation to the theoretical framework presented in Section 3. Broader implications will be considered in the overall case studies synthesis discussion in Section 4.6.

Many groups had considerable debate on the relative importance of different attributes and on the question of the degree to which it was fair to ask their 'constituents' to pay for them. Regularly, people felt that from their own conviction, they would choose a higher cost alternative, but that if they had to weigh off the benefits to the public against how the investment could otherwise be spent, they could not justify the higher cost. Thus, people became more 'picky' and appeared to consider more closely whether a specific alternative really weighed up. People's choices also appeared to be less 'attitudinal', as they were less inclined to pay something just because they favoured conservation.

Another important factor that appeared to reduce WTP is that people more consciously weighed the costs of the hypothetical scenarios against other conservation projects and other broader societal priorities such as healthcare. These deliberations were sometimes placed in the context of the scale of the benefits of the proposed project and led to debate about whether the project would have wider benefits, e.g. in the sense of having positive effects on wildlife in the larger landscape and whether there would be potential benefits for tourism.

In terms of specific attributes, repeatedly there were complex discussions mixing debate over information, making linkages, and discussing moral topics, particularly fairness and responsibility. For example, one group discussed the importance of water quality and noted that it was a particularly central element in their systems diagram. However, the group concluded that it would be fairer if polluting companies would pay to improve water quality rather than communities and that for communities the moral argument to protect species should weigh more.

In terms of the species attribute, most groups came to discuss their sense of moral obligation towards preventing extinction. The attribute was framed as the number of species that would go extinct 'locally', i.e. it was made clear that this did not mean that species would necessarily go

extinct altogether. However, participants regularly argued that 'everyone should take responsibility' or that 'we need to do our bit'. One participant noted: "*when something is extinct, it's gone - you could reintroduce species, but if everyone doesn't take care of their species then at some point there are no places left to reintroduce them from."* While moral arguments dominated, it was also mentioned that birdlife was defining for the area, and that biodiversity was ultimately foundational for tourism in the region.

Participants also explicitly weighed the plurality of value. One of the larger groups distinguished intrinsic and non-intrinsic value, calling these 'ecological value', the value of improving the environment for its own sake; and 'economic value', which was composed of benefits such as attracting more tourism and recreation. Participants identified that they were looking for 'best value', which incorporated both those two things. Making trade-offs was difficult when there were conflicts and had to be negotiated. Participants often did not reach consensus and there remained minority positions. In this group there was also a continual small minority that felt that all the amounts of tax were too high for the public to pay, at least under current economic circumstances.

Thus, across the workshops the range of different deliberative processes as conceptualised in the DVF model (Section 3.5) could be seen. The systems modelling intervention stimulated people to make broader linkages, think through consequences together, and consider trade-offs between environmental and other priorities. Both the quantitative and qualitative results illustrate that moral thinking and questions of responsibility were more present in the group-based valuation than in the individual valuation. Thus, WTP was shaped by sharing and discussing information (e.g. around causal effects), beliefs (e.g. about broader social priorities, or responsibility), norms (e.g. around protection of endangered species, or providing local opportunities to recreate to disadvantaged people who are not able to go further afield) and transcendental values (e.g. fairness, social care, harmony with the environment, health, beauty). Through this process, WTP in deliberated individual values and particularly deliberated group values became more considered and focused on key priorities, situated within the wider social-ecological context of the region.

4.3 Local case study 2: Hastings

This in-depth local case study focused on valuing ES around inshore fisheries and marine conservation in Hastings, Sussex (**Figure 11**). Working with the Hastings Fisheries Local Action Group (FLAG)[19] this case study investigated shared values for the cultural benefits of the marine environment and activities within it, particularly inshore fisheries. Specifically, this case study explored how environmental settings can have collective meaning to groups of people, who are in turn influenced by their cultural and social setting. We investigated through a series of three iterative workshops, with the same group of local Hastings marine environment stakeholders, how engaging people in discussion with one another using various deliberative and analytical-deliberative techniques can help demonstrate and explain shared and cultural values. This process of discussion and exchange was particularly important in bringing out 'deeper', transcendental values and in facilitating consideration of the weighting of these values in negotiation of the trade-offs needed between environmental, cultural and social-economic priorities in hypothetical policy decision-making exercises. A further aim of the study was to develop a novel methodology for DMV that was independent of statistical stated preference monetary valuation techniques (CV and CEs) such as those used in the Forth and MPAs DMV. As such, the approach used in this case study aimed to

[19] FLAGs are funded through European Fisheries Funding, coordinated by the Marine Management Organisation (MMO) and delivered through a local partnership. The Hastings FLAG partnership includes local council members, local fisherman, the Fishermen's Protection Society, local businesses, the University of Brighton in Hastings, the MMO, Natural England, IFCA, Hastings Voluntary Action and community representatives.

engage a group with a range of different stakeholder perspectives to come to a genuine, negotiated outcome on the basis of principles of deliberative democracy (Section 4.1.1). The study thus provides an example of how a variety of participatory valuation and social learning techniques can be combined in a stakeholder-led process of developing and evaluating policy. The Hastings case study was a collaborative venture between WP5 and the EU INTERREG GIFS (Geography of Inshore Fishing and Sustainability) project, which focuses on regenerating coastal fishing communities.

4.3.1 Background

Hastings is a town of around 87,000 inhabitants on the south east coast of England and one of Britain's oldest fishing ports. Boats have worked from the beach in front of the ancient town for over a thousand years, supplying Hastings with its core industry and main tourist attraction. The 'Stade', the beach and the area immediately adjacent to it, harbours over 25 boats, making the Hastings fleet the largest beach-launched fishing fleet in Britain (**Figure 20**). The artisan fleet of under 10 meter vessels is seen to represent an environmentally benign approach to fishing and is accredited for sustainable fishing methods by the Marine Stewardship Council. Represented by the Hastings Fishermen's Protection Society (HFPS) it has been strongly vocal in terms of supporting marine conservation efforts. However, artisan fisheries in the UK have over recent years fallen outside of the European Common Fisheries Policy quota system, which meant that the fleet was not allowed to catch significant amounts of key species such as cod, seriously endangering the economic viability of the fleet[20]. This encouraged economic diversification of the fishing community and building stronger alliances with others, e.g. local culture and arts organisations such as the recently established Jerwood Art Gallery. Another issue faced by the fleet is keeping and attracting young people into the industry and transferring traditional knowledge to future generations, which HFPS is trying to address through a recently initiated 'Classroom on the Coast'. Finally, climate change and sea level rise pose longer-term threats to the beach, changing accretion patterns, which lead to the beach becoming steeper, making it difficult to land boats in bad weather.

While the 'Old Town' of Hastings faces these issues surrounding the fleet and the marine environment, Hastings' 'New Town' faces broader social deprivation issues, as one of the most deprived towns in the south east of England (Hastings Borough Council, 2011). 28% of Hastings households are on low incomes and almost a third of residents live in the 10% most deprived neighbourhoods in England. The Broomgrove and Farley Bank/Halton areas have the unenviable position of being among the most deprived 1% in England. Government austerity measures have meant that Hastings Borough Council has had to almost halve its budget in 2013.

[20] However, shortly after the series of workshops took place in May 2013, Hastings fishermen finally secured new quota rights in court.

Figure 20. Hastings has the largest beach-launched fleet in the UK.

4.3.2 Methods

The main stage of data gathering consisted of three intensive workshops with the same group of 11 local stakeholder representatives and included deliberative MCA and DMV extended through a mix of analytical and qualitative non-monetary valuation exercises. These group deliberative interventions included: a SWOT analysis of the Hastings community; structured in-depth discussions; shared storytelling and reflection; a transcendental values 'compass'; participatory conceptual systems modelling; visioning; and informal deliberation during group beach walks. The MCA and deliberative exercises finally led to an innovative implementation of DMV through policy package development and negotiation and participatory budgeting. **Figure 21** outlines the methods used per workshop.

The workshop themes were developed in collaboration with four core FLAG members at an initial scoping meeting in April 2013. In addition to core themes, participants drew up a list of key stakeholder representatives who might be invited to participate in the process. The results of this scoping meeting were then sent to FLAG members for input on any missing representation. Working in partnership with the FLAG was a purposeful approach to ensure the beneficiaries selected and themes explored were predominantly fisheries-led. The only core stakeholder group absent from the workshops was conservation organisations; these were unable to attend for logistical reasons. **Table 27** depicts sectors represented. We will now provide an overview of the objectives and different methods and tools used for each of the three workshops.

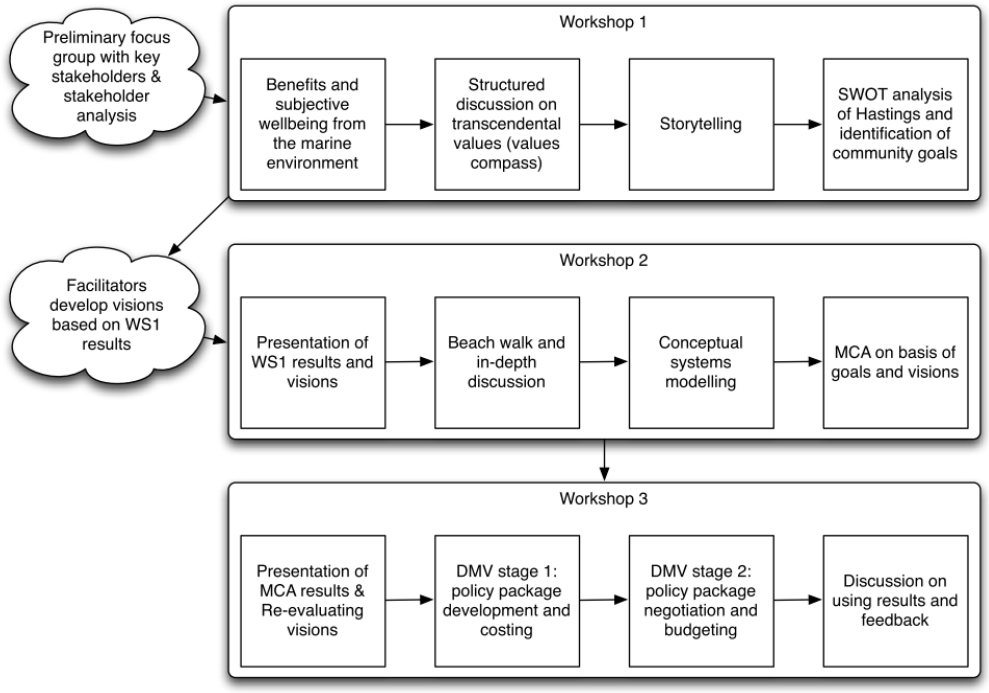


Figure 21. Hastings case study: methods outline.

Table 27. Hastings case study: sectors represented.

- a 'new town' residents association (x1)
- education sector (x1)
- fisheries sector and Hastings Fisheries Protection Society (x3)
- Hastings Borough Council (x2)
- local sea angling club (x1)
- marine/Fisheries Agencies (x1)
- 'Old town' residents (x4)
- students (x1)
- tourism sector (x1)

4.3.2.1 Workshop one (WS1)

Benefits and subjective well-being: A group plenary to discuss participants' key benefits and values from the marine environment. These benefits were then evaluated using an individual ranking exercise on the basis of the subjective well-being indicators adapted from the MPA case study outlined in **Table 28**.

Transcendental values: Individual and group discussion of transcendental values using what we termed a 'values compass' (Section 4.1.3). Participants were asked to each circle the five values that they felt were most important in guiding their life. Results were presented back and discussed with participants at the start of workshop two.

Storytelling: The link between benefits and values was then developed in a storytelling exercise in small groups where each participant told a memorable personal story about their relationship with the marine environment in Hastings. Following the storytelling both the list of well-being benefits and the 'values compass' were discussed as a group in order to reflect upon which values emerged from the storytelling. This process allowed participants to identify and share with the group their transcendental values and consider if the benefits originally considered in the first ranking exercise

had changed in their importance. The discourse data from the storytelling were content analysed to quantify the number of times different well-being benefits were mentioned.

SWOT: In the final WS1 exercise participants collectively identified in three small groups key strengths, weaknesses, opportunities, threats, drivers for change, and actions needed to achieve community goals. These were organised in social-economic, environmental and cultural themes. From the group discussions, facilitators identified prominent community goals that emerged through the discussion process. The data from this exercise were then used to inform four different 'visions for Hastings' developed by the researchers for use in workshop two.

Table 28. Hastings case study: well-being themes

• existence • fulfilment • livelihoods • memories • nature • sense of community • sense of place • spiritual • therapeutic • commercial* • education* • relaxation and enjoyment*
* Added by participants

4.3.2.2 Workshop two (WS2)

Visions: Four visions were identified by facilitators on the basis of WS1 results: *Green Hastings*, *City of Culture*, *Greater City* (initially named *Greater London* but then renamed by participants) and *Business as Usual*. The four visions gave hypothetical, characterised examples of the way that Hastings might look in 2030. The visions as presented to participants can be read in Annex 6. It was made explicit that the changes outlined by the visions were not necessarily mutually exclusive and that other possibilities could also be imagined.

Beach walk: A walk along the foreshore and in-depth discussion (**Figure 22**). This facilitator-led walk meant the real-life marine/ coastal environment was able to trigger and contextualise both the values identified in the classroom as well as the physical changes needed to secure the community goals and visions identified in the WS1 group exercise. During the walk, participants were asked at different parts of the beach (fisheries area; community area; tourism area) "*What will this part of the beach look like in 2030*?", "*What do you want it to look like*?" and "*How could we make that happen*?" These discussions were recorded and analysed with reference to the learning process of critical engagement with the different visions, including which trade-offs were deemed necessary/accepted by the group.

Conceptual systems modelling: A social-ecological system mapping exercise in two groups. Based on the data identified by the groups in the SWOT exercise (WS1) the participants mapped the relationships (cause and effect) between the drivers for change and the variables subject to that change (such as social justice or size of the fishing fleet). 28 variables and four drivers (climate change; fish quota; reduced consumerism; and initiation of a Marine Conservation Zone [MCZ]) had been derived from the SWOT analysis by the researchers. Each group debated and gained consensus on what they felt were the most important feedback loops and chains of variables and the impact upon these loops/chains of key drivers for change. This exercise focused on group learning around

trade-offs and the relations between ES and a broad set of social, cultural, economic and environmental variables. Participatory systems modelling as a methodological approach was explained in detail in Section 4.1.2, above.

MCA: Following individual and then group consensus rating on the importance of different community goals derived from WS1, the workshop continued with the group analysis of how and to what extent each of the four visions delivered those goals. This exercise was used to assess how changes in management of environmental, socio-economic and cultural settings influence shared views on the capacity of the community to achieve their goals. The group were asked to come to a consensus score (0-100) for how well they expected each vision to achieve each goal. Weighted scores for each vision (i.e. the goals rated highest by the group were valued proportionally higher in the scoring) were calculated by the researchers between workshops 2 and 3 to reflect back to participants how well the visions were expected to perform overall. The MCA exercise allowed us to assess how participants made trade-offs between values when confronted with differing visions. MCA as a method was introduced in Section 4.1.1, above.

Figure 22. Hastings case study: beach walk.

4.3.2.3 Workshop three (WS3)

Re-evaluating visions: Identification of which key policy features should be kept for each vision and what negative side effects would need to be mitigated against. Following presentation and brief discussion of the MCA results from WS2, this exercise was facilitated as a 'carousel' of three small groups moving between visions (so that each small group could evaluate each vision in turn) and aimed to develop group views on potential trade-offs.

DMV - policy package development and costing: Based on a hypothetical £45 million 'European fund for sustainable development' grant provision, three working groups (environmental, social-economic and cultural) developed a policy package proposal for 'Hastings 2030' focused on addressing the communal goals identified in WS1. Each policy measure had to meet a set of tests: correspondence to communal values, realism, and goal satisfaction. Measures were costed and accompanied by a set of success indicators. This exercise involved the consideration of necessary trade-offs, relative costs and interaction/integration with other thematic goals. The development of success indicators and financial valuation of policy packages in this exercise enabled the participants to identify the indicator values they would place on the policies that secured their shared contextual values. The detailed rules and outline for this exercise as presented to participants can be seen in 0. A general introduction to DMV was provided in Section 4.1.1, above.

DMV - policy package negotiation and budgeting: Group package revisions and negotiation of final Hastings 2030 package. The environmental, social-economic and cultural policy components were presented to the whole group, discussed, and constituent measures ranked by importance. Subsequently, the most important measures were brought together and a final budget was allocated to the final package. This was a group negotiation process with a return to a consideration of the prioritised goals, trade-offs for different policy measures and finally WTP. At the request of participants, a final ranking of importance of the selected policy measures was also undertaken providing a non-monetary evaluation alongside the deliberative monetary outcome.

Feedback and learning outcomes: Finally, participants provided feedback on the process and briefly discussed how they could use the outcomes of the process and the learning gained to influence future developments in Hastings.

4.3.3 Results

Here, results will be presented per workshop component. Names referring to individual participants are pseudonyms.

4.3.3.1 Workshop one

Benefits and subjective well-being: As part of the initial plenary discussion the group collectively agreed upon additional benefits/criteria: *economic value*, *educational value* and *relaxation & enjoyment*. *Place identity* was ranked highest by all participants and with the smallest variation in rank between participants. All the benefits received high scores (all over 60) with spiritual being the lowest and with the greatest variation between participants during this preliminary exercise **(Figure 23**).

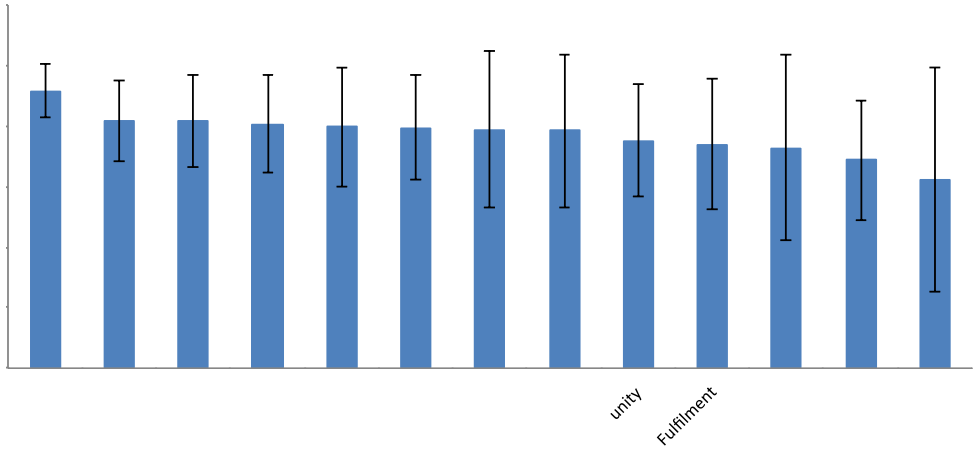


Figure 23. Hastings case study: importance of different well-being benefits. Error bars indicate maximum and minimum participant scores.

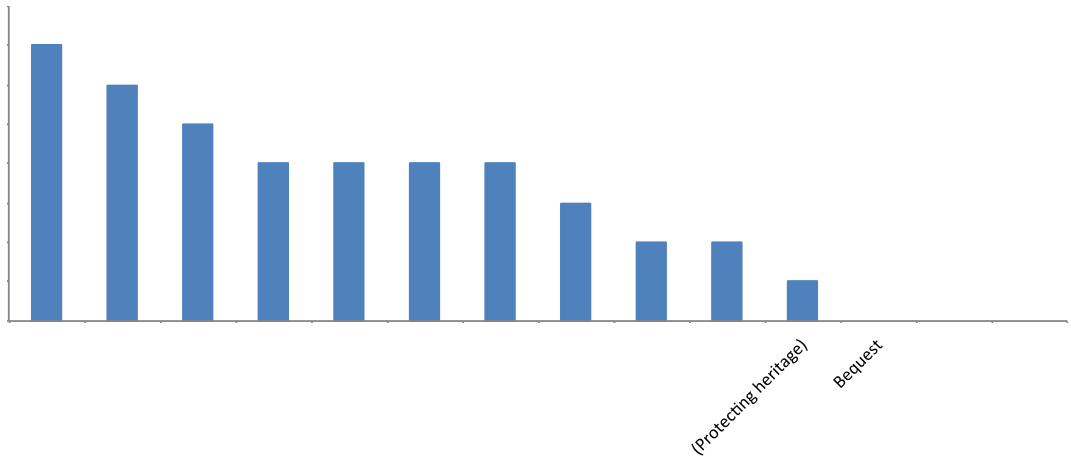


Figure 24. Hastings case study: number of times different well-being benefits were referred to during storytelling.

Storytelling and transcendental values: In contrast, while *place identity* still ranked highly (as the third most mentioned benefit) in the storytelling, it was instead the *transformative* benefit (i.e. a memorable experience with lasting impact) that scored highest in the storytelling exercise (**Figure 24**). Discussion between participants led to a consensus on the highly interlinked nature of all the benefits. Equally, the process of discussion demonstrated that the benefits can hold a different emphasis for each beneficiary – this was particularly true of *relaxation & enjoyment*. The enjoyment benefit of the marine environment and how this emerged in group discussions and was linked to other benefits triggered by the storytelling can be seen in the following excerpt.

Male:	I think mine is probably more an everyday one. It's probably the pleasure I get as I walk by the sea most days, usually in Hastings. It's the shared pleasure you get seeing other people being by the sea, walking by the sea, people choose to make a conscious to do that normally. So they're normally pretty positive, normally people care to say hello

	more when they're walking by the sea. I guess it's the bonding without the big one, people choose to be there. It's a definite positive for us.
Male:	There's a psychological benefit of looking at the sea when the horizon's clear, looking at everything in front of you.
Female:	A sense of freedom, isn't it?
Male:	I don't know what it is but I'm pretty sure it ticks lots of boxes, and different people will tick different things, but it is definitely something about, especially if you're on a boat and you're heading out to sea as well, and there's nothing in front of you.
Male:	It's also the opposite to that as well, because I kayak and it's very good to kayak out to sea, you just stop and look back to the shore.
Male:	It's a perspective, and one that you don't have unless you either work at the sea or go or have a boat and go out to sea, most people don't have that, and you can take it for granted actually, if you go out to sea every day.

As the small groups used a list of Schwartz values to reflect on the transcendental values that the personal stories had elicited (both for the story-teller and group), a number of personal values emerged as being dominant including 'sense of belonging', 'enjoying life', and 'protecting the environment'. Values of self-direction (including creativity and freedom) and social justice also featured prominently (**Figure 25**). When presented with these results in WS2, and asked whether they felt that these values represented the communal values of Hastings, participants expressed that they were struck by the way that they accurately reflected their view of the identity of the town, the only mismatch being 'respect for tradition' (which they thought should have scored higher).

SWOT: The scenario development exercise was the most pragmatic exercise in W1 and saw the group dynamic and broader context beginning to display more explicitly than it had in the earlier exercises. For example, the group members' self-appointed roles (e.g. scribe, leader, facilitator, pragmatist, diplomat, challenger) became evident as the groups developed their SWOT analysis (including drivers for change and actions). The data from this exercise (0) showed the perceived importance of fisheries and the marine environment for all four categories (economic, social, cultural and environmental) in addition to the prominence of pride of place and sense of belonging as central to community strength. The actions identified were ambitious including examples of national scale partnership, sector connectivity and political lobbying. From the accompanying group discussions the researchers identified the ten key goals listed in **Table 29**.

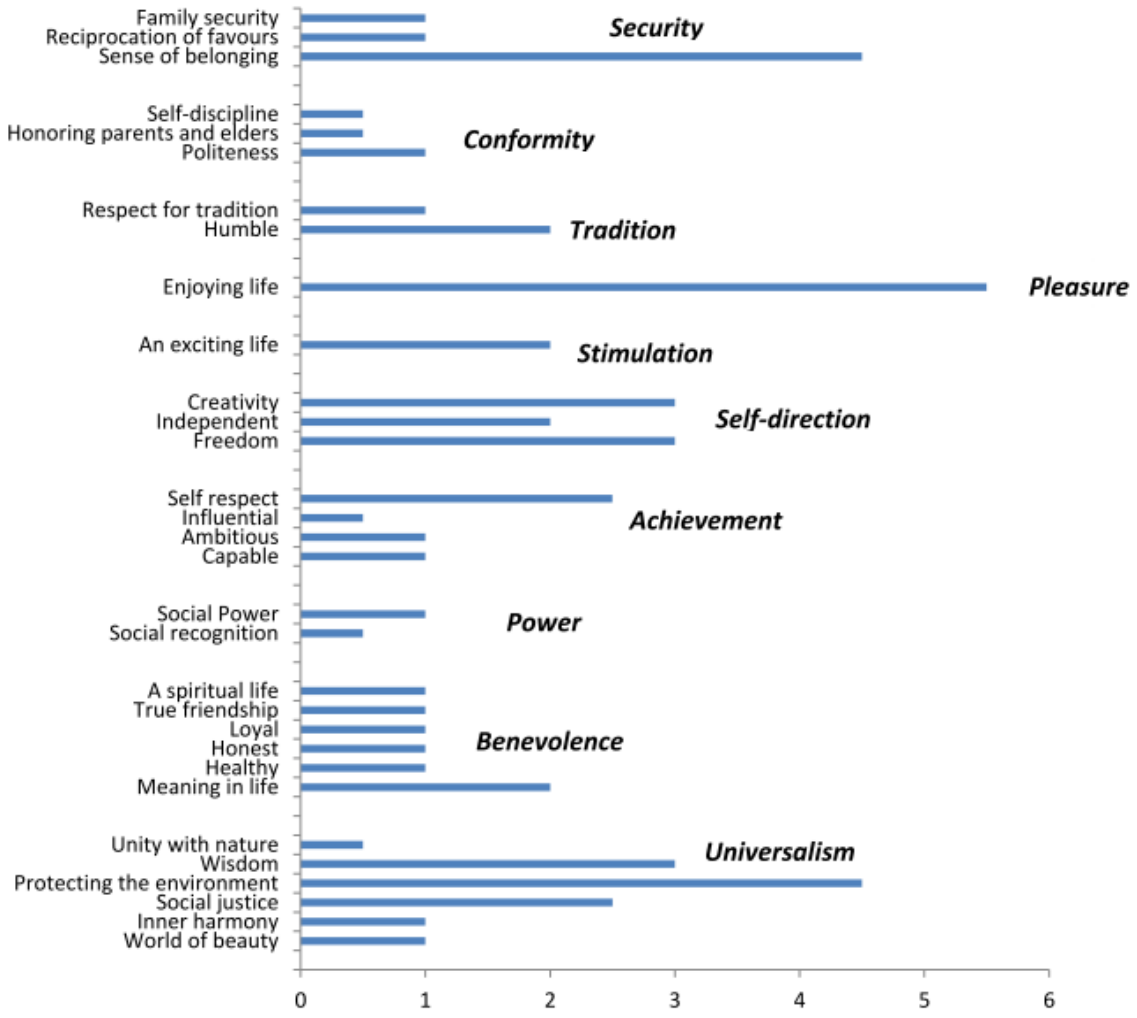


Figure 25. Hastings case study: number of participants choosing particular transcendental values as most important. The y-axis shows Schwartz value items, bold type indicates Schwartz value categories (Schwartz, 1990).

Table 29. Hastings case study: group key goals for Hastings used in MCA and DMV exercises.

1. Reduced unemployment
2. Increased social justice
3. Increased community cohesion
4. Economic growth
5. Resilience to climate change
6. Conservation of biodiversity
7. Reduced pollution
8. Strong cultural identity
9. Engagement with nature
10. Well-educated population

4.3.3.2 Workshop two

Beach walk: A review of the beach walk discussion showed the importance of a larger and more economically viable fisheries to be included in the economic future vision for the town (including training and apprenticeships for young fisherman). The economic vision was additionally focussed on

upgrading the tourism potential of the beachfront. From a social/cultural perspective the participants stressed the integral part the beach and fisheries play in the educational offer for local young people and schools in particular. The importance of reconnecting the younger generation to the fisheries and Hastings marine environment was paramount. This discussion also linked these contextual values to more transcendental values of respect, tradition and engagement with nature as can be seen in the following excerpt.

Male:	Maybe some sort of school or younger training for younger fisherman.
Male:	Apprenticeships, that kind of thing.
Female:	I was thinking of also incorporating some sort of educational facility, like we had a fisherman's thing for the uni students to come down recently. We could perhaps do something for schools where kids could get a chance of a certain to come down and maybe learn about the species, learn about the beach, how to look after it.
Female:	So practical things around classroom on the coast as well?
Female:	Practical, because as Mary said, some of the children further up the town don't even know what is down here and it's so sad that we live in this beautiful town, and the kids don't have access to it. So maybe we could incorporate something.
Female:	Reconnecting.
Female:	Reconnecting the locals, you know from children's level? Because it's so important that the kids grow up with the knowledge as opposed to being ignorant about it.
Male:	They need to have knowledge about that comprises of fishing, but also knowledge of – understanding biodiversity and – it's a lot of things.
Female:	Understanding biodiversity, the environment, understanding where we live. How do we look after it? How do we protect it? ... It's just education, opening up.
Female:	It's about learning, training people to respect the environment, isn't it? You learn from childhood. If parents are not into it already, you can deal with the kids.
Male:	Start at a young age.
Female:	Absolutely.
Male:	Go into schools, we've already been doing this for a few years, Mary has been going into schools, I've been going to schools, giving talks on fishing, understanding the aspects of the fishing industry, how important it is for the town. But now we should have the ability to take that on through the classroom and community centre where we can actually bring more schools in and interact directly with them, because that will give them a learning process from a younger age. I think that is what has been missing for a long time. A lot of the juveniles that we have problems with have no respect anymore. They've lost respect. They should have more respect for the industry...
Female:	I mean respect comes from knowledge as well.
Male:	It does.
Female:	They don't know what, you know, the old traditions...

Conceptual systems modelling: The group learning through discussion and deliberation embedded in this exercise was central to making the links between ES, community goals and the values underlying these goals. The two models produced by the groups are depicted in 0. The results show an appreciation of the highly inter-linked and complex nature of the relationship between variables as participants made extensive linkages between ecological, social, economic and cultural variables. The models showed that well-being was related to not only economic factors but also pride of place, social cohesion, social justice, biodiversity and, in the long term, resilience to climate change. In a discussion of feedback loops and chains, level of education was seen as a central variable, with education facilitating a wide range of positive outcomes including reduced deprivation and more cultural activities but also more engagement with nature and hence potential for increased environmental sustainability. External investment, improvement of infrastructure and economic

growth were also seen as important in driving other variables, with differing emphasis on social justice. Although group composition and the roles individuals took in developing the models played an important part in determining their eventual lay-out, there appeared to be significant learning and engagement with all individuals. While participants indicated that they had felt this to be a challenging exercise, feedback reports also showed this to be one of the most rewarding.

MCA - group discussion and evaluation of visions: Following the individual and group rating of common goals**, Figure 26** below shows how reduced unemployment, conservation of biodiversity, reduced pollution, and engagement with nature were the MCA criteria/goals that showed the least change from individual to group ranking. Resilience to climate change showed the greatest rating increase between individual (60) and group rating (100). The scoring of these goals was followed by a group analysis of to what extent (scored out of 100) each of the four visions could deliver the 10 group goals (**Figure 27**). Weighted scores show the Green Hastings vision was perceived by the group to be best able to achieve the overall goals, followed by City of Culture, then Greater City and finally Business as Usual (**Figure 28**). Green Hastings scored highest because it was the only vision that was seen to significantly address goals related to biodiversity, climate change and pollution.

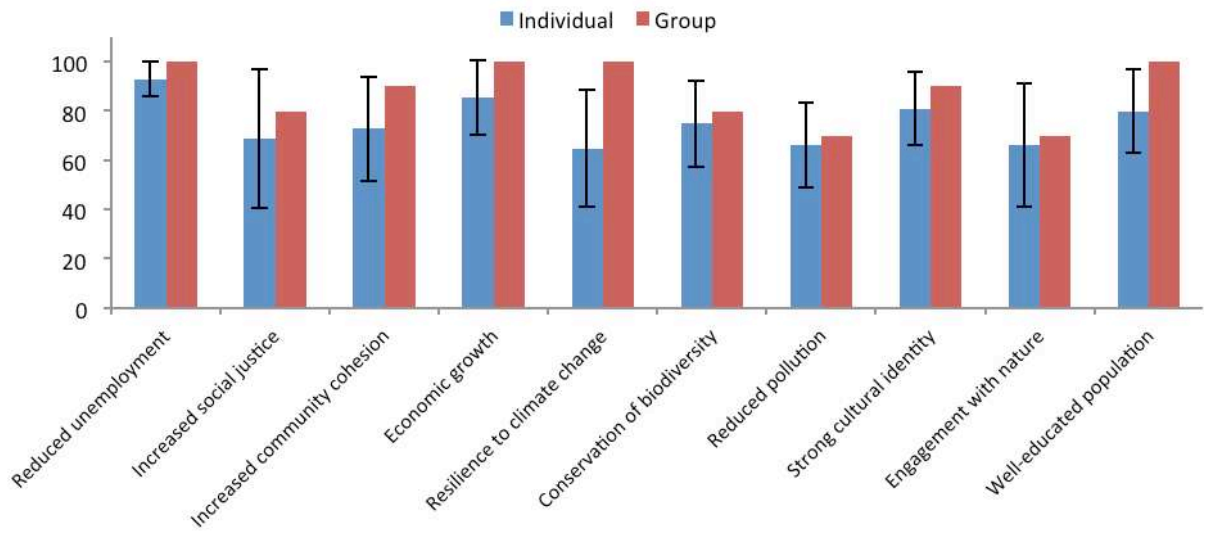


Figure 26. Hastings case study: relative importance of goals for Hastings: individual and group ratings.

Figure 27. Hastings case study: performance of visions per goal based on group consensus scores.

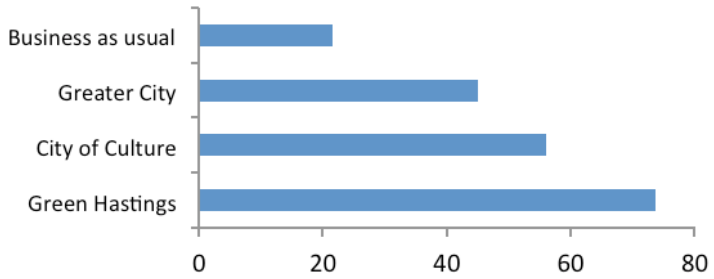


Figure 28. Hastings case study: overall performance of the visions in the MCA. The bars show how well the visions are expected to achieve the goals for Hastings based on the scores agreed by the group (average of weighted scores). The scores are proportionally weighted by the ranks given to the goals, so more important goals contribute more to the overall vision score.

4.3.3.3 Workshop three

Evaluating visions: This exercise required a more critical engagement with the detail of the environmental, cultural and economic visions for Hastings. This detailed evaluation of the visions built on the participatory conceptual systems modelling done in WS2, as causal relationships (positive and negative) between key variables had already been established by the group and this social learning was evident in informing group discussions. For example, the links were now explicit between the cultural objectives of the City of Culture vision and issues of social cohesion and a sense of pride in the town, while the links between environmental costs and increased tourist visitors were also made explicit. Having brought communal transcendental and well-being values to the fore in WS1 and WS2, this exercise helped progress the participants in terms of translating transcendental values into shared contextual values more explicitly, as expressed in **Table 30,** which lists the benefits the group would want to keep from each vision and also the risks they would need to mitigate against.

DMV – policy package development and costing: This exercise was the most involved group exercise of WS3 with participants deliberating in three small groups their priority policies to satisfy the cultural, socio-economic and environmental goals identified in WS1. This initial small group deliberation session was essential in identifying shared views on how to measure worth, not just in

monetary terms, but also in terms of ways policies might integrate to better reflect a combination of values attached to the marine environment, social priorities and communal transcendental values. The in-depth discussions of policy costing and integration was often framed by efforts to achieve a sense of balance and fairness for different beneficiaries and, as such, informed group WTP and the development of consensus around which policies to prioritise in the final negotiation session.

DMV - policy package negotiation and budgeting: In the whole group deliberation exercise involving the revision of the small group packages and the identification of a final Hastings 2030 package, the resistance to the exercise format was explicit with the group wanting to rank the policies using a non-monetary format as well as attributing monetary value. This indicated a balance of pragmatism in terms of coming to a shared outcome in a very limited time span, but also highlighted the group need to seek a more democratic or fairness approach in the allocation of funds. The social WTP exercise was criticised by at least some members of the group as arbitrary, because it depended on cost as much as value and WTP would be highly dependent on match-funding available. As such social WTP was felt not to accurately reflect the relative importance of the different measures, proposals and benefits discussed. For example, marine conservation was seen as very important, but did not require any costly measures and was thus not allocated funds.

In the end, the group did find consensus on how funds would be allocated (**Table 31**). The final package consensus showed greatest support for the package developed by the small group that had focused on environmental measures, echoing the MCA results from W2. However, synergies between themes and priorities were also key considerations. Two of the most capital-intensive measures were improvement of the harbour arm and sea defences, and a 'green' house retrofitting and building programme. The harbour project addressed resilience to climate change goals but was also essential in terms of supporting the fleet and the cultural identity of the community. The green housing programme again addressed environmental goals but would also create significant social benefits.

There were some interesting examples of where WTP did not fully reflect importance as expressed by the non-monetary rating. A lifelong learning project ranked joint second in importance, but was allocated 'only' £3 million (out of £45 million available). Conversely, improving seafront structures was allocated £5 million, but was ranked as joint seventh only in importance.

Table 30. Hastings case study: features to keep and effects to mitigate against for each vision.

Features to keep	*Mitigate against side effects*
Green Hastings (environment-focused vision)	
Bathing water quality	Environmental impact of increase in visitors
Flood defence: maintain/construction	Lack of funding for harbour arm
Fishing fleet profile	Difficult governance relationships
Green food destination	
Investment in community projects	
Buy local	
Beachy Head Marine Conservation Zone	Possible MCZ impact on fishing fleet
Rail & cycling routes	
City of Culture (culture-focused vision)	
City of culture status	Environmental impact of visitor numbers; loss of non-'cultural' jobs
Venues and festivals	Overwhelming visitor numbers
Fishing fleet promoted	
Sustainable fishery	
Pier regeneration	
Education projects (include lifelong learning)	Ensure apprenticeship capacity
Educational expansion	
Hotel expansion	Planning obstacles
Encourage youth to join the fishing fleet	Need for matching industry growth and fishing stock
Greater City (economy-focused vision)	
External investment	Loss of identity
Large hotels	Planning delays and unforeseen costs
Improved transport links	Bypassing of Hastings: develop sustainable transport links and connectivity
Business sites	Conservation measures
University expansion	Less local people attending
Fishing fleet growth	
Pier regeneration	
Modern sports facility	

Table 31. Hastings case study: final 'Hastings 2030' group policy package.

Measure and description	*Funds allocated (£ million)*	*Anticipated match funding (£ million)*	*Importance: marks assigned*
Harbour arm + sea defences	5	10	8
Eco-housing and refurbishment (incl. social housing)	10	50	4
Sports centre & swimming pool	10	10	2
Develop Cinque Port heritage and museums	2	4	3
Develop castle	2	4	0
Seafront structures	5	5	1
Community education find	1	3	1
Investment in lifelong learning and cultural education	3	-	4
Work-based training programme	2	-	0
Support for new and existing employers	4	-	2
Neighbourhood planning	1	-	0

4.3.4 Discussion

The combination of deliberative techniques (e.g. in-depth discussion) and analytical-deliberative techniques (e.g. participatory systems modelling) proved highly successful in eliciting consensus-

based group values and securing shared learning between the beneficiaries (in terms of both the motivation for values attributed to the marine environment in Hastings and the democratic outcome value of the process of deliberation and dialogue). The non-traditional context of this exercise allowed participants the freedom to consider CES in a holistic way outside of the restrictions of a policy-related, economic, or other framework.

Deliberated group values developed through discussion and negotiation in group exercises. Key sub-processes were identified as having a direct impact on the values that emerged, how these values were ranked and how they might apply to policy. Group dynamics, impact of the broader political and economic context and the deliberative group valuation experience were noticeable in shaping the values and subsequent policy plans. These will be described in more detail below. Broader implications will be considered in the case study synthesis discussion (Section 4.6).

Group dynamics: The role of pragmatists – specifically those familiar with traditional policy making processes – was evident in their leadership of the groups and this was exaggerated by time restrictions, as they sought to complete the exercise. Community leaders (with known/respected knowledge in this field) often led the deliberation and discussion process. On occasions this had the danger of marginalising less confident participants with less technical knowledge and needed to be carefully facilitated.

Political and economic context: The austerity/recessionary political-economy context of these workshops (England in 2013) became evident in the shift from visioning to practical policy package exercises. While the visioning exercise led to the dominance of a 'Green Hastings' future, the practical policy development exercise was equally dominated by economic considerations around economic sustainability (e.g. employment, infrastructure investment, fish quota). Language around weighing economic costs and benefits was pervasive. Nonetheless, active synergies were sought to meet multiple goals, reinforced by the elaborate connections that were made through the systems modelling exercise in particular. The systems modelling led to a brief discussion where one of the participants questioned dominant paradigms around economic growth, particularly where it was based on attracting external investment rather than supporting the local economy. While this had the effect of shifting the discussion more towards local initiatives, the rest of the group did not seem to have an interest in pursuing the broader thread of discussion around questioning mainstream economic models.

Impact of deliberative group valuation processes: The process of group deliberation involved the weighing up and listening to different participant views and options by emphasising reason and balance, rather than participant power or hierarchy. The group valuation process involved a sharing of stated ideas and values before coming to a common result that best reflected the group as a whole. Citizen values such as 'social justice' emerged more readily through deliberation/in-depth discussions as the shared learning and preference moralisation was prominent in these exercises, making participants more sensitive to and aware of the values, beliefs, and knowledge of other beneficiaries. While fisheries and the marine environment remained a central theme, decisions became equally driven by strong social concerns around issues such as youth unemployment, deprivation, and lack of opportunity for the disenfranchised. The exercises clearly moved individuals to look beyond their own situation into a broader vision of social values and needs.

The learning effect of in-depth discussions about ES and their inter-linked nature with the town emerged most explicitly from the systems mapping and helped inform the interaction test in the package development exercise. The storytelling exercise provided an accessible way of discussing transcendental values, which then made it easier to revisit these types of values during the discussion of the policy packages. The connection between policy measures and deeper-held,

transcendental values was not automatic, but the way the process was built meant that, through discussion and learning, people were able to assess the policies in terms of communal transcendental values in the third workshop.

The balance of values-based exercises and practical policy exercises, and presenting back and discussing results from previous workshops, were useful in highlighting the link between the two sets of data for the participants. Further, the practical exercises that required more discussion and group working generated a great deal of energy and passion from the groups which in turn led to more in-depth discussions, more detailed consideration of shared values on a social scale and with more 'other-regarding' intention. The more the group worked together (and learnt together) the more participants took account of each other's values.

4.4 National case study 1: Marine protected areas

The Marine Protected Areas (MPA) study, investigating the monetary and non-monetary values of a range of cultural service benefits associated with marine settings, is the most extensive of the four case studies reported here. Data gathering consisted of two phases: an online survey with 1,683 divers and sea anglers across the UK, and a series of 11 DMV workshops with 130 participants in total and five MCA workshops with 55 participants across England and Scotland (**Figure 29**). Workshop participants were largely recruited from those who completed the survey, so that responses between the two could be compared. An overview of workshops across the UK is given in **Figure 11**.

The survey contained a monetary valuation component but also a novel non-monetary survey instrument on subjective well-being that was developed specifically for this study to assess the benefits of marine CES. The online survey led to an extensive peer-reviewed UK NEAFO interim report on the aggregate use and non-use values of UK divers and sea anglers for 25 Scottish pMPAs, 119 English recommended Marine Conservation Zones and seven existing Welsh Marine Special Areas of Conservation (Kenter *et al*. 2013a; available from http://uknea.unep-wcmc.org). As such the methods and results of the online survey are only presented here where they are relevant to our discussion of shared values, and comparison between the results of phases one and two.

We will first present the background context of the study, after which we will discuss methods and results for the various components of the study.

Figure 29. MPAs case study: Participants working in small groups at an MCA workshop.

4.4.1 Background

The UK has signed up to international agreements including the Convention on Biological Diversity and the OSPAR Convention that set the task of establishing an 'ecologically coherent network' of MPAs by 2010 that is 'well-managed' by 2016. The EU Marine Strategy Framework Directive requires EU member states to put in place measures to achieve or maintain good environmental status in their seas by 2020, and to establish an MPA network as a means towards this goal. In accordance with these policy drivers and to progress towards the UK administrations' joint vision, expressed in the UK Marine Policy Statement, for 'clean, healthy, safe, productive and biologically diverse oceans and seas', governments are working towards designation of an ecologically coherent network of MPAs in UK waters. This would ensure that sites collectively provide more benefits than the sum of their parts. There are a variety of different designations for sites that all contribute to the MPA network. Historically, these include SSSIs and Marine Nature Reserves, European marine sites (Special Areas of Conservation and Special Protection Areas) and Ramsar sites established under the 1971 Convention of Wetlands of International Importance. More recently, the Marine & Coastal Access Act 2009 and Marine (Scotland) Act 2010 put in place both the power and obligation to designate new sites linked to the UK network as a whole. These new sites include MCZs to protect nationally important marine wildlife, habitats, geology and geomorphology inshore and offshore in England and Wales, and Scottish MPAs for the protection of nationally important marine biodiversity and geodiversity features in Scottish inshore and offshore waters (**Figure 30**). At the time of the research, in England, 127 recommended Marine Conservation Zones (rMCZs) had been identified through intensive stakeholder engagement, of which 31 were being considered in a public consultation. In Scotland 33 MPA proposals had been recommended by statutory scientific advisors (SNH and Joint Nature Conservation Committee [JNCC]) as well as a further four wider MPA search

locations that were still under consideration. In Wales, MPAs policy was being re-evaluated following controversy over initial proposals to designate a number of highly protected MCZs from which all extractive, damaging and disturbing activities would have been prohibited. In Northern Ireland the development of a Marine Bill, which will provide the powers to designate MPAs, was still underway.

In recognition of the fact that our seas are subject to intense use, with highly contested spaces, social and economic factors have been taken into account in planning MPAs. However, there is a paucity of knowledge on the socio-economic benefits of MPAs in a UK context. Various aggregate ex-ante valuation studies of the UK MPA proposals have been undertaken on the basis of value transfer (Hussain *et al.* 2010), but transferred values have been drawn from an extremely small base of primary valuation data. For most CES benefits no primary data is available (e.g. cultural identity) or is only available for marketed benefits (e.g. recreation). The lack of data has resulted in questions around whether a defensible policy evidence base can be developed without more primary valuation and in particular, valuation that can attribute values to specific sites (Hussain *et al.* 2010).

In parallel with the formal MPA identification process, the Marine Conservation Society (MCS) ran an online project entitled 'Your Seas Your Voice'[21] as a mechanism for members of the public to share their views on the designation of 73 specific pMPA sites around the UK. People were invited to comment on whether they thought certain sites should be protected or not and their responses included details of how they use the sea, how and why they value it, and how they believe sites should be managed. The majority of votes were from non-extractive recreational sea users such as divers, walkers and wildlife watchers. Analysis of the comments received alongside the votes highlighted several key benefits that inspire people to support MPAs, including aesthetic appreciation, emotional attachment and existence values, as well as an appreciation of specific habitats, species or marine landscapes.

When considering the value of benefits, it is useful to distinguish between that of users and non-users. Existence values of marine biodiversity (the satisfaction derived from knowing that marine habitats and species exist even when they do not provide any direct or indirect use or other benefit [Aldred, 1994]) are relevant to both users and non-users (the general public). However, most ES benefits, including cultural ES benefits such as the aesthetic and amenity value of marine ecosystems, are relevant to users only.

Sea anglers and divers are amongst the largest marine user groups. Within the UK, an estimated 1.1 (Drew Associates, 2004) to 2 million (CEFAS, 2013) people go sea angling every year. There are around 200,000 UK divers and snorkelers (BSAC, personal communication). The recreational activities of these groups make significant contributions to local economies, but also gain considerable non-market value from marine ecosystems (Beaumont *et al.* 2008; Scottish Government, 2009; Stolk, 2009). Nonetheless there have been no studies assessing, in a systematic way, the cultural ES values for the sites that sea anglers, divers and snorkelers visit, nor have there been studies to establish monetary values for the environmental benefits that users enjoy. Thus, to feed into the English and Scottish MCZ/MPA impact assessment, the UK NEAFO WP5 team developed a state-of-the-art CE and CV study to assess the value of MPAs in the UK to divers and sea anglers using an online survey (Kenter *et al*. 2013a), published in July 2013. This provided a baseline of individual values against which to compare shared values in the sense of the values that arise from a shared deliberative process (deliberated individual values) and the values deliberatively decided on by groups, rather than individuals (deliberated group values).

[21] http://www.mcsuk.org/mpa/england/yourseasyourvoice

The case study provides an example of a national-scale assessment of values in a live policy context. The interim report transferred the results of the individual CEs and CV and individual non-monetary well-being values to a suite of 155 actual sites. Here, the focus is not on the value of a suite of policy sites but on how values might be different between individual and shared values. Because of the time-scale of the project, exploring how the cultural ES value of specific potential pMPAs might change was beyond the scope of our project. However, in principle it would be possible to transfer the deliberative group-based results from this study to value any potential UK MPA.

Besides gathering evidence on the difference between individual, deliberated and group values, the study is also important as an example of a mixed method approach that recognises the plural nature of values. A particular innovation in this area is combining monetary values with non-monetary indicators for cultural ES. One way to understand cultural ES benefits is to consider subjective well-being experienced associated with the use of and relations with and within environmental settings. The design of indicators to understand what might influence well-being in society is an important focus in research and government policy. Nature is known to be an important element of human well-being as evidenced by many studies that that have found links between the proximity of green space and well-being (e.g. Maas *et al.* 2006; Mitchell & Popham, 2008). Having access to the natural environment has been shown to have restorative benefits for psychological well-being and cognitive function (e.g. Wells, 2000) and use or engagement with nature facilitates multiple dimensions of well-being (e.g. Irvine *et al*. 2013). There is some evidence that greater biodiversity enhances psychological well-being through the benefits of peoples' relationship with such places over time, ability to reflect on their lives and sense of personal identity; all reported to be heightened where perceived or real species diversity was greater (Dallimer *et al*. 2012; Fuller *et al*. 2007). Indeed Lindemann-Matthies *et al*. (2010) found a positive association between species richness and aesthetic appreciation of grasslands. Well-being benefits also tend to be associated with particular ecosystems, for example woodlands (O'Brien, 2005). As yet, there is little known about the subjective well-being benefits derived from marine CES, although Wheeler *et al*. (2012) found that people living closer to the coast reported better health.

The Millennium Ecosystem Assessment divided CES into recreational, spiritual and religious, aesthetic and educational and scientific, plus existence values (MA, 2005). However, as is explained in NEAFO WP4, this categorisation is problematic, because of the intangibility of these categories and because of their overlap, e.g. recreation can include aesthetic and spiritual experiences. Also, it leads to bias in assessment, as rarely all these categories are assessed and other categories of cultural experience can be identified. Thus, the UK NEA developed a CES framework where environmental settings (NEA) or places (NEAFO) themselves were identified as CES, with the MA categories redefined as types of benefits (Church *et al.* 2011). This allowed for CES, such as woodlands, allotments, coastal settings etc. to be assessed directly in terms of quality and quantity. The quality and quantity of CES then impact on the *practices* that take place in these settings, which generate *benefits* in terms of *experiences*, *identities*, and *capacities* (see UK NEAFO WP4). Marine settings include an underwater landscape, with particular features that would be more or less attractive to their users. For example, mussel beds on a muddy substrate provide a different experience to divers and anglers than a sea grass landscape, a rocky area with corals, or an estuarine setting. Applying the WP4 framework, in this case we value the marine places/settings and their characteristics themselves through monetary measures and MCA, while non-monetary subjective well-being indicators and storytelling are used to value benefits in terms of experiences, identities, and capacities.

Conceptualising CES this way also links their provision to marine users to components of biodiversity. While the leisure and recreation industry depends directly on the diversity of sites, recreation valuation studies thus far have generally not addressed this dependency (Rees *et al*.

2010; Ruiz-Frau *et al*. 2013). Protection of biodiversity is also important for the existence values associated with marine settings (Ressurreição *et al.* 2011, 2012).

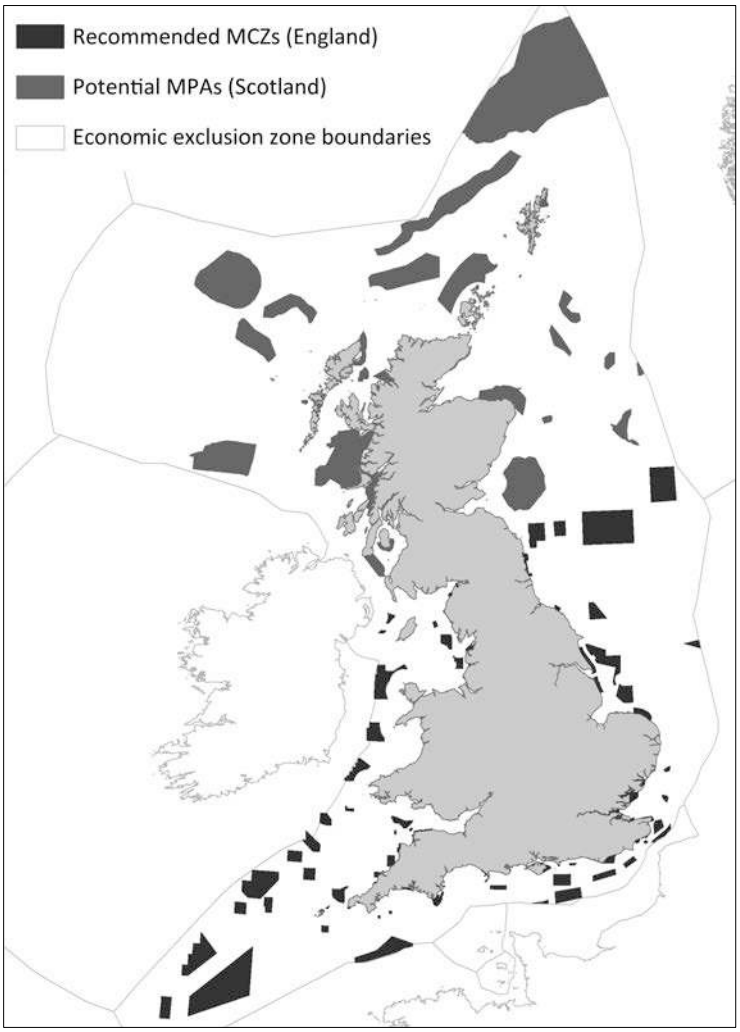


Figure 30. MPAs case study: English recommended Marine Conservation Zones (MCZs) and Scottish potential Marine Protected Areas (MPAs) at the time of the research.

4.4.2 Methods

Across the two data-gathering phases (i.e. online survey and workshops; **Figure 31**), the case study results can be effectively divided into a number of components: 1) monetary valuation (non-deliberative survey vs workshops); 2) non-monetary valuation using multi-criteria analysis (MCA workshops); 3) non-monetary valuation using subjective well-being indicators (survey vs two types of workshops); 4) non-monetary valuation using storytelling (DMV workshops); 5) psychometrics (survey vs two types of workshops); 6) participants' preferences on how to elicit values. Above (Section 4.1), we have already provided a general introduction into DMV and MCA and provided details on storytelling and psychometric methods, as these were used across case studies. Below, we provide further details on methods used for monetary valuation, MCA, well-being indicators, and gathering participant feedback on different methods for assessing values. A diagrammatic overview of the data gathering process and methods used is provided in **Figure 31**.

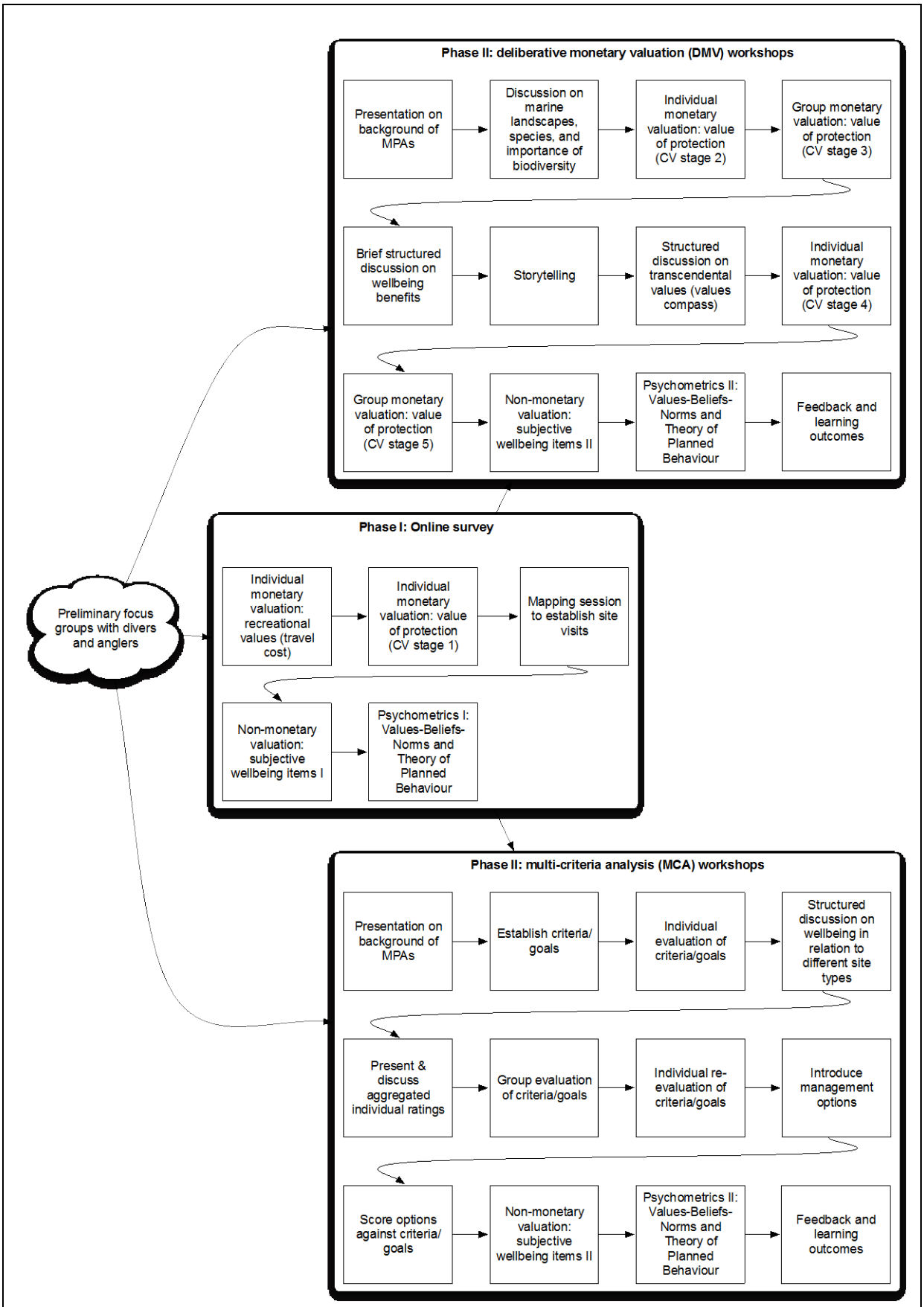


Figure 31. MPAs case study: methods outline.

4.4.2.1 Monetary valuation

Monetary valuation in the survey included a combination of transport-cost based CEs, which were used to estimate recreational use values, and CV questions that asked about WTP towards protecting sites into the future. In the DMV workshops, across four stages CV questions were asked using the same design as in the survey, so that results could be directly compared. Here we only focus on the CV results. An innovation was the use of attributes in the CV tasks, which made it possible to evaluate the relative importance of specific aspects of sites for WTP, as in CEs.

	SITE 2
Marine landscape:	 Mostly sandy or gravelly seafloor with sea grass or eel grass beds.
Underwater objects:	 Shipwreck
Sea life:	 Seal
Access:	 Accessible by shore and boat
Other restrictions:	 No dredging & trawling
Number of vulnerable species under protection:	5 (of 40)
Size of protected area:	10 km^2
Travel distance:	50 miles

Figure 32. MPAs case study: example workshop contingent valuation hypothetical site as presented to participants.

Contingent valuation attributes: Attributes included vulnerable species, marine landscape/habitats, presence of large fish, other charismatic species, wrecks and rock formations, access options, management restrictions, size, and travel distance. Attributes were selected and evaluated on the basis of four focus groups with divers and sea anglers. An example hypothetical site as presented to

participants is given in **Figure 32**. Details on the presentation of attributes and attribute levels are given in Annex 10.

The *marine landscape* attribute was based on grouped habitat categories derived from a combination of English MCZ habitat 'features of conservation interest' (FOCI) and Scottish MPA 'search features' and hence readily aligns with the habitat categorisations used for actual pMPA sites. For Wales, we were able to link SAC conservation features to English FOCI. We combined landscape descriptions with substrate characteristics ('mostly rocky', 'mostly sandy or gravelly', or 'mostly muddy') as focus groups suggested substrate was highly relevant to divers because of its relation to underwater turbidity and visibility. Because many habitats are only found in combination with particular substrates, combining habitat and substrate into one attribute prevented presentation of unrealistic combinations to respondents. Because of the large number of FOCI habitats and Scottish search features, four habitats (littoral chalk communities, peat and clay exposures, sheltered muddy gravels, and deep water mud) were excluded after multiple focus groups concluded that they would be of little interest to divers and anglers. For each habitat, participants could access photos as well as descriptions, by hovering over them in the survey or in a separate brochure in the workshops.

The *vulnerable species protected* attribute (for sake of brevity also referred to as the 'species' attribute) was framed as the number of vulnerable species present at the site that would be protected, out of a total of 40 vulnerable species. Species again correspond to a combined list of English FOCI and Scottish search features. Participants had access to a list of species in a separate browser window or tab or brochure in the workshop with name, biological family, photo and a link to a species-specific Natural England web page for further information (see Kenter *et al*. 2013a, for presentation of the complete list of species). It was suggested to participants that it was very unlikely that they would either encounter or catch one of these species if they would dive or fish at the site. Although it is known that different species and taxa are not necessarily valued equally (Ressurreição *et al.* 2012), because of the large number of attributes in our design we decided to implement vulnerable species as a single continuous variable.

A list of *restrictions* and *access options* was identified from proposed policy documents and discussed in focus groups to evaluate which restrictions would be most relevant to participants. Similarly, various non-protected, charismatic species of interest to divers and anglers for the *sea life* attribute were evaluated for relevance, whilst making sure that there was no significant overlap between 'sea life' and vulnerable species.

Individual and group valuation stages: The monetary component of the online survey followed a conventional format, with presentation of limited amounts of descriptive texts and photographs on tasks and attributes to help inform participants. We will call the survey responses 'valuation stage 1'. The DMV workshops consisted of two stages of deliberation and four further valuation stages (**Table 32**). The first deliberation stage focused on exchange of information. It included a short presentation on MPAs with emphasis on the current governmental plans to implement a network of sites in UK waters. Then facilitators asked participants to discuss marine habitats and species of conservation interest on the basis of a hand-out that contained the same information and photos as was presented in the online survey, and to discuss the importance of marine biodiversity in general. This was followed by valuation stage 2, consisting of a set of individual CV WTP questions and then stage 3, where participants were asked to discuss the same tasks as a group and come to a decision on

what would be a 'fair price' to ask divers and anglers[22] (**Table 33**). This was followed by the next deliberative intervention, which focused on exchange of experiences and values. It included storytelling by participants linked to a group discussion on feelings of well-being associated with visiting marine sites, and a discussion of personal and shared transcendental values on the basis of a values 'compass'. This was followed by another individual valuation stage (4) and group valuation stage (5). In the online survey, participants had received four CV tasks (Kenter *et al.* 2013a). In the workshops participants received four tasks as an individual in stage 2 then repeated the same tasks as a group. In stage 3, again, they valued four different tasks as an individual and then those same tasks as a group in stage 5. After each individual valuation stage participants completed a follow-up question to establish decision-making rules and identify 'protesting' and strategic bidding (**Table 34**).

Payment vehicle: WTP was implemented as a voluntary donation on a single-bounded payment card from £0 - £40 (i.e. participants could circle various amounts between £0 and £40 or indicate an amount of their choice above £40). Participants were also confronted with a short script reminding them to consider budget restraints (**Table 33**). A limitation of the voluntary contribution payment vehicle is that it is not fully 'incentive compatible', i.e. it may not reveal the full extent of individual values (Arrow *et al.* 1993). In particular, voluntary donations may be reduced because of free rider concerns, which induce respondents to donate less as they do not trust others to donate because of the voluntary nature of the payments (Bush *et al.* 2013). However, voluntary payments can nonetheless be more appropriate for particular contexts as they may be more credible than a compulsory payment vehicles (e.g. Berrens *et al.* 2002; Biénabe & Hearne, 2006; Champ *et al.* 2002). In addition, focus groups and discussions with stakeholders suggested that any compulsory mechanism (tax or entrance fees) would lead to considerable protesting, particularly amongst anglers.

We chose a one-off payment over an annual payment because marine users are commonly asked for some kind of site based contribution. Also, we deemed it likely that a one-off contribution would be more closely linked to site characteristics than a recurring donation to some hypothetical body, which might be more strongly associated with attitudinal, political or moral expression. One-off payments moreover avoid the problem in aggregation where donations are asked for multiple competing sites; participants would be unlikely to make annual subscriptions to more than a handful of sites, while focus groups suggested divers and anglers were quite used to paying multiple one-off donations or site fees over a period of time.

Analysis of impact of deliberation and group vs individual valuation: The main focus of this case study was to highlight *if* and *where* changes in evaluation of the hypothetical sites and attributes appeared over the course of completing stage 1 to 5. We tested three main hypotheses on how participants might change their preferences:

Hypothesis 1: The workshop *information* intervention, consisting of the group studying and discussing the attributes in more detail (particularly marine landscape and vulnerable species, which were most complex) would change participants' stated preferences. This hypothesis could not be disentangled from any possible baseline effect that performing the tasks in a workshop setting had (at least through modelling monetary measures alone).

Hypothesis 2: The *moralisation* intervention, which consisted of storytelling and the values compass, would change participants' stated preferences.

[22] As with the Forth study, in order to be able to make more accurate comparisons and to respect minority positions, we modelled individual votes for the group-based valuation.

Hypothesis 3: Participants would develop different preferences in *group valuation* tasks compared to their *individual valuation* tasks.

Statistical analysis: To estimate WTP, we used a random effects interval regression model, with the log-transformed WTP interval as the response variable. Independent variables included the CV attributes, the mean of subjective well-being factor scores (Section 4.4.2.3), and VBN and TPB psychometric parameters (Section 4.1.4). To test the hypotheses above we introduced workshop valuation stage as a time factor variable within the model and interacted this with each of the CV attributes. Details on the statistical analysis used can be found in Annex 11.

Table 32. MPAs case study: DMV workshop outline with different valuation stages.

Online survey	
Valuation stage 1	Individual WTP
	Psychometrics, well-being indicators
DMV workshops	
Deliberation: information stage	Presentation and discussion on biodiversity
Valuation stage 2	Individual WTP
Valuation stage 3	Group-based fair price
Deliberation: moralisation stage	Storytelling and well-being discussion
	Transcendental values compass
Valuation stage 4	Individual WTP
Valuation stage 5	Group-based fair price
	Psychometrics, well-being indicators, feedback

Table 33. MPAs case study: CVM questions for individual and group choices.

Individual willingness to pay: individual decisions	***Fair price: group decisions***
On the following pages you will be presented with four different dive/angling sites. If any of the four sites was a real protected area, do you think you could afford to, and would be willing to give a one-off donation? Your donation would be used to set up a local management trust to maintain this site as it is shown above, and protect its natural features against the risk of future harm and degradation. *In this question and questions that follow, it is really important for our analysis that you consider travel distances and financial amounts as if they were real. Thus, you need to consider your household income and expenditures, and what you might need to give up to be able to afford a donation, or the cost of travelling to a site.* *Please have a look at SITE 1. If you were asked to make a one-off donation to support protection of SITE 1 into the future, how much would you be willing to donate? Please carefully consider the characteristics of SITE 1 according to site shown.*	*What would be a fair donation to ask anglers and divers? You are asked to discuss this with the others in your group and come to a joint decision. If there is no consensus, you will vote.* *Please base your vote on, and discuss in particular:* • *Do you feel that the benefits to divers & anglers of protecting sites are worth the cost?* • *What amount of voluntary donation would be a fair price to ask divers & anglers for the protection of each site, given their particular characteristics and benefits?* *Again, donations would be used to set up a local management trust to maintain the sites as they are shown, and to protect their natural features against the risk of future harm and degradation. Please record your own vote, not the outcome of the group vote.* *What was your vote for SITE 1?*

Table 34. MPAs case study: monetary valuation follow-up question to identify 'protesting' and strategic bidding. Respondents who picked italicised answers were excluded from the CV analysis.

Which statements best describe how you decided the amounts you were willing to donate? *You can pick more than one answer.*
1. *I picked zero or low amounts because **I wanted the average that comes out of the survey to go down**.*
2. *I picked high amounts because **I wanted the average that comes out of the survey to go up**.*
3. I considered my household budget, and **how much I could spare**.
4. I considered **how much I would pay, if I was really asked** to donate.
5. I thought about **what others would donate**.
6. I picked high amounts because I thought it was **the right thing to do**.
7. *I picked zero or low amounts because I thought money needed for managing this site **should come from another source,** such as taxes.*
8. *I picked zero or low amounts because **I do not agree with proposed policies** around marine protected areas.*
9. I picked an amount depending on **what I thought protecting a specific site was worth**.
10. Other

4.4.2.2 Multi-criteria analysis

The deliberative MCA process involved six main stages (**Figure 31**; **Table 35**). In summary, MCA workshop design involved the preparation of a set of criteria to reflect the cultural ES values of recreational users (**Table 36**) and a number of options, which were used to assess how changes in management influence the values (criteria) held by participants (**Table 37**). Scoring of how criteria (in this context, contextual value-based goals) varied between options and different environmental (marine and coastal) settings allowed us to assess how effective participants believed the different management measures would be at achieving or safeguarding their values. The criteria and options were piloted with local groups and partner organisations (BSAC and AT) to ensure their relevance and the clarity of the questions asked during the ranking and scoring processes. Each workshop was introduced with a presentation similar to that of the DMV workshops, outlining why MPAs were being implemented, the state of the marine environment and threats faced on UK and global levels, and the MPA designation process.

The ratings given to the goals by each participant were standardised to sum to one to ensure that participants had equal weight and these values were used in the subsequent analyses. To calculate weighted scores for how well marine settings and management scenarios delivered the criteria (goals), scores given to the settings and management scenarios were multiplied by the standardised criteria ratings, and divided by the sum of the standardised ratings for all participants. For each setting and management scenario, weighted scores were summed for each participant to give an overall score. We used the final, post-deliberation ratings to weight the scores for management scenarios.

To analyse how the criteria rankings changed before and after group deliberation, and to investigate how well criteria were met both individually and overall across marine settings and management options, generalised linear mixed models were used. Weighted scores were used to model the influence of scenarios on the set of goals and un-weighted scores used to analyse the responses in relation to individual goals. GLMM models were fitted using the *gamm* function in the R (version 3.0.1) package *mgcv* incorporating workshop and participant ID as random effects and using the quasi-binomial family for over-dispersed ordinal data.

Table 35. MPAs case study: main stages in the deliberative MCA workshop design.

1. Establish criteria (goals)   A list of criteria representing common goals (performance measures) held by recreational users for the use and management of marine sites was prepared (Table 36). During each workshop, criteria were discussed, modified and accepted by participants who were offered the option of adding one further criterion if they, as a group, agreed that this was important and missing from the prepared list.
2. Rank criteria   In recognition that criteria may not be equally important to all participants, attendees ranked these in order of priority to establish the relative weight placed on different goals. To elicit and compare individual, deliberated and group values, there were two iterations: individual ranks were recorded prior to and after the intervention and group deliberation (stage 3). Participants gave a rank of 100 to the criteria/criterion that were/was most important to them and ranked the remaining criteria between 0 and 100.
3. Intervention and deliberation   This encouraged participants to consider what values they derived from different marine settings. To shift participant thinking from management goals to less tangible experiential values, a series of place-based CES benefits was introduced (Table 36). These benefits were allied to the non-monetary cultural ES instrument developed for the online survey, detailed in the next section (4.4.2.3), but added a further number of items associated with existence and bequest values, and 'sense of fulfilment', which had been brought forward in a pilot. With these benefits in mind, participants were asked to consider why they visit particular sites and, in subgroups of 5-8 participants, to exchange stories of memorable visits. To structure the intervention around sites most of value to participants, proposed MPA sites were grouped into six 'archetypes': harbour, estuary, loch, rocky shore/seabed, sandy beach, and out at sea, three of which were selected for discussion in each workshop. These included the two site types that participants visited most often in the workshop region, plus a third chosen at random. This was followed by further small group deliberation, in which the same subgroups were asked to come to a consensus on the top five shared criteria and rank these from 1-5, followed by the second individual ranking. A summary of initial ranks was calculated and used as a prompt for part of the deliberation.
4. Define options   Scenarios were developed as the basis for assessing how changes in management might influence the values held by participants. Three options were defined, representing a gradient of increasing protection and restrictions (Table 37). These incorporate measures being considered in the designation process for new UK MPAs (JNCC/NE, 2010) and are comparable with strategies proposed by recreational user groups (Nautilus Consultants, 2005) and established elsewhere to manage user pressures (Gray *et al.* 2010). The goals and restrictions on use or access considered necessary to achieve each of these scenarios were outlined and discussed with participants to allow them to seek and offer clarification.
5. Score options against criteria   To understand how changes in management were likely to affect participant values, the performance of each management option was scored against each criterion. Participants were asked to indicate how likely they felt it was that each option would achieve each of the criteria (goals) and so maintain or safeguard what they felt was important about the marine environment. Participants provided scores for each of the three site types used in deliberation. This allowed us to examine how changes in management might affect place-based values and assess the site-specificity/transferability of CES values between different settings.
6. Weighting   To conduct multi-criteria analysis, algorithms were used to combine the ranks and scores into weighted values that describe the overall preferences towards each option. Weighting and aggregation are important and potentially contentious aspects of the method (Garmendia & Gamboa, 2012; also see Section 5.5), and deliberation and repeat ranking allowed us assess how individual vs shared values would affect aggregated responses.

Table 36. MPAs case study: criteria considered in the MCA and place-based cultural ecosystem service benefits used in the deliberation.

Criteria: recreational user goals for use and management of marine sites	*Place-based cultural ecosystem service benefits*
1. Protect non-damaging recreational access opportunities 2. Improve fish stocks 3. Reduce pollution & litter 4. Protect species & habitats 5. Improve chance of wildlife encounters 6. Protect cultural heritage: wrecks, local history 7. Include local knowledge for monitoring & management of marine environment 8. More scientific data: stronger evidence base on status of seas	1. **Engagement with nature** – feeling connected with nature, enjoying the beauty of nature, opportunities to learn about nature. 2. **Sense of fulfilment** – improving skills, sense of excitement, competitive opportunities, satisfaction of catching a meal. 3. **Sense of belonging** – feeling like these places are part of your personal identity, missing these places when you can't visit them. 4. **Therapeutic** - Feeling healthy & clearing your head, feeling free. 5. **Spiritual value** - Feeling connected to something larger than yourself. 6. **Sense of community** – bonding with other people. 7. **Memorable experiences** that have a lasting impact on your life. 8. **Bequest** – protecting places for future generations. 9. **Existence & intrinsic** - value of marine environment for its own sake.

Table 37. MPAs case study: MCA options: the three management scenarios used in MPA MCA workshops (see Table 35 for detail on the construction of these scenarios).

1. No special protection • Existing voluntary measures & statutory regulations & levels of enforcement.
2. Moderate restrictions **Strategy**: Modify & reduce extraction, reduce disturbance through restrictions on commercial use and managed recreational access. **Goals:** Reduce pollution, gear & litter deposition, improve age structure & diversity of breeding populations, protect underwater features (wrecks, reefs) & habitats from disturbance. **Recreational use:** • Voluntary compliance with increased minimum landing sizes. The AT 'encourage all anglers to apply voluntary minimum retention sizes that exceed the EU's and allow all fish retained the chance to have bred at least once', i.e. retention size limits above age of sexual maturity; stricter than existing EU legal minimum landing sizes which apply only to motorised vessels with a commercial license. • Permitted moorings/anchorage points only. **Commercial use:** • Only small-scale commercial fishing, netting, potting, etc. allowed. • Static gear only. • Increased minimum landing sizes.
3. High level of protection measures **Strategy**: Reduce extraction, deposition & disturbance through exclusion of commercial use & avoidance of recreational impacts in sensitive seasons/locations, through use of voluntary & statutory measures, with stronger enforcement of regulations. **Goals**: Stronger emphasis on protection of wildlife & sensitive habitats to improve size, diversity & success of breeding populations, protect underwater features (wrecks, reefs) & habitats from disturbance, reducing pollution & disturbance/damage to species and habitats. **Recreational use:** • Catch & release only. • Permitted moorings/anchorage points only. • Manage potential damage through code of conduct: speed restrictions on motorised vessels & minimum viewing distances for wildlife.

- Seasonal closures of sensitive, e.g. feeding, spawning, nursery, breeding areas.
- Regular monitoring to ensure that closures and codes of practice are followed.

Commercial use:

- No commercial harvesting (access only).
- Stronger enforcement & monitoring of fisheries regulations.

4.4.2.3 Subjective well-being indicators

To understand the contribution of the marine environment to quality of life, we investigated subjective well-being derived by recreational users of marine areas. A set of non-monetary, subjective well-being indicators on themes such as identity, knowledge, health, connectedness to nature, social bonding were developed on the basis of a wide range of literature sources and implemented through a set of statements using a conventional 5-point Likert response scale from 'strongly agree' – 'strongly disagree'. We addressed the following two questions: 1) What are the different types or dimensions of well-being expressed by recreational users of the marine environment? 2) How did participation in deliberative processes influence perceived subjective well-being in comparison to an online survey?

Constructs of well-being that we *a priori* identified may be relevant to recreational users of marine sites (**Table 38**) were drawn from a wide range of sources, including literature on the benefits of green spaces and biodiversity in relation to concepts of sense of place and identity (Dallimer *et al.* 2012; Fuller *et al.* 2007; Irvine *et al.* 2010; Manzo, 2003), as well as conceptualisation of the benefits of cultural ES in the UK NEA (Church *et al.* 2011) and Max-Neef's Human Development Matrix upon on which the UK NEA draws (Cruz *et al.* 2009; Max-Neef, 1989). We also drew from indicators used in Natural England's (2012) Monitor of Engagement with the Natural Environment that has been implemented in UK NEAFO WP4, recent thinking on CES, goods and values (Chan *et al.* 2012) and the relation between cultural services, identity and landscapes (Tengberg *et al.* 2012). Selected constructs of well-being and their measures were oriented on the place-based UK NEA cultural ES approach (Church *et al.* 2011), which conceives environmental settings themselves as cultural services, delivering a range of benefits such as health, knowledge and amenity goods. Potential measures were both adapted from previous research (Fuller *et al*. 2007; Dallimer *et al*. 2012) and developed specifically for this study. They were crosschecked against results from the MCS 'Your Seas, Your Voice' survey and discussed in four focus groups with divers and sea anglers. This process led to a novel instrument consisting of 15 indicator statements using a standard 5-point Likert response scale (*strongly disagree* to *strongly agree*). While the instrument was designed for assessing the subjective well-being benefits of marine settings with marine beneficiaries, the instrument could easily be adapted for broader assessment of cultural ES.

Table 38. MPAs case study: subjective well-being indicator statements and *a priori* constructs.

Indicator statement	***A priori constructs; links to literature & existing instruments***
1. Visiting these sites clears my head.	1-4: Reflection and sense of wholeness (Dallimer *et al.* 2012; Fuller *et al.* 2007; Irvine *et al.* 2010) 3: Connection to nature (MENE) 4: Spiritual value (NEA; Chan *et al.* 2012)
2. I gain perspective on life during my visits to these sites.	
3. Visiting these sites makes me feel more connected to nature.	
4. At these sites I feel part of something that is greater than myself.	
5. These sites feel almost like a part of me.	5-8: Sense of place: place identity and continuity with past (Fuller *et al.* 2007; Dallimer *et al.* 2012; Tengberg *et al.*
6. I feel a sense of belonging in these sites.	
7. I've had a lot of memorable experiences in these sites.	

Indicator statement	***A priori constructs; links to literature & existing instruments***
8. I miss these sites when I have been away from them for a long time.	2012) 7: Transformative values (Chan *et al.* 2012); 5: Identity (MENE)
9. Visiting these sites has made me learn more about nature.	Knowledge (NEA; MENE)
10. I have made or strengthened bonds with others through visiting these sites.	Social bonds (HSDM)
11. I feel like I can contribute to taking care of these sites.	Participation (NEME; HSDM)
12. I have felt touched by the beauty of these sites.	Aesthetics (NEA) Appreciation (MENE)
13. These sites inspire me.	Inspiration (Chan *et al.* 2012)
14. Visiting these sites leaves me feeling healthier.	Health (NEA; MENE)
15. Visiting these sites gives me a sense of freedom.	Freedom (HSDM)
HDSM: Human Scale Development Matrix (Cruz *et al.* 2009; Max-Neef, 1989) MENE: Monitor of Engagement with the Natural Environment (Natural England, 2012) NEA: UK National Ecosystem Assessment: Cultural Services (Church *et al.* 2011)	

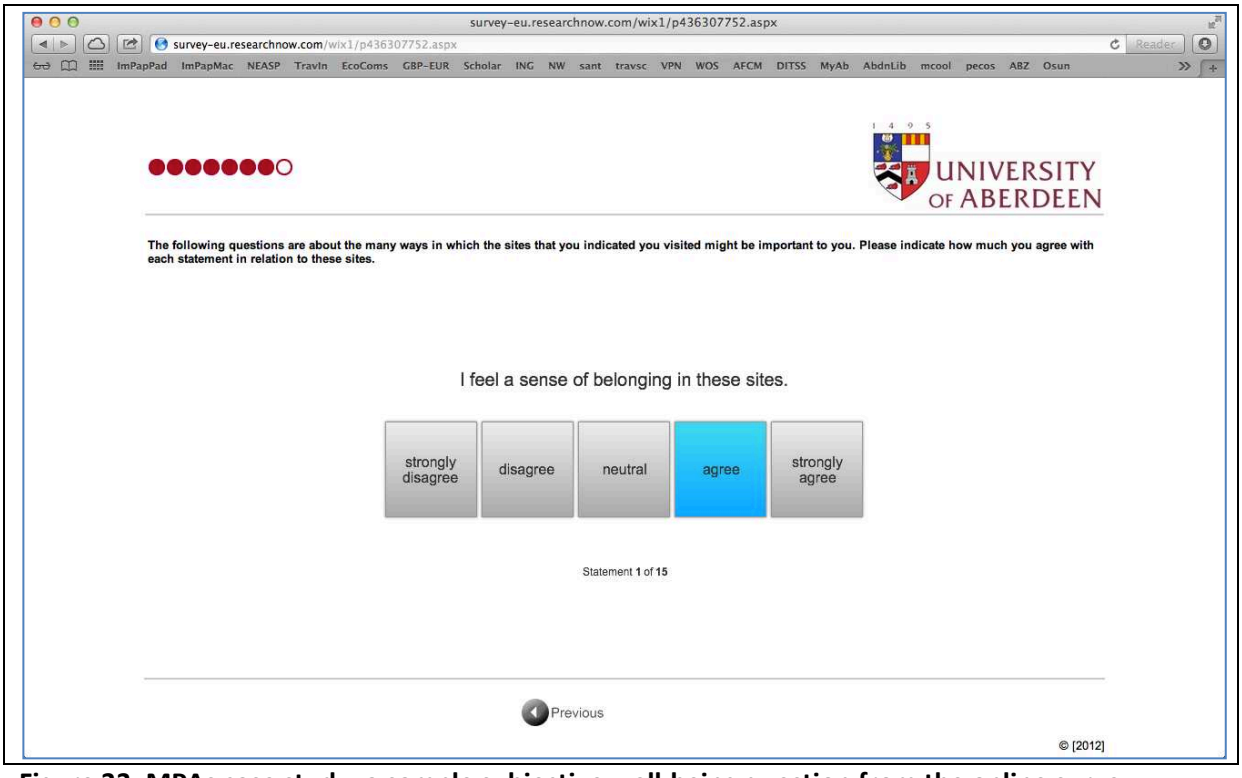


Figure 33. MPAs case study: a sample subjective well-being question from the online survey.

Participants were first asked for responses to the set of well-being indicator statements as part of the MPA online survey (Kenter *et al*. 2013a). To investigate the influence of participating in a deliberative workshop, the same well-being indicator statements were presented a second time to participants at the end of each DMV and MCA workshop (**Figure 31**). Participants were prompted with the question: "*The following questions are about the many ways in which the sites that you*

indicated you visited might be important to you. Please indicate how much you agree with each statement in relation to these sites" (**Figure 33**). In the online survey, the responses were related to a set of specific sites that participants indicated they visited within their region of the UK, using an interactive mapping application. This allowed us to assign well-being values to specific locations; details on this are provided in Kenter *et al.* (2013a). Within the workshop setting the indicator statements referred to sites that participants visited in general rather than a specific list of regional sites; here we were mainly interested in whether scores would differ following the workshop deliberations. This meant that in the survey, scores might vary both with individuals and with the set of sites they indicated they visited, and in the survey only with individuals. While it is reasonable to assume a degree of covariance between individuals and the sites they visit, we recognise that this might nonetheless have implications for the degree to which potential changes might be explained.

Analysis included use of both exploratory and confirmatory factor analysis (EFA and CFA). Details on this are provide in Annex 12.

4.4.2.4 Preferences for ways of eliciting values

At the end of both the DMV and MCA workshops, participants completed a feedback questionnaire where they were asked whether they felt more confident in their survey or their workshop choices, what approach they thought should be used to elicit their values (survey vs workshop, individual vs group), whether they felt others had shared their views, whether they felt they had gotten to know their own values better, learnt something new or had an influence on decision-making, and whether they found the workshop enjoyable, interesting or difficult. The aim of this was to evaluate differences in how participants experienced the online survey, DMV and MCA workshops. Open questions asking for feedback and learning outcomes were also included, but are not analysed here.

4.4.3 Results and discussion

In this section, we will present and discuss results for each of the different components of the case study as outlined above. A discussion of broader themes and implications will be presented in the overall case studies synthesis discussion in Section 4.6.

4.4.3.1 Monetary valuation

A total of 130 divers and anglers participated in the 11 UK DMV workshops; of those 95 had participated in the online survey. 67% were divers and 33% were anglers, the latter were slightly better represented than in the survey. Gender ratios were similar to the survey: 28% were female divers, while one female angler participated who had not taken part in the survey; the sea angler population only has about 3% female members (Drew Associates, 2004). The ratio of protesting and strategic bidding within the sample was high; 45% of the respondents who had participated in the workshop and survey were dropped leaving 52 respondents (15 anglers and 37 divers) for further analysis. However, this figure included participants who had protested at any of the stages of data collection, even when they only protested at a single stage. The most prevalent motivation for protesting was believing that divers and anglers should not be asked to pay towards marine conservation (26% over the first two workshop stages), a smaller group (4%) was not WTP because they did not agree with the proposed MPAs policies. Protesting for these two reasons was notably higher in the workshops than the survey and substantially less prevalent in the group of participants who had not previously participated in the survey (**Figure 34**). Protesting decreased somewhat in stages 4/5, after the 'moralising' intervention, with 22% believing that divers and anglers should not be asked to pay. It decreased more markedly with those who hadn't participated in the survey, from 20% to 11%. Strategic bidding appeared to be minimal.

Results of the interval regression models used to analyse the CV data from the five stages of data collection (see Section 4.4.2.1 and **Figure 31**) are given in Annex 11. ANOVA results comparing mean overall WTP between stages are given in **Table 39**. Overall WTP in stage 1 (online survey) and two (individual values, deliberation on information only) was very similar. In stage 3 (group values expressed as 'fair price', deliberation on information only), WTP decreased by 35% compared to the online survey. In Stage 4 (individual values after information and moralisation based deliberation), WTP decreased 18% compared to the online survey, while in Stage 5 (group values expressed as 'fair price', after information and moralisation based deliberation) WTP was decreased by 51%. Analysis of variance indicated these results were highly significant (p=0.004). Thus, as was the case in the Forth case study, both group-based decision-making and moralisation had a negative impact on overall WTP, and reinforced each other. Anglers decreased their WTP relative to the survey more so than divers. Again this effect appeared to be stronger reflected in the group values.

Because WTP was estimated as the natural log of the parameters (**Equation 1**, p266), it is not possible to provide WTP figures per individual attribute. However, the coefficients (β) in Annex 12 provide an indication of the relative importance of each attribute at different stages of the workshop; a negative sign means the parameter has a negative influence on WTP. Relatively, the most important attributes were large fish, wrecks and, in the workshops, habitats, particularly mussel/oyster/flame shell beds, kelp and sea grass, rocky estuarine habitats, tide-swept channels, and muddy habitats with sea-pens, burrowing animals and firework anemones. Distance, as expected, had a significant negative effect. Presence of bird colonies or the size of the protected area did not prove important to participants. While participants were not sensitive to scope in terms of area size, they were sensitive to scope in terms of features and species present. Thus results suggest that divers and sea anglers do not primarily depend on large areas to enjoy their activity, as long as the site provides them with the site characteristics they enjoy or wish to protect.

Table 40 shows that changes in monetary values could be seen in terms of differences between the three deliberation treatments (none; information; moralisation), as well as between individual and group-based valuation. The support for management restrictions on e.g. dredging and trawling appeared to increase after both the first and second deliberative intervention. Thus, both giving more information and prompting participants to consider their transcendental values increased participants' perception of the importance of management restrictions at marine sites. In contrast, the combination of moralisation and group decision-making in stage 5 led to negative appreciation of restrictive access options (shore only and boat only). Here, discussions pointed towards an arising sense of solidarity between users around access rights. In both group discussion stages, presence of large fish became significantly less important. In contrast, WTP assigned to charismatic species, protection of vulnerable species and wrecks appeared to be stable across the different stages, suggesting that these anchored the bids. Travel distance was, as expected, a negative parameter and also did not significantly change throughout the workshop process and thus appeared to be unaffected by deliberative interventions.

Because of the large amount of habitats under consideration, it was difficult to tease out stage-specific effects for different marine habitats, but it was possible to compare overall survey vs workshop results (Model C in Annex 12). In the survey results for both the subgroup of workshop participants and the sample of all survey participants (*cf.* Kenter *et al*. 2013a), WTP for conservation was largely independent of the specific habitat that participants were asked about. However, in the workshops, participants had formed clearer preferences as most landscape attribute variables became significant. This was quite a remarkable difference; in the online survey results as a whole, with a sample of more than a thousand participants, preferences could not be identified (Kenter *et al*. 2013a), while in the workshops, with only 52 participants, the statistical model was able to

identify them. Thus, it appears that the workshops gathered less data but with seemingly much higher quality of information as a result of participants expressing more considered choices.

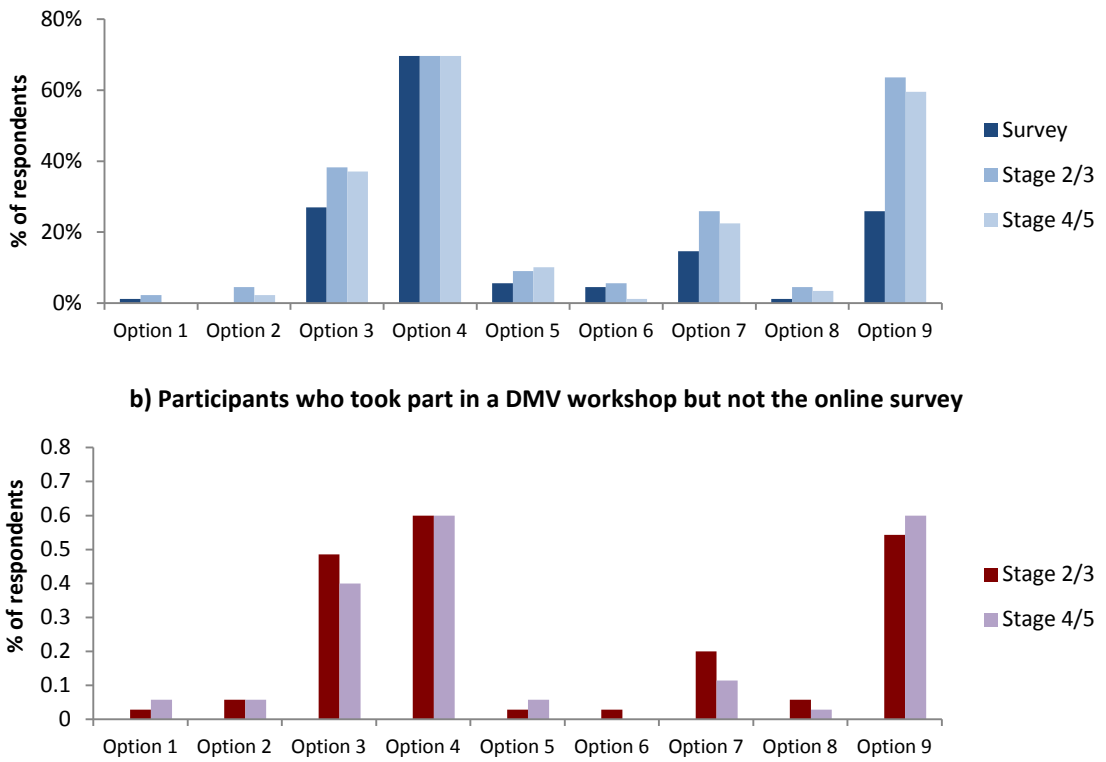
In Model A, we also included mean subjective well-being scores as a parameter. Notably, although the scores themselves were individual, they did not appear to predict individual WTP, but they were reflected by group WTP after the storytelling and moralising intervention (stage 5).

Table 39. MPAs case study: individual/non-deliberated vs group/deliberated WTP.

Stage	*Online or workshop*	*Individual or group values*	*Deliberation 'treatment'*	*Mean WTP*	*Change vs Stage 1*
1	Online	Individual	None	£8.86	
2	Workshop	Individual	Information	£9.22	4%
3	Workshop	Group	Information	£5.72	-35%
4	Workshop	Individual	Information+moralisation	£7.28	-18%
5	Workshop	Group	Information+moralisation	£4.30	-51%
WTP based on mid-points for payment scale interval. One-way analysis of variance of natural log of mid-point of WTP interval indicates variance between stages was significant (p=0.004).					

Table 40. MPAs case study: effects of deliberative interventions and group-based (vs individual) valuation on WTP for interval regression model.

Interaction with stage	*Information*	*Moralisation*	*Group valuation*
Access by shore and boat	(base)	(base)	(base)
Access by shore only	NS	**	*
Access by shore, boat and pier	NS	NS	NS
Access by boat only	NS	**	*
No restrictions	(base)	(base)	(base)
Restrictions on dredging and trawling	↑**	↑T	NS
Restrictions on dredging and trawling + potting and gillnetting	↑**	↑*	↑T
Restrictions on dredging and trawling + anchoring and mooring	↑*	↑**	NS
Small fish only	(base)	(base)	(base)
Large/specimen fish	NS	NS	↓**
Diver	(base)	(base)	(base)
Angler	↓*	NS	NS
Mean subjective well-being score	NS	NS	↑**
↑: Increase in response to treatment; ↓: decrease in response to treatment; ** Significant at p<0.01; * p<0.05; T: tendency at p<0.1; NS: non-significant; (base): attribute base level. Results based on Wald contrast tests for information (stage 2 vs 1), moralisation (stage 4 vs 2 & 5 vs 3) and group treatments (stage 3 vs 2 & 5 vs 4). Model detailed in Annex 11.			



Key to options

1. I picked zero or low amounts because I wanted the average that comes out of the survey to go down.
2. I picked high amounts because I wanted the average that comes out of the survey to go up.
3. I considered my household budget, and how much I could spare.
4. I considered how much I would pay, if I were really asked to donate.
5. I thought about what others would donate.
6. I picked high amounts because I thought it was the right thing to do.
7. I picked zero or low amounts because I thought money needed for managing this site should come from another source, such as taxes.
8. I picked zero or low amounts because I do not agree with proposed policies around marine protected areas.
9. I picked an amount depending on what I thought protecting a specific site was worth.

Figure 34. MPAs case study: selection of decision-making rules for deciding on WTP.

Finally, we considered whether psychometric variables could predict WTP (Model B in Annex 12). Outcomes of the psychometric testing itself are detailed in Section 4.4.3.5, below. In terms of values, participants with stronger altruistic and biospheric values had a tendency for higher WTP in the survey. This effect then disappeared in stages two and three of the valuation. However, after the moralising intervention, altruistic and biospheric values again became influential.

Egoistic values also followed a complex pattern. In the survey, they negatively influenced WTP to the same degree that biospheric/altruistic values influenced WTP positively. In the individual valuation stages of the survey, this effect disappeared and in stage 2, egoistic values even appeared to have a somewhat positive impact on WTP. In the group valuation stages, however, egoistic values again negatively influenced WTP. During the course of the workshop, the egoistic value mean decreased significantly (Section 4.4.3.5). In stage 5, the degree to which participants' egoistic values had decreased substantially and positively influenced their WTP expressed in their group votes, but not in other stages.

Subjective norms did not impact on WTP in the survey while in the workshops they decreased WTP across the different stages. What this means was that those who believed that their social connections had pro-environmental norms were actually less WTP themselves in the group setting. NEP did not significantly influence WTP and the other psychometric items did not adequately load onto hypothesised factors (Section 4.4.3.5) and were thus not included in the model.

We also asked individuals in workshops to state their motivations behind donating money towards protecting marine sites after stages two and four on a conventional 5-point Likert scale. These were: 1) protect for the option of future visits (option value); 2) protect for other users' benefit (altruistic value); 3) protect for future generations (bequest value); and 4) protection for the sake of other species, irrespective of personal benefits (existence value). Most important were bequest and option value, which were judged by 53% and 47% of participants as of very high importance after stage 4. Existence value scored 41% and altruistic value 36%. Thus, WTP appeared to represent a mix of self- and other-regarding motivations. Participants did not significantly change their answers for motivational aspects during the course of the workshop.

Overall, however, the results clearly indicate that group values were different from individual values, as well as the significance of deliberation. The deliberative intervention that focused on sharing and discussing information changed appeared to develop more informed perceptions on the value of different habitats and the importance of management restrictions. While the small sample size in combination with the large number of habitats assessed made it difficult to isolate at what stage contextual values and preferences for different habitats started to form, it is reasonable to assume that the discussions on which habitats were important and why, and discussions on biodiversity more generally, helped to shape these changes. Habitats that turned out to have the highest values such as kelp and tide-swept channels were some of the most discussed and perhaps also most familiar. Familiarity was not restricted to divers. One angler noted that "*you can **feel** the ground when you are fishing*"; for him, he did not have to see the habitat to know it.

The notion of interdependence of different parts of marine life, and that damaging parts would be risking the whole was a theme that recurred in each workshop. Diver 1: "*All species are important, because they're all interlinked."* Angler: *"Yes, through food webs."* Diver 1: *"so one thing affects everything else."* Diver 2: *"And it's unpredictable, we don't know what would happen [if some species were not there]"*. There were also discussions about the broader significance of specific marine ecosystems, such as the degree to which particular habitats were important as spawning habitats. Deliberation regularly tied together the topics of restrictions and biodiversity: For example, one diver noted that *"species don't do well without other species, it's all interdependent. That means that if something like scallop dredging happens, it doesn't regenerate so easily."* These discussion carried over into the group deliberation during the valuation itself; e.g. *"in the future there might be more to see [at this site] because of all these restrictions,"* according to one diver. Divers and anglers also discussed that some habitats were more fragile than others, or more at risk. They sometimes also exchanged their experiences of viewing what happened after an area had been trawled. *"You often notice what's absent. There's no diversity, an absence of everything after trawling. We have to be in a position to protect that diversity".*

In the moralising intervention, a wide array of themes was brought up related to transcendental values, well-being, experiences and emotions, as discussed in Section 4.4.3.4, below. These not only made implicit values explicit, but also highlighted for many participants the deeper significance of the marine environment as a central part of their identity and as something that shaped how they lead their lives. Additionally, it brought out a stronger moral element in relation to how sites needed to be managed, e.g. this should be socially just. Moralisation thus supported a further push to impose restrictions on dredging and trawling, building on discussions around their impact. *"Trawling*

– *it's just criminal, basically"*. Moralisation also brought out debates around motivation for WTP and how this might depend on transcendental values. Angler: "*Social justice was important for me. It also comes into this. If you make a donation, then some clown from out of town might come and make a mess of it, and then your tenner's gone down the drain."* Diver [responding]: *"I would give even if it wouldn't make me feel good; it's because it's what's right".*

In the group valuation sessions, participants would often evaluate the site systematically, briefly summarising and discussing attributes one by one. The relative importance of different attributes was also used as arguments in the debate, in a process of negotiation that often took place to reach consensus: **"***Ok, You've talked me up to £20 but I'm not going up to £40!"* Participants also regularly raised the notion that every pound could only be spent once, so it should be spent wisely: on the right sites, achieving most value for money. The decline in WTP thus appears to not be the result of participants valuing marine conservation less, but of more intense or critical scrutiny of sites as a group than as an individual.

It could be considered that at least part of the difference between individual and group values may have resulted from seeing a site for the second time. However, there were also changes in particular parameters (e.g. large fish less important and access options more important in the final group valuation) that suggest a different approach to valuation. The notion of a 'fair price' was particularly relevant in relation to access options, as participants deemed it inappropriate to suggest high donations when some people would be excluded from a site. The 'fair price' framing, particularly after the moralising intervention, orientated participants more towards a broader perspective with other-regarding values becoming more dominant in the discussions. As in the Forth case study, discussions recognised multiple value dimensions, with sometimes difficult trade-offs between existence values and more use-oriented option values.

However, as will be discussed in more detail in the storytelling and values-compass results in Section 4.4.3.4, fundamentally, both stakeholder groups shared strong communal values around protecting the environment and subjective experience of the environment as something that one feels a mutual relationship with. As such, at the level of transcendental values, there were no strong value-conflicts between self-regarding values and other-regarding values, as values such as enjoyment, pleasure and self-direction depended on protecting the environment and being in harmony with it.

Interestingly, after the storytelling and values compass, it appeared that group-based decision-making led to monetary values better reflecting participants' scores on the non-monetary, subjective well-being instrument. This value convergence, which was not seen in any of the individual valuation stages, suggests that participants' votes on what should be a 'fair price' in part came to represent how much participants actually felt they benefited from the marine sites they visited. The subjective well-being indicators, while designed to measure the 'benefits' of CES (Section 4.4.2.3), are not so much instrumental but rather relational measures. Generally, monetary valuation has a strongly instrumental framing arising from underlying welfare-economic assumptions around utility maximisation, with little attention to underlying values. However, it appears that the deliberative, group-based approach, after specifically eliciting discussion on these relational elements in the storytelling exercise, was able to translate these into a monetary measure.

Group discussions were not just important for shaping, changing or better reflecting values, but also for clarifying them. For example, distance negatively affected WTP for sites across stages and the importance of this remained stable. It was often one of the first attributes to be discussed and generally people reached a consensus on it quite rapidly and considerations were similar across groups. While obviously people would travel less to sites that were far away, another key recurring argument was summarised by one participant as: *"I feel I can influence management of local sites*

and get involved, and then I'm happy to pay for those. But I can't really influence far away sites; it's up to people there how they do it".

Finally, we consider protesting in the case study, which was substantially higher in the workshops than the online survey. This can be explained in various ways. First, at the start of the workshop, participants received a detailed presentation on how MPA policies across the UK might be implemented. This appeared to reduce support for the policies amongst anglers; 52% of anglers participating in the workshops strongly agreed with extending the network of MPAs in the UK, while 61% of that same group had strongly agreed in the survey, even though their more general support for the idea that more needed to be done around marine conservation (83%) did not change. Divers did not change their opinion on MPAs during the workshops.

Second, participants spent more time considering what was asked of them in the three hour workshop than in the online survey, which took participants on average around 20 minutes to complete. This may have led to more clearly formed beliefs around *not* willing to pay because the money should come from elsewhere. After the moralising intervention, less people protested on this basis, though still somewhat more than in the survey. Given that norms and beliefs around ascription of responsibility influenced WTP, it is possible that deliberation in the moralisation intervention led to an increase in felt responsibility, and hence less protesting on the grounds that divers and anglers shouldn't be asked to take responsibility for any of the costs of conservation.

Thirdly, there were some vocal protestors who had already announced their position in the question round after the initial presentation, i.e. before the first individual valuation stage in the workshop (stage 2). Although facilitators did not allow for discussion of these issues until after stage 2 was completed, it is nonetheless conceivable that the surfacing of these concerns encouraged others to also exert protest bids.

4.4.3.2 Multi-criteria analysis

55 participants took part in one of the five MCA workshops, of which 12 were anglers and 43 were divers and of which 51 had participated in the online survey. Intentionally we avoided any overlap between DMV and MCA participants.

Participants accepted the prepared set of criteria as a fair representation of recreational user goals for the use and management of the marine environment. In three of the five MCA workshops, participants added a ninth goal that they agreed was an important recreational goal, which was missing from the criteria; these were: increase ease of access, education, and proactive conservation action (habitat restoration).

Table 41 shows the mean ratings and ranks given to the goals by individuals and the frequency with which they were included in the top 5 choices in the group deliberation. The protection of non-damaging recreational opportunities was the only goal to change significantly as a result of deliberation in terms of absolute ratings, showing a decline in the second individual rating. Relatively, the goal decreased in importance from rank 4 to 6, and it was only included 54% of the time in the group consensus choices. This reflects that here the focus of discussion was more on the wider benefits of the protection of species and habitats, which maintained the highest ranking for both individuals and groups.

Both deliberation and group-based decision-making had an impact on the relative importance of education, which was ranked 6th in the initial individual values, 3rd in the deliberated individual values, and joint 1st (with protecting species and habitats) in the deliberated group values. The role

of the requirement for more scientific data appeared to be a relatively unimportant goal for individuals (ranked 10th). However two groups agreed, through deliberation, that it was in fact their most important group priority. Protection of cultural heritage remained the lowest ranked priority, despite being included in the groups' five consensus goals on some occasions.

Overall, marine setting (site type) had no significant influence on the extent to which each of the scenarios was likely to maintain or safeguard management goals (**Figure 35**). Considering each goal individually, site type had few effects. The 'rocky shores' type was significantly positively associated with 'ease of access', which had been added by participants during one workshop; i.e it was considered that this goal could most easily be achieved in that site type. 'Sea lochs' appeared to be negatively associated with 'more scientific data'.

There were large differences in the extent to which different scenarios were perceived to influence management goals (**Figure 35**). Increased management restrictions had strongly positive effects on the scores, with scenario 3 (high level of restrictions) having the most positive influence on overall scores for sites and for individual goals (**Figure 35** and **Figure 36**). This indicates that participants felt scenario 3 was most likely to maintain or safeguard the values represented by the goals or criteria; this applied across all site types. **Figure 36** shows that 'protection of species and habitats' was considered to be most achievable under the scenario 3. This pattern was also observed for several of the other goals related to environmental health, such as 'improving fish stocks', 'reduce pollution and litter' and 'improve chance of wildlife encounters'. In contrast, the goal 'protecting non-damaging recreational opportunities' showed only a small increase with moderate restrictions and was not further improved by the high level of restrictions scenario.

Overall MCA scores were highest for the high protection management option and this was thus considered most likely to deliver value-based goals of recreational users. However, rankings were subject to numerous provisos that came through in the discussions, notably relating to restrictions on commercial activity, enforcement of existing and any new regulations and issues of scale (e.g. where pollution originates from wide catchments and requires management beyond the scale of a marine site).

Table 41. MPA case study: mean MCA ratings and rankings given to criteria pre- and post-deliberation and the % of occasions where goals were included in the groups' top 5 goals.

Criteria/goals	*Mean rating pre-deliberation (±SD)*	*Mean rating post-deliberation (±SD)*	*% of times group top 5*	*Rank pre-deliberation*	*Rank post-deliberation*	*Group rank*
Protecting species and habitats	94.6 ±8.7	95.0 ±15.7	100%	1	1	1
Improve fish stocks	85.5 ±17.5	85.6 ±14.5	77%	2	2	3
Habitat restoration*	83.4 ±15.5	75.3 ±26.2	50%	3	5	6
Protecting non-damaging recreational opportunities	77.7 ±20.9	70.9 ±24.1	54%	4	6	5
Reduce pollution	76.2 ±20.3	76.6 ±20.1	69%	5	4	4
Education*	75.2 ±25.2	77.6 ±17.4	100%	6	3	1
Ease of access*	74.4 ±16.7	68.6 ±19.5	0%	7	7	11
Improve chance of wildlife encounters	70.1 ±23.6	65.7 ±27.9	46%	8	9	7
Include local knowledge	65.6 ±22.0	62.3 ±21.5	15%	9	10	10
More scientific data	63.5 ±22.6	67.3 ±24.8	46%	10	8	7
Protect cultural heritage	56.9 ±27.0	53.2 ±25.2	31%	11	11	9

*Criteria identified as additional goals in certain workshops.
SD: standard deviation.

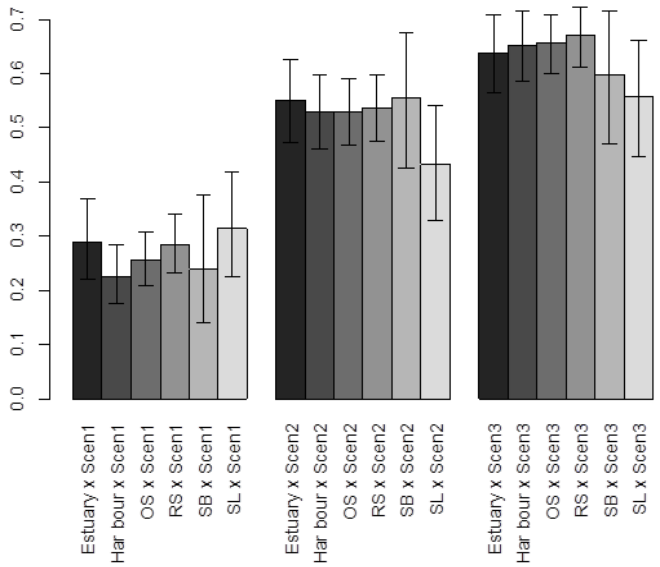


Figure 35. MPAs case study: MCA scores per site and scenario. Error bars represent standard deviation. OS=out at sea, RS=rocky shore, SB=sandy beach, SL=sea loch.

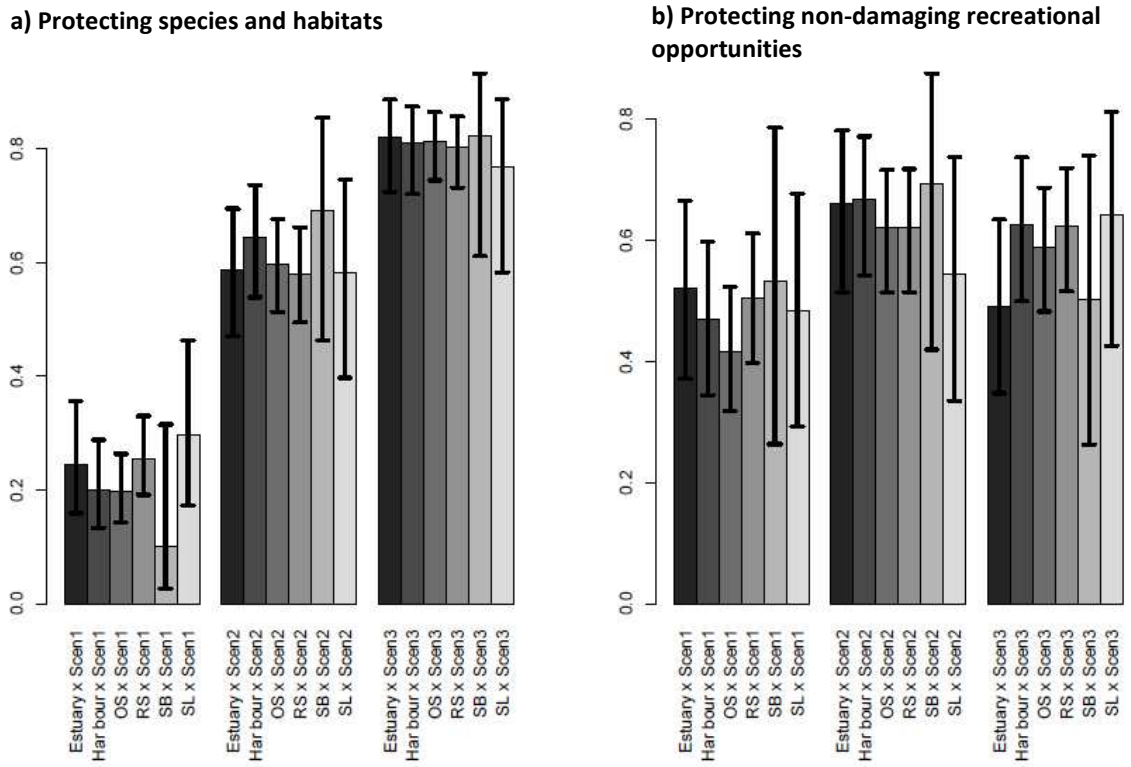


Figure 36. MPAs case study: MCA scores for how changes in management were perceived by participants to influence recreational user values for two of the criteria. Error bars represent standard deviation. OS=out at sea, RS=rocky shore, SB=sandy beach, SL=sea loch.

The different stages of the MCA process helped elicit different aspects of individual, shared and plural values in a number of ways:

- *MCA criteria were seen as meaningful indicators of group contextual values.* Overall, there was agreement with the prepared list was an appropriate set of goals, i.e. they were meaningful indicators of value to the participant group and the way that participants engage with the environment.

- *Group values were different from aggregated individual values*: The ranking results indicated that participants expressed different values as a group to those expressed as individuals (**Table 41**). The deliberative consensus ranking to identify the top five shared goals were more strongly orientated towards education and less strongly protecting recreational opportunities. Some groups carried out the group consensus exercise from the perspective of their personal needs as recreational divers and angers, but the majority approached the exercise from a wider societal perspective, where it was felt that prioritising environmental protection would benefit both themselves and wider society.

- *Deliberated individual values fell between individual non-deliberated values and deliberated group values.* The protection of non-damaging recreational opportunities was the only goal to change significantly as a result of deliberation in terms of absolute ratings, showing a decline in the second individual rating. Some other goals did not change significantly in rating, but did change in ranking, particularly education, which became more important. These changes were also seen in the group rankings, but here the ranking shifts were stronger. Thus, it appeared that group decision-making amplified and extended the impact of deliberation.

- *Site-based deliberation linked values to real landscapes, helped elicit communal values and provided a basis for the consensus ranking of broader marine goals*. Quantitatively there were only limited differences between settings in terms of achieving different management goals. However, in terms of deliberation focusing the discussion and scoring on site-based values helped tie values and goals to specific places and facilitated qualitative discussion of complex CES benefits such as place identity. Group deliberation revealed the diversity of participant values and the complexity of their experiences by grounding these in real landscapes. This common ground facilitated the subsequent consensus ranking activity.

- *The group process elicited strongly felt communal contextual values around environmental protection common to both divers and sea anglers.* The high protection scenario scored highest and was thus considered most likely to deliver divers' and anglers' goals. This scenario placed more emphasis on important issues and values that surfaced through the qualitative stages of the workshops, including discussions following the introduction to MPAs, discussion of the linkages and dependencies between goals and experiential and transcendental values revealed through the site-based deliberation. These reiterated contextual values and beliefs held in common by the diving and sea angling communities: the importance of species and habitat protection based on transcendental values, place-based emotional connection and other-regarding motivations, limiting (damage caused by) commercial fishing, and at the same time doubts over the effectiveness of regulations and enforcement.

- *Ranking and scoring results appeared to reflect trade-offs between other-regarding, transcendental values and norms, particularly environmental protection, and self-regarding, utilitarian values focussed on recreational opportunities.* However, these were not always seen to be in conflict. Restrictions on access might be balanced by improvements in habitat quality (e.g. increasing scores for biodiversity, fish stocks and lower pollution from scenarios one to

three) or by reduced pressure from commercial use. Views on the degree to which increased protection would impinge on recreational activity differed, but overall there was a perception that management options aimed to manage access and pressures rather than prevent it altogether. Fairness and proportionality around measures was a consistent theme, particularly for anglers, as participants commented that restrictions on recreational access should be proportionate to those applied to commercial fishing, which was thought to have far greater impacts than recreational use.

- *Social learning was evident during the group consensus exercise.* Opportunities for social learning may have been limited by the small number of stakeholder groups represented during the workshops and by the lack of time for reflection, particularly when compared with the broader range of stakeholders and interests, and longer timeframe in the Hastings case study (*cf*. Prell *et al*. 2010). However, the process of forming group consensus over the five most important goals served as an important opportunity for participants to discuss relationships between goals, thus allowing them to co-develop a more holistic view of the functioning of the marine environment, which is likely to have contributed to the different value sets that emerged during this exercise compared to individual responses.

- *The site-based values deliberation formed part of the translation process between transcendental values and the goals or criteria that served as indicators of recreational value.* For instance, elements of universalism, achievement and pleasure (within the Schwartz system of transcendental values, see Sections 3.1 and 4.1.3, and **Table 15**, p95) were expressed during the site-based values deliberation, where a mix of experiential (e.g. therapeutic, social bonding), environmental (e.g. habitats, visibility) and practical (access, safety, cost) factors were discussed.

4.4.3.3 Subjective well-being indicators

Responses from 1,220 divers and anglers were used in the analysis. The majority of workshop participants who responded to the well-being indicator statements (134 out of 185) had taken part in the initial online survey. Strongly positive responses for each individual well-being indicator suggested that marine sites had considerable non-monetary value for recreational users. Comparing indicator means between divers and anglers showed some differences between the groups (**Table 42**). Divers were more taken with the beauty of sites than anglers, whereas for anglers the place identity indicators scored higher on average. However, overall differences were remarkably small.

The 15 indicator statements loaded onto three principal factors, which we were able to thematically summarise as *engagement and interaction with nature*, *place identity* and *therapeutic value* (**Table 42**). The engagement and interaction factor explained the highest amount of variation (23%) in the data set followed by place identity (18%) and therapeutic value (17%). Cronbach's alpha scores were all >0.7, indicating reliability of the measures (**Table 42**). Separate analyses for divers and anglers generated less interpretable 2-factor models. As this was likely an artefact of reduced individual variation, subsequent analyses used the joint model. The 3-item place identity factor to emerge from our EFA corresponded well with our *a priori* construct of place identity, with only one indicator not loading. The other two factors described distinct components of well-being, but at a broader level than our *a priori* constructs (**Table 38**). Four indicators did not load on any of the factors. Three of these related to distinct *a priori* constructs with no other indicators: *social bonding*, *spiritual value* and *memory/transformative value*; hence we took these items forward in further analyses as single-item constructs. We dropped item 2: 'I gain perspective on life during my visits to these sites', as we could not clearly associate this with one of our *a priori* constructs besides 'wholeness and reflection', which did not come through as a clear dimension as its items loaded on multiple factors. CFA

supported the six dimensions that were taken forward from the EFA, with all factors loading at >0.4 and sufficient model fit (CFI/TLI/CD above 0.96, RMSEA = 0.054, RMSEA 90%CI: 0.048-0.060).

Table 42. MPAs case study: ranked loadings of indicators in exploratory factor analysis from survey data.

Factor	*Factor theme*	*Factor mean & standard deviation*	*Cronbach's alpha*	*A priori construct*	*Indicator (no.)*	*Loading*	*Mean divers*	*Mean anglers*
1	Engagement and interaction with nature *23% variation*	*4.04±0.6*	*0.87*	Knowledge	Visiting these sites has made me learn more about nature (9)	0.86	4.18	4.05
				Wholeness & reflection	Visiting these sites makes me feel more connected to nature (3)	0.71	4.16	4.09
				Aesthetics	I have felt touched by the beauty of these sites (12)	0.60	4.17	3.87
				Participation	I feel like I can contribute to taking care of these sites (11)	0.49	3.82	4.03
				Inspiration	These sites inspire me (13)	0.48	3.99	4.04
2	Place Identity *18% variation*	*3.63±0.81*	*0.83*	Place identity	These sites feel almost like a part of me (5)	0.92	3.33	3.65
				Place identity	I feel a sense of belonging in these sites (6)	0.68	3.62	3.85
				Place identity	I miss these sites when I have been away from them for a long time (8)	0.46	3.74	4.04
3	Therapeutic value *17% variation*	*4.02±0.74*	*0.83*	Reflection	Visiting these sites clears my head (1)	0.84	3.93	4.05
				Freedom	Visiting these sites gives me a sense of freedom (15)	0.58	4.12	3.85
				Health	Visiting these sites leaves me feeling more healthy (14)	0.52	3.93	4.20
n/a	Spiritual value	3.85*±0.95*		Wholeness & reflection, spiritual value	At these sites I feel part of something that is greater than myself (4)	n/a	3.86	3.83
	Social bonds	3.95*±0.88*		Social bonds	I have made or strengthened bonds with others through visiting these sites (10)	n/a	4.00	3.82
	Memory/ trans-formative value	4.26*±0.76*		Wholeness & reflection, transformative value	I've had a lot of memorable experiences in these sites (7)	n/a	4.28	4.17
	Not taken forward	3.79*±0.89*		Wholeness & reflection	I gain perspective on life during my visits to these sites (2)	n/a	3.75	3.88

Changes in perceptions of well-being among individuals who participated in both the survey and the workshops tended to be different between workshop deliberation type. Individuals who attended MCA workshops tended towards higher scores for engagement with nature after the workshops, while those participating in DMV reported lower scores relative to the initial survey (**Figure 37**). There was no change in the perception of place identity for individuals after workshops. Therapeutic value on the other hand received lower scores after DMV workshops. This pattern was repeated for spiritual value and social bonds with the latter showing a contrasting increase after MCA workshops. Memory/transformative value showed no change (**Figure 37**). No significant differences were observed between anglers and divers, which is likely to be due to the relatively small number of anglers in the sample (n=39).

By chance, the original responses to the survey of those individuals allocated to MCA workshops tended to be lower than those allocated to DMV (**Figure 37**), which may have contributed to some of the increases observed after MCA. On average survey scores tended to be high, so the way in which individuals were allocated to the two types of workshop meant that the MCA group had more potential for an increase, which is likely to have been triggered by the discussion in some of the deliberative exercises. Annex 13 provides more detail on differences between responses in the survey and the workshops.

Another difference between the DMV and MCA process was that in DMV the discussion in relation to valuation itself was focused on the relative importance of specific benefits of sites, whereas in MCA the discussion focused on the relative importance of goals. Thus the valuation questions were different: in DMV, participants were asked: 'what is it about this site that is worthy to protect?', while in MCA, they were asked: 'which goals are most important and how will different management scenarios achieve them?' Although subjective well-being was discussed in relation to experiences and transcendental values in the DMV intervention, many of the well-being benefits in the MCA could be directly linked to the goals themselves, and thus formed the backbone of discussion. The positive influence of MCA on responses was most evident in the case of 'engagement and interaction with nature' and for the single-measure dimensions 'social bonds' and 'spiritual value'. The importance of the protection of species and habitats emerged as a primary goal in the MCA workshops and, through the group deliberation, participants often agreed that this was essential for the delivery of other goals and benefits. This process of discussing, understanding and agreeing on the importance of environmental health may have resulted in participants recognising a greater value for the indicator-statements reflecting these dimensions in the well-being questions, such as '*feeling connected to nature*' and a feeling of '*being able to contribute to the care of marine sites*'. The importance of furthering knowledge of marine ecosystems was also highlighted through deliberation of one of the MCA goals: 'more scientific data', which may have increased scores on the '*learning about nature*' indicator, another indicator statement within the 'engagement and interaction with nature' factor.

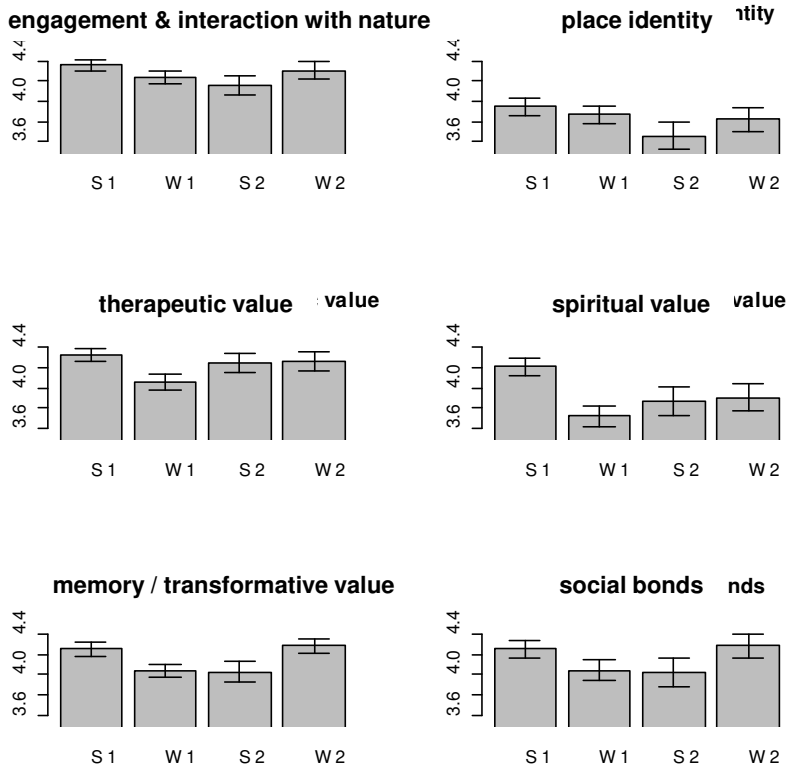


Figure 37. MPAs case study: fitted model results for changes across the six well-being dimensions. Average scores are shown with standard deviation for stage (S: survey, W: workshop,) and workshop type (1: DMV, 2: MCA).

4.4.3.4 Storytelling and values compass

Storytelling during the DMV workshops brought up a range of themes that expressed how communal values, shared experiences and identity related for both divers and anglers. **Table 43** presents which themes emerged most often (in relation to the well-being indicators discussed previously), how the experiences relating to these themes were characterized by anglers and divers and which transcendental values were expressed through their experiences.

The majority of diver stories related to connection with the environment and in particular their immersion in this environment, so as to feel part of it. Stories shared related to interaction with marine animals and the connection they felt as a result.

> *"[I had this] magic moment with cuttlefish, they have strange […], they come up and pull away, you realise there's intelligence there, and there's a connection, it's fascinating."*

Divers experiences were often conveyed as more spiritual, magical and imbibed with colour. The diving experience itself was also social and divers referred in their stories to bonding with their dive mates and building trust as a result of their dives.

> *"I ticked all of these (values) and more, I added religious which is strange really because I am an atheist. I was in one place and visibility opened up and it was like a cathedral, with jewel anemones lighting up everywhere. I felt like I was in the presence of God, if there is such a thing. I was crying when I came out of the water. It was a Sunday as well, oddly enough."*

> *"I freedive, we have such trust in each other. There is bonding. We know each other so well now."*

Stories were often related to the exploratory, adventurous aspect of diving and the feeling of freedom felt as a result of taking part in this activity. Divers tended to emphasise this exploration/adventure aspect as a positive for diving in UK waters, which were described as more challenging but much more biodiverse and interesting than more commonly dived sites abroad.

> *"It was on par with any tropical dive. In Egypt you expect more than you get. Here I expected murk and just got all this colour, diversity. Chalk arches, fantastic stuff just on my doorstep."*

> *"I get a buzz from it [diving] … I love to see things others haven't seen … You are in your own world… [I] love to see the diversity"*

Recreational fishers involved in this study also shared the way they experienced and valued marine sites. The stories told by anglers tended to present this activity as a more solitary, reflective and therapeutic activity than diving, where a strong connection with place was fostered.

> *"I grew up at the coast… there is perhaps a difference between diving and angling, you do not have to go with a buddy for angling. Often you just wanna be on your own."*

> *"[This area is a] really important place to me…. going there helped me with pressures at work…I always feel a bit rejuvenated after I went there."*

Although connection with nature remained a significant theme, anglers referred to themselves as observers rather than the participants that the divers saw themselves to be.

> *"You see more above (the water) than below. We [anglers] are the eyes and ears, you divers see what's under there."*

> *"I wouldn't go anywhere without my binoculars… [I like to] watch the terns diving…. It is that relation to nature that gets me….you don't have to catch a fish on a good day."*

Anglers also tended to share stories about introducing angling to others and the influence that this has had for someone else. In particular these stories were about passing on knowledge or experience to a younger person, and these experiences were often transformative for all the parties involved.

> *"Then one of them landed a weaver fish, it was a 17 year old who had only been to the beach twice in his life, his parents couldn't afford it. A big feeling of pride. […] Passing knowledge on to them, they were fascinated when I said watch the seagulls. There was a school of bass forcing the white bait to the surface, that was what the seagulls went for, getting to know that, how marine biodiversity all links together. As soon as one of them catches their first fish, it stays with you forever."*

The transcendental values circled by anglers and divers after storytelling (**Figure 38**) matched those arising through it (**Table 43**) in terms of the categories of values that were mostly strongly expressed, particularly universalism, benevolence, stimulation, self-direction, and pleasure. This suggests these types of values strongly underpin motivations for going diving and sea-angling, as much as the range of well-being benefits identified, which also clearly came through in the stories.

The highest scoring values by far were enjoying life and protecting the environment, followed by honest, self-respect, freedom, and a varied life.

Notably, particular values in the universalism, benevolence and self-direction categories scored strongly, even when they weren't explicitly brought out by the stories, e.g. honest, creative and choosing own goals, lending support to the overall Schwartz (1990) value structure (discussed in Sections 3.1 and 4.1.3 and depicted in **Table 15**, p95). Sometimes discussions brought out relations that were not immediately obvious. For example, discussions around social justice might relate to the importance of open access to the environment. Here anglers often strongly expressed that sea anglers on low income depended on their activity and would be excluded if areas would be closed off or some kind of licensing was introduced, the idea of which was felt as genuinely upsetting and deeply unfair. Justice was also an issue in terms of bringing justice to commercial fisheries, who should not be allowed to 'get away with' destroying the environment.

In discussions around transcendental values, participants were often struck by how many of their core values they could associate with diving or angling. As such, this often led to strong realisations that these activities and the marine environment were a fundamental part of their core identity. Here, values and identity were seen as co-emergent over time:

> *"When you go start diving you do it for the buzz, but over time you learn things and become more respectful. Most people just seem to see the sea as a dump. If more people would dive or fish they would feel more connection."*

Table 43. MPAs case study: selected quotes from stories that related to well-being themes and emergent transcendental values. 'D' indicates Diver and 'A' indicates Angler; where uncertain we have used 'U'. Key words are highlighted in bold. Values are listed per Schwartz (1990) value category.

Well-being theme	*Quotes*	*Associated values*	*Comment*
Engagement with nature: getting to know nature, feeling connected to nature.	**D:** I went for just a little dive under a pier. It was **covered in life**, the sun was shining, clear green blue, little bits of kelp, then two huge rays came past, it was **like paradise**. It was just a silly little shallow dive but it was **magic**. The most **beautiful** were the anemones and the plants. It was **exquisite**. **A:** When we go out 9 out of 10 times we do a beach comb, recycling stuff for our own use and clearing rubbish. **D:** I go on my own to take marine photos from a nearby pier on the Clyde. Visibility is usually bad but sometimes it opens up, it did one time and became really clear, all the anemones and marine life on this chain of posts lit up, such a diversity. **I felt the beauty but also felt sadness**, because where had all the fish gone? They were there in the past but not there anymore. **D:** We r**escued a seal pup** wrapped in nylons (diver talking about an experience where he disentangled a pup from a fishing net, which could have caused him serious bite injuries). **D:** It was **on par with any tropical dive**. In Egypt you expect more than you get. Here I expected murk and just got all this **colour, diversity**. Chalk arches, **fantastic** stuff just on my doorstep. **D:** It was November, in the Farns. I went out with Seal Diver 'B' [a well-known figure around the Farn Islands], 16 of us in the boat. In November the seals are more playful, they're outside of their rivalry point. ' **B' taught us this trick** to get them to come, find some kelp, sit there and do that [makes a waving hand movement]. **They came, really close!** You make your hand into a fist, and then they put their nose against it. **D:** [I had this] **magic** moment with cuttlefish, they have strange […], they come up and pull away, you **realise there's intelligence** there, and there's a **connection**, it's fascinating. **A:** I wouldn't go anywhere without my binoculars…[I like to] watch the terns diving…. It is that **relation to nature** that gets me… you don't have to catch a fish on a good day." **D:** We came across a seal. There was a **real interaction**. It was the way it approaches… [it was] **a sentient being**. **A:** You see more above (the water) than below. **We [anglers] are the eyes and ears**, you divers see what's under there.	**Universalism**: protecting the environment, a world of beauty, unity with nature, social justice. **Benevolence**: helpful, responsible. **Stimulation**: a varied life, an exciting life.	The most common theme to emerge related to engagement with nature. Differences emerged in how divers and anglers connected with nature in their activities. For divers it was the experience of being surrounded by and coming face-face with nature. For anglers, it was the species they saw above water, which they felt a connection to. Both divers and anglers spoke of rescuing nature and clearing refuse.

Well-being theme	*Quotes*	*Associated values*	*Comment*
Place identity: Feeling like these places are part of your personal identity, feeling a sense of belonging when you have gone there and missing them when you can't go there.	**D:** We have gone to so many places in Scotland that we would have never gone to if we weren't going diving. **D:** It's **surprising** how many people you take diving that haven't dived in the UK. **D:** A lovely dive, close to the shore, a lovely wreck, **not many people know about it** **D:** "**Wow, we have got this in British waters**?! … I think this can be easily lost when we don't do anything" **U:** I was brought up near the sea, had not seen it for 20 years and **rediscovered it.** **D:** I love wrecks… **[I'm] always looking to come back**.	**Universalism**: world of beauty, wisdom. **Achievement**: influential. **Self-direction**: curious, freedom, independent. **Stimulation:** daring, a varied life. **Security:** Sense of belonging.	Both anglers and divers talked about feeling like they were part of a place thorough carrying out their activities. A number of participants spoke about the connection they felt with the wider area through travelling to carry out their activity. The connection with place was associated with both land features and with diving, where divers felt a greater connection with UK waters and surprise at the diversity of underwater landscape.
Therapeutic value: Feeling free, feeling healthy and clearing your head.	**U: Your worries** are the last things you're thinking of. **U: It clears my mind**, it's meditative. **A:** I was night fishing, east wind, snowing, one of those nights when **your wife says you're a crackhead**. I heard scraping, a seal pulled itself on the gravel and then two foxes came scavenging along the tide line. These places become part of your **identity**. They make me feel **free**." **A:** [this area is a] really important place to me…. going there **helped me** with pressures at work…I always feel a bit r**ejuvenated** after I went there. **U:** [I] let go… **being free**…It's like **flying.**	**Universalism**: inner harmony. **Benevolence**: a spiritual life, healthy. **Self-direction**: freedom. **Pleasure**: enjoying life.	Both anglers and divers derived therapeutic value from their experiences and 'feeling free' was a common theme from both groups.
Spiritual value: Feeling connected to something larger than yourself.	**D: [it was] like a cathedral** I ticked all of these (values) and more, I added religious which is strange really because I am an atheist. I was in one place and visibility opened up and it was like a cathedral, with jewel anemones lighting up everywhere. I felt like I was in the presence of God, if there is such a thing. I was crying when I came out of the water. It was a Sunday as well, oddly enough. **U:** It clears my mind, **it's meditative**. **D: Some wrecks feel like a cathedral**. There is so much **life** on them. **D:** [I had this] **magic** moment with cuttlefish, they have strange […], they come up and pull away, you **realise there's intelligence** there, and there's a **connection**, it's fascinating.	**Universalism**: unity with nature, social justice. **Benevolence**: meaning in life, a spiritual life. **Tradition**: humble.	A sense of connection to something larger featured in many stories. Divers were more likely to relate diving to more explicitly spiritual experiences, mentioning how some dive areas were like 'cathedrals' and 'magical.'

Well-being theme	*Quotes*	*Associated values*	*Comment*
Social bonding: Bonding with other people.	**D:** One diver told us about a dive at a very poor site with low visibility which he would normally not even mention, but he remembered it for the **atmosphere** and **being with a couple of friends**; sharing the experience and having managed the **challenge of that low visibility dive**. **A:** I go **catch fish to eat**, it's so **rewarding** to feed your family and then **share the experience** you had. **D:** Meeting with friends and going out the night before the dive. Going diving despite hangover for the sake of wreck diving. Diver explains that you tend to forget about it until you surface again. **D:** I freedive, we have such trust in each other. **There is bonding**. We know each other so well now. **D:** I felt **very secure** with him (female diver talking about a dive with her son). **D:** If you're out and **nature goes against you**, and everyone gets back in one piece. That **bonds** you. **A:** I grew up at the coast… there is perhaps a difference between diving and angling, you do not have to go with a buddy for angling. Often you just **wanna be on your own.**	**Universalism**: protecting the environment, social justice, wisdom, equality. **Benevolence**: helpful, loyal, responsible, true friendship. **Achievement**: capable. **Security**: social order, sense of belonging, reciprocation of favours.	Divers and anglers differed in their experiences relating to bonding with others. For divers the process was a shared experience and one that may start the night before the dive. Divers spoke about looking out for one another and the growing trust that occurs as a result. Anglers tended to speak more of introducing others to the activity and the profound effect this had on both themselves and the other individual.
Transformative value: Memorable experiences that have a lasting impact on your life.	**D:** I only knew seaweed as this crispy stuff on the beach … [I] went diving for the first time in a seagrass bed and found it "**beautiful**… [I] will never forget this first dive. **A:** I actually have a **fear of water**. I can swim but only just. Groups of kids, taking them out fishing, Walker Bank, it's a vast stretch of sand, nothing there. It was low tide. It was the 1st time they went to fish. There was a little Asian lad who landed a flatfish, it was **fantastic**, he'd **never seen something like that**, [and] he'd hardly ever seen it at Morrison's. They were 7-17 year old and they all landed with something. Then one of them landed a weaver fish, it was a 17 year old who had **only been to the beach twice** in his life, his parents couldn't afford it. A big feeling of **pride**. **Passing knowledge on** to them, they were fascinated when I said watch the seagulls. There was a school of bass forcing the white bait to the surface, that was what the seagulls went for, getting to **know that, how marine biodiversity all links together**. As soon as one of them catches their first fish, it **stays with you forever**. **A:** It's about **introducing someone else**. We had **so many fish** in one go that day. He was hooked for life. Pardon the pun!	**Universalism**: a world of beauty, equality. **Benevolence**: helpful. **Achievement**: influential.	Anglers tended to share stories about have a lasting impact. In particular these stories related to introducing others to angling and the impact this has had for the individual who was introduced and for themselves.

Well-being theme	*Quotes*	*Associated values*	*Comment*
Emergent theme: *Exploration, adventure and challenge.*	**A:** I was with my dad, the sea was like a millpond, [and] then **suddenly** out of nowhere 100s and 100s of salmon and trout started jumping! **D:** I get a **buzz** from it [diving] … I love to **see things** others haven't seen … You are in your **own world**… [I] love to see the **diversity.** **D:** Every time I send down a shot line I feel **excitement**. **D:** It's about the marine life and the **adventure**, for me the marine life is a bonus.	**Power**: ambitious. **Self-direction**: curious, choosing own goals, independent. **Stimulation**: daring, a varied life, an exciting life.	Divers were most likely to share stories relating their experience to exploration and adventure.

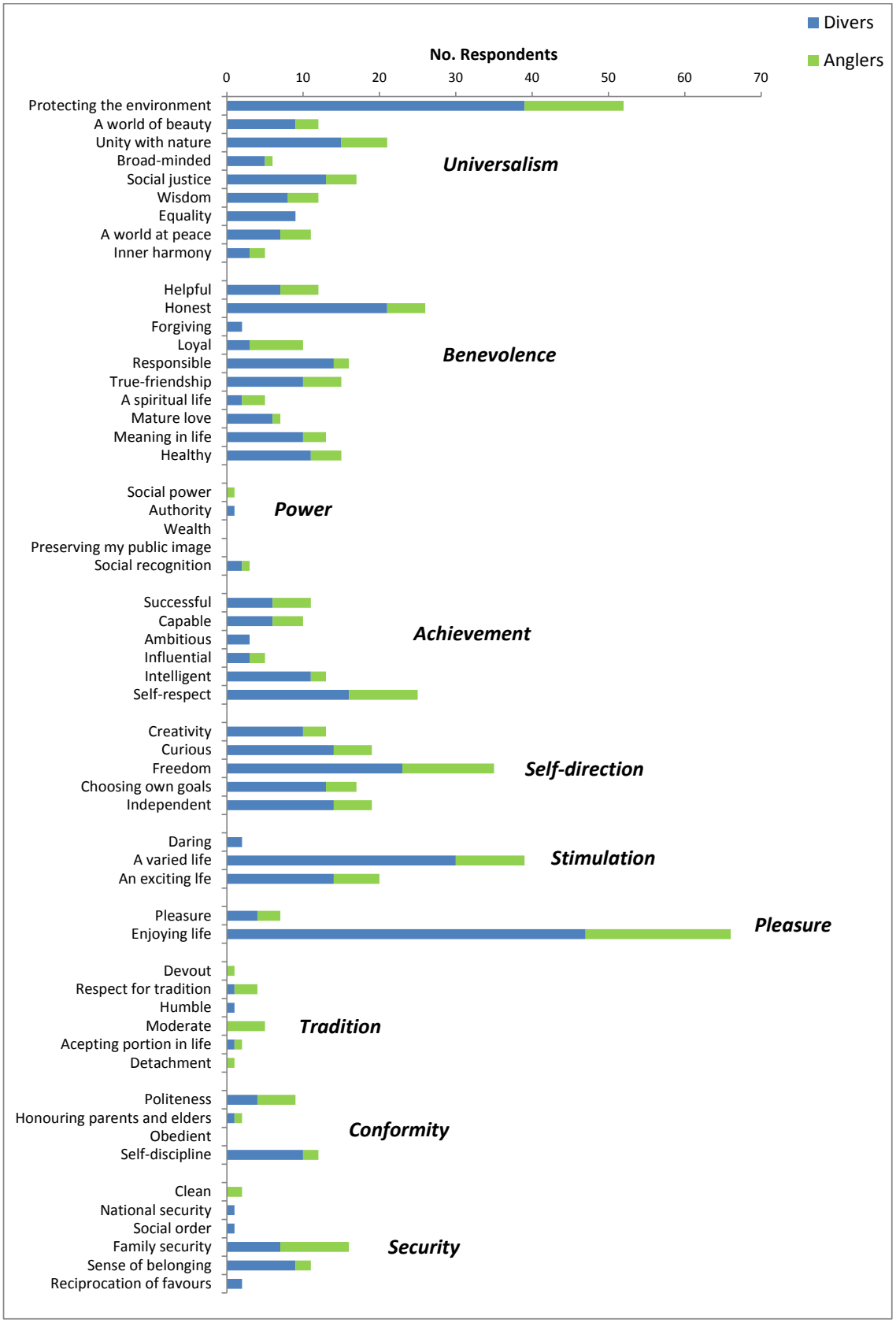


Figure 38. MPAs case study: transcendental values circled by participants after storytelling.

4.4.3.5 Psychometrics

The CFA and SEM models used for the MPA case study TPB psychometric analysis provide a good fit for the data with adequate loadings, except for our AC beliefs construct, which was dropped from the analysis; for details see Annex 2. In terms of the structural part of the VBN model, NEP was strongly and positively influenced by biospheric values. Connections between NEP and the other value types were weaker but still substantial. Biospheric values also substantially influenced AR beliefs, but the indirect influence mediated through NEP was stronger. NEP strongly influenced AR beliefs. AR beliefs did not substantially influence norms, while the unmediated influence of NEP on norms was very strong.

Table 44 presents standardised alpha scores for the MPA case study. These suggest that the indicators were consistent for altruistic and biospheric values, NEP and subjective norms (above 0.7 for both survey and workshop data). Egoistic value indicators were marginally consistent (0.59 for survey and 0.67 for workshop data). AC, AR and BC beliefs and norms were inadequate (below 0.6 for both the survey and workshop data) and were thus not included in the analyses relating psychometric constructs to WTP (Section 4.4.3.1).

Survey scores for MPA workshop participants were similar to overall survey scores. Biospheric values (mean 4.98 for workshop participants' survey scores on a -1 to 8 scale) and altruistic values (4.88) scored substantially higher than egoistic values (3.18). Relatively high NEP scores (mean 3.95 on a 1-5 scale) suggested that participants rendered a mostly pro-environment worldview. Participants norms' also strongly expressed that protecting the marine environment was the right thing to do (4.37). Subjective norm scores (3.79) suggested that participants often associated with people who were in favour of marine conservation. Behavioural control scores were moderate on average (3.12) while the relatively high standard deviation (0.95) indicated that participants had divergent feelings about the degree to which they could help protect the marine environment.

Two factors changed significantly in mean scores before and after deliberation (**Table 44**). For both the DMV and MCA workshop types, egoistic values, though low already, declined substantially (from 2.86 to 2.25 for DMV and from 2.74 to 2.02 for MCA, on the -1 to 8 scale). Altruistic values declined somewhat for both types of workshops, but this was only significant for the DMV participants (from 4.85 to 4.46).

Table 44. MPAs case study: psychometric score means and Cronbach's alpha (standardised).

	Alpha		*Means: survey*		*Means: DMV*					*Means: MCA*				
	Survey	*Workshop*	*Mean*	*SD*	*Pre: mean*	*SD*	*Post: mean*	*SD*		*Pre: mean*	*SD*	*Post: mean*	*SD*	
EGO†	.59	.67	3.18	1.43	2.86	1.25	2.25	1.51	*	2.74	1.13	2.02	1.25	**
ALT	.78	.76	4.88	1.41	4.85	1.43	4.46	1.48	*	4.98	1.49	4.65	1.56	
BIO	.90	.78	4.98	1.43	5.02	1.35	5.07	1.35		5.29	1.29	5.12	1.21	
NEP	.70	.76	3.95	0.56	3.96	0.56	3.82	0.73		4.11	0.49	4.16	0.44	
AC	.26	.58	4.37	0.77	4.46	0.69	4.13	1.16		4.66	0.59	4.66	0.54	
AR	.55	.32	3.68	0.93	3.89	0.87	3.74	0.94		4.02	0.81	4.1	0.68	
NOR‡	.42	.42	4.37	0.72	4.51	0.58	4.22	0.98		4.56	0.75	4.27	0.71	
SUB	.73	.75	3.79	0.85	4.07	0.72	3.94	0.90		3.97	0.73	4.20	0.76	
BC	.38	.58	3.12	0.95	3.23	1.01	3.17	1.09		3.27	0.99	3.14	1.11	

* Significant difference between pre-and post-deliberation scores at p<0.05; ** p<0.01; Bonferroni correction applied for 18 comparisons. † EGO2 dropped; ‡ Wilcoxon signed-rank test used to account for skewness; otherwise paired t-test used. EGO: egoistic values; ALT: altruistic values; BIO: biospheric values; NEP: New Ecological Paradigm (environmental worldview); AC: awareness of consequences beliefs; AR: ascription of responsibility beliefs; NOR: pro-environmental norms; SUB: pro-environmental subjective norms; BC: behavioural control. EGO, ALT, BIO on a -1 to 8 continuous scale, others on a 1-5 continuous scale. For item descriptions see Table 20.

4.4.3.6 Participant confidence and preferences for ways of eliciting values

Participants felt substantially more confident about their answers in both DMV and MCA workshops than in the survey (**Figure 39**). There was little difference between the two types of workshops. Asking people for their opinion on which approach should be used to assess their values around marine sites, the majority of DMV and MCA participants indicated they preferred the workshop format and most of those preferred group to individual choices (**Figure 40**). There was a somewhat stronger preference for group choices in the MCA (51%) that in the DMV workshops (41%). Participants strongly enjoyed the workshops and felt that they had shared views with other divers and anglers (**Figure 41** and **Figure 42**). Both workshop types were seen as interesting and the vast majority of participants felt they had learnt something new. Almost half of participants agreed that they had exerted an influence on decision-making processes around MPAs and that they had more insight into their own values.

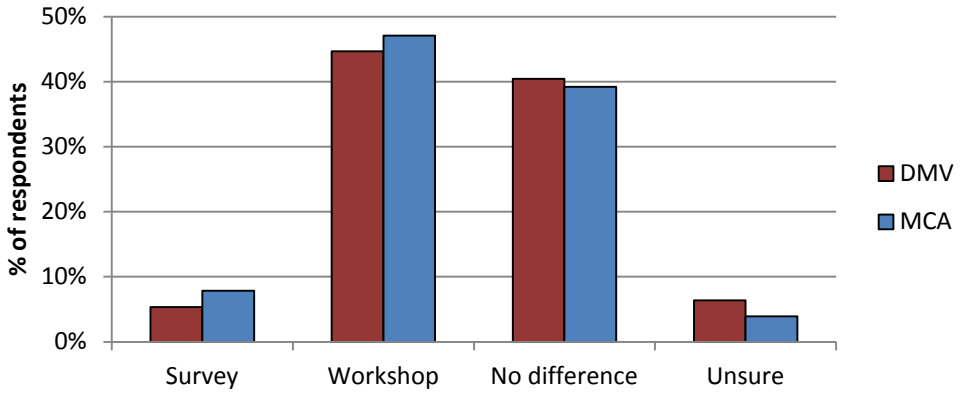


Figure 39. MPAs case study: participant confidence levels in the workshops vs the online survey; where confidence was felt to be highest.

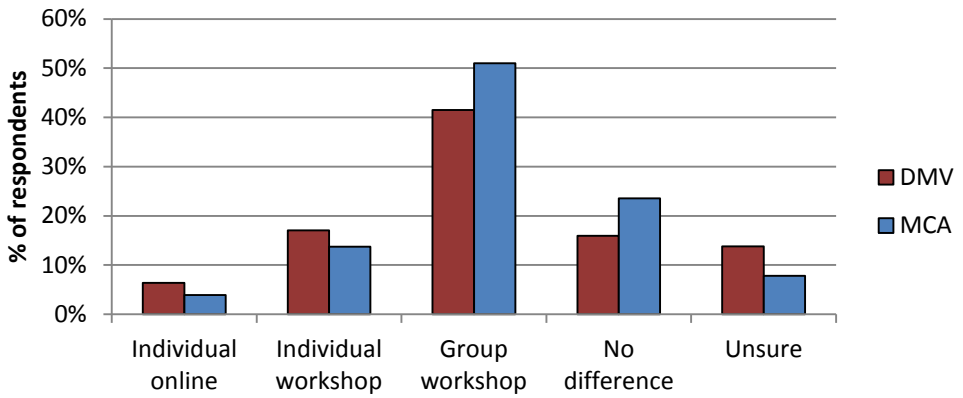


Figure 40. MPAs case study: participant preferences for means of eliciting values.

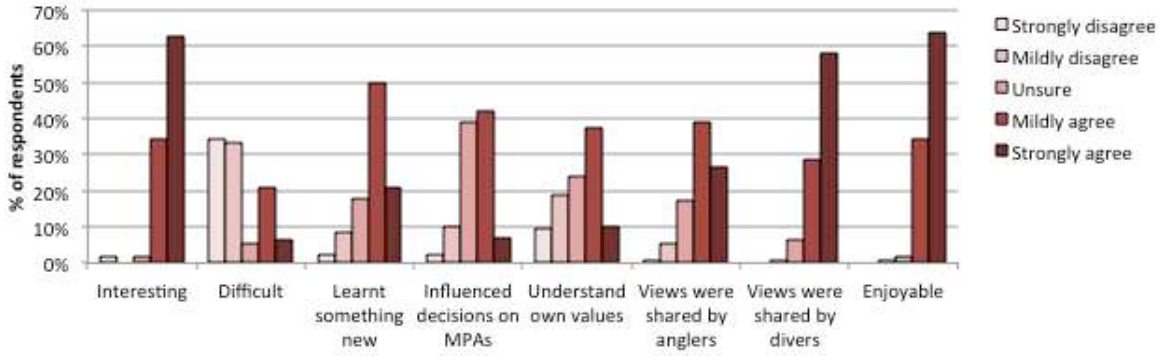


Figure 41. MPAs case study: DMV workshops participant feedback.

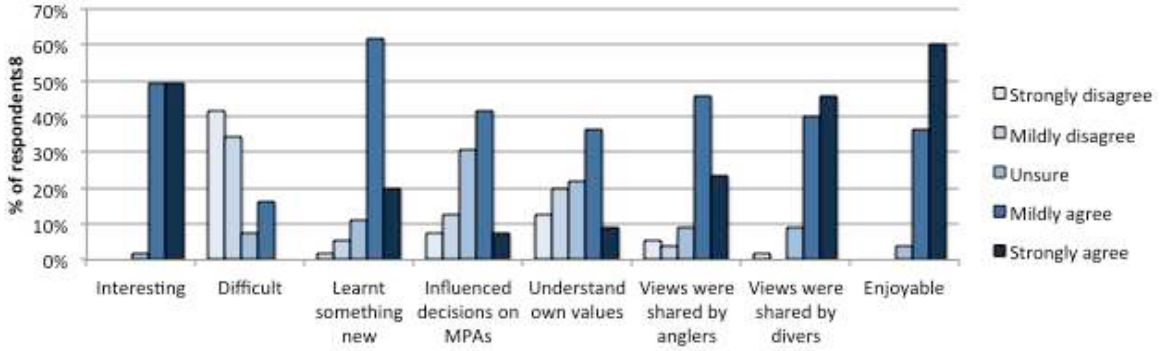


Figure 42. MPAs case study: MCA workshops participant feedback.

4.5 National case study 2: The coast in the media

The diversity of the coastline and the marine environment is immense, and the variety of stakeholders and the often competing social, cultural, environmental, economic and ecological interests and values, make management of these areas especially complicated. In this case study, we examine which values relating to the coastline and marine protected areas are expressed as shared values within news media and which stakeholders they are ascribed to. The study serves to illustrate a desk-based approach that can be used to assess how cultural and communal values come to play in managing the environment, which is crucial for understanding conflicts and developing policy that responds to and takes account of the public discourse. In this regard, news media are part of the public deliberative process, highlighting particular concerns, developing debates, aligning values with stakeholders, and structuring narratives of environmental and ecological risk and protection.

This case study has two components. The first analyses national news media coverage of stories about the UK coastline to identify: i) how the coast is framed and discussed within different debates; ii) which shared values are ascribed to the coastline through those debates; and iii) which stakeholders are aligned with those values. The second analyses press coverage relating to marine protected areas, as a specific topic, to compare the expression of shared values in regional and national news coverage.

4.5.1 Background

The UK coastline is around 11,500 miles in length (Cullingworth & Nadin, 2006). Its importance to daily life is, to large extent, highlighted by the fact that one third of the UK population live within six miles of the coast (Gibbard *et al*. 2006) and nowhere in the UK is more than 70 miles away from the sea (Natural England, 2013). The social, cultural and economic importance of the coastline is underscored by the location of major cities and towns in Britain, many of which, including London, have been built by an estuary or on the coast (McGlashan & Barker, 2005). Properties with a coastal view or positioned within close proximity to a beach attract a premium and increased demand for beachfront properties has substantially raised land values relative to values elsewhere (Schwartz, 2005). Public interest in the UK coast is reflected in the continuing popularity of the BBC television series, *Coast* (2005 -), eight series of which have been broadcast in the UK by 2013. Tourism, and specifically the growth of coastal tourism and nature based tourism, further reinforces claims for the economic, cultural and ecological importance of these areas. At the same time, an increasingly substantial body of research into sustainable coastal tourism acknowledges the impact of tourist and other activities on these fragile environments (UNEP, 2009).

Coastal regions support a variety of tourist activities, the range of which reflect the physical diversity of the coastline and include water-based, beach-based and other land-based pursuits as well as those activities which take place in urban sea-front environments (Johnson, 2002). In all, around one third of the coastline in Britain and Wales is developed with a further third included in national parks and AONB (Cullingworth & Nadin, 2006). The National Trust maintains and manages around 720 miles of coast in England and Wales supported via the Neptune Coastline Campaign, with 169 properties that the Trust deems to be at risk from coastal erosion and 126 properties at risk from tidal flooding (National Trust, 2013).

Coastal habitats are diverse, supporting a variety of specialised species. The JNCC notes that UK coastal habitats are a priority for nature conservation and lists five priority habitats included in the UK BAP; shingle, cliffs, saltmarsh, dunes and machair (JNCC, 2012). A series of threats and pressures are identified as impacting on UK coastal habitats including urban development, recreation, 'coastal squeeze', erosion and land claim. In its appraisal of the issues facing England's marine environment, Natural England lists climate change, habitat loss, over fishing, pollution and non-native species as threats (Natural England, 2013).

4.5.1.1 News media

News media are neither value-neutral nor objective. News reporting is shaped by public and political agendas as well as commercial pressures to the extent that the act of agenda-setting by the media is highly complex involving multiple actors. Agenda-setting theories suggest that the presence of a topic and the frequency with which it appears in news media impacts on the public understanding of its importance (McCombs, 2004). Salience cues such as a topic's placement in a newspaper, online or in a broadcast as well as repetition emphasize, or not, the importance of an issue. Over time, salience cues can move a topic on the public agenda, attracting public attention in the early stages of

public opinion formation. This approach may, on the face of it, appear to suggest that the media exerts powerful effects on audiences. However, the picture is more complicated than this and while agenda-setting theory does grant news media a central role in initiating what goes on the public agenda it also takes into account the contemporary media environment, where competition for public attention is fierce and individual viewers and readers do not passively consume media messages. There is no guarantee that media audiences will read and accept the intended meaning of a text and may instead take a resistant or opposing position. From this perspective, news media do play a key role in the construction of social reality through the choice, frequency and representation of issues but do not necessarily influence public opinion directly. Instead, media visibility gives certain issues presence in the public space while the obverse, media invisibility, consigns topics to obscurity, meaning that media visibility has symbolic power and affects political affairs (Lester & Hutchins, 2012). By generating media visibility certain interests are perceived as more important and in the case of an issue which is framed as having some dimension of risk, concerns can be galvanised and result in public pressure being brought to bear on policy makers (Bakir, 2006).
A second argument that emerges from agenda-setting research proposes that the media can act as a proxy for public opinion (Bakir, 2006). This position assumes that a newspaper will address and appeal to the beliefs and attitudes of its target audience. Policy makers may rely on media reporting as a gauge of public attitudes towards an issue on the basis that firstly, newspapers understand their readership and, for commercial reasons, don't wish to alienate them and secondly, readers will be reluctant to spend money purchasing a newspaper that does not accord with their views. Some agenda-setting literature goes so far as to suggest that media reporting offers policy makers a more reliable sense of public opinion than opinion polls (Rogers & Dearing, 1988). From this perspective it is proposed that the values that are expressed in news media will, by and large, be considered to reflect the values held collectively by the readership. By extension, the way in which an issue is framed by news media can reinforce, naturalise or challenge values and attitudes. Analysing newspaper coverage of topics related to ecosystems and the environment can therefore offer a useful insight into the expression of shared values.

It is well established by many studies that news media remain an important source of public information and serve as a forum for public discourse on the environment and environmental issues (Boykoff & Boykoff, 2007; Nelkin, 1995). The relationship between news media and public information is increasingly recognised as important when it comes to the communication of ecological or environmental risk. With such risks seldom being directly experienced by individuals, news media is more often the primary source of information on these topics (Dudo *et al*, 2007). Beyond providing information, the media amplification of risk through the frequency of reporting and the framing of an issue, leads to the social amplification of that risk which in turn may produce public demand for regulatory change (Kasperson *et al.* 1988; Bakir, 2006). Considered to be a component of agenda setting, framing therefore is an especially important concept to draw on when analysing news coverage of environmental risks. As a broad definition, framing refers to the emphasis, de-emphasis or omission of particular attributes of an issue. In more specific terms, a frame is *"a central organizing idea or story line that provides meaning to an unfolding strip of events, weaving a connection among them. The frame suggests what the controversy is about, the essence of the issue"* (Gamson & Modigliani, 1987). Drawing on this approach, a frame delimits a set of messages and organises ideas. Once an issue is framed by the media it can be difficult to alter its characterisation (Linksy, 1986). By amplifying the salience of certain aspects of an issue the communicating text promotes specific moral evaluations, treatments or definitions of problems (McCombs, 2004). Framing in news reporting can be unintentional, in the sense that it is arrived at through the normalisation or institutionalisation of particular reporting practices or cultures, or it may be intentional, in which case interests are purposefully promoted by a media outlet.

Newspapers have particular editorial stances and intended readerships, factors that affect the coverage of an issue. The ideological position adopted by a newspaper will also have a bearing on the framing of an issue although a newspaper's orientation and political allegiance may not remain consistent, a point exemplified by *The Sun* for instance which supported Labour in the 1997, 2001 and 2005 elections after having previously supported the Conservative party under Margaret Thatcher's leadership in 1992. Taking into account the newspapers' political support in the 2010 General Election, the orientation of UK broadsheets and tabloids can be summarised as in **Table 45**.

Table 45. Media case study: Political orientations of UK newspapers

Newspaper	***Type***	***Orientation***
The Guardian	Broadsheet	Centre-left
Financial Times	Broadsheet	Centrist, economically liberal
The Independent/Independent on Sunday	Broadsheet	Centre-left
The Times	Broadsheet	Centre-right
Daily Telegraph/ Sunday Telegraph	Broadsheet	Centre-right
The Sunday Times	Broadsheet	Centre-right
Observer	Broadsheet	Centre-left
The Daily Mirror/ Sunday Mirror	Popular	Left-wing, populist
The Express/Express on Sunday	Popular	Right-wing
The Sun	Popular	Right-wing, populist
News of the World	Popular	Right-wing, populist
The Daily Mail	Popular	Right-wing, populist
The People	Popular	Left-wing, populist

The terms 'ecosystem' and 'environment' are used with greater frequency in the broadsheets than in the popular press, implying a greater level of engagement with environmental issues by the 'quality press' than by what have been referred to as the 'tabloids' (**Table 46**).

Table 46. Media case study: Use of the term 'ecosystem' by UK newspapers

Newspaper	***Type***	***Number of items that include the term 'ecosystem' 1992-2012***
The Guardian	Broadsheet	2,215
The Independent/Independent on Sunday	Broadsheet	1,405
The Times	Broadsheet	1,333
Daily Telegraph/ Sunday Telegraph	Broadsheet	823
The Sunday Times	Broadsheet	772
Observer	Broadsheet	521
The Daily Mirror/ Sunday Mirror	Popular	204
The Express/Express on Sunday	Popular	174
The Sun	Popular	160

This corresponds with widely acknowledged distinctions between the broadsheets and the popular press, with the former being more likely to cover news about national and foreign economics and politics, also referred to as 'hard news', the latter generally focussing on celebrity, crime-based news and human interest stories, otherwise referred to as 'soft news'. Broadsheets may employ science and environment specialists while it is more likely that the same issue will be covered by generalist journalists in the popular press (Boykoff & Mansfield, 2008). As a consequence, science and environment reporting in the popular press has less depth and breadth and representations tend to be more simplistic and are often sensationalised (Boykoff & Mansfield, 2008). For this reason, it is assumed that the 'quality' press have greater bearing on policy and decision-making (Wilson, 1995; Carvalho & Burgess, 2005). However, the same cannot be said about the influence of the quality press on the public understanding of environmental issues as the daily circulation of some tabloid newspapers exceeds that of broadsheets by a large margin. For instance, the circulation figure for

The Observer is 253,000 compared with *Daily Mail* circulation of 1.8 million and *The Sun* with an average daily circulation of over 2.4 million. Therefore, while coverage of ecosystems stories and environmental issues by the popular press may be less than that of the broadsheets, the readership of the former is greater than the latter, in some cases by as much as ten times (NRS, 2012). Classification of the readership also differs markedly with those defined in the ABC1 social grades comprising the majority of broadsheet readers and the popular press attracting a readership classified mainly as C2DE (NRS, 2012; **Table 47)**.

Table 47. Media case study: National Readership Survey demographic categories

Social grade	*Occupation*	*% of population*
A	Higher managerial, administrative and professional	4
B	Intermediate managerial, administrative and professional	22
C1	Supervisory, clerical and junior managerial, administrative and professional	27
C2	Skilled manual workers	22
D	Semi-skilled and unskilled manual workers	16
E	State pensioners, casual and lowest grade workers, unemployed with state benefits only	9
Source: National Readership Survey 2012-13, http://www.nrs.co.uk/lifestyle-data/		

4.5.2 Methods

The research utilised a mix of quantitative and qualitative approaches to the analysis of the expression of values in UK newspapers. Content analysis was used to examine large text samples, identify broad patterns and quantify the use of specific terms over a particular time period. Discourse analysis was employed to analyse smaller samples, taking account of context and focusing on the expression of particular values.

Content analysis, which quantifies content according to predetermined categories, has been widely used to examine large samples of print news media. By deciding on the rules for categorising material in advance, the coding of data is consistent, bias is minimised and the analysis is systematic and replicable (Bryman, 2001). Content analysis is suited to handling and quantifying large datasets, placing emphasis on frequency by coding material into rigid mutually exclusive categories. Intercoder reliability is used to test the robustness of the category system.[23]

This study used *NewsBank*, a database of regional and national UK and Ireland newspapers. A series of initial searches were undertaken using a broad set of key search terms: 'ecosystem', 'coastline', 'nature', 'environment', 'forest', 'woodland' and 'marine protected area'. Initial searches were made in 12 national newspapers: *The Guardian*, *Financial Times*, *The Independent*/*Independent on Sunday*, *The Times*, *Daily Telegraph*/*Sunday Telegraph*, *The Sunday Times*, *Observer*, *Daily Mirror*/*Sunday Mirror*, *The Express*/*Express on Sunday*, *The Sun*, *News of the World* and *The People*. Searches used a ten-year date range, from 2002 to 2012. The headline and lead paragraph from the first 30 results

[23] Intercoder reliability refers to the extent to which two or more coders agree. During the content analysis, intercoder reliability was tested twice, each time using a 15% sample. The first test used ReCal (http://dfreelon.org/utils/recalfront/recal2/), an online utility that calculates the intercoder reliability coefficients for nominal data to calculate the percentage agreement of nominal values. This test resulted in the collapsing together of two topic categories due to problems establishing their exclusivity for coding purposes. A second test was conducted using ReCal. This test gave a percentage agreement of 95%. Scott's Pi, Cohen's Kappa, and Krippendorff's Alpha reliability coefficients for intercoder variability were all considered reliable with agreement coefficients of 0.928, 0.929 and 0.929 respectively.

returned for each search according to 'best result' were scanned for repeated terms. These repeated terms were used as further narrowing criteria.

The search for articles containing the term 'coastline' published between 2002 and 2012 in twelve national newspapers returned 4,393 results. Given the large number of articles about non-UK coastlines, the search was refined to include only articles that included 'coastline' and 'Britain'. This search gave 530 results, which were subsequently categorised into one of 15 categories. Letters, media reviews, travel reviews and articles which promoted or covered coastal charity walks were excluded to leave a sample of 191 news articles. From these the articles from two broadsheets and two tabloid newspapers made up the filtered sample for analysis. The selection of newspapers took into account the editorial stance of each paper (**Table 48**) to assemble a sample that represented a range of political positions. This gave a combined filtered sample of 74 articles from *The Times*, *The Guardian*, *The Express,* and *The Daily* and *Sunday Mirror*.

Table 48. Media case study: Circulation, readership and affiliation of sample

Newspaper	***Type***	***Circulation (dailies)****	***Affiliation***	***Readership†***
The Times	Broadsheet	390,941	Centre-right	ABC1
The Guardian	Broadsheet	187,000	Centre-left	ABC1
The Express	Popular	522,264	Right-wing	ABC1/C2DE
The Mirror	Popular	1,038,753	Left-wing	C2DE
* Circulation figures for June 2013. Source: ABC / The Guardian, http://www.theguardian.com/media/table/2013/jul/15/abcs-national-newspapers † Majority readership January-December 2012. Source: NRS, http://www.nrs.co.uk/lifestyle-data/				

Articles in the filtered ten year sample were coded according to topic, location, authority, value, communication of risk and antagonist. Initially topics were categorised as either wildlife, rising sea levels, law/legislation, renewable energy, pollution/litter, erosion, weather, dredging, fishing, flooding, right to roam, and other. Following the first intercoder reliability test, these categories were refined and erosion and rising sea levels were collapsed into a single category. To establish if there was any bias toward reporting about a particular coastal region, articles were categorised as either national; various named locations; various unnamed locations; south west; south east; north west; north east; Scotland; Wales; and, other. For consistency, coders used *Google Maps* to check the location of named coastal areas. The expert sources cited in the articles, perceived risks and expression of values were also categorised. Expert sources used in a news report legitimate the framing of facts. The credibility and authority of a news story and the values it expresses are therefore reliant, in part, on the expert sources used in the article. This study categorised the main authority cited or quoted in an article as either scientist/engineer; UK government representatives (including MPs and representatives of government agencies and statutory bodies); conservation/wildlife group; EU representative; newspaper/ journalist; and other. The communication of perceived risk was coded as either yes or no. Values were assigned to one of thirteen categories: economic; heritage; recreation; national identity; aesthetic; biodiversity; intrinsic; spiritual; scientific; tourist; community cohesion; other; and a combination of two or more values from categories 1-11. Treating each news article as a story with a narrative structure, emergent coding, which establishes categories after an examination of the data, was used to identify if an antagonist was present in the story.

Coding the values expressed in the articles revealed that the majority of stories expressed two or more values. To provide a more detailed account of the expression of values in the news articles, discourse analysis was used to study MPA news coverage. A search for national and regional press coverage of the establishment of MPAs in 2010 was confined to a single date range (20th August 2010, when the UK Government submitted 15 candidate marine SACs and SPAs to the European

Commission) to delimit the sample. This search returned seven articles, two from national broadsheets, *The Guardian* and *Daily Telegraph*, two from Scotland-wide newspapers (*The Scotsman* and *The Herald*) and three from regional newspapers: *The Western Mail* (Cardiff), *Daily Post* (Liverpool) and the *Aberdeen Press & Journal*.

While content analysis as an approach is useful for large datasets it is limited as a means to analyse attitudes, rhetorical strategies, symbolism, and by extension, the expression of particular values. In this respect, values are seldom expressed as individual terms; instead they may be nuanced, embedded within a discourse or linked to a particular theme, belief or ideology. Discourse analysis, an interpretive qualitative approach, is more complex than content analysis and specifically concerned with context and embedded meaning. Discourse analysis focuses on smaller samples than content analysis and assumes that discourses represent knowledge about a particular topic that is contextual and historically situated. This type of analysis is concerned with how discourses regulate the way in which a topic can be meaningfully discussed and the resulting normalisation of particular attitudes, beliefs and values (Fairclough, 2003). In the context of this study, discourse analysis took into account the structure of the text, the use of rhetorical devices and semantic relations, the authorities quoted, the socio-historical context, and the editorial position of the newspaper.

4.5.3 Results

There was an overall increase of more than 46% in the frequency of the term 'environment' in national and regional UK newspapers between 2002 and 2012. The frequency with which the term 'ecosystem' appears in UK newspapers increased by more than 200% over the same period. It is reasonable to suppose that the overall rise in the frequency of use of the terms 'environment' and 'ecosystem' indicates an *increase* in news media coverage on environmental stories over the ten-year period and a significant growth in public interest in such issues. The terms 'ecosystem' and 'environment' were used with greater frequency in the broadsheets than in the popular press. This implies a greater level of engagement with environmental issues by the 'quality press' than by the 'tabloids', a finding consistent with the assumption that environment stories constitute hard news and therefore are more readily covered by the broadsheets.

The 530 articles examined in the unfiltered British coastline sample were also more likely to appear in the broadsheets with over 66% of the articles in the sample in *The Guardian*, *Financial Times*, *The Independent*, *Independent on Sunday*, *The Times*, *Daily Telegraph*, *The Sunday Telegraph*, *The Sunday Times*, and *Observer*. However the greatest number of occurrences of the combination of terms 'British' and 'coastline' in a single newspaper were found in *The Express*. More than one quarter of all articles in the unfiltered sample came from this paper. However, this can be accounted for by the fact that *The Express* also had the highest proportion of travel and holiday features (34%), stories about charity walks around the coast (24%) and reviews of other media (25%) including, for instance, the BBC television series *Coast*, (2005 -) in the sample.

In the filtered sample which excluded travel features, letters and media reviews and focused only on news articles in *The Times*, *The* Guardian, *The Express, The Sunday Mirror* and *The Daily Mirror*, 'Britain' and 'coastline' were most frequently referred to specifically in stories about wildlife (16%), erosion and rising sea levels (15%), pollution (14%) and renewable energy (8.1%). Looking across the filtered sample, wildlife stories were distributed equally between the popular press (50%) and the broadsheets (50%). However *The Express* accounted for the highest proportion of wildlife stories in a single publication (42%). This is in-line with the tendency for wildlife or animal stories to be framed as 'soft news' and more likely to be covered by the popular press (Molloy, 2011). The number of stories about erosion and rising sea levels was reasonably evenly split between broadsheet and popular press coverage with only marginally more articles (54% in total) appearing in *The Express,*

Express on Sunday and *The Daily Mirror* and *Sunday Mirror* compared with 46% in the broadsheets. The majority of stories about pollution and litter appeared in *The Times* (40%) and the broadsheets were also responsible for the greater number of articles about renewable energy. Public access to the coastline in relation to the 'right to roam' featured in 8% of articles in the sample.

The most frequently cited antagonists were global warming/climate change (16%), polluters/litterers (12%), government/government agencies (11%) and landowners and wealthy classes (8%). It should be noted however that 19% of articles did not have an obvious antagonist. The relationship between the topic of the article and the antagonist was reasonably consistent with global warming/climate change being cited mainly as the antagonists in stories about erosion and rising sea levels, polluters and litterers in stories about pollution and litter and landowners and the wealthy being cited as antagonists in right to roam coverage. Criticism of government and government agencies did not show any significant patterns with regards to being linked to a specific topic but government and government agencies were more likely to appear as antagonists in articles published in *The Guardian* and *The Express*. Articles in these two newspapers also tended to be more critical of landowners in coverage on the right to roam debate.

4.5.3.1 Location and area

The filtered sample showed that the majority of articles in the study referred to the coastline in a national context (32%). When considered in relation to regional representations, 19% of articles referred to the south west coastline, 5% to the south east, 4% to the north west and 3% to the north east. The coastlines of Scotland and Wales appeared in 5% and 3% of the articles respectively. Although 18% of articles mentioned multiple coastal locations, in these cases, south west locations still tended to dominate. It is of note that in 2005 the first episode of the BBC television series *Coast* began by focusing on the chalk cliffs at Dover, which were, four months later, reported to be the nation's favourite coastline (*Times*, 3 November 2005).

4.5.3.2 Authority and sources

31% of expert sources in the sample were representatives from mainstream conservation and wildlife groups: National Trust, RSPB, Whale and Dolphin Conservation Society, Marine Conservation Society, Wildlife Trust, RSPCA, Coastal Concern Action Group, and Campaign to Protect Rural England. Of these, the National Trust was cited as the main expert source in 15% of the articles included in the filtered sample. RSPB representatives were quoted in 5% of articles. The second most popular source in the sample was representatives of government or government agencies. In all, these accounted for 28% of all expert sources. Scientists were the main source in 18% of the sample. Where nature was afforded intrinsic value or the biodiversity or habitat value of the coastline was emphasised, conservation and wildlife group representatives tended to be used as expert sources. MPs and representatives from government agencies were more likely to be quoted in articles that expressed the economic value of coastal regions. Aesthetic value was more likely to be attributed to the coast in articles that used quotes from conservation groups while scientists tended to be expert sources in stories that expressed a variety of values, including the value of the coastline to scientific knowledge, the value of biodiversity and the intrinsic value of wildlife.

4.5.3.3 Threats and risks

68% of articles in the sample communicated some type or measure of risk. In news media, potential threats are often expressed through a combination of facts and values (Arnoldi, 2009). In this sense, facts are framed through the expression of particular values that, in turn, suggest how the risk should be understood and managed (Arnoldi, 2009). Risks can be both material and symbolic (Beck,

2004). In the context of the studied sample, threats were expressed as material risks that may or may not be quantified, for instance property loss due to coastal erosion, and symbolic risks which included for instance the cultural significance of coastal erosion in terms of its impact on community or national identity.

In *The Express* and *Express on Sunday*, risks posed by erosion, rising sea levels and flooding were framed by discourses of conflict and invasion. The threats were quantified in terms of past measurements of coastline loss and future predictions of what can be expected within *"100 years"* (*Express*, 15 March 2006) or "*within the lifetime of many children born today"* and amplified through the use of terms such as *"disaster"*, *"suffer"* and *"increasingly ferocious"* (*Express*, 29 December 2002). In this context, coastline erosion was normalised as a natural process, which benefits nature at the expense of a collective cultural heritage. This was framed by a discourse of conflict between nature and culture where rising sea levels were referred to as an *"invader"* to which the coast has to be *"surrendered"* (*Express*, 15 March 2006) or *"abandoned"* in *"a modern war"* and *"a new battle now being fought around Britain's coastline"* (*Express*, 23 August 2008). The discourse of invasion was also extended to wildlife including *"rare stinging jellyfish"* that *"invaded one of Britain's most spectacular stretches of coastline"* (*Express*, 1 June 2002) and *"toxic seaweed"* originating in France which was a *"threat to **our** wildlife"* (*Express*, 20 August 2009).

In coverage of rising sea levels and erosion, although global warming was identified as a cause, nature was positioned by the headlines as a shared threat. In the popular press, a collective 'we' against 'nature' was sensationalised by the suggestion that nature is something *"**we** can't stop"* with the resulting cultural cost to the nation, in terms of its *"unique landmarks"*, expressed as *"the gems **we** stand to lose"* (*Express*, 29 December 2002; *Express*, 15 March 2006). In the sample, the articles establish a relationship between the material loss of coastline from erosion with shared values expressed in terms of national culture, heritage, tradition and identity.

The importance of the coastline and its value in terms of constituting part of a shared national identity was also apparent in *The Times*, referring to the White Cliffs of Dover as "*a symbol of Britain*", the collective ownership of which was emphasised by references to *"our islands", "our greatest conquests from the sea"* and *"our coastline"* (*The Times*, 8 June 2002). The significance of the coastline as a key aspect of national identity was expressed as that which *"delineates- an island nation like ours"* (*Times*, 13 April, 2005) and "*defines this island nation*" containing *"many of our most evocative landmarks"* (*Times*, 1 July 2010).

Erosion was positioned within broader historical narratives of a changing coastline landscape, *"the result of hundreds of generations of heavy labour"* (*The Times*, 8 June 2002) and - invoking a sense of national security- *"built by nature against infection and the hand of war"* (*Times*, 13 April 2005). The value of the coastline is therefore expressed in symbolic terms as, not only, part of a shared national identity but also important to the nation's security. In *The Times* national identity was partnered with economic value and both placed in opposition to any intrinsic value of nature. *The Times* stated for instance that *"it is pleasant to yield to nature when livelihoods do not have to be considered"* (*The Times*, 8 June 2002) and "*the impact upon the landscape*" is accompanied by *"human hardship*", particularly the loss of property such as *"seaside homes*", "*beach huts and other buildings*" (*Times*, 31 January 2005).

A coastal heritage narrative was developed in a different way in *The Guardian*, which framed rising sea levels and coastal flooding in a positive way, as a form of historical habitat restoration. Erosion and rising sea levels were contextualised within an historical narrative as a natural return to a "l*ost landscape"* (*Guardian*, 8 October 2007). Terms such as 'transform" and "return" were mobilised to de-amplify the threat of rising sea levels and, instead, position the flooding of coastal regions as a

way of working with nature to create a "*restored landscape"* and a natural *"buffer"* against the risks posed by *"the force of the tides"* (*Guardian*, 8 October 2007), providing important wildlife habitats that will *"protect communities"* (*Guardian*, 4 May 2006).

A discourse of stewardship and the notion of working with, rather than against, nature was present in *Guardian* articles in the sample. *The Guardian* also accounted for the highest proportion of articles that featured the work of the National Trust or quoted a representative from the Trust. While the values expressed in relation to the coastline were similar to other newspapers, those of a national and community identity, the risks of erosion, rising sea levels, and flooding were not framed as a battle with nature and combined with the greater tendency to use experts from conservation and wildlife groups, this group of articles tended to emphasise the intrinsic worth of the coast as a natural landscape.

Stories about pollution and litter were framed by a discourse of cleanliness and personal responsibility. In these cases, the aesthetic, recreational, heritage and national identity values of the coastline were under threat from litter and pollution. National *"pride"* (Times, 13 April 2005) was proposed as a motivation not to litter with the *Times* claiming that "*litter has no place in a civilised society"* and framing it as a criminal activity comparable with *"shoplifting"* (*Times*, 12 April 2008). In an *Express* article those responsible for littering were referred to as *"culprits*" and *"louts*" with the public being reminded that *"everyone must take responsibility"* and *"it is up to everyone to act responsibly"* (*Express*, 20 April 2007).

4.5.3.4 Marine protected areas

Following a similar pattern to national news coverage that features the coastline, a *Daily Telegraph* story on MPAs foregrounded south west locations, referring to them as "*the best known"* (*Daily Telegraph*, 20 August 2010). The remaining locations mentioned in the article were then ordered and grouped according to marine species, marine habitats, marine SACs/SPAs, sand banks and a final grouping referred to only as *"other sites*". The article's headline 'National parks of the seas' uses the 'park' metaphor as a rhetorical device that is repeated later as a simile where MPAs are claimed to be "*like national parks at sea*" and it is stated that "**our** seas" need just as much protection as "***our land***". The comparison between land and sea is used again later in the article where a lack of government commitment to conservation is said to render MPAs "*paper parks*". The overall discourse is one of protectionism emphasising both collective societal responsibility and government responsibility for marine conservation. The communication of risk is related to marine species and emphasised in the second sentence of the article, which refers to *"rare species in danger of extinction*". The expert sources quoted in the article are the minister for the marine environment and a spokesperson for the Marine Conservation Society. The restrictions on fishing and wind farms mentioned in the opening paragraph of the article and a later quote that refers to fishing and extractive industries as *"damaging"* establishes a conflict of interests between industry and conservation. The article's protectionist discourse has a conservation bias, which when read as a narrative places the industries mentioned in the article as the antagonists of the story.

Risks and antagonists were constructed differently in *The Guardian* article published on the same date (20 August 2010). In this story, risk was related to budget cuts, the article claiming that government priorities *"will leave agencies unable to afford to properly enforce the regulations or investigate new sites"*. The conflict between fishing, dredging, wind turbines, and species protection is established in the headline and the main body of the article. Species rather than habitats are configured as primarily in need of protection. This framing of MPA priorities towards species is amplified in the article's inclusion of a list of protected species, the value of which is enhanced through the deployment of terms such as *"exotic"* and *"colourful"*. The locations of MPAs are of

lesser importance to the story than the protected species and named regions (Devon, the Lizard, North-West Rockall Bank, Liverpool Bay and The Outer Thames Estuary) occur later in the article. A comparison between land and sea is made at the end of the article which uses the same quote from the marine environment minister as the *Telegraph* but deploys it to emphasise a disparity rather than a similarity between land and sea protection stating that *"the proportion of sea protected will still be less than half that on land"*. In addition to the minister, the other expert source quoted in the article is a spokesperson for the RSPB who is critical of the government's priorities in relation to marine protection.

Regional newspapers focused on specific sites to reflect the interests of a more localised readership. *The Western Mail* (Cardiff) and *Daily Post* (Liverpool) stories on 20 August 2010 concentrated on the designation of Liverpool Bay as an SPA for birds. In contrast with the national coverage, these two articles position the Liverpool Bay SPA within a wider European context, rather than the national context favoured by the national broadsheets. The *Daily Post* and *Western Mail* both make the point that the bay is part of a European network of protected areas. This context functions as a device to amplify the significance of the regional site as being one of Europe's "*most important areas for wildlife*". The focus on a specific location allows both articles to give more space to factual information about the species under protection, the numbers of which play an important role in emphasising the individuality of the site.

Coverage of the establishment of MPAs in August 2010 in two of three Scottish newspapers included in the sample emphasised consultations with the fishing industry and foregrounded the economic value of marine areas. *The Scotsman* linked conservation with the benefits to the economy of wildlife tourism, natural heritage, and a sustainable fishing industry. The *Aberdeen Press & Journal* focused more on the symbiotic relationship between fishing and marine protection, linking healthy seas with productivity. The discourse of health was also apparent in *The Scotsman*'s article. *The Herald*, on the other hand, focused on habitats and species protection and the communication of risk, referring to "*the most seriously threatened marine life*" (*The Herald*, 20 August 2010). *The Scotsman* and *Aberdeen Press & Journal* communicate risk as shared by the fishing industry, marine species and habitats.

4.5.4 Discussion

Environmental stories typically utilise narrative structures in which ecosystems are cast as a victim that is under threat or at risk. This was the case in the news coverage of the coastline examined for this study where stories were frequently about environmental risk, damage or pollution. Global warming was frequently cited as a cause, or in narrative terms constructed as an antagonist. In these cases, news coverage that featured the coastline as the victim of environmental threats is also part of the broader public debate about climate change. Due to the timescales involved and the complexity of interactions, the causes and impacts of climate change are notoriously difficult to communicate to the public (Doyle, 2011). However, coastal erosion provides an important means by which climate change can be visualised and measured. Stories about the coastline and coastal erosion therefore become an important part of the public debate on climate change and coverage by newspapers is an elicitation process by which shared values can be expressed.

This study suggests that in national news coverage, the coastline is often closely associated with values, beliefs and attitudes related to national identity. In the national newspapers included in this study, national identity was normalised as something that is shared and therefore the loss of coastline through erosion, flooding and so forth is considered to be a collective loss. In terms of the rhetoric of the news discourse, this association can give rise to risks to the coastline being deployed as metaphors for threats to or erosion of national identity and national security. Shared values that

are associated with the coastline tended to be expressed as transcendental societal and communal values. This is apparent, for instance, in news coverage of erosion and the resulting loss of natural landmarks where rhetorical devices, such as references to historical narratives of conquest, were used to establish the landmarks as a shared cultural heritage. While such landmarks may have economic value, for example as tourist attractions, - in the sample studied, their value as heritage and their relationship to national identity tended to be foregrounded instead. Although less common than the cultural and societal values that were expressed in relation to national identity, communal values were also present in stories about tidal damage and flooding that resulted in some sort of loss or damage to coastal towns. In these cases, communal values tended to be expressed in relation to cultural traditions and nostalgia associated with a particular place. Although cultural values related to a national identity were mobilised around national coastline loss, the news coverage analysed for this study favoured stories about coastal areas in the south west and south east.

Other-regarding transcendental values were apparent in coverage of the right to roam debate where access to the coast was claimed to be a citizen right. In these articles, loss of access to the coast can also be equated with the loss of value to society. In the majority of articles included in this study, access to the coastline for all citizens was considered a right although this was challenged in a minority of the coverage in which access to the coastline was reframed as contextual, and rights to roam were positioned as in conflict with the interests of landowners. In these cases, the right to roam debate was framed as a conflict between self-regarding contextual values of different interests.

Aesthetic benefits of the coastline were also brought out in coverage of the right to roam debate, although they were by no means confined to just articles on this topic. Indeed, in the unfiltered sample of 530 articles adjective-noun combinations that related to aesthetics were used to describe the coastline in 16% of stories. The most popular of these being ‘beautiful coast[line]’, ‘spectacular coast[line]’ and ‘dramatic coast[line]’ which combined accounted for 11% of all articles. In the filtered sample aesthetic value was attributed to the coastline in 22% of articles.

The aesthetic benefits of the coastline were mobilised as a counter to arguments for the economic value of the coastline in articles about renewable energy, rising sea levels, dredging and gas drilling. In these cases, the aesthetic benefits of the coastline were linked to transcendental societal values around beauty while economic value was framed as either self-regarding (in the case of individual companies interests) or communal and self-regarding (in the case of benefits to a community or region). While it was more common for aesthetic value to be set against economic value in debates about wind farms, dredging and drilling, the two sets of values were not mutually exclusive and aesthetic value and economic value were combined in stories about tourism and the economic revival of the south west coast in 2004.

Value to wildlife and the value of biodiversity featured heavily in the filtered sample where it was notable that the majority of articles that emphasised wildlife value were found in *The Express* and those that emphasised biodiversity were published in *The Guardian* newspaper. These were also the papers with the fewest articles foregrounding the economic value of the coastline. Although not as common as aesthetic value, there were also examples of the coastline being attributed with recreational, spiritual, and broader well-being value.

4.6 Case studies: Synthesis discussion

In the following discussion, we will consider the overall evidence generated by the four case studies, evaluating the different methods used and their potential for assessing different types of shared

values. First, we will evaluate the evidence regarding differences between non-deliberated, values in 'conventional' valuation and deliberated and group values in DMV and MCA. Then, we will reflect on the mixed deliberative approach used in Hastings to consider the importance of learning processes for value formation. Continuing the discussion on the potential of mixed method approach, we discuss the added value of considering subjective well-being for assessing ES. Thereafter, we bring these threads of discussion together to provide an overall evaluation of the DVF model presented in Section 3 in light of the empirical evidence. Finally, we discuss the potential of media analysis for assessing shared values of ecosystems.

4.6.1 Changes in values in DMV resulting from group deliberation

The evidence from both the Forth and MPA DMV workshops showed clear, substantial and statistically robust differences between individual and group values. The way in which WTP changed was complex. On the one hand, overall WTP decreased. On the other, priorities for the allocation of values shifted in the sense of becoming more other-regarding. A third effect was that group-based WTP better reflected non-monetary measures of subjective well-being. A reflection on group discussions in the workshops can provide some insight on these effects. In both case studies having to decide on what others should pay seemed to bring out a real 'scratch on the back of the head' of whether a tax rise (Forth) or suggested donation (MPAs) was just. Discussions about justness focused on 1) what the benefits really meant, and which benefits were ultimately most important in the short and long term; 2) who would benefit: all of society, only some people, or some people who were particularly in need; 3) competing priorities, both whether money should be spent on this or other environmental projects, or non-environmental social concerns; 4) duties to other species and future generations; and 5) responsibilities, e.g. the notion that local people were responsible for local sites, or that everyone, or every local community, had to take responsibility for 'their bit' towards social goals such as protecting biodiversity.

Targeted deliberative interventions helped to bring out many of these processes. For example, the conceptual systems modelling exercise in the Forth helped participants to better understand the wider role of different environmental components in the social-ecological system (e.g. the role of wetlands vs woodlands), while it also brought out competing social demands. Explicitly asking about transcendental values sometimes brought out notions of fairness and social justice, but more broadly helped people to consider more clearly what was important to them at a more fundamental level. There was also evidence that appears to suggest that deliberation not just altered preferences but also helped to shape them where there were none previously, around the large number of marine habitats in the MPAs case study. Deliberative interventions affected both individual and group WTP, but effects tended to be reinforced in the deliberated group values.

The evidence presented here suggests that deliberated group values were more considered, more strongly anchored onto the value of benefits and less an expression of 'gesturing' than non-deliberated individual values, while at the same time more reflective of underlying transcendental values of participants. Evidence includes the results of valuation models themselves, psychometric measures, correlations between subjective well-being and monetary results, and qualitative evidence. As such, deliberated group values may be a better reflection of real welfare impacts than non-deliberated individual WTP. Certainly, participants themselves overwhelmingly felt that the deliberative group-based approach was a better way to elicit their values than the conventional individual survey approach (**Figure 40**) and they felt more confident in the group setting (**Figure 39**). Despite on-going improvements in framing and techniques, the Achilles heel of CV and similar approaches remains hypothetical bias: the tendency of participants to overstate in surveys what they would be willing to pay in comparison to real life. In the Forth and MPAs case study,

deliberation substantially reduced WTP. Exploration of the potential of DMV to reduce hypothetical bias would be a particularly interesting avenue of research.

Links can be made here to the literature on 'inferred' WTP (where participants are asked to state what they think others are WTP). Studies that have compared conventional stated WTP and inferred WTP with actual WTP have mostly concluded that inferred WTP provides a better reflection of actual behaviour, because people believe themselves more generous than they actually are, but are less magnanimous about others (Yadav *et al*. 2012). Asking participants what would be a fair price naturally brings in the question around what would be acceptable to others. However, the fair price approach is fundamentally different to an inferred WTP in that doesn't ask people to reflect on the selfishness of others, but rather on what would be a just trade-off between self- and other-regarding values.

The Forth and MPA results, psychometric evidence suggests that within the workshops, the relative importance of biospheric values became greater compared to egoistic and altruistic values. In the MPAs study, this affected WTP, but only in the group-based valuation that followed the moralising intervention, which included a specific exercise focused on transcendental values (the 'values compass') and storytelling connected to discussing experiences of well-being. The fact that changes in values could be observed and that they were stronger in the DMV than MCA, while there were no significant changes in other psychometric factors, suggests that changes are more likely to occur in the specific areas targeted by deliberative exercises, underlining the importance of targeted interventions. In the Forth study, WTP was not directly influenced by values but more by the 'end points' of the VBN theory: norms and beliefs relating to ascription of responsibility. This may again be the result of the nature of the interventions, where values were connected to system models; hence there was more emphasis on application of values and the conceptual modelling appeared to be an effective tool to bridge transcendental and contextual values.

DMV and participatory systems modelling appear to show intuitive complementarities. Whereas valuation methods depend on scenarios to be valued, obvious scenarios are not always ready to hand and have thus far almost always been arbitrarily selected by researchers. Systems modelling with stakeholders could be used as a more inclusive way of generating valuation alternatives. The process of model construction is also known to generate considerable learning and helps incorporate local knowledge (Bizikova, 2009; Cockerill, 2009; Standa-Gunda, 2003). By better understanding system dynamics, participants can make better-informed judgements in terms of value trade-offs between different ES and current and future generations.

However, divergence of how psychometric results related to WTP between the Forth and MPAs case studies is probably not just a consequence of different types of deliberative interventions. Group composition was also fundamentally different. In the Forth study, community councillors were experienced deliberators and largely knew each other. This much more strongly politicised their debates, focusing on the questions of what was right and who should take responsibility. In the Forth study, normative beliefs were predictors for WTP throughout; in the MPAs study values and well-being scores acted as predictors, particularly in the final stage of group-based deliberation. In the Forth, there was no sign of 'protesting' against the monetary valuation framing, while in the MPAs there was significant protesting in both the online surveys and the workshops – on both the grounds that divers and anglers should not be the ones paying, and the notion that the value of nature is infinite. While the Forth CE was less explicit in asking participants to 'name their price' than the CV method used with the MPAs, this also reflects that the Forth groups may have been more pragmatic, feeling more comfortable in terms of accepting to make trade-offs on a utilitarian basis after discussions that included both utilitarian and non-utilitarian considerations and values.

In the group-based DMV, the notion of a 'fair price' is a particularly useful way to incorporate shared values into valuation, because it allows for consideration of other-regarding values without facing the problem of double counting that would occur if other-regarding values were included in individual WTP. However, theoretical concerns around aggregation (Section 2.4.2) are only fully addressed by a social WTP approach, where WTP is given at the societal scale rather than at the individual scale, such as that taken in the Hastings case study. Either approach addresses to some degree concerns around commensurability of values because ethical dimensions of value can be incorporated into group decisions more explicitly and because transcendental and contextual values can be distinguished more clearly and valued through different processes. Regardless, concerns around monetary valuation may remain, either because it might be perceived as commodification of nature (as was considered by some of the protestors in the MPAs DMV workshops), or because it risks pegging the *value* of something to the *cost* of realising it, as was expressed by participants in the Hastings study.

4.6.2 Changes in values in MCA resulting from group deliberation

In contrast to the Forth and MPAs DMV workshops, in the MPAs MCA results deliberation had a less strong effect on individual and group contextual values (as judged by differences in how goals for marine management were prioritised). Nonetheless, the significant decline in the rating and rank of 'protection of non-damaging recreational opportunities' goal suggested participants became more focused on biospheric goals. This reflects an increase in biospheric transcendental values in psychometric results and the thread of group discussion, which tended to focus on the wider benefits of the protection of species and habitats. It appears that in the systematic structure of the process, participants co-developed a greater sense of how central the health of the marine environment is for the provision of a range of benefits. The structure of the MCA process itself mimics a number of aspects of the deliberative value formation process, e.g. learning about the basis upon which others would make their decisions by considering a range of criteria. There was also some evidence that participation in MCA influenced perceived well-being benefits from the marine environment: engagement and interaction with nature, social bonds and transformative experiences scored higher following MCA workshops.

The MCA results also underlined the importance of the deliberative process outlined in the DVF model (Section 3.5) in terms of eliciting transcendental values, connecting these to practical beliefs and concerns to shape contextual values, and then translating these into indicators (in this case scores and ranks). The MCA particularly showed the benefits of using a settings-based approach. Even though this was a national-scale case study, the use of a number of archetypal sites (e.g. sea loch, estuary) and a primary orientation at the start of the workshop to associate real local sites with these hypothetical sites helped to anchor the discussions into a tangible context, while at the same time allowing for comparability in results between different locations. Because MCA design focuses on practical management options and is flexible in terms of what kind of criteria can be incorporated, the method is particularly useful for eliciting site-based contextual values and structuring discussion at the level of interaction with a particular setting. However, making unambiguous links between the contextual values elicited as part of the MCA structure and transcendental and societal values requires careful, integrative design of deliberative exercises and MCA. This again highlights the importance of including targeted interventions into deliberative valuation.

4.6.3 Mixed deliberative methods, learning and value formation

The elaborate mixed method design applied in Hastings went into more depth but with a smaller number of participants and on a smaller geographical scale than the MPAs and Forth studies. It

showed the potential of the combined use of different deliberative (e.g. in-depth discussion) and deliberative-analytic (e.g. participatory systems modelling) tools, to come to sophisticated consensus-based group values and securing shared learning between stakeholders, in terms of both the motivation for values attributed to the marine environment in Hastings and the democratic outcome value of the process of deliberation and dialogue.

The benefit of social learning from each other's views and knowledge to help inform contextual values and indicators was explicit in the discourse of group discussions and feedback comments. In general, societal/cultural and communal values were evident in the early group benefit ranking exercises with this set of values appearing close to the surface for the beneficiaries in their day-to-day stakeholder roles. Value to society and other-regarding were more forthcoming from the evaluation of visions and systems modelling that forced participants to discuss and consider the different scales/time periods of benefits and the variety of stakeholders affected. The storytelling exercise was effective in terms of both elicitation and characterisation of intangible cultural ES benefits such as place identity and transformative values, and elicitation of transcendental values. The non-traditional (and non-policy related) context of this exercise allowed participants the freedom to consider CES in a holistic way outside of the restrictions of a policy-related, economic, or other framework. Given the complexity, intangibility and interdependence of cultural ES benefits it was to be expected that discussions were highly mobile and would result in the emergence of a plurality of types of values, with participants discussing a mixture of transcendental or contextual value types at different scales with different intentions and with varying indicators of those values. The freedom of the deliberative process opened up the multi-dimensional nature of ecosystem values in a way that conventional individual monetary valuation processes are unable to do.

Overall, results show how the deliberative processes clearly made explicit existing communal values as well as constructed deliberated group values through a process of shared learning and in-depth discussion. In terms of the DVF model (Section 3.5), this initial small group deliberation session was essential in identifying shared views on how to measure worth, not just in monetary terms, but also in terms of ways policies might integrate to better reflect a combination of values attached to the marine environment, social priorities and communal transcendental values.

The iterative process was explicitly designed on the basis of the DVF model. As such, it started off with a consideration of individual and communal transcendental values in workshop 1. Here, deeper held emotional relationships with the marine environment were shared through storytelling and crystallised through a discussion of different non-monetary well-being benefits. In the second half of workshop 1 and in workshop 2, participants went through an intensive process of information sharing and making connections, first through the SWOT analysis, then through the systems modelling exercise. The discussion of visions connected transcendental and communal values an evaluation of contextual values. In the MCA, these different contextual values were weighed up against each other, and as such overall group priorities started to become increasingly crystallised. In the DMV, however, participants did not choose to pursue a single agenda. The in-depth discussions of policy measures and costing was framed by efforts to achieve a sense of balance and fairness for different beneficiaries and to bridge and reflect multiple transcendental values, from wealth to social justice to harmony with nature, without pushing one as a single dominant principle. This then strongly informed group WTP and the development of consensus around which policies to prioritise in the final negotiation session.

The mix of deliberative, deliberative-analytical and narrative methods was extremely productive in drawing out common values and shared learning. However, the emphasis of the values that emerged and how they translated into the results was clearly affected by the balance of participants, their expertise, their role in the community and the associated power and knowledge capital they

held in the group. This was also a particular consideration during the storytelling with the narrative created being shaped in part by participants' relative experience of storytelling in public. Some participants were clearly more comfortable and effusive than others when adopting the role of the 'narrator'. Storytelling is affected by the social context in which it is conveyed and by the interaction of the audience (Kendall & Kendall, 2012). The method is a social construct of its own and as such must be interpreted with its given context, including the impact of the group composition, workshop surroundings, geography of location and experience of previous workshop exercises. The complexity and sophistication of the method might benefit from a more detailed and extended analysis of the social representation of marine and coastal values than this rapid multi-method approach allowed or indeed intended (*cf*. Buijs *et al.* 2011).

The large number of exercises in a relatively short time also impacted on the more analytical tools used. The MCA component in particular was felt to be overly complex by some participants and required intensive facilitation. This shift from less to more directed facilitation then impacted upon the dynamics of the exercise. Challenges in relation to complexity were amplified by the timing available to cover the number of different exercises required. A less busy timetable would have allowed for confusion to be resolved at a more considered pace, but also for the linkage between the different methods to be made more explicit and so gain greater purpose for the participants.

4.6.4 Subjective well-being approaches

Another way in which the multidimensionality of ecosystem values was unveiled was through incorporation of subjective well-being indicators as a way to rank the cultural ES benefits of settings using a non-monetary metric (Kenter *et al*. 2013a). The well-being instrument used quantitatively and qualitatively in the MPAs case study and qualitatively in Hastings provided an effective way of uncovering the dimensions of well-being benefits experienced by recreational users of the marine environment. During workshop deliberations the well-being benefits, derived from a range of sources and refined through focus groups, provided an important link between the way that individuals value the CES benefits of the marine environment (e.g. place identity, spiritual values, social bonding) and the deeper held or transcendental values that underlie the well-being benefits they experience (e.g. self- or other-regarding, anthropocentric or biocentric). This provided a greater understanding of how people make choices about what sites they should visit or protect and how they should be managed.

To extend the use of this well-being instrument for the wider assessment of CES, further development is necessary. While the combined exploratory and confirmatory factor analyses suggest a degree of model robustness with regards to well-being dimensions, many of the well-being dimensions were associated with only a small number of indicator statements. For implementation purposes it was necessary to limit the number of statements in the online survey and post-workshop questionnaire so as to reduce participant burden or fatigue. However, some of the dimensions, e.g. spiritual value or transformative value, are particularly difficult to articulate and may be rarely explicitly expressed by many people. These are nonetheless important dimensions of well-being and in this study were only measured using single indicators. Additionally, some aspects of well-being were raised by participants that were not covered by the indicator statements, and for which we are unsure whether they fall within the six dimensions of well-being that we have identified or constitute one or more additional dimensions: the well-being received from showing and teaching others, acquiring skill, and overcoming challenges. Hence, further research is needed to develop an enlarged set of reliable and valid well-being indicators and test them with a wider range of user groups for a number of environmental settings. This would allow development of an instrument for wider use, to help ensure that the full range of experiential well-being benefits associated with ecosystems can be considered in environmental management and decision-making.

4.6.5 Deliberative value formation processes

In the different case studies, deliberative interventions were specifically designed to provide participants with opportunities to share information and learn from each other (participatory systems modelling, SWOT analysis), share experiences, perspectives and beliefs (storytelling) and moralise the discussion (via exercises designed to elicit and discuss transcendental values). Methods were used to assess changes before and after deliberation in both contextual values (via WTP in CEs and CV or priority rankings in MCA) and transcendental values (via VBN questionnaires).

The results showed that participants were less willing to pay for measures to protect or enhance the environment after they had engaged in deliberation that included the explicit discussion of transcendental values. However, within this overall decrease in WTP, there was a shift away from prioritising options that were more associated with self-regarding values (recreational benefits) towards prioritizing options that may be more associated with other-regarding values (conservation). Analysis of these deliberations showed that participants were both informed (e.g. about what benefits really meant, how long they might last, and who might benefit most) and moralised (e.g. balancing environmental versus socio-economic priorities, duties to other species and generations, or a collective sense of responsibility for the environment – a recognition that they should 'do their bit') through a combination of targeted interventions and group deliberation and negotiation.

In the MCA workshops, changes resulting from deliberation were less strong, but a significant decline in the rating and rank of 'protection of non-damaging recreational opportunities' goal suggested people were more focused on biospheric goals, which reflects an increase in biospheric transcendental values in psychometric results and the thread of group discussion, which tended to focus on the wider benefits of the protection of species and habitats. The Hastings study was less focused on comparing individual vs. group deliberated metrics, but the group deliberation discourse during and outcomes of the different exercises clearly demonstrated the emergence of different types of values and processes in the fashion outlined by the DVF.

Overall, the three workshop-based case studies support the DVF model, with the deliberative process informing and making evident the transformation from transcendental values (e.g. identified in storytelling and psychometric surveys) to contextual beliefs and values (e.g. identified in the evaluation of scenarios), to indicators (as MCA scores and WTP). The outcomes support the theoretical notion (Section 2.4.2.2) that the articulation of values at the communal and societal level was thus not just about the aggregation of individual values, but more about the bringing together, exchange and co-production of beliefs, perspectives, knowledge, transcendental values and norms, to ultimately construct a joint statement of what would be of most value to a community or society as a whole.

4.6.6 The potential of media analysis for assessing shared values

The final case study, on the coast and marine environment in the media, showed that content and discourse analysis of media publications is able to distinguish and characterise the plurality of cultural, societal and transcendental values and their interrelations, and can clearly picture the self- and other-regarding value-basis that underpins environmental issues. While influential in setting the agenda for public debate on environmental issues, news media also gives key insights into public responses to those issues (Boykoff & Mansfield, 2008; Boykoff, 2011; Jaspal *et al*. 2012). News media therefore functions as part of the on-going public deliberative process where reporting of issues such as erosion, pollution, and littering elicit the expression of values. This does not assume that

news media reporting is always scientifically accurate; indeed, previous studies have demonstrated that in relation to environmental issues media representations have been misleading (Boykoff, 2013). Nonetheless, mass media shape the public debate, amplify particular positions and while "*the media don't tell people what to think […] they tell them what to think about*" (Boykoff, 2009, p444). For this reason, media analysis can increase understanding of the changes in public values and give an accurate snapshot of the collective expression of values at any given time.

Media analysis is also able to recognise the different values associated with different interests and different sectors of society. The expression of transcendental values is entangled with the communication of material and symbolic risks in news coverage on environmental stories. In this way, environmental risks simultaneously convey a material risk to property, land, livelihood and so on, *and* a symbolic risk to collective national identity and security. Stories that communicate tensions between different stakeholders also reveal self- and other-regarding values, often setting them in opposition to one another. The assignment of self- and other-regarding values to stakeholders is linked to the reporting of expert claims. In reporting on conflicts over environmental issues, the alignment of self- and other-regarding values with particular stakeholders is normalised and reinforced in relation to who is quoted in the article, whose knowledge claims are given precedence and which authority is constructed by the newspaper as trustworthy (Boykoff, 2013). Thus, media analysis may help predict where conflict could occur as a result of a new policy and how potential tensions might be prevented or managed better by decision-makers.

As such, this approach is a promising avenue to characterise societal and cultural values at a large scale and consider changes in values over time, and also has potential to inform the framing of deliberative valuation and deliberative work with stakeholders. Social media can provide a further forum for understanding societal and communal values surrounding environmental issues.

5 Concluding discussion

In this report, we provided an overview of shared values in the literature and the relationship of shared values with spiritual and aesthetic values and social learning. We discussed the way in which conventional economic valuation considers shared and social values mainly as the sum of self-regarding, individual values, but this is critiqued because there is no single logically consistent way to aggregate individual values. The plural, multidimensional nature of value also poses the fundamental problem of incommensurability of values. This notion is present across much of the non-economic and ecological economics literature and is also emergent within other fields, such as valuation of health services. We developed a comprehensive theoretical framework that conceptualised shared values and related terms, the relation between shared and individual values, and deliberative processes that can be used to elicit these values. We provided two local and two national-scale case studies based on new research that used a wide variety of methods to elicit and reflect shared values and that empirically demonstrated differences between shared and individual values. In this final section, we reflect further on of the central issues covered by this report and suggest various areas of future research.

5.1 What are shared values?

Our literature review highlighted a lack of clarity of meaning, a fuzziness of concept and an inter-changeability in usage with regard to the terms shared, cultural, social and plural values. Within the literature, there was clearly a set of values considered core or fundamental, such as ethical or moral issues or key beliefs that are part of individual or community identity. The literature also highlighted that there are often strong contextual values related to specific places, objects or practices. Both of these types of values tended to be viewed as incommensurable and would give rise to protest if people were asked to monetise them, reduce them to a single metric or trade them off, as they might be considered special, sacred, protected or taboo. Plural values, while a term that is infrequently used explicitly in the broader base of literature assessed, was nonetheless implicitly present, reflecting the multidimensionality of values both within (e.g. citizen vs consumer values) and across value providers, and across different dimensions of value. As such, it constitutes a distinctly different category of term from shared, social and cultural values, one that highlights plurality rather than specific types of values. Incorporating this plurality is a critical dimension in both the research about values and the management of specific places.

Consequently, we have not provided a single definition of shared values, but have worked with seven distinct yet interrelated and non-mutually exclusive types of shared values: transcendental, cultural/societal, communal, group, deliberated and other-regarding values, and value to society (Section 3). In our theoretical framework, we conceived of the relationship between individual and shared values as a dynamic interplay, where values can be considered at multiple levels (individual, community and culture/society). While individuals represent and express their culture, many transcendental societal values are implicit and require group deliberation to be fully brought to light. Hence, assessment of shared values can give rise to a more comprehensive encompassment of value than individual valuation alone. Broadly, the elicitation of shared values of nature goes beyond the narrow elicitation of self-regarding economic preferences to incorporate common notions of social goods. Cultural significance can be reflected through deliberative processes that can incorporate a broad set of individual and shared meanings and concerns. We have considered values as three concepts: transcendental values (guiding principles and life goals), contextual values (notions of importance), and value indicators (monetary and non-monetary measures). We discussed some of the relationships between these different value-concepts and the role that deliberation can play in 'translating' transcendental to contextual values, such that the process of assigning value and expressing preferences better reflects underlying values, which are often held in common. This can

address some of the issues around eliciting and reflecting the plurality of values, as much of what is problematic about commensuration in monetary metrics is that respondents provide a wide range of different value types, concerns, attitudes etc. when asked about WTP. In our view, the poor record that conventional valuation methods have in terms of reflecting plural values is in part a result of not providing an adequate process for reflection on and moralisation of preferences.

5.2 Individual versus shared deliberated values

Of course, preference moralisation in itself is not something that only happens in groups. Individuals can also engage in deliberation in the sense of thinking and reflection. Asking people for altruistic, bequest, or existence values is, by definition, a moral question, which is unlikely to receive a response in terms of measures that reflects welfare alone, hence the debate about whether stated WTP is more of an indicator of attitudes than of welfare (Kahneman *et al.* 1999; Ryan & Spash, 2011; Spash *et al.* 2009). When confronted with such questions, people will almost certainly refer back to senses of duty or virtue and to narratives around things such as meaning and identity. This is likely to include taking other peoples' values and norms into account as well as their own. Our case studies show that moral concerns can be reflected more explicitly through group-based valuation approaches based on elicitation of a 'fair price'. The DMV approaches used in the case studies lead to inclusion of a moral dimension, particularly notions of fairness and responsibility. Nonetheless WTP did not become a symbolic or political gesture but instead became a more considered weighing of benefits.

Conventional monetary valuation methods that solely focus on establishing WTP do not encapsulate the full richness of value motivations that is provided by transcripts of group discussion. The survey-based methods typically used in valuation could be enhanced by including psychometrics, open-ended motivational questions, etc. or, on a smaller scale, by using individual interviews. In this way, and by including 'time to think' to allow for individual deliberation, it may be possible to measure higher quality contextual values that are a better reflection of underlying transcendental values, going beyond the 'whims' of poorly formed individual preferences.

Nonetheless, such an 'individual deliberation' approach to valuing nature misses out on one of the main advantages of group-based deliberative approaches: the opportunity for social learning. Deliberative learning processes, if well facilitated, allow for the exchange of information, considerations, perspectives, values, beliefs and norms, which provides an opportunity to collectively wrestle with difficult questions, particularly where there are risks, uncertainties, and winners and losers (de Vente *et al.* under review).

Learning also becomes particularly important when we consider that environmental goods themselves often have multiple value dimensions, with some components more subtle than others. Examples are the benefit of cultural identity formation and the way environmental settings and goods enable a particular livelihood and way of life, sense of place, aesthetics, and the social bonding that happens with the active or passive use of environmental settings. These values, which relate to practices, experiences, identity and capacities (see WP4), all tend to be tied to a place, which is often intimately connected with a sense of community around that place. Consequently, these place-bound values are likely to be strongly shared as communal values. Initially, when valuing particular environmental attributes, only their more obvious (e.g. provisioning) services and benefits might be valued and a social learning process may be required to bring out more subtle shared senses of values with stronger moral, emotional, social-cultural and identity components (Kenter *et al.* 2011). Our MPAs case study indeed confirmed that subjective well-being was better reflected in monetary values in group valuation than in individual valuation tasks. Additionally, the limited research available on the preferences of valuation participants themselves for individual or group-

based approaches seems to suggest that they feel their values are more considered, and can be better expressed, after group deliberation (Spash *et al*. 2009; Clark *et al*. 2000; Ryan & Spash, 2011), which is again supported by our case studies.

5.3 Deliberation and value formation

Deliberation (as defined in Section 2.4.3) can inform the formation and expression of values in two broad ways: (i) group deliberation may reduce the cognitive burden associated with expressing individual values; and (ii) deliberation may help shape and/or express transcendental values linked to non-economic considerations such as social norms, rights, and procedural fairness. These transcendental values may then subsequently shape contextual values that group participants express, for example for a particular landscape type or management option. This value formation process may be particularly important for the valuation of nature, as environmental values are often latent and frequently emerge only as a consequence of reflection during deliberation, or when they are perceived to be under threat.

The shaping of values through deliberation may be framed in several ways. It may be considered as simply 'informing' participants, so that they make more informed value judgments (although of course they may be misinformed), a process called 'economisation' by Lo and Spash (2012). Alternatively, deliberation may be framed as a way of 'moralising' participants so that their value judgments are informed by transcendental values. This includes a process of making explicit an individual's previously implicit, deeper-held values, so that these transcendental values are able to influence contextual values and the expression of value indicators (such as WTP). This moralisation process can also make explicit the societal or communal transcendental values shared by the members of a group. This could involve negative processes such as peer-pressure on individuals to adopt norms of the majority of the group and alter their contextual values accordingly (although we did not see evidence of this in our case studies). This may result in entrenchment of values and disengagement as much as it may result in value convergence. Similarly, deliberation can be used as a way of bringing in transcendental values from outside the group to 'politicise' subsequent value judgments. As such, deliberative processes must be carefully designed and managed to ensure that, instead, they 'democratise' values (Lo & Spash, 2012). This more democratic approach to valuation can be seen as one that enables group members to learn from and influence one another to reach more informed value positions, without allowing undue pressure or manipulation to contribute towards the formation of a 'dysfunctional consensus' (*cf*. Cooke & Kothari, 2001).

Resulting from these three processes (informing, moralising and democratising; see Lo & Spash, 2012), the DVF model proposed in Section 3.5 suggests that the consideration of others' values and needs can lead to a genuine increased sense of responsibility and concern for others compared to the pre-deliberated state, leading to increased realisation of other-regarding values. This may be paired with an increased sense of 'common cause' and development of a joint, mutual or reciprocal moral motivation, which can lead to increased willingness to sacrifice personal interests, what Sagoff (1998) would call a shift from 'consumer' to 'citizen' values. Importantly, our case study evidence showed that, in DMV, this shift does not necessarily lead to higher WTP for the environment, as participants carefully make deliberated decisions on trade-offs involving different dimensions of value and social as well as environmental concerns.

As is clear from the evidence presented in Section 4, deliberative valuation processes indeed shape and alter contextual values, preferences and WTP. This raises an interesting question: is it problematic that when values are changed or constructed through a social process, these values cease to represent those of whichever wider population is under consideration (e.g. the public, users, beneficiaries)?

From a neoclassical economic perspective, deliberative valuation can be considered positive if it meets two criteria: (i) if it helps participants better understand how they would be affected by whatever marginal change is being proposed; and (ii) if it can be assumed that the sample is representative of the population under investigation in terms of its response to deliberation. A range of potential types of changes in values, beliefs and preferences was outlined in Section 3.4.2. Certain types of changes, such as people changing their opinion as a result of peer pressure or power dynamics, obviously do not meet these criteria and would need to be (and often can be) avoided through careful process design and facilitation. Conversely, changing one's preferences as a result of being better informed would fit both criteria: a reasonable assumption can be made that, if the sample is sufficiently representative in terms of sex, age, education, income, geography, etc. the broader population would form or change their values in the same way. Other processes include the emergence of transcendental values that were previously implicit and moralisation of preferences through debate. These processes would pass the test if first, these values would be expected to arise if the hypothetical marginal change under consideration would be actualised and second, it could be assumed that the population has similar implicit values.

In all of this, if statistical representativeness is sought, a significant disadvantage of group-based deliberative work compared to online and postal surveys is that these group approaches require more resources to mobilise an adequate sample size. Nonetheless, large scale and relatively rapid assessments using deliberative methods are feasible, as demonstrated by the MPAs case study discussed in Section 4 and previous work by Christie *et al*. (2010). Also, valuation of complex goods such as biodiversity and ES using online or postal surveys can be challenging for participants (Christie *et al*. 2006, 2010, 2012). To address this conventionally, surveys would be administered using individual interviews. Here, deliberative group-based approaches can actually increase data gathering efficiency, as the values of 10-20 people can be elicited in a single 2-3 hour group session (also see **Table 18** in Section 3.4). Of course, deliberative processes in many cases aim to be politically rather than statistically representative by including as many as possible relevant interests through rigorous stakeholder analysis (*cf*. Varvasovszky & Brugha, 2000). Alternatively, large-scale non-monetary valuation alternatives exist, such as deliberative opinion polls (Section 3.4).

Regardless of what kind of representativeness is sought, the design of deliberative interventions must be built on a rigorous theoretical understanding of the relationship between deliberation and the formation and expression of values. In our case studies, the DVF model proved to be a useful conceptualisation both for elucidating and designing deliberative valuation processes. It provides a promising theoretical grounding for the increasing interest in deliberative valuation in the environmental field but also in other areas of policy where the public good or social priorities need to be debated and negotiated.

The DVF model attempts to describe the process through which deliberation does this, by showing how contextual values and indicators of value (such as WTP) are influenced by an individual's norms, which in turn are influenced by their contextual beliefs and worldviews and their individual transcendental values. These individual transcendental values in turn are shaped by the transcendental values of the culture and communities of practice to which an individual belongs. This is not just an unconscious process of social norms being adopted by groups. The social psychology literature shows how the translation of norms into contextual values (or preferences) and hence behaviours, is mediated by knowledge-based beliefs. For example, a strong transcendental belief in the intrinsic value of nature might not translate into contextual values or indicators of value that prioritise the cessation of a damaging activity, if the person does not believe that the activity is damaging. Case study evidence particularly highlighted the importance of moral debate around notions of who should take responsibility and to what degree.

As knowledge is acquired through learning, the shaping of contextual values and indicators of value can thus be viewed as a social learning process. Partly, this is a long-term process of socially mediated value formation where changes take place in transcendental values at a societal or communal scale (e.g. the expanding 'ethical envelope' as described in **Box 5**, Section 2.4.3). As such, the vertical arrows in **Figure 10** (Section 3.5) represent social learning of the type described by Bandura (1977), where all learning takes place in a specific social context and is influenced by that context. Partly, this is a short-term process of social learning within groups that deliberate together (indicated by the horizontal arrows in **Figure 10**). This represents a different school of thought to the literature that considers social learning to be learning that occurs through social interaction and/or deliberation between groups of individuals, at the scale of social units of communities of practice (Reed *et al*. 2010). The former may take place over much shorter time-scales than the latter and may be used to elicit values from groups via deliberative or analytical-deliberative techniques. Learning can take place at a number of levels and may shape an individual's transcendental values, and while our case studies show that this can happen over the course of a single workshop or short-term series of group events, it is likely that prolonged interactions are necessary for this to have a lasting effect. In the learning literature, processes that lead to changes in transcendental values are sometimes referred to as 'triple-loop learning' (Rushmer *et al*. 2004).

Although a considerable literature exists on social and deliberative learning processes, apart from the evidence presented in this report, there is little research on whether and how group-based deliberative methods are able to elicit 'better' values beyond what may be gained from an improved conventional survey approach to valuation. The DVF model provides a theoretical backbone to describe and interpret the overall deliberative process, but further effort needs to be made to more clearly understand sub-processes within it. Further research is also needed to consider what might be the most appropriate protocols and techniques for legitimate deliberation, in order to assess the extent of problematic processes such as social-desirability bias and how this can be mitigated and to know more about the impact of different ways of framing and different approaches to instigate learning. If group learning strongly influences values, the interpretation of results needs to critically consider to what degree this learning is endogenous to participants, and to what degree it is instigated by those that develop, frame and facilitate the process.

Finally, one may note that the case studies in this report were all relatively benign. For example, there is often substantial conflict between different interests (e.g. conservation, recreation, fisheries and developers), which may each have significantly different sets of communal values, frames, beliefs and narratives. However, our MPAs study only investigated the values of two stakeholder groups, where both transcendental and contextual values in relation to the sea were remarkably similar. In the Hastings context, a wide range of stakeholders was brought together. Multiple, potentially conflicting dimensions of value related to harmony with nature, social justice and equity, and cultural identity were debated. But instead of getting caught up in value conflicts, participants, supported by the carefully designed process, focused on finding synergies. This was enabled by two things in particular. The first is the design of the process, which carefully allowed participants to express and consider each other's personal values, consider different angles, analyse together, and to form shared values as a group. The second was the existing social and cultural capital of the local community: early on in the process, participants noted how the shared identity of Hastings – what Cantrill & Senecah (2001) might have described as shared sense of selves in place – was linked to a set of communal values that thereafter gave a sense of shared purpose, helping to orientate further discussions. Further research is needed to evaluate the efficacy of the various valuation processes used in situations where shared values are less strong from the outset and where there might be more antagonism, such as in the examples of the siting of renewables and forest privatisation

provided in the literature review (Section 2.3) and as highlighted by the case study on the coast in the media (Section 4.5).

5.4 Shared values and cost-benefit analysis

Ultimately, a key question in terms of assessment of shared values is the purpose of the valuation exercise. CBA, although widely criticised, is one of the most widely used tools to rank policy alternatives (Hanley, 2001). A pragmatic approach to DMV can seek to incorporate deliberation on information sharing and/or transcendental and societal values into CV and allied methods to 'improve' the elicitation process (Alvarez Farizo & Hanley, 2006; Alvarez Farizo *et al.* 2007; Macmillan *et al.* 2002), but still with the assumption that such values could feed into CBA. However, can it be theoretically justified to include shared values, which may be the result of discussing and trading-off self- and other-regarding values, in CBA using a conventional utilitarian social welfare function that assumes maximisation of individual, self-regarding utility?

This relates to a complex philosophical issue. Conventionally, CBA is about aggregating individual, self-regarding preferences and this aggregate is then seen as a measure of social welfare (as discussed in more detail in Section 2.4.2). If other-regarding values were included, this could lead to double counting. Thus, estimates of WTP, even where they include non-use components of total economic value (altruistic, bequest, existence value), need to be assumed to be completely selfish (Section 3.3). Thus any kind of moralisation of preferences in the sense that people start to express any kind of altruism would pose a problem. Yet, even without deliberation, it is known that WTP in CV includes many kinds of sentiments (see Section 2.4.2). This poses an ethical problem. The ultimate aim of CBA is to consider options by evaluating their welfare measures. Welfare is considered as aggregate utility. If CBA is about estimating aggregate utility, then any kind of WTP that is not a measure of utility should be excluded, otherwise something other than welfare estimates is produced. For example, if someone states a high WTP for a particular option because they feel it is the most 'just' choice, it can be argued that that 'moralised' preference cannot be considered a welfare measure, because it represents an ethical belief rather than a measure of benefit, and is thus incommensurable with utilitarian costs and benefits (Keat, 1997).

However, it may be noted that revealed preferences of actual market transactions are only *assumed* to be self-regarding. In reality, behaviour in markets goes beyond selfish utility maximisation, and is obviously influenced by moral norms[24]. The market does not ask why people are WTP for goods and services, it is 'blind to reason'. From this perspective, including deliberated WTP estimates is not conceptually more problematic than incorporating market prices into CBA.

A novel way to incorporate 'moralised' preferences into CBA that sidesteps this discussion is to elicit a 'fair price' instead of conventional individual WTP. Examples of this were seen in the Inner Forth and MPAs case studies. A 'fair price' is elicited at the individual level, and in contrast to asking for individual WTP, it asks the respondents to consider what they believe is the value to whoever they are representing as a whole (e.g. the public, a beneficiary group). As such, it encapsulates self-regarding and other-regarding values, and in a sense value to society or some other social unit, but at the individual scale. It removes the risk of double counting that occurs when we assumedly ask individuals for their self-regarding WTP but in reality receive a mix of self and other-regarding values, and it may be an effective way to help translate transcendental values such as justice into contextual values and a monetary indicator. As discussed in Section 4, case study evidence showed that

[24] Subjectivists might theorise that moral norms could have arisen through voluntary contract, though this is not of relevance to our discussion here. For a critical discussion of whether moral norms could have spontaneously arisen from voluntary contracts and consequences for CBA see Peacock (1997).

deliberated 'fair price' measures better-reflected subjective well-being, as elicited through non-monetary indicators. Arguably, aggregating fair prices for non-marketed ES allows for inclusion of other-regarding values and transcendental values into a social-scale welfare measure that could be compared to market-derived measures.

5.5 Comparing methods for assessing shared values

While it may thus be possible include shared values in CBA in various ways, a number of fundamental critiques around aggregation and commensurability have been raised (Section 2.4.2). These suggest that, while CBA can rank options in terms of a particular type of economic efficiency, it is fundamentally incapable of generating a ranking of options in terms of their value to society. Notably, these key issues around commensurability and aggregation (Section 2.4.2) have a bearing upon all mainstream economic methods of social valuation, regardless of whether they are based on market cost, stated or revealed preferences.

Non-econometric DMV provides one alternative to establish the social value of various policy options directly, without the need for aggregating individual values. This option has so far remained unexplored in practice, as far as we are aware, and our case study in Hastings (Section 4.3) has been a first attempt. In the Hastings study, a group of stakeholders valued different local policy options by indicating how much public money they thought should be spent on them, after an extensive deliberation process over the course of three afternoons. Thus, policy options were valued directly, rather than through aggregating and trying to put a money/utility value on things that may not be seen as amenable to this. Participants could negotiate to come to a balance between ethical and pragmatic concerns, between the well-being of present and future generations and between different benefits, costs, and interests. Such a process, if well designed, emphasises the plural nature of value and that there is no single correct way to trade-off different dimensions of value or aggregate across individuals, as was argued in Section 2.4.2. DMV based on CV or CEs is mostly about improving these stated preference techniques, but here DMV provides an alternative to CBA in general.

A further alternative to CBA is using MCA to rank different policy options. MCA, also called multi-criteria evaluation or multi-criteria decision analysis, is a non-monetary appraisal tool that is particularly suited to evaluate stakeholder perspectives on trade-offs between different domains of value in relation to practical scenarios. The Hastings and MPAs case study provided two different examples of how MCA can be implemented and UK NEAFO WP 3b, WP 7 and the WP9 NEAT Tree toolkit also discuss MCA in some detail. While MCA comes in many shapes and forms, frequently utilitarian assumptions are made to bring together different dimensions of value into a single arithmetic. Thus, MCA as it is most commonly used shares some features with CBA, which may be seen as either an advantage or disadvantage. Like CBA and monetary valuation, arithmetic-based implementations of MCA assume that different dimensions of value are fundamentally commensurable. While any kind of criteria can be incorporated, including apparently non-utilitarian considerations such as the rights of future generations or other species, these are still given a score, rather than acting as a categorical constraint.

For example, imagine a very simple MCA with only two policy options, A and B, and two criteria: 'preventing species extinctions' and 'economic benefits'. The latter might consist of some evidence from an economic valuation or CBA analysis. Imagine participants had strong moral norms in favour of other species and the first was scored at 100 on a 0-100 scale, while economic benefits were given a score of 60. If policy option A received a score of 40 in terms of it's likely capability for preventing extinctions and 25 for economic benefits, whereas option B was given 0 for preventing extinctions and 100 for economic benefits, using a simple but common weighting matrix, A would be

rated at ((40x100)+(25x60))/100 = 55. B would be rated at ((0x100)+(60x 100))/100 = 60. Thus, according to the MCA, B would be the preferred option, regardless of the strong moral values of the group. Fundamentally, the problem is that many participants may allocate a high score to a criterion as an expression of rights, duties and virtues, but these expressions are not taken into account as such by a utilitarian algorithmic approach. An MCA exercise could of course first establish ethical constraints on which options should be assessed and which should be excluded – e.g. those that would lead to extinctions. However, this is equally possible using DMV or indeed conventional monetary valuation and CBA (as is illustrated by UK NEAFO WP3b, which undertook a spatial analysis of ES trade-offs with either no species extinctions or no net loss of biodiversity constraints).

Nonetheless, while MCA thus shares some issues with monetary valuation and CBA, when implemented in a deliberative format MCA outcomes can be better (in)formed, moralised and seen as more democratic, as discussed in Section 3.4. Also, it is possible to apply MCA in one of the less common formats that do not force commensurability. For example, options could be compared pairwise on the basis of sets of criteria and then debated, with a deliberated group verdict on which option is preferred rather than an algorithmic verdict (Mendoza & Martins, 2006).

Thus, DMV and MCA, as 'hybrid' methods, can be used as analytical policy or project appraisal tools in parallel to or as an alternative to conventional monetary valuation and CBA (also see discussion of the 'balance sheets approach' by UK NEAFO WP3b, which suggests to assess shared values in parallel with economic costs/benefits and local social impacts, generating three distinct balance sheets that could then be evaluated by decisision-makers). However, for evaluation of shared values in the sense of the deeper held values of communities, non-analytic, qualitative and interpretive approaches such as the storytelling exercises used in some of our case studies provide a rich description of value. The UK NEA (Fish *et al*. 2011b) discussed that shared values are intimately connected to shared senses of meaning and significance. Qualitative approaches can bring out the meaning of values, whereas analytical quantitative approaches on their own only provide an indication of trade-offs. Quantitative approaches are often founded on a positivist epistemology, where value is conceived as something discrete and objectively measureable, and hence by their nature tend more towards commodification.

It is important to recognise that valuation and appraisal methods are value-articulating institutions. In other words, their epistemology, the way in which they talk about and conceive of values (e.g. preferences, WTP, experiences, rights, etc.) as well as their normative assumptions shape and determine value-outcomes (Vatn, 2009). The importance of non-monetary qualitative evidence lies not just in providing an alternative to monetary valuation, but also in its potential to reflect value that is relational, experiential, and relates to what we called 'enchantment' in our discussion of spiritual and aesthetic values of nature (Section 2.4.1). In relation to CES, it is particularly important to realise that, while they obviously provide benefits, their value cannot be reduced to that category and they also need to be included in decision-making through revealing their (often shared) meanings. However, it is clear that provisioning and regulating services also have cultural attributes that can be lost if there is solely a focus on quantifying instrumental value (Kenter *et al*. 2011; and see UK NEAFO WP4 and the UK NEAFO *Arts and Humanities Perspectives on Cultural Ecosystem Services* report).

Thus, to formulate policies that holistically reflect the value of ES, we need to understand not just their relative economic value, but also how they shape our well-being and our identity at the communal and societal level. While the broad range of tools discussed in this report perform different functions and are more or less suited to assessing different types of shared values - **Table 18** in Section 3.4 provides an overview of methods in relation to different types of shared values -

quantitative and qualitative methods can be used in tandem to comprehensively understand not just how ES affects human well-being, but also what nature means to us.

In addition, as the Hastings case study shows in particular, a mixed method approach with analytical, deliberative and narrative based components can put ES in a broader societal perspective, and consider values across ecological, social and economic domains. Such an approach is particularly useful for operationalising the Ecosystems Approach, where ES are seen as part of a dynamic and complex social-ecological system. Here, environmental management is seen as a matter of on-going adaptation to a changing environment. Management is decentralised with a high level of local stakeholder participation and societal deliberation. Decision-making is seen as a matter of balancing economic benefits and costs with cultural and communal values, and of considering both expert and local knowledge, with a strong sustainability perspective (CBD 2000, 2004).

5.6 Shared values, legitimacy and decision-making

An interesting avenue of research in relation to shared values and deliberative methods is to consider when and where decision-makers see shared value evidence as having more or less legitimacy than evidence based on the values of individuals. While there has now been decades' worth of valuation evidence produced with the explicit aim of policy-makers taking better account of environmental benefits and costs, this has still not translated into tangible improvements in terms of environmental outcomes, as discussed in detail by UK NEAFO WP8[25]).

Certainly, the belief that, if we can only produce better and more convincing value evidence, this might change, is somewhat naïve (Jordan & Russel, in press; Nutley *et al*. 2007). Additionally, there is a widely divergent view as to what 'better' values and valuation might be, ranging from technical improvements and eliminating biases, making values spatially explicit, better informed, more considered or 'deeper'. What is certainly clear is that decision-makers require evidence to be contextualised as well as being of high quality (Church & Ravenscroft, 2011). This suggests that, in addition to the quality of evidence, decision-makers' ideas of 'better' are aligned to different perspectives of legitimacy, concerns about what evidence is defensible, and the usability of the evidence.

These concerns and conceptualisations will also vary across different decision-making venues and scales. For example, whereas national or transnational institutions that monitor ES may be interested in aggregate biophysical data, quantitative indicators of well-being and monetary data, decision-makers in a local policy consultation may be more interested in value outcomes of a carefully designed process involving all relevant stakeholders. This is not to say that national-scale indicators cannot be delivered through group-based valuation processes. For example, large-scale deliberative polls or citizens' juries might be very successful forms of evidence, although there have been few examples of this in practice.

In conclusion, while both the theoretical and empirical components of this study highlight that there are important differences between individual and shared values, considerable further research is necessary in terms of developing methods for assessing the wide range of shared values of nature. Such evidence-generation should strongly involve decision-makers to assure that approaches, methods, and results are considered legitimate, relevant and useable. This way, a more

[25] Notably, WP8 found that cultural services received less attention than other types of ecosystem service across most of the types of policy appraisal that were considered in their content analysis. Cultural services were most likely to be considered in Environmental Impact Assessments.

comprehensive, democratic and social valuation of policy alternatives can be achieved and the considerable collective meanings, significance and value of nature recognised and safeguarded.

6 References

Abelson, J., Forest, P., Eyles, J., Smith, P., Martin, E. & Gauvin, F.P. (2003). Deliberations about deliberative methods: issues in the design and evaluation of public participation processes. *Social Science & Medicine*, **57**, 239-251.

Ackoff, R.L. (1977). Optimization + objectivity = optout. *European Journal of Operational Research,* **1**, 1–7.

Adamowicz, W., Beckley, T., Hatton Macdonald, D., Just, L., Luckert, M., Murray, E. & Phillips, W. (1998). In search of forest resource values of indigenous peoples: are nonmarket valuation techniques applicable? *Society and Natural Resources: An International Journal,* **11,** 51-66.

Ajzen, I. (1985) From intentions to actions: A theory of planned behavior. *Action Control. Springer Series in Social Psychology,* **1985**, 11-39.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, **50**, 179–211.

Ajzen, I. & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior.* Eaglewood Cliffs, NJ, Prentice-Hall.

Aldred, J. (1994). Existence value, welfare and altruism. *Environmental Values*, **3**, 381–402.

Alvarez Farizo, B. & Hanley, N. (2006). Improving the process of valuing non-market benefits: combining citizens' juries with choice modelling. *Land Economics,* **82**, 465.

Alvarez Farizo, B., Hanley, N., Barberán, R. & Lázaro, A. (2007). Choice modeling at the market stall: Individual versus collective interest in environmental valuation. *Ecological Economics*, **60**, 743–751.

Anderson, T. (2013). *The Life of David Lack: Father of Evolutionary Ecology.* New York, Oxford University Press.

Ansary, H. (2007). 'Burying the dead': making Muslim space in Britain. *Historical Research*, **80,** 545-566.

Anthony, A., Atwood, J., August, P. Byron, C., Cobb, S., Foster, C. Fry, C. Gold, A. Hagos, K., Heffner, L., Kellogg, D.Q., Lellis-Dibble, K., Opaluch, J.J., Oviatt, C., Pfeiffer-Herbert, A., Rohr, N., Smith, L., Smythe, T., Swift, J. & Vinhateiro, N. (2009). Coastal lagoons and climate change: ecological and social ramifications in U.S. Atlantic and Gulf Coast ecosystems. *Ecology and Society,* **14** [online]/

Appleton, J. (1975). *The Experience of Landscape*. London, Wiley.

Arlinghaus, R. (2006). Overcoming human obstacles to conservation of recreational fishery resources, with emphasis on central Europe. *Environmental Conservation,* **33**, 46-59.

Arnoldi, J. (2009) *Risk.* London, Polity.

Arnsperger, C. & Varoufakis, Y. (2006). What is neoclassical economics? *Post-Autistic Economics Review*, **38** [online].

Arrow, K. (1950). A difficulty in the concept of social welfare. *Journal of Political Economy*, **58**, 328–346.

Arrow, K., Solow, R., Portney, P., Leamer, E., Radner, R. & Schuman, H. (1993). Report of the NOAA Panel on Contingent Valuation. *Federal Register,* **58**, 4602–4614.

Ashley, P. (2012). Confirming the spiritual value of wilderness. *International Journal of Wilderness,* **18**, 4-8.

Bachika, R. & Schulz, M.S. (2011). Values and culture in the social shaping of the future. *Current Sociology,* **59**, 107–118.

Bakir, V. (2006). Policy Agenda Setting and Risk Communication: Greenpeace, Shell and Issues of Trust. *The Harvard International Journal of Press & Politics* **11**, 67-88.

Balmford, A., Rodrigues, A.S.L., Walpole, M., ten Brink, P., Kettunen, M., Braat, L. & de Groot, R. (2008). *The Economics of Biodiversity and Ecosystems: Scoping the Science.* European Commission (contract: ENV/070307/2007/486089/ETU/B2). Cambridge.

Bandura, A. (1969). Social learning of moral judgments. *Journal of Personality and Social Psychology,* **11**, 275-279.

Bandura, A. (1977). *Social Learning Theory*. Englewood Cliffs, NJ, Prentice Hall.

Barbanente, A. & Khakee, A. (2003). Influencing ideas and inspirations, scenarios, as an instrument in evaluation. *Foresight*, **5**, 3-15.

Barbercheck, M., Kiernan, N.E., Hulting, A.G., Duiker, S., Hyde, J., Karsten, H. & Sanchez, E. (2011). Meeting the 'multi-' requirements in organic agriculture research: successes, challenges and recommendations for multifunctional, multidisciplinary, participatory rojects. *Renewable Agriculture and Food Systems,* **27**, 93-106.

Bardi, A. & Goodwin, R. (2011). The dual route to value change: Individual processes and cultural moderators. *Journal of Cross-Cultural Psychology* **42**, 271–287

Barnes, B. (1988) *The Nature of Power*. Cambridge, Polity Press.

Baveye, P., Baveye, J. & Gowdy, J. (in press). Monetary valuation of ecosystem services: it matters to get the timeline right. *Ecological Economics*.

Beall, A. & Zeoli, L. (2008). Participatory modeling of endangered wildlife systems: Simulating the sage-grouse and land use in Central Washington. *Ecological Economics*, **68**, 24–33.

Bearden, W.O., Money, R.B., Nevins, J.L. (2006). Multidimensional versus unidimensional measures in assessing national culture values: The Hofstede VSM 94 example. *Journal of Business Research,* **59**, 195-203.

Beaumont, N., Townsend, M., Mangi, S. & Austen, M.C. (2008). Marine biodiversity - an economic valuation. Defra, London.

Bebbington, J., Brown, J. & Frame, B. (2007). Accounting technologies and sustainability assessment models. *Ecological Economics,* **61**, 224–236.

Beck, U. (2004). *Risk Society: Towards a New Modernity*. London, Sage.

Beckerman, W. & Pasek, J. (1997). Plural values and environmental valuation. *Environmental Values*, **6**, 65–86.

BEN (2013) Black Environment Network [online] http://www.ben-network.org.uk/about_ben/strategy.asp [Accessed 15/09/2013]

Bengston, D. (1993). Changing forest values and ecosystem management. *Society and Natural Resources*, **7**, 515-533.

Berrens, R., Jenkins-Smith, H., Bohara, A. & Silva, C. (2002). Further investigation of voluntary contribution contingent valuation: fair share, time of contribution, and respondent uncertainty. *Journal of Environmental Economics and Management* **44**, 144–168.

Bessette, J.M. (2001) Deliberation: Political Aspects. *International Encyclopedia of the Social & Behavioral Sciences,* 3377–3380.

Biénabe, E. & Hearne, R.R. (2006). Public preferences for biodiversity conservation and scenic beauty within a framework of environmental services payments. *Forest Policy and Economics*, **9**, 335–348.

Birol, E., Koundouri, P. & Kountouris, Y. (2008). Integrating wetland management into sustainable water resources allocation: The case of Akrotiri wetland in Cyprus. *Journal of Environmental Planning and Management*, **51**, 37–53.

Bizikova, L., Dickinson, T. & Pintér, L. (2009). Participatory scenario development for climate change adaptation. *Participatory Learning and Action*, **60**, 167–172.

Blackmore, E. & Holmes, T. (eds.), (2013). *Common Cause for Nature: Values and Frames in Conservation.* Public Interest Research Centre, Machynlleth.

Bloomfield, D., Collins, K., Fry, C., Munton, R., (1998). Deliberative and inclusionary processes: Their contributions to environmental governance. *1st ESRC 'DIPs in environmental decision-making' seminar,* 17th December 1998*.*

Bobinac, A., Exel, N.J.A., Rutten, F. & Brouwer, W. (2012). Inquiry into the relationship between equity weights and the value of the QALY. *Value in Health*. **15,** 1119-1126.

Bohman, J. F. (1996). *Public deliberation: Pluralism, complexity, and democracy*. Cambridge MA, MIT Press.

Bourdieu, P., (1972). Outline of a theory of practice. Cambridge University Press, Cambridge.

Bowden-Pickstock, S. (2009). *Quiet Gardens: The Roots of Faith?* Continuum International Publishing Group Ltd.

Boykoff, M. (2009). "We speak for the trees": Media reporting on the environment. *Annual Review of Environment and Resources*, **34**, 431-458.

Boykoff, M. (2011). *Who speaks for climate? Making sense of media reporting on climate change*. Cambridge, England, Cambridge University Press.

Boykoff, M. (2013) Public enemy No.1? Understanding media representations of outlier views on climate change. *American Behavioural Scientist*, **57**, 796-817.

Boykoff, M. & Boykoff, J. M. (2007). Climate change and journalistic norms: A case-study of US mass-media coverage. *Geoforum,* **38**, 1190-1204.

Boykoff, M. & Mansfield, M. (2008) "Ye Olde Hot Aire": reporting on human contributions to climate change in the UK tabloid press. *Environmental Research Letters*, **3**, 1-8.

Bradley, I. (1999). *Celtic Christianity: Making myths and chasing dreams.* Edinburgh University Press.

Brady, E. (2003). *Aesthetics of the Natural Environment*. Edinburgh, Edinburgh University Press.

Brazier, J., Ratcliffe, J., Salomon, J.A., Tsuchija, A. (2007). Measuring and valuing health for economic evaluation. Oxford, Oxford University Press.

Brody, G.H. (1978). A social learning explanation of moral development. *Contemporary Educational Psychology,* **3**, 20-26.

Brooke, J.H. (1991) *Science and Religion; some historical perspectives.* Cambridge, Cambridge University Press.

Brouwer, R., Powe, N., Turner, R.K., Bateman, I.J. & Langford, I.H. (1999). Public attitudes to contingent valuation and public consultation. *Environmental Values,* **8**, 325–347.

Brouwer, W., Exel, J., Baker, R. & Donaldson, C. (2008). The new myth: the social value of the QALY. *PharmacoEconomics*, **26**, 1-4.

Brown, D. (2004). *God and the enchantment of place; reclaiming human experience.* Oxford, Oxford University Press.

Brown, G. (2004). Mapping spatial attributes in survey research for natural resource management: methods and applications. *Society and Natural Resources,* **18,** 1–23

Brown, G. (2013). The relationship between social values for ecosystem services and global land cover: An empirical analysis. *Ecosystem Services*, **5**, 58-68.

Brown, A. (2012) *National Angling Survey 2012*. [online]. Available from: Substance. http://www.substance.coop/node/656 [accessed 01-05-2013]

Brown Gaddis, E.J., Vladich, H. & Voinov, A. (2007). Participatory modeling and the dilemma of diffuse nitrogen management in a residential watershed. *Environmental Modelling & Software*, **22**, 619–629.

Brown, M. (2010). *Tensions in Christian Ethics.* London, SPCK Publishing.

Brummel, R.F., Nelson, K.C., Souter, S.G., Jakes, P.J. & Williams, D.R. (2010) Social learning in a policy-mandated collaboration: communitywildfire protection planning in the eastern United States. *Journal of Environmental Planning and Management*, **53**, 681-699.

Bryan, B.A., Raymond, C., Crossman, N.D. & King, D. (2010a). Comparing spatially explicit ecological and social values for natural areas to identify effective conservation strategies. *Conservation Biology*, **25**, 172–181.

Bryan, B.A., Raymond, C.M., Crossman N.D., & Macdonald, D.H. (2010b). Targeting the management of ecosystem services based on social values: Where, what, and how? *Landscape and Urban Planning,* **97,** 111–122.

Bryman, A. (2001). Social Research Methods. Oxford, Oxford University Press.

Buijs, A.E., Arts, B.J.M., Elands, B.H.M. & Lengkeek, J. (2011). Beyond environmental frames: the social representation and cultural resonance of nature in conflicts over a Dutch woodland. *Geoforum,* **42**, 329-341.

Bull, R., Petts, J. & Evans, J. (2008). Social learning from public engagement: dreaming the impossible? *Journal of Environmental Planning and Management*, **51**, 701-716.

Burson, A., Crocker, J. & Mischkowski, D. (2012). Two types of value-affirmation: Implications for self-control following social exclusion. *Social Psychological and Personality Science,* **3**, 510-516.

Bush, G., Hanley, N., Moro, M. & Rondeau, D. (2013). Measuring the local opportunity costs of conservation: A provision point mechanism for eliciting willingness-to-accept for conservation. *Land Economics*, **89**, 490-513.

Byrne, B. (2010). *Structural Equation Modelling with AMOS.* New York/London, Routledge.

Calhoun, C.J. (1992). *Habermas and the Public Sphere*. Ann Arbour MA, The MIT Press.

Cameron, T.A. & Huppert, D.D. (1989). OLS versus ML estimation of non-market resource values with payment card interval data. *Journal of Environmental Economics and Management,* **17**, 230–246.

Campaign for National Parks (2013) Mosaic [online]. Available from: http://www.cnp.org.uk/mosaic [accessed 15 September 2013]

Cantrill, J.G. & Senecah, S.L. (2001). Using the 'sense of self-in-place' construct in the context of environmental policy-making and landscape planning. *Environmental Science and Policy,* **4,** 185-203.

Carlson, A. (2000). *Aesthetics and the Environment: The Appreciation of Nature, Art, and Architecture*. New York, Routledge.

Carlson, A. (2009). *Nature and Landscape: An Introduction to Environmental Aesthetics.* Columbia University Press, New York, NY.

Carroll, N. (1993). On being moved by Nature: between religion and natural history. In I. Gaskell and S. Kemal (eds). *Landscape, Natural Beauty and the Arts,* Cambridge, Cambridge University Press.

Carter, C., O'Brien, L. & Morris, J. (2011). *Enabling positive change: evaluation of the Neroche Landscape Partnership Scheme*. [online] Report to the Forestry Commission. http://www.forestry.gov.uk/fr/INFD-8H8DFS

Carvalho, A. & Burgess, J. (2005). Cultural Circuits of Climate Change in U.K. Broadsheet Newspapers, 1985-2003. *Risk Analysis* **25**, 1457-1469.

CBD, (2000). Decisions of the Fifth Conference of the Parties to the Convention on Biological Diversity. Secretariat of the Convention on Biological Diversity, Montreal.

CBD, (2004). The Ecosystem Approach, CBD Guidelines. Secretariat of the Convention on Biological Diversity, Montreal.

CEFAS, (2013). *Sea Angling 2012* (in prep.)

Chambers, R. (1997) *Who's reality counts? Putting the first last*. London, Intermediate Technology Publications.

(2002). *Participatory Workshops*. London, Earthscan**Champ, P.A.**, Flores, N.E., Brown, T.C. & Chivers, J. (2002). Contingent valuation and incentives. *Land Economics*, **78**, 591–604.

Chan, K.M.A., Satterfield, T. & Goldstein, J. (2012). Rethinking ecosystem services to better address and navigate cultural values. *Ecological Economis*, **74**, 8–18.

Chiesura, A. & de Groot, R. (2003). "Critical Natural Capital: A Socio-Cultural Perspective." *Ecological Economics* 44(2-3).

Christie, M., Hanley, N., Warren, J., Murphy, K., Wright, R. & Hyde, T (2006). Valuing the diversity of biodiversity. *Ecological Economics*, **58**, 304–317.

Christie, M., Hyde, T., Cooper, R., Fazey, I., Dennis, P., Warren, J., Colombo, S. & Hanley, N. (2010). Economic Valuation of the Benefits of Ecosystem Services delivered by the UK Biodiversity Action Plan: Final report. London, Defra.

Christie, M., Fazey, I., Cooper, R., Hyde, T. & Kenter, J.O. (2012). An evaluation of monetary and non-monetary techniques for assessing the importance of biodiversity and ecosystem services to people in countries with developing economies. *Ecological Economics*, **83**, 69–80.

Church Commissioners for England, (2013a) Webpage on their rural assets [online]. Available from: http://www.churchofengland.org/about-us/structure/churchcommissioners/assets/property-investments/rural.aspx [accessed 15 September 2013]

Church Commissioners for England, (2013b) Fracking clarification [online]. Available from: http://www.churchofengland.org/about-us/structure/churchcommissioners/mineral-registration-programme/fracking-clarification.aspx [accessed 15 September 2013]

Church, A. & Ravenscroft, N. (2011). Politics, research and the natural environment: the lifeworlds of water-based sport and recreation in Wales. *Leisure Studies,* **30**, 387-405.

Church, A., Burgess, J., Ravenscroft, N., Bird, W., Blackstock, K., Brady, E., Crang, M., Fish, R., Gruffudd, P., Mourato, S., Pretty, J., Tolia-Kelly, D., Turner, K. & Winter, M. (2011). Cultural Services. In: *UK National Ecosystem Assessment: Technical Report*. UNEP-WCMC, Cambridge.

Clark, J., Burgess, J. & Harrison, C.M. (2000). I struggled with this money business: respondents' perspectives on contingent valuation. *Ecological Economics*, **33**, 45–62.

Clarke, T. (2011). *The Cambridge Introduction to Literature and the Environment,* Cambridge University Press, Cambridge.

Cleary, S.M., Mooney, G. & McIntyre, D. (2010). Claims on health care: a decision-making framework for equity, with application for HIV/AIDS in South Africa. Health Policy and Planning **26**, 464-470.

Cockerill, K., Passell, H. & Tidwell, V. (2006). Cooperative modeling: Building bridges between science and the public. *Journal of the American Water Resources Association*, **42**, 457–471.

Cockerill, K., Daniel, L., Malczynski, L. & Tidwell, V. (2009). A fresh look at a policy sciences methodology: collaborative modeling for more effective policy. *Policy Sciences*, **42**, 211–225.

Colman, A. (2001). Oxford Dictionary of Psychology. Oxford University Press, Oxford.

Common Land Forum (1986) *Common land: report of the Common Land Forum*. Countryside Commission, Cheltenham.

Cooke, B. & Kothari, U. (2001). Participation: The new tyranny? New York, Zed Books.

Cooper, N. (2009). The spiritual value of ecosystem services: an initial Christian exploration [online]. http://hdl.handle.net/10540/288687 [Accessed 10 May 2010].

Cooper, N. (2012). The history of English churchyard landscapes illustrated by Rivenhall, Essex. In: Pungetti, G., Oviedo, G. & Hooke, D. *Sacred species and site; Advances in biocultural conservation.* Cambridge, Cambridge University Press.

Cooper, N.S. (1995). Wildlife conservation in churchyards: a case-study in ethical judgements *Biodiversity and Conservation,* **4,** 916-928.

Cooper, N.S. (2000). How natural is a nature reserve?: an ideological study of British nature conservation landscapes. *Biodiversity and Conservation,* **9,** 1,131-1,152.

Cosgrove, D. (1984). *Social Formation and Symbolic Landscape.* London, Croom Helm.

Cosgrove, D. and Daniels, S. (eds) (1988) The Iconography of

Landscape: Essays on the Symbolic Representation, Design and Use of Past Environments. Cambridge, Cambridge University Press.

Costello, A. & Osborne, J. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment* 10, 7.

Cowley, J. (2008). *Granta102: The New Nature Writing.* London, Granta Publications

Crompton, T. (2010). *Common Cause: The Case for Working with our Cultural Values.* Godalming, WWF-UK.

Cruz, I., Stahel, A. & Max-Neef, M. (2009). Towards a systemic development approach: Building on the Human-Scale Development paradigm. *Ecological Economics*, **68**, 2,021–2,030.

Cullingworth, B. & Nadin, V (2006) *Town and Country Planning in the UK*. Oxford/New York, Routledge.

Cundill, G. & Rodela, R. (2012). A review of assertions about the processes and outcomes of social learning in natural resource management. *Journal of Environmental Management*, **113**, 7-14.

Cuppen, E. (2012) Diversity and constructive conflict in stakeholder dialogue: considerations for design and methods. *Policy Sciences* **45**, 23-46.

Curry, P. (2012). *Enchantment and Modernity* [online]. PAN Partners. Available from: http://arrow.monash.edu.au/vital/access/manager/Repository/monash:85446 [accessed 15 September 2013]

D'Agostino, F. (2000). Incommensurability and commensuration: Lessons from (and to) ethico-political theory. *Studies in History and Philosophy of Science*, **Part A 31,** 429–447.

Daily, G.C., Polasky, S., Goldstein, J., Kareiva, P.M., Mooney, H.A., Pejchar, L., Ricketts, T.H., Salzman, J. & Shallenberger, R. (2009). Ecosystem services in decision-making: time to deliver. *Frontiers in Ecology and the Environment,* **7**, 21–28.

Dallimer, M., Irvine, K.N., Skinner, A.M.J., Davies, Z.G., Rouquette, J.R., Maltby, L.L., Warren, P.H., Armsworth, P.R. & Gaston, K.J. (2012). Biodiversity and the feel-good factor: understanding associations between self-reported human well-being and species richness. *Bioscience*, **62**, 47–55.

Dandy, N., Marzano, M., Moseley, D., Stewart, A. & Lawrence, D. (2012). Exploring the role of street trees in the improvement and expansion of green networks. *Proceedings of the ICF Annual Conference, Trees, People and the Built Environment*, 13th-14th April 2011.

Daniel, T.C., Muhar, A., Arnberger, A., Aznar, O., Boyd, J.W., Chan, K.M., Costanza, R., Elmqvist, T., Flint, C.G., Gobster, P.H., Grêt-Regamey, A., Lave, R., Muhar, S., Penker, M., Ribe, R.G., Schauppenlehner, T., Sikor, T., Soloviy, I., Spierenburg, M., Taczanowska, K., Tam, J. & der Dunk von, A. (2012). Contributions of cultural services to the ecosystem services agenda. *Proceedings of the National Academy of Sciences,* **109**, 8812–8819.

Daniels, S.E. & Walker, G.B. (1996) Collaborative learning: Improving public deliberation in ecosystem-based management. *Environmental Impact Assessment Review* **16**, 71-102.

Davies, A.L. & White, R.M. (2012). Collaboration in natural resource governance: reconciling stakeholder expectations in deer management in Scotland. *Journal of Environmental Management,* **112**, 160-169.

de Vente, J., Reed, M.S., Stringer, L.C., Newig, J. & Valente, S. (under review). How do context and design of participatory decision-making processes affect their outcomes? Evidence from sustainable land management in dryland sites. *Journal of Environmental Management*.

Department of Environment and Climate Change NSW (2010). *Cultural connections: indigenous communities managing biological and cultural diversity for ecological, cultural and economic benefit.* State of New South Wales and the Department for Environment, Climate Change NSW, Sydney, Australia.

Desvousges, W.H., Johnson, F.R., Dunford, R.W., Hudson, S.P. & Wilson, K.N. (1993). Measuring natural resource damages with contingent valuation: tests of validity and reliability. In: J.A. Hausman (Ed.). *Contingent valuation: A critical assessment*, 91–164. Amsterdam, North Holland Press.

Dietz, T., Fitzgerald, A. & Shwom, R. (2005). Environmental values. *Annual Review of Environment and Resources,* **30**, 335–372.

Dirksmeier, P. (2008). Strife in the rural idyll? The relationship between autochthons and in-migrants in scenic regions of South Bavaria. *Erdkunde,* **62**, 159-171.

Dobson, A. (2012). The death of politics. *Centre for the Study of Democracy Bulletin*, **Summer 2012**.

Dolan, P. & Green, C. (1998). Using the person trade-off approach to examine differences between individual and social values. *Health Economics*, **7,** 307-312.

Dolan, P., Shaw, R., Tsuchiya, A. & Williams, A. (2004). QALY maximisation and people's preferences: a methodological review of the literature. *Health Economics,* **14**, 197-208.

Doyle, J. (2011) *Mediating Climate Change*. Surrey, Ashgate.

Drew Associates, (2004). *Research into the economic contribution of sea angling.* Defra, London.

Dryzek, J.S. (2000). *Deliberative Democracy and Beyond: Liberals, Critics, Contestations*. Oxford, Oxford University Press.

Dudo, A. D., Dahlstrom, M. F. & D. Brossard (2007). Reporting a Potential Pandemic. *Science Communication*, **28**, 429-454.

Dunlap, R.E., Van Liere, K.D., Mertig, A.G. & Jones, R.E. (2000). Measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues*, **56**, 425–442.

Dutton, D. (2003). Aesthetics and Evolutionary Psychology. In: Levinson, J. (ed.) *The Oxford Handbook of Aesthetics*. New York, Oxford University Press**.**

Economic and Social Research Council. (2000). *Risky choices, soft disasters: environmental decision-making under uncertainty*. Global Environmental Change Programme. Swindon, ESRC / Brighton, University of Sussex.

Eagly, A.H. & Chaiken, S. (1993). *The Psychology of Attitudes*. Fort Worth TX, Harcourt Brace Jovanovich College Publishers.

Eden, C. & Sims, D. (1979). On the nature of problems in consulting practice. *Omega*, **7**, 119–127.

Edlin, R., Tsuchiya, A. & Dolan, P. (2012). Public preferences for responsibility versus public preferences for reducing inequalities. *Health Economics*, **21,** 1,416-1,426.

Elmqvist, T., Colding, J. Barthel, S., Borgstrom, S., Duit, A., Lundberg, J. Andersson, E., Ahrne, K., Ernstson, H., Folke C. & Bengtsson, J. (2004). The dynamics of social-ecological systems in urban landscapes - Stockholm and the National Urban Park, Sweden. Annuals of the New York Academy of Sciences, **1,023**, 308-322.

Elwyn G. (2010) Deliberation before determination: the definition and evaluation of good decision-making. *Health Expectations* **13**, 139–147.

Ereaut, G. & Segnit, N. (2006) *Warm Words: How are we telling the climate story and can we tell it better?* London, Institute for Public Policy Research.

Evans, D. (1997). *A History of Nature Conservation in Britain.* 2nd ed. London, Routledge,

Evans, S.M., Gebbels, S. & Stockill, J.M. (2008). Our shared responsibility: Participation in ecological projects as a means of empowering communities to contribute to coastal management processes. *Marine Pollution Bulletin,* **57**, 1-5.

Evely, A.C., Pinard, M., Reed, M.S. & Fazey, I. (2011). High levels of participation in conservation projects enhance learning. *Conservation Letters,* **4**, 116–126.

Everard, M. (2011). *Common Ground*. London, Zed Books.

Everard, M. & Appleby, T. (2009). Safeguarding the societal value of land. *Journal of Environmental Law and Management*, **21**, 76-82.

Faber, M., Manstetten, R. & Proops, J. (1996). *Ecological Economics: Concepts and Methods*. Cheltenham, Edward Elgard.

Faber, M. (2008). How to be an ecological economist. *Ecological Economics*, **666**, 1–7.

Fagerholm, N., Kayhko, N., Ndumbaro, F. & Khamis, M. (2012). Community stakeholders' knowledge in landscape assessments – mapping indicators for landscape services. *Ecological Indicators,* **18,** 421-433.

Fairclough, N. (2003). *Analysing Discourse: Textual analysis for social research*. London, Routledge.

Fairlie, S. (2009). A short history of enclosure in Britain. *The Land,* **7**, 16-31.

Farber, S.C., Costanza, R., & Wilson, M.A. (2002). Economic and ecological concepts for valuing ecosystem services. *Ecological Economics*, **41**, 375–392.

Fazey, I., Fazey, J.A. & Fazey, D.M.A. (2005) *Learning More Effectively From Experience*.

Fazey, I., Kesby, M., Evely, A., Latham, I., Wagatora, D., Hagasua, J.E. & Reed, M.S. (2010). A three-tiered approach to participatory vulnerability assessment in the Solomon Islands. *Global Environmental Change*: *Human and Policy Dimensions,* **20**, 713-728.

Fazey, I., Evely, A.C., Reed, M.R., Stringer, L.C., Kruijsen, J.H.J., White, P.C.L., Newsham, A., Jin, L., Cortazzi, M., Phillipson, J., Blackstock, K.L., Entwistle, N., Sheate, W.R., Armstrong, F., Blackmore, C., Fazey, J.A., Ingram, J., Gregson, J., Lowe, P., Morton, S., Trevitt, C. (2013) Knowledge Exchange: A review and research agenda for environmental management. *Environmental Conservation* **40**, 19-36.

Feldman, A. (1987). Welfare economics. *The New Palgrave Dictionary of Economics*, 889–895. London, MacMillan.

Fielding, K., McDonald, R. & Louis, W. (2008a). Theory of planned behaviour, identity and intentions to engage in environmental activism. *Journal of Environmental Psychology*, **28**, 318–326.

Fielding, K., Queensland, A., Terry, D., Masser, B., Hogg, M. & California, U. (2008b). Integrating social identity theory and the theory of planned behaviour to explain decisions to engage in sustainable agricultural practices. *British Journal of Social Psychology*, **47**, 23–48.

Fish, R., Burgess, J., Chilvers, J., Footitt, A., Haines-Young, R., Russel, D., Turner, K. & Winter, D.M. (2011a). *Participatory and deliberative techniques to embed an ecosystems approach into decision-making: Full Technical Report.* London, Defra.

Fish, R., Burgess, J., Church, A. & Turner, K. (2011b). Shared values for the contributions ecosystem services make to human well-being. *UK National Ecosystem Assessment: Technical Report*, Chapter 24. Cambridge, UNEP-WCMC.

Fletcher, P. (2013). Statement from the Church of England on Fracking - 16 August 2013 [online]. Available from: http://www.churchofengland.org/media-centre/news/2013/08/statement-from-church-of-england-on-fracking.aspx [accessed 15 September 2013]

FAO Food and Agriculture Organization of the United Nations (2012) *Finding common ground*. Rome, FAO.

Foster, J. (1997) Introduction: Environmental value and the scope of economics. In: Foster, J. (ed). *Valuing nature? Ethics, economics and the environment*. London, Routledge.

Foucault, M. & Gordon, C. (Eds.) (1980). *Power/Knowledge: Selected interviews and other writings 1972 - 1977 by Michel Foucault*. Brighton, Harvester Press.

Fourcade, M. (2011). Cents and sensibility: economic valuation and the nature of 'nature'. *American Journal of Sociology,* **16**, 1,721-77

Frey, R. (1994). *Eye juggling: Seeing the world through a looking glass and a glass pane: a workbook for clarifying and interpreting values*. Lanham, University Press of America.

Fujiwara, D. & Campbell, R. (2011). Valuation techniques for social cost-benefit analysis - Stated preference, revealed preference and subjective well-being approaches: A discussion of the current issues. London, HM Treasury.

Fuller, R.A., Irvine, K.N., Devine-Wright, P., Warren, P.H. & Gaston, K.J. (2007). Psychological benefits of greenspace increase with biodiversity. *Biology Letters*, **3**, 390–394.

Gamson, W. A. & Modigliani, A. (1987) The chaning culture of affirmative action. R. G. Braungart, R.G. & Braungart, M.M. (eds) *Research in Political Sociology (Vol. III)*, 137-177. Greenwich, JAI Press.

Garmendia, E. & Gamboa, G. (2012). Weighting social preferences in participatory multi-criteria evaluations: a case study on sustainable natural resource management. *Ecological Economics*, **84**, 110–120.

Gastil, J., Black, L. & Moscovitz, K. (2008). Ideology, attitude change, and deliberation in small face-to-face groups. *Political Communication*, **25**, 23-46.

Gibbard, P. L., Rawson, J. E., & Smith, A.G. (2006). The future: Climate and sea-level change, glaciations and a northward drift. Brenchley, P. J. & Rawson, P. F. (eds) *The Geology of England and Wales*. 469-476. London, The Geological Society.

Gobster, P.H. (2001). Visions of nature: Conflict and compatibility in urban park restoration. *Landscape and Urban Planning,* **56**, 35-51.

Goldstein, H. (1981). *Social learning and change: A cognitive approach to human services.* University of South Carolina Press.

Goodall, J. (with Phillip Berman) (1999). *Reason for hope; a spiritual journey*. New York, Warner Books.

Gorsuch, R. (1983). *Factor analysis*. Hillsdale NJ, L. Erlbaum Associates.

Government Social Research Service, (undated). *What is a Rapid Evidence Assessment?* [online]. Available from: http://www.civilservice.gov.uk/networks/gsr/resources-and-guidance/rapid-evidence-assessment/what-is [Accessed 1 May 2013].

Green, C. (2009). Investigating public preferences on 'severity of health as a relevant condition for setting healthcare priorities. *Social Science and Medicine*, **68**, 2,247-2,255.

Green, C. & Gerard, K. (2009). Exploring the societal view of health-care interventions: a stated preference discrete choice experiment. *Health Econo*mics, **18**, 951-976.

Grinde, B. & Patil, G.G. (2009) Biophilia: does visual contact with nature impact on health and well-being? *International Journal of Environmental Research and Public Health*, **6**, 2,332-2,343.

Grusec, J.E. (2011) Socialization processes in the family: social and emotional development. *Annual Review of Psychology*, **2011**, 243-269.

Habermas, J. (1989) *The Structural Transformation of the Public Sphere*. Cambridge MA, MIT Press.

Hahn, F.H. (1984). *Equilibrium and Macroeconomics*. Oxford, Basil Blackwell.

Haines-Young, R. (2011). Exploring ecosystem service issues across diverse knowledge domains using bayesian belief networks. *Progress in Physical Geography,* **35**, 681-699.

Haines-Young, R. & Potschin, M., (2012). *CICES V4.2 - Report prepared following consultation on CICES Version 4, August-October 2012.* EEA Framework Contract No EEA/IEA/09/003.

Halpern, D. & Gibbs, J. (in press). Social media as a catalyst for online deliberation? Exploring the affordances of Facebook and YouTube for political expression, *Computers in Human Behavior* **29,** 1159-1168.

Hanley, N. (2001). Cost-benefit analysis and environmental policymaking. *Environment and Planning C: Government and Policy,* **19**, 103–118.

Hansla, A., Gamble, A., Juliusson, A. & Garling, T. (2008). The relationships between awareness of consequences, environmental concern, and value orientations. *Journal of Environmental Psychology*, **28**, 1–9.

Hanson, J. (2012). From Me to We: Transforming values and building professional community through narratives. *Nurse Education in Practice*, **13**, 142-146.

Hardin, G. (1968). The tragedy of the commons. *Science,* **162**, 1,243-1,248.

Hardin, G. (1994). The tragedy of the unmanaged commons. *Trends in Ecology & Evolution,* **9**, 199.

Hargrove, E. (1988) *Foundations of Environmental Ethics.* Prentice Hall

Harries (1992). Law Report: *Harries v The Church Commissioners for England* [1992] 1 WLR 1241, [1993] 2 All ER 300.

Hastings Borough Council (2011). *Hastings and St Leonards Anti-Poverty Strategy* [online]. Available from: http://www.hastings.gov.uk/decisions_democracy/how_we_make_decisions/policies_strategies/anti_poverty_strategy/anti_poverty_strategy/ [Accessed 1 May 2013].

Hausman, J.A. (Ed.), (1993). *Contingent valuation: A critical assessment*. Amsterdam/New York, North Holland Press.

Hawcroft, L.J. & Milfont, T.L. (2010). The use (and abuse) of the new environmental paradigm scale over the last 30 years: A meta-analysis. *Journal of Environmental Psychology* **30**, 143-158.

Hay, D. & Hunt, K. (2000). *Understanding the spirituality of people who don't go to church*.[online] A report on the findings of the Adults' Spirituality Project at the University of Nottingham. Available from: http://spiritualjourneys.org.uk/pdf/look_understanding_the_spirituality_of_people.pdf [accessed 7 May 2013].

Hedger, M. (1995). Wind farms: a case of conflicting values. In: Guerrier, Y., Alexander, N., Chase, J., & O'Brien, M. (eds.) *Values and the Environment: A social science perspective*, West Sussex, Wiley.

Guerrier, Y., Alexander, N., Chase, J., & O'Brien, M. (1995). *Values and the environment: a social science perspective*. West Sussex, Wiley.

Hettinger, N. (2008). Objectivity in environmental aesthetics and environmental protection. In: A. Carlson and S. Lintott eds. *Nature, Aesthetics, and Environmentalism: From Beauty to Duty*. New York, Columbia University Press, 413-37.

Hitlin, S. & Piliavin, J.A. (2004). Values: Reviving a dormant concept. *Annual Review of Sociology*, 30, 359–393.

Hockley, N. (in press). Burying and praising cost-benefit analysis: its role in integrating ecosystems knowledge for decision-making. *Environment and Planning C: Government and Policy*.

Hodgson, G.M. (1999). *Evolution and Institutions: on Evolutionary Economics and the Evolution of Economics*. Cheltenham, Edward Elgar.

Hoekveld, G. & Needham, B. (2012). Planning practice between ethics and the power game: Making and applying an ethical code for planning agencies. *International Journal of Urban and Regional Research,* **37,** 1638-1635.

Holland, A., (2002a). Assumptions of cost-benefit analysis. *The Thingmount Working Paper Series on the Philosophy of Conservation*, 1–18.

Holland, A. (2002b). Are choices tradeoffs? In: D.W. Bromley, J. Paavola, Eds. *Economics, Ethics, and Environmental Policy Contested Choices*. Blackwell, Oxford; Malden, MA, 17–34.

Holling, C.S. (1973). Resilience and stability of ecological systems. *Annual Reviews of Ecological Systems* **4**, 1-23.

Howarth, R.B. & Wilson, M.A. (2006). A Theoretical Approach to Deliberative Valuation: Aggregation by Mutual Consent. *Land Economics*, **82**, 1–16.

Hussain, S., Winrow-Giffin, A., Moran, D., Robinson, L., Fofana, A., Paramor, O. & Frid, C. (2010). An ex ante ecological economic assessment of the benefits arising from marine protected areas designation in the UK. *Ecological Economics,* **69**, 828–838.

Ihse, M. & Lindahl, C. (2000). A holistic model for landscape ecology in practice: the Swedish survey and management of ancient meadows and pastures. *Landscape and Urban Planning,* **50**, 59-84.

Independent Panel on Forestry. (2011). Final report. Independent Panel on Forestry.

Inge, J. (2003). *A Christian Theology of Place.* Alsershot, Ashgate Publishing Limited.

Irvine, K.N., Fuller, R.A., Devine-Wright, P. & Tratalos, J. (2010). Ecological and psychological value of urban green space. In: M. Jenks, C. JonesEds. *Dimensions of the Sustainable City.* Amsterdam, Springer, 1–23.

Irvine, K.N., Warber, S.L., Devine-Wright, M.D., Gaston, P. & Gaston K.J. (2013). Understanding urban greenspace as a health resource: A qualitative comparison of visit motivation and derived effects among park users in Sheffield. *International Journal of Environmental Research & Public Health*, **10**, 417-442.

Ishihara, H. & Pascual, U. (2012). Institutions and agency in creating collective action for common pool resources. University of Cambridge Environmental Economy and Policy Research.

Ishii, H.T., Manabe, T., Ito, K., Fujita, N., Imanishi, A., Hashimoto, D. & Iwasaki, A. 2010. Integrating ecological and cultural values toward conservation and utilization of shrine/temple forests as urban green space in Japanese cities. *Landscape and Ecological Engineering,* **6**, 307-315.

Ison, R., Blackmore, C. & Iaquinto, B.L. (2013). Towards systemic and adaptive governance: exploring the revealing and concealing aspects of contemporary social-learning metaphors. *Ecological Economics,* **87**, 34-42.

Jaspal, R., Nerlich, B., & Koteyko, N. (2012) Contesting science by appealing to its norms: readers discuss climate change in the *Daily Mail*. *Science Communication*, **35**, 383-410.

Jessup, J. (2010). Plural and hybrid environmental values: a discourse analysis of the wind energy conflict in Australia and the United Kingdom. *Environmental Politics*, **19**, 21-44

JNCC Joint Nature Conservation Committee (2012). *UK Coastal Habitats* [online]. Available from http://jncc.defra.gov.uk/page-1429 [Accessed 23 May 2013].

JNCC/NE Joint Nature Conservation Committee/Natural England (2010). *Marine conservation zone reference areas: Guidance document for regional MCZ projects* [online]. Available from: http://www.naturalengland.org.uk/ourwork/marine/mpa/mcz/guidanceandadvice.aspx [Accessed 23 May 2013].

Johnson, D. (2002). Towards sustainability: examples from the UK coast. Harris, R., Griffin, T & P. Williams (eds). *Sustainable Tourism: a global perspective*, 167-179. Oxford & Burlington, MA, Butterworth-Heinemann.

Johnson, K.A., Dana, G., Jordan, N.R., Draeger, K.J., Kapuscinski, A., Schmitt Olabisi, L.K. & Reich, P.B. (2012). Using participatory scenarios to stimulate social learning for collaborative sustainable development. *Ecology and Society*, **17**.

Jones, N.A., Perez, P., Measham, T.G., Kelly, G.J., díAquino, P., Daniell, K.A., Dray, A. & Ferrand, N. (2009). Evaluating participatory modeling: Developing a framework for cross-case analysis. *Environmental Management*, **44**, 1180–1195.

Jones, P.T. & Jacobs, R. (2006) *Terra Incognita: Globalisering, Ecologie en Rechtvaardige Duurzaamheid*. Ghent, Belgium, Academia Press.

Jonsen, A.R. & Toulmin, S. (1988). *The abuse of casuistry: a history of moral reasoning.* Berkeley, University of California Press.

Jordan, A. & Russel, D. (in press). Embedding an Ecosystems Approach? The Utilisation of Ecological Knowledges in Decision-making. *Environment and Planning C: Government and Policy*.

Just, R.E., Hueth, D.L. & Schmitz, A. (2004). *The welfare economics of public policy*. Cheltenham, UK, Edward Elgar.

Kahneman, D., Ritov, I. & Schkade, D. (1999). Economic preferences or attitude expressions?: An analysis of dollar responses to public issues. *Journal of Risk and Uncertainty*, **19**, 203–235.

Kaiser, F., Hubner, G. & Bogner, F. (2005). Contrasting the theory of planned behavior with the value-belief-norm model in explaining conservation behavior. *Journal of Applied Social Psychology*, **35**, 2,150–2,170.

Kallis, G., Videira, N., Antunes, P., Pereira, A.G., Spash, C.L., Coccossis, H., Quintana, S.C., Del Moral, L., Hatzilacou, D., Lobo, G., Mexa, A., Paneque, P., Matcos, B.P. & Santos, R. (2006). Participatory methods for water resources planning. *Environment and Planning C-Government and Policy*, **24**, 215–234.

Kanowski, P.J. & Williams, K.J.H. (2009). The reality of imagination: integrating the material and cultural values of old forests. *Forest Ecology and Management,* **258**, 341-446.

Kaplan, R. (2001). The nature of the view from home. *Environment and Behaviour*, **33**, 507-542.

Kaplan, S. (1987). Aesthetics, affect, and cognition: Environmental preference from an evolutionary perspective. *Environment and Behavior*, **19**, 3-32.

Kaplan, S. (1995). The restorative benefits of nature: towards an integrative framework. *Journal of Environmental Psychology*, **15**, 169-182.

Kasperson, R.E., Renn, O., Slovic, P., Brown H.S., Emel., J., Gobel, R., Kasperson, J.X. Ratick, S. J., (1988). The social amplification of risk: A conceptual framework. *Risk Analysis*, **8**, 178-187.

Kato, K. (2006). Community, connection and conservation: Intangible cultural values in natural heritage – the case of Shirakami-sanchi World Heritage Area. *International Journal of Heritage Studies,* **12**, 458-473.

Katz, C. & Kirby, A. (1991). In the nature of things: the environment and everyday life. *Transactions of the Institute of British Geographers N.S.,* **16**, 259-271

Kay, J.J. & Regier, H. (2000). Uncertainty, Complexity and Ecological Integrity: insights from an ecosystem approach. *Implementing ecological integrity: Restoring regional and global environmental and human health. NATO science series, environmental security*, 121–156. Deventer, Kluwer.

Keat, R. (1997). Values and Preferences in Neo-Classical Environmental Economics. In: Forster, J. (ed.) *Valuing nature? Ethics, economics and the environment*. London, Routledge.

Keen, M. & Mahanty, S., (2006). Learning in Sustainable Natural Resource Management: Challenges and Opportunities in the Pacific. *Society & Natural Resources*, **19**, 497-513.

Kellert, S.R. (1993). The biological basis for human values of nature. In: S.R. Kellert and E.O. Wilson (eds). *The Biophilia Hypothesis*. Washington, Island Press.

Kendall, J. & Kendall, K. (2012) Storytelling as a qualitative method for IS research: Heralding the heroic and echoing the mythic. *Australasian Journal of Information System*s, **17**, 2.

Kennedy, J. J., Fox, B.L. & Osen, T.D. (1995). Changing social values and images of public rangeland management. *Rangelands,* **17**, 127-132.

Kennedy, J.J., Thomas, J.W. & Glueck, P. (2001). Evolving forestry and rural development beliefs at midpoint and close of the 20th Century. *Forest Policy and Economics,* **3**, 81-95.

Kenter, J.O., Hyde, T., Christie, M., Fazey, I. (2011). The importance of deliberation in valuing ecosystem services in developing countries - evidence from the Solomon Islands. *Global Environmental Change,* **21**, 505-521.

Kenter, J.O., Christie, M., Fazey, I., Hockley, N., Irvine, K., O'Brien, L., Ravenscroft, N. & Reed, M, (2013b). What are shared and social values of ecosystems? *Proceedings of the conference of the European Society for Ecological Economics*, 18-22 June, Lille.

Kenter, J.O., O'Brien, L., Hockley, N., Ravenscroft, N., Fazey, I., Irvine, K.N., Reed, M.S., Christie, M., Brady, E., Bryce, R., Church, A., Cooper, N., Davies, A., Evely, A., Everard, M., Fish, R., Fisher, J.A., Jobstvogt, N., Molloy, C., Orchard-Webb, J., Ranger, S., Ryan, M., Watson, V., Williams, S. (under review). What are shared and social values of ecosystems? *Ecological Economics*.

Kenyon, W. (2007) Evaluating flood risk management options in Scotland: a participant-led multi-criteria approach. *Ecological Economics,* **64,** 70-81.

Kil, N., Stein, T.V., Holland, S.M. & Anderson, D.H. (2012) Understanding place meanings in planning and managing the wildland–urban interface: The case of Florida trail hikers. *Landscape and Urban Planning*; **107**, 370– 379.

Kirk, K. (1999). *Conscience and its problems: An introduction to casuistry.* Cambridge, James Clarke & Co Ltd.

Klain, S.C. & Chan, K.M.A. (2012). Navigating coastal values: Participatory mapping of ecosystem services for spatial planning. *Ecological Economics,* **82**, 104-113.

Klamer, A. (2003). A pragmatic view on values in economics. *Journal of Economic Methodology,* **10**, 191-212, 271.

Kohak, E. (1984) *The embers and the stars; a philosophical inquiry into the moral sense of nature.* Chicago, University of Chicago Press

Koonal, S. (2009). Severity of illness and priority setting in healthcare: A review of the literature. *Health Policy*, **93**, 77-84.

Koonal, S., Tsuchiya, A. & Wailoo, A. (in press). Valuing health at the end of life: an empirical study of public preferences. *European Journal Health Economics*.

Kortenkamp, K.V. & Moore, C.F. (2001). Ecocentrism and anthropocentrism: Moral reasoning about ecological commons dilemmas. *Journal of Environmental Psychology*, **21**, 261–272.

Kumar, S. (2002). *Methods for community participation.* Rugby, Warwickshire, Practical Action Publishing.

Kümmerling, M. & Müller, N. (2012). The relationship between landscape design style and the conservation value of parks: A case study of a historical park in Weimar, Germany. *Landscape and Urban Planning,* **107**, 111-117.

Lancsar, E., Wildman, J., Donaldson, C., Ryan, M. & Baker, R. (2011). Deriving distributional weights for QALYs through discrete choice experiments. *Journal of Health Economics*, **30,** 466-478.

Lane, D.C. & Oliva, R. (1998). The greater whole: Towards a synthesis of system dynamics and soft systems methodology. *European Journal of Operational Research*, **107**, 214–235.

Large, M. & Ravenscroft, N. (2009). A global land-grab. *The Ecologist,* **39**, 87-88.

Layke, C. (2009). *Measuring nature's benefits: a preliminary roadmap for improving ecosystem service indicators.* Washington, USA: World Resources Institute.

Lawson, T. (2013). What is this "school" called neoclassical economics? *Cambridge Journal of Economics*, **37**, 947–983.

Lehoux, P., Daudelin, G., Demers-Payette, O. & Boivin, A. (2009) Fostering deliberations about health innovation: What do we want to know from publics? *Social Science & Medicine* **68**, 2002-2009

Leopold, A. (1949). A sand county almanac: with other essays on conservation from `Round River'. Oxford, Oxford University Press.

Lester, L. & Hutchins, B. (2012). The power of the unseen: environmental conflict, the media and invisibility. *Media, Culture & Society*, **34,** 847-863.

Lindemann-Matthies, P., Junge, X., & Matthies, D. (2010). The influence of plant diversity on people's perception and aesthetic appreciation of grassland vegetation. *Biological Conservation*, **143**, 195–202.

Linksy, M. (1986) *Impact: How the Press Affects Federal Policymaking*. Norton, New York.

Linley, W.G. & Hughes, D.A. (2013). Societal views on NICE, cancer drugs fund and value-based pricing criteria for prioritising medicines: a cross-sectional survey of 4,118 adults in Great Britain. *Health Eco*nomics, **22,** 948-964.

Lipsky, R.S. & Ryan, C.M. (2011). Nearshore restoration in puget sound: understanding stakeholder values and potential coalitions. *Coastal Management,* **39**, 577-597.

Lo, A.Y. (2011). Analysis and democracy: the antecedents of the deliberative approach of ecosystems valuation. *Environment and Planning C: Government and Policy,* **29**, 958-974.

Lo, A.Y. & Spash, C.L. (2012). Deliberative monetary valuation: in search of a democratic and value plural approach to environmental policy. *Journal of Economic Surveys*, **27**, 768–789.

López-Mosquera, N. & Sánchez, M. (2012) Theory of Planned Behavior and the Value-Belief-Norm Theory explaining willingness to pay for a suburban park. *Journal of Environmental Management*, **113**, 251–262.

Lynch, A.J.J., Fell, D.G. & McIntyre-Tanwoy, S. (2010). Incorporating Indigenous values with 'Western' conservation values in sustainable biodiversity management. *Australasian Journal of Environmental Management,* **17**, 244-255.

MA Millennium Ecosystem Assessment, (2005). *Ecosystems and Human Well-being: Synthesis Report.* Washington, DC, Island Press,

Maas, J., Verheij, R.A., Groenewegen, P.P., de Vries, S. & Spreeuwenberg, P. (2006). Green space, urbanity, and health: How strong is the relation? *Journal of Epidemiology and Community Health*, **60**, 587–592.

Mabey, R. (1996). *Flora Britannica.* London, Sinclair-Stevenson.

Macmillan, D.C., Philip, L., Hanley, N. & Alvarez Farizo, B. (2002). Valuing the non-market benefits of wild goose conservation: A comparison of interview and group-based approaches. Ecological Economics, **43**, 49–59.

Maddrell, A. (2013). Moving and being moved: More-than-walking and talking on pilgrimage walks in the Manx landscape. *Culture and Religion,* **14,** 63-77

Manzo, L. C. (2003). Beyond house and haven: toward a revisioning of emotional relationships with places. *Journal of Environmental Psychology*, ***23***, 47–61.

Markus, H.R., & Kitayama, S. (1994). The cultural construction of self and emotion: implications for social behavior. In: S. Kitayama and H. R. Markus (Ed.), *Emotion and Culture*, 89–130. Baltimore, MD, United Book Press.

Mauss, M. (1954). *The gift: Forms and functions of exchange in archaic societies*. 2000 edition, New York, W. W. Norton & Company.

Max-Neef, M. (1989). Human scale development: an option for the future. *Development Dialogue,* **1**, 5–81.

Maxwell, S., Henderson, D., McCloy, R. & Harper, G. (2011). Social Impacts and Well-being: Multi-criteria analysis techniques for integrating non- monetary evidence in valuation and appraisal. *Defra Evidence and Analysis*, Series 5.

McCombs, M. (2004) *Setting the agenda: the mass media and public opinion*. Oxford, Polity Press.

McCrum, G., Blackstock, K., Matthews, K., Rivington, M., Miller, D. & Buchan, K. (2009). Adapting to climate change in land management: the role of deliberative workshops in enhancing social learning. *Environmental Policy and Governance*, **19**, 413-426.

McGinnis, M.V. (1995). On the verge of collapse: the Columbia river system, wild salmon and the Northwest Power Planning Council. *Natural Resources Journal,* **35**, 63-92.

McGlashan, D. J. & Barker, N. (2005). The partnership approach to integrated coastal management in Britain'. In: Potts, J. & Smith, H. D. (eds), *Managing Britain's Marine and Coastal Environment: Towards a Sustainable Future,* 217-238. New York, Routledge.

McShane, K. (2012). Some challenges for narrative accounts of value. *Ethics & the Environment,* **17**, 45-69.

Mendoza, G.A. & Martins, H. (2006). Multi-criteria decision analysis in natural resource management: A critical review of methods and new modelling paradigms. *Forest Ecology and Management,* **230**, 1–22.

Mendoza, G.A. & Prabhu, R. (2006). Participatory modeling and analysis for sustainable forest management: Overview of soft system dynamics models and applications. *Forest Policy and Economics*, **9**, 179–196.

Milbrath, L. (1984). A proposed value structure for a sustainable society. *Environmentalist,* **4**, 113-124.

Milfont, T.L. & Duckitt, J. (2004). The structure of environmental attitudes: A first- and second-order confirmatory factor analysis. *Journal of Environmental Psychology*, **24**, 289–303.

Mitchell, R. & Popham, F. (2008). Effect of exposure to natural environment on health inequalities: An observational population study. *The Lancet*, **372**, 1,655–1,660.

Molloy, C. (2011) *Popular Media and Animals*. Basingstoke, Palgrave Macmillan.

Monbiot, G. (2013). *Feral: Searching for enchantment on the frontiers of rewilding.* London, Allen Lane.

Mooney, G. (1998). "Communitarian claims" as an ethical basis for allocating health care resources. *Social Science and Medicine*, **47**, 1,171-1,180.

Mooney, G. (2000). Judging goodness must come before judging quality- but what is the good of health care? *International Journal for Quality in Health Care,* **12,** 389-394.

Mooney, G. (2005). Communitarian claims and community capabilities: furthering priority setting? *Social Science and Medicine,* **60,** 247-255.

Mooney, G., Jan, S., Wiseman, V. (2002). Staking a claim for claims: a case study of resource allocation in Australian Aboriginal health care. *Social Science & Medicine* **54**, 1657–1667.

Mooney, G. & Blackwell, S.H. (2004). Whose health service is it anyway? Community values in healthcare. *Medical Journal of Australia*, **180**, 76-78.

Mow, J.M., Taylor, E., Howard, M., Baine, M., Connolly, E. & Chiquillo, M. (2007). Collaborative planning and management of San Andres Archipelago's coastal and marine resources: A short communication on the evolution of the Seaflower marine protected area. *Ocean & Coastal Management,* **50**, 209-222.

Mummery, J., Rodan, D., (2013). The role of blogging in public deliberation and democracy. *Discourse, Context and Media* **2,** 22–39.

Namyun, K., Stein, T.V., Holland, S.M. & Anderson, D.H. (2012). Understanding place meanings in planning and managing the wildland–urban interface: the case of Florida trail hikers. *Landscape and Urban Planning,* **107**, 370-379.

Nash, R. (1982). *Wilderness and the American Mind. 3rd edition.* Yale University Press.

NICE National Institute for Health and Clinical Excellence (2008). *Guide to the methods of technology appraisal* [online]. Available from http://www.nice.org.uk/media/D45/1E/GuideToMethodsTechnologyAppraisal2013.pdf [Accessed 27-1-2014].

National Readership Survey (2012). *Lifestyle & Classification Data* [online]. Available from: http://www.nrs.co.uk/lifestyle-data/ [Accessed 5 July 2013].

National Trust (2013). *Neptune Coastline Campaign* [online]. Available from: http://www.neptunecoastlinecampaign.org.uk/site/aboutneptune.cfm [Accessed 23 May 2013].

Natural England (2009). *Experiencing landscapes: Capturing the cultural services and experiential qualities of landscape*. *NECR024*. Cheltenham, Natural England.

Natural England (2012). *Monitor of Engagement with the Natural Environment: The national survey on people and the natural environment.* [online]. Available from: http://publications.naturalengland.org.uk/publication/1712385. [Accessed 27-1-2014].

Natural England (2013). *England's marine environment and why it is important* [online] www.naturalengland.org.uk/ourwork/marine/importance.aspx [Accessed 23 May 2013].

Nautilus Consultants (2005). *Invest in fish south west report: The motivation, demographics and views of south west recreational sea anglers and their socio-economic impact on the region.* [online]. Available from http://resources.anglingresearch.org.uk/library/economic_south_west. [Accessed 27-1-2014]

Negi, C.S. & Nautiyal, S. (2003). Indigenous peoples, biological diversity and protected area management – policy framework towards resolving conflicts. *International Journal of Sustainable Development & World Ecology,* **10,** 169-179.

Nelkin, D. (1995). *Selling science: How the press covers science and technology*. New York, W. H. Freeman.

Newig, J. & Fritsch, O. (2009). Environmental governance: participatory, multi-level – and effective? *Environmental Policy and Governance*, **19**, 197–214

Nicolson, M.H. (2011). *Mountain gloom and mountain glory: The development of the aesthetics of the infinite.* Seattle, University of Washington Press.

Niemeyer, S. (2004). Deliberation in the wilderness: Displacing symbolic politics. *Environmental Politics,* **13**, 347–372.

Nord, E. (1995). The person trade-off approach to valuing health care programs. *Medical Decision-making,* **15**, 201–8.

Norgaard, R.B. (2010). Ecosystem services: From eye-opening metaphor to complexity blinder. *Ecological Economics,* **69**, 1,219-1,227.

Norman, R., Hall, J., Street, D. & Viney, R. (2013). Efficiency and equity: a stated preference approach. *Health Economics,* **22,** 568-581.

Norton, B.G. (2000). Biodiversity and environmental values: in search of a universal earth ethic. *Biodiversity and Conservation,* **9**, 1029-1044.

Norton, B.G. & Steinemann, A.C. (2001). Environmental values and adaptive management. *Environmental Values,* **10**, 473–506.

Nunes, P.A. & Schokkaert, E. (2003). Identifying the warm glow effect in contingent valuation. *Journal of Environmental Economic Management,* **45**, 231–245.

Nutley, S.M., Walter, I. & Davis, H.T.O. (2007) *Using evidence: how research can inform public service.* Bristol, Policy Press.

O'Brien, E. A. (2005). Public and woodlands in England: well-being, local identity, social learning, conflict and management. *Forestry*, **78**, 321–336.

O'Neill, J. (1996). Cost-benefit analysis, rationality and the plurality of values. *Ecologist*, **26**, 98–103.

O'Neill, J., Holland, A. & Light, A. (2008). *Environmental values*. London, Routledge.

Orians, G. (1986). An ecological and evolutionary approach to landscape aesthetic. In: E.C. Penning-Rowsell & D. Lowenthal, eds. *Landscape Meaning and Values*. London, Allen and Unwin, 3-25.

Ostrom, E. (1990). *Governing the commons*, Cambridge, Cambridge University Press.

Pakenham, T. (1996). *Meetings with remarkable trees.* London, Weidenfeld & Nicolson.

Palmer, M. (2012). *Sacred Land; decoding Britain's extraordinary past through its towns, villages and countryside.* London; Piatkus.

Palmer, M. & Finlay, V. (2003). *Faith in conservation; new approaches to religions and the environment.* Washington DC, The World Bank.

Parks, S. & Gowdy, J. (2012). What have economists learned about valuing nature? A review essay. *Ecosystem Services*, **3,** e1-e10.

Parsons, G. (2008). *Aesthetics and Nature*. London, Continuum.

Parsons, G. (2010). *Beauty and Public Policy*. London, Commission for Architecture and the Built Environment.

Passmore, J. (1980). *Man's Responsibility to Nature*. London, Duckworth.

Patel, M., Kok, K. & Rothman, D.S. (2007). Participatory scenario construction in land use analysis: An insight into the experiences created by stakeholder involvement in the Northern Mediterranean, *Land Use Policy* **24**, 546-561

Patterson, T., Gulden, T., Cousins, K. & Kraev, E. (2004). Integrating environmental, social and economic systems: a dynamic model of tourism in Dominica. *Ecological Modelling*, 175, 121–136.

Peacock, M. (1997). Rationality and social norms. In: Forster, J. (ed.) *Valuing Nature?* New York, Routledge.

Pearce, D. & Moran, D. (1994). *The economic value of biodiversity.* London, Earthscan Publications.

Pearce, F. (2012). Land grabbers: Africa's hidden revolution. *The Guardian*, Sunday 20th May 2012. [online]. Available at: http://www.guardian.co.uk/world/2012/may/20/land-grab-ethiopia-saudi-agribusiness [Accessed 27-1-2014]

Pike, K., Johnson, D., Fletcher, S., Wright, P., & Lee, B. (2010). Social value of marine and coastal protected areas in England and Wales. *Coastal Management*, **38**, 412–432.

Pike, K., Johnson, D., Fletcher, S. & Wright, P. (2011). Seeking spirituality: respecting the social value of coastal recreational resources in England and Wales. *Journal of Coastal Research,* **61**, 194-204.

Prades J.L.P. (1997). Is the person trade-off a valid method for allocating health care resources? *Health Economist,* **6,** 71-81.

Pirselimoğlu, Z. & Demirel, Ö. (2012). A study of an ecologically based recreation and tourism planning approach: a case study on Trabzon Çalköy High Plateau in Turkey. *International Journal of Sustainable Development & World Ecology,* **19,** 349-360.

Porteous, J.D. (1996). *Environmental aesthetics: ideas, politics and planning.* New York, Routledge.

Posner, R.A. (1983). *The economics of justice*. Harvard University Press.

Prell, C., Hubacek, K., Reed, M., Quinn, C., Jin, N., Holden, J., Burt, T., Kirby, M. & Sendzimir, J. (2007). If you have a hammer everything looks like a nail: traditional versus participatory model building. *Interdisciplinary Science Reviews*, **32**, 263–282.

Prell C., Hubacek K., Reed M.S. (2009) Social network analysis and stakeholder analysis for natural resource management. *Society & Natural Resources* **22**, 501–518.

Prell, C., Reed, M., Racin, L., & Hubacek, K. (2010). *Competing structure, competing views: the role of formal and informal social structures in shaping stakeholder perceptions. Ecology and Society* **15**, 34.

Pretty, J.N. (1994). Alternative systems of inquiry for sustainable agriculture. *IDS Bulletin,* **25**, 37–48.

Price, C. (2000). Valuation of unpriced products: contingent valuation, cost-benefit analysis and participatory democracy. *Land Use Policy,* **17**, 187–196.

Priego, C., Breuste, J.H & Rojas, J. (2008). Perception and value in urban landscapes: a comparative analysis of cities in Germany, Chile and Spain. *Landscape Online,* **7**, 1-22.

Pungetti, G., Oviedo, G. & Hooke, D. (eds) (2012). *Sacred species and sites; advances in biocultural conservation.* Cambridge UK, Cambridge University Press.

Radford, K.G. & James, P. (2013). Changes in the value of ecosystem services along a rural–urban gradient: A case study of Greater Manchester, UK. *Landscape and Urban Planning,* **109,** 117–127

Rannikko, P. (1996). Local environmental conflicts and the change in environmental consciousness. *Acta Sociologica,* **39**, 57-72.

Reed, M.S. (2008). Stakeholder participation for environmental management: a literature review. *Biological Conservation,* **141,** 2,417-2,431.

Reed, M.S., Evely, A.C., Cundill, G., Fazey, I., Glass, J., Laing, A., Newig, J., Parrish, B., Prell, C., Raymond, C. & Stringer, L.C. (2010) What is social learning? *Ecology and Society,* **15**.

Rees, S.E., Rodwell, L.D., Attrill, M.J., Austen, M.C., & Mangi, S.C. (2010). The value of marine biodiversity to the leisure and recreation industry and its application to marine spatial planning. *Marine Policy*, ***34***, 868–875.

Rees, W.E. (2003). Economic development and environmental protection: an ecological economics perspective. *Environmental Monitoring and Assessment,* **86**, 29-45.

Rees, W.E. (2010). What's blocking sustainability? Human nature, cognition, and denial. *Sustainability: Science, Practice, & Policy,* **6,** 13-25.

Ressurreição, A., Gibbons, J., Dentinho, T.P., Kaiser, M., Santos, R.S. & Edwards-Jones, G. (2011). Economic valuation of species loss in the open sea. *Ecological Economics,* **70**, 729–739.

Ressurreição, A., Gibbons, J., Kaiser, M., Dentinho, T., Zarzycki, T., Bentley, C., Austen, M., Burdon, D., Atkins, J., Santos, R. & Edwards-Jones, G., (2012). Different cultures, different values: The role of cultural variation in public's WTP for marine species conservation. *Biological Conservation*,**145**, 148–159.

Richardson, K. (2005) The hegemony of the physical sciences: an exploration in complexity thinking. *Futures*, **37**, 615–653.

Richardson, G., Bojke, C., Kennedy, A., Reeves, D., Bower, P., Lee, V., Middleton, E., Gardner, C., Gately, C., Rogers, A. (2009). What outcomes are important to patients with long term conditions? A discrete choice experiment. *Value in Health*, **12**, 331-9.

Richardson, J., McKie, J., Peacock, S. & Lezzi, A. (2007). Severity as an independent determinant of the social value of a health service. Monash University, Business and Economics, *Centre for Health Economics,* Research paper **18**.

Rist, S., Delgado Burgoa, F. & Wiesmann, U. (2003). The role of social learning processes in the emergence and development of Aymara land use systems. *Mountain Research and Development*, **23**, 263-270.

Robinson, J.G. (2011). Ethical pluralism, pragmatism, and sustainability in conservation practice. *Biological Conservation,* **144**, 958-965.

Robinson, L.W., Bennett, N., King, L.A. & Murray, G. (2012). 'We want our children to grow up to see these animals:' values and protected areas governance in Canada, Ghana and Tanzania. *Human Ecology,* **40**, 571-581.

Rodela, R. (2012a) The social learning discourse: trends, themes and interdisciplinary influences in current research. *Environmental Science and Policy*, **25**, 157-166.

Rodela, R. (2012b). Advancing the deliberative turn in natural resource management: An analysis of discourses on the use of local resources. *Journal of Environmental Management,* **96**, 26–34.

Rodgers, C.P., Straughton, E., Winchester, A.J.L. & Pieraccini, M. (2011). *Contested common land. Environmental governance past and presen*t. London, Earthscan.

Rogers, E. M. & Dearing, J.W. (1988). Agenda-Setting Research: Where Has It Been, Where Is It Going? In: Anderson, J.A. (ed.) *Communication Yearbook 11*, 555-594. London, Sage.

Rokeach, M. (1973). *The nature of human values*. Free Press.

Ruiz-Frau, A., Hinz, H., Edwards-Jones, G. & Kaiser, M.J. (2013). Spatially explicit economic assessment of cultural ecosystem services: Non-extractive recreational uses of the coastal environment related to marine biodiversity. *Marine Policy*, **38,** 90–98.

Rushmer, R., Kelly, D., Lough, M., Wilkinson, J.E. & Davies, H.T.O. (2004). Introducing the learning practice. The characteristics of learning organizations in primary care. *Journal of Evaluation in Clinical Practice,* **10**, 375–386.

Ryan, A.M. & Spash, C.L. (2011). Is WTP an attitudinal measure? Empirical analysis of the psychological explanation for contingent values. *Journal of Economic Psychology*, **32**, 674–687.

Sabari, J.S. (1985). Professional socialization: implications for occupational therapy education. *The American journal of Occupational Therapy*. , **39**, 96-102.

Sagoff, M. (1986). Values and Preferences. *Ethics*, **96**, 301–316.

Sagoff, M. (1998). Aggregation and deliberation in valuing environmental public goods: A look beyond contingent pricing. *Ecological Economics,* **24**, 213–230.

Sandker, M., Campbell, B.M., Ruiz-Perez, M., Sayer, J.A., Cowling, R., Kassa, H. & Knight, A.T. (2010). The Role of Participatory Modeling in Landscape Approaches to Reconcile Conservation and Development. *Ecology and Society*, **15.**

Sarkar, S. & Montoya, M. (2011). Beyond parks and reserves: the ethics and politics of conservation with a case study from Perú. *Biological Conservation,* **144**, 979-988.

Schama, S. (1996). *Landscape and Memory.* London, Fontana.

Schama, S. (2004). *Landscape and Memory*. London, Harper Perennial.

Schlapfer, F. (2009). Contingent valuation: confusions, problems, and solutions. *Ecological Economics*, **68**, 1,569–1,571.

Schnabel, N., Purdie-Vaughns, V., Cook, J.E., Garcia, J., & Cohen, G.L. (2013). Demystifying values-affirmation interventions: writing about social belonging is a key to buffering against identity threat. *Personality and Social Psychology Bulletin*. In press.

Schultz, L., Folke, C. & Olsson, P. (2007). Enhancing ecosystem management through social-ecological inventories: lessons from Kristianstads Vattenrike, Sweden. *Environmental Conservation,* **34**, 140-152.

Schultz, P.W. & Zelezny, L. (1999). Values as predictors of environmental attitudes: evidence for consistency across 14 countries. *Journal of Environmental Psychology*, **19**, 255–265.

Schwappach, D.L.B. (2002). The equivalence of numbers: The social value of avoiding health decline: An experimental web-based study. *BMC Medical Informatics and Decision-making,* **2**, 3.

Schwappach, D.L.B. (2003). Does it matter who you are or what you gain? An experimental study of preferences for resource allocation. *Health Economics,* **12**, 255-267.

Schwartz, M. (2005). *Encyclopedia of Coastal Science*. The Netherlands, Springer.

Schwartz, S.H. & Jerusalem, T. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues,* **50**, 19–45.

Schwartz, S.H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in experimental social psychology,* **25**, 1–65.

Schwartz, S.H. (1999). A theory of cultural values and some implications for work. *Applied Psychology,* **48**, 23–47.

Schwartz, S.H. & Bilsky, W. (1987). Toward a universal psychological structure of human-values. *Journal of Personality and Social Psychology,* **53**, 550–562.

Scott, A.J., Carter, C., White, V. and Brown, K. (2009). Seeing is not everything: exploring the landscape experiences of different publics, *Landscape Research*, **34**, 397-424.

Scottish Agricultural College (2005). *Measuring public preferences for the uplands.* Centre for the Uplands, Cumbria.

Scottish Government, 2009. *Technical Report: Economic Impact of Recreational Sea Angling in Scotland*. Available from: http://www.scotland.gov.uk/Publications/2009/07/31154700/4 [accessed 1 June 2013].

Scottish Government (2011). *Scottish Index of Multiple Deprivation Database* [online]. Available from: www.scotland.gov.uk/Topics/Statistics/SIMD [accessed 15 May 2012].

Seabrook, L., McAlpine, C. & Fensham, R. (2008). What influences farmers to keep trees? *Landscape and Urban Planning,* **84**, 266-281.

Selman, P. & Swanwick, C. (2010). On the meaning of natural beauty in landscape legislation. *Landscape Research*, **35**, 3-26.

Sherrouse, B.C., Clement, J.M. & Semmens, D.J. (2011). A GIS application for assessing, mapping, and quantifying the social values of ecosystem services. *Applied Geography,* **31**, 748–760.

Shnabel, N., Purdie-Vaughns, V., Cook, J.E., Garcia, J., and Cohen, G.L. (in press). Demystifying Values-Affirmation Interventions: Writing About Social Belonging Is a Key to Buffering Against Identity Threat. *Personality and Social Psychology Bulletin*.

Short, J.R. (1991) *Imagined country: Environment, culture, and society*. Syracuse NY, Syracuse University Press.

Singh, J., Lord, J., Longworth, L., Orr, S., McGarry, T., Sheldon, R. & Buxton, M. (2012). Does responsibility affect the public's valuation of health care interventions? A relative valuation approach to health care safety. *Value in Health,* **15,** 690-698.

Singh-Manoux, A. & Marmot, M. (2005) Role of socialization in explaining social inequalities in health. *Social Science and Medicine*, **60**, 2,129-2,133.

Skrimshire, S. (Editor) (2010). *Future ethics: Climate change and apocalyptic imagination.* London, Continuum.

Smith, R.D. & Richardson, J. (2005). Can we estimate the 'social' value of a QALY? Four core issues to resolve. *Health Policy*, **74**, 77-84.

Snelgar, R.S. (2006). Egoistic, altruistic, and biospheric environmental concerns: Measurement and structure. *Journal of Environmental Psychology*, **26,** 87–99.

Spash, C.L. (2007). Deliberative Monetary Valuation (DMV): issues in combining economic and political processes to value environmental change. *Ecological Economics*, **63**, 690-699.

Spash, C.L. (2008). Deliberative monetary valuation and the evidence for a new value theory. *Land Economics,* **84**, 469–488.

Spash, C.L. & Hanley, N. (1995). Methodological and ideological options. Preferences, information and biodiversity preservation. *Ecological Economics*, **12**, 191–208.

Spash, C.L., Urama, K., Burton, R., Kenyon, W., Shannon, P. & Hill, G. (2009). Motives behind willingness to pay for improving biodiversity in a water ecosystem: Economics, ethics and social psychology. *Ecological Economics,* **68**, 955–964.

Stagl, S. (2004). Valuation for sustainable development – the role of multicriteria evaluation. *Vierteljahrshefte zur Wirtschaftsforschung,* **73**, 53–62.

Standa-Gunda, W., Mutimukuru, T., Nyirenda, R., Prabhu, R., Haggith, M. & Vanclay, J.K. (2003). Participatory modelling to enhance social learning, collective action and mobilization among users of the Mafungautsi Forest, Zimbabwe. *Small-scale Forestry,* **2**, 313–326.

Stecker, R. (2003). Value in Art.In: J. Levinson, ed. *Oxford Handbook of Aesthetics,(*Oxford, Oxford University Press.

Steg, L., Dreijerink, L. & Abrahamse, W. (2005). Factors influencing the acceptability of energy policies: A test of VBN theory. *Journal of Environmental Psychology*, **25**, 415–425.

Stein, T.V., Anderson, D.H. & Kelly, T. (1999). Using stakeholders' values to apply ecosystem management in an Upper Midwest landscape. Environmental Management, **24**, 399–413.

Stern, P.C. (2000). New environmental theories: toward a coherent theory of environmentally significant behavior. *Journal of Social Issues,* **56**, 407–424.

Stern, P.C. & Dietz, T. (1994). The value basis of environmental concern. *Journal of Social Issues*, **50**, 65–84.

Stern, P.C. Dietz, T. & Kalof, L. (1993). Value orientations, gender, and environmental concern. *Environment and Behavior*, **25**, 322–348.

Stern, P.C., Dietz, T., Abel, T., Guagnanon, G.A., Kalof, L. (1999). A social psychological theory of support for social movements: the case of environmentalism. *Human Ecology Review*, **6**, 81–97.

Stern, P.C., Fineberg, H.V. (Eds.) (1996). *Understanding risk: Informing decisions in a democratic society*. Washington, DC, National Academy Press.

Stern, P. C., Dietz, T. & Guagnano, G.A. (1998). A Brief Inventory of Values. *Educational and psychological measurement*, **58**, 984.

Steyaert, P., Barzman, M., Billaud, J.P., Brives, H., Hubert, B., Ollivier, G. & Roche, B. (2007). The role of knowledge and research in facilitating social learning among stakeholders in natural resources management in the French Atlantic coastal wetlands. *Environmental Science and Policy*, **10**, 537-550.

Stolk, P. (2009). *The social and community benefits of angling.* Research task 1, Angling participation. Available from: http://resources.anglingresearch.org.uk. [Accessed 12 April 2013]

Sutton, R.M., Douglas, K.M. & Murphy, A.O. (2012). *Engaging Coastal Communities in Climate Mitigation and Adaptation Measures. a Review of Relevant Psychological Science. CC2150 Psychological Barriers Phase 1 Report.* Canterbury, University of Kent.

Swanwick, C. (2009). Society's attitudes to and preferences for land and landscape. *Land Use Policy*, **26**, 262-275.

Swanwick, C., Selman, P. & Knight, M. (2006). *A statement on natural beauty.* Unpublished report to The Countryside Council for Wales.

Szabó, (2011). Reducing protest response by deliberative monetary valuation: Improving the validity of biodiversity valuation. *Ecological Economics*, **72**, 37-44.

Tabachnick, B. G. & Fidell, L. S. (2001). *Using multivariate statistics*. 4th edition. New York, HarperCollins.

Taşeli, B.K. (2007). Nature conservation efforts set for specially protected areas of Turkey. *Environmentalist,* **27**, 315-327.

TEEB, (2010). The Economics of Ecosystems and Biodiversity: Ecological and Economic Foundations. London, Earthscan.

Tengberg, A., Fredholm, S., Eliasson, I. & Knez, I. (2012). Cultural ecosystem services provided by landscapes: Assessment of heritage values and identity. *Ecosystem Services*, **1**, 14–26.

Thompson, E.P. (1991) *Customs in common*. Harmondsworth, Penguin.

Trainor, S. F. (2006). Realms of value: conflicting natural resource values and incommensurability. *Environmental Values,* **15**, 3-29.

Turner, R.K. (2007). Limits to CBA in UK and European environmental policy: Retrospects and future prospects. *Environmental and Resource Economics,* **37**, 253–269.

UK National Ecosystem Assessment (2011). *UK National Ecosystem Assessment: Technical Report*. Cambridge, UNEP-WCMC.

UNEP (2009). *Sustainable Coastal Tourism: An integrated planning and management approach* [online]. Available at http://www.unep.fr/shared/publications/pdf/DTIx1091xPA-SustainableCoastalTourism-Planning.pdf [Accessed 5 July 2013].

Usher, G. B. (2012). *Places of Enchantment; meeting God in landscapes.* London, SPCK Publishing.

Vadnjal, D. & O'Connor, M. (1994) What is the Value of Rangitoto Island? *Environmental Values*, **3**, 369-380.

Van den Belt, M., Kenyan, J.R., Krueger, E., Maynard, A., Roy, M.G. & Raphael, I. (2010). Public sector administration of ecological economics systems using mediated modeling. *Annals of the New York Academy of Sciences*, **1185**, 196–210.

Van Gigch, J.P. (1991). *System Design Modeling and Metamodeling*. New York, Plenum Press.

Van Swol, L.M. (2011). Forecasting another's enjoyment versus giving the right answer: Trust, shared values, task effects, and confidence in improving the acceptance of advice. *International Journal of Forecasting,* **27**, 103–120.

Varvasovszky, Z. & Brugha, R. (2000). How to do (or not do) a stakeholder analysis. *Health Policy and Planning,* **15**, 338-345.

Vatn, A. (2009). An institutional analysis of methods for environmental appraisal. *Ecological Economics*, **68**, 2207–2215.

Velleman, J. (2003). Narrative explanation. *The Philosophical Review,* **112**, 1-25.

Videira, N., Antunes, P. & Santos, R. (2009). Scoping river basin management issues with participatory modelling: The Baixo Guadiana experience. *Ecological Economics*, **68**, 965–978.

Vinning, J. & Schroeder, H.W. (1987)**.** Emotions in environmental decision-making: rational planning versus the passionate public. *Social Science in Natural Resource Management Systems.* M.L. Miller, R.P. Gale, R.P. & Brown, P.J. (eds). Westview Press, Boulder, CA.

Wallace, J.S., Acreman, M.C. & Sullivan, C.A. (2003). The sharing of water between society and ecosystems: from conflict to catchment-based co-management. *Philosophical Transactions of the Royal Society*, **B358**, 2011-2026.

Warmoth, W. (2002). *The economic crisis of the commons*. Unpublished paper. Sonoma University. Available at http://www.sonoma.edu/users/w/warmotha/economiccrisiscommons.htm [accessed 3rd May 2013].

Webler, T., Kastenholz, H. & Renn, O. (1995). Public participation in impact assessment: a social learning perspective. *Environmental Impact Assessment Review,* **15**, 443–463.

Wegner, G. & Pascual, U. (2011). Cost-benefit analysis in the context of ecosystem services for human well-being: A multidisciplinary critique. *Global Environmental Change,* **21**, 492–504.

Weintraub, E.R. (2002). Neoclassical economics. In: D.R. Henderson ed. *Concise Encyclopaedia of Economics*. Library of Economics and Liberty, Liberty Fund.

Wells, N.M. (2000). At home with nature: effects of "greenness" on children's cognitive functioning. *Environment and Behavior*, **32**, 775–795.

Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity*. Cambridge, Cambridge University Press.

Wheeler, B.W., White, M., Stahl-Timmins, W. & Depledge, M.H. (2012). Does living by the coast improve health and well-being? *Health & Place*, ***18***, 1,198–1,201.

Wilson, C. & Irvine, K.N. (2012). Bottom-up communication: identifying opportunities and limitations through an exploratory field-based evaluation. *Energy Efficiency*, **6**, 91-104.

White, R.M., Fischer, A., Marshall, K., Travis, J.M., Webb, T.J., Di Falco, S., Redpath, S.M. & van der Wal, R. (2009). Developing an integrated conceptual framework to understand biodiversity conflicts. *Land Use Policy*, **26**, 1–12.

Wilson, K. (1995). Mass Media as sources of global warming knowledge. *Mass Communication Review*, **22**, 75-89.

Wiseman, V. & Nona, P. (1998). Setting health care priorities of Badu Islan. *Aboriginal and Islander Health Worker Journal*, **22**, 21-22.

Wiseman, V., Daley, L.A., Mooney, G., Williams, S. & Williams, V. (1999). Improving Aboriginal health in Wellington (NSW): Ask local Koori people what can be done. *Aboriginal and Islander Health Worker Journal*, **23**, 21-22.

Womack, P. (1989). *Improvement and Romance: Constructing the Myth of the Highlands.* Basingstoke, Macmillan Press.

Wright, G. & Rowe, G. (2011). Group-based judgmental forecasting: An integration of extant knowledge and the development of priorities for a new research agenda. *International Journal of Forecasting*, **27**, 1-13.

Wylie, J. (2007). *Landscape - Key ideas in Geography.* Oxford/New York, Routledge.

Yadav, L., Rensburg, T. & Kelley, H. (2012). A comparison between the conventional stated preference technique and an inferred valuation approach. *Journal of Agricultural Economics*, **64**, 405–422.

Yamamoto, Y.T. (2010). Values, objectivity and credibility of scientists in a contentious natural resource debate. *Public Understanding of Science,* **21**, 101-125.

Zografos, C. & Howarth, R.B. (2010). Deliberative ecological economics for sustainability governance. *Sustainability*, **2010**, 3399-3417.

Zweig, C.L. & Kitchens, W.M. (2010). The semiglades: the collision of restoration, social values, and the ecosystem concept. *Restoration Ecology,* **18**, 138-142.

Annex 1 Methods to calculate QALY utility weights, and health valuation search terms

Methods to calculate QALY utility weights: The main techniques used by health economists to calculate utility weights are *standard gamble* (for the generic SF-6D), *time trade-off* (for the commonly recommended EQ-5D) and the *visual analogue scale*. The SF-6D and the EQ-5D are generic health state appraisal tools that describe a health state as a composite of six or five dimensions, respectively. In both cases, a QALY value can be calculated for any health state within the descriptive system. These values are based on aggregate results from population surveys based on individual's values for defined health states. (Brazier *et al*. 2007).

Using *standard gamble*, a choice is presented which requires the respondent to choose between a certain outcome and a gamble. If the gamble is chosen, it may result in either a better outcome (with a probability *p*) or a worse outcome than the original (with a probability 1-*p*). The utility weight is gained through adjusting the probability of the best outcome until the subject is indifferent between the certain intermediate outcome and the gamble (Brazier *et al*. 2007).

Using *time trade-off***,** the individual is presented with a choice between living for a period *t* in a specified but less than perfect state (outcome *B*) versus having a healthier life (outcome *A*) for a time period *h* where *h*<*t*. Time *h* is varied until the respondent is indifferent between the alternatives. The utility weight given to the less than perfect state is then *h/t* (Brazier *et al*. 2007).

Using *visual analogue scale***,** the individual is shown a line with two end points. One end indicates perfect health and the other end indicates the worst possible health state, i.e. death. The line has a scale on it to measure these health states, for example, 100 might indicate perfect health and 0 would indicate the worst possible health state. When presented with a VAS the respondent is asked to pick a point on the line which, in their opinion, best describes their current state of health. The visual analogue scale is much like a thermometer measuring peoples 'feelings' of their health. (Brazier *et al*. 2007).

Health valuation search terms: A search was undertaken on Medline (Ovid), 1949 – present. Search terms included the following and led to the following numbers of hits (bracketed):

"stated preference*".tw. (247)
(discrete adj choice).tw. (544)
"conjoint analysis".tw. (350)
"standard gamble".tw. (653)
"time trade-off".tw. (717)
"contingent valuation".tw. (374)
"willingness to pay".tw. (2066)
"QALY*".tw. (647)
"Visual Analogue Scale".tw. (11442)
"person trade-off".tw. (40)
AND
*Social Values (5851)
(cultural adj5 value*).tw. (1894)
(social adj5 value*).tw. (2507)
(share adj5 value*).tw. (238)
(plural adj5 value*).tw. (9)

The two search sets combined gave a total of 102 results.

Annex 2 Economics textbooks used for index search in REA

To assess frequency of use of shared values-related terms, we conducted an index search of the economics textbooks listed in **Table 49**.

Table 49. Economics textbooks used for index search in REA.

Authors	*Year*	*Title*
Dinwiddy & Teal	1996	Principles of cost-benefit analysis for developing countries
Portney & Weyant	1999	Discounting and intergenerational equity
Boadway & Bruce	1984	Welfare economics
Johansson	1993	Cost-benefit analysis of environmental change
Brent	1998	Cost-benefit analysis for developing countries
Just, Hueth, Schmitz	2004	The Welfare Economics of Public Policy
Mueller	2003	Public choice III
Edwards-Jones, Davies & Hussain	2000	Ecological economics
Hanley & Spash	1993	Cost-benefit analysis
Common & Stagl	2005	Ecological economics
Price	1989	The theory & application of forest economics
Faber, Manstetten & Proops	1996	Ecological economics
Soderbaum	2008	Understanding sustainability economics
Cato	2009	Green economics
Endres	2011	Environmental economics
Sagoff	2004	Price, principle and the environment
Hausman & McPherson	2006	Economic analysis, moral philosophy, and public policy
Adler & Posner	2006	New foundations of cost-benefit analysis
Adler & Posner	2001	Cost-benefit analysis: legal, economic, and philosophical perspectives
Johansson	1991	An introduction to modern welfare economics

Annex 3 Forth and MPAs psychometric analysis

A general outline of the psychometric analysis and results is given in Section 4.1.4. Here we provide more detail on the procedures used in the analysis.

Methods: For the MPAs case study, data was analysed using the *sem* package in Stata 12.1 (StataCorp Ltd). We used online survey data for factor analysis and structural equation models (SEMs). While there was some skewness in the data, normality held sufficiently overall to warrant use of maximum likelihood estimation, especially given the large sample size (n=1220). We first developed a confirmatory factor analysis (CFA) model that included indicators for all of the hypothesised two-item latent constructs: awareness of consequences (AC), ascription of responsibility (AR), norms (NOR), subjective norms (SUB) and behavioural control (BC). We iteratively improved model fit by relaxing constraints on covariance between indicator residuals on the basis of modification indices. We then developed a SEM on the basis of VBN theory using a similar process. We initially focused on direct causal effects, but added indirect effects where this improved the model, again considering modification indices. Model fit was evaluated using root mean square error of approximation (RMSEA) and standardised root mean square residual (SRMR) measures, which suggest good fit <0.05, and the coefficient of determination (CD), comparative fit index (CFI) and Tucker-Lewis index (TLI), which suggest good fit >0.95 (Byrne, 2010). Finally, we estimated Cronbach's alpha to assess reliability of the scales for all of the survey data, the survey data but only for workshop participants, and the workshop data (the psychometric questionnaires were completed at the end of the DMV and MCA workshops).

For the Forth case study, given the small sample size (*n*=52), estimation of a full SEM/CFA was deemed unfeasible. Established indicators for values and the NEP were evaluated for reliability by estimating Cronbach's alpha. For the indicators that we devised or modified (those associated with awareness of consequences, ascription of responsibility and norms), we used the multiple group method (MGM), a simple form of CFA. This method establishes a correlation matrix to examine for each indicators which factor they correlate with most (correcting for self-correlation) (Steg *et al*. 2005).

Results: The MPA case study CFA model of two-item indicators is depicted in **Figure 43**. Model fit was very good across multiple indicators (see text in figure). All items loaded onto their expected factors except for AC2 with a factor score of only 0.26 (Costello & Osborne [2005] consider 0.32 to be a minimum criterion). The VBN SEM model would not converge; considering CFA model results we excluded AC from the SEM model. The subsequent VBN SEM was then improved substantially by including direct paths between biospheric values and AR beliefs, and between NEP and norms (but not between biospheric values and norms); including these additions model fit was very good across indicators (**Figure 44**). All indicators loaded strongly onto their hypothesized factors, apart from NEP4 and NEP10. Further results are provided in the main text.

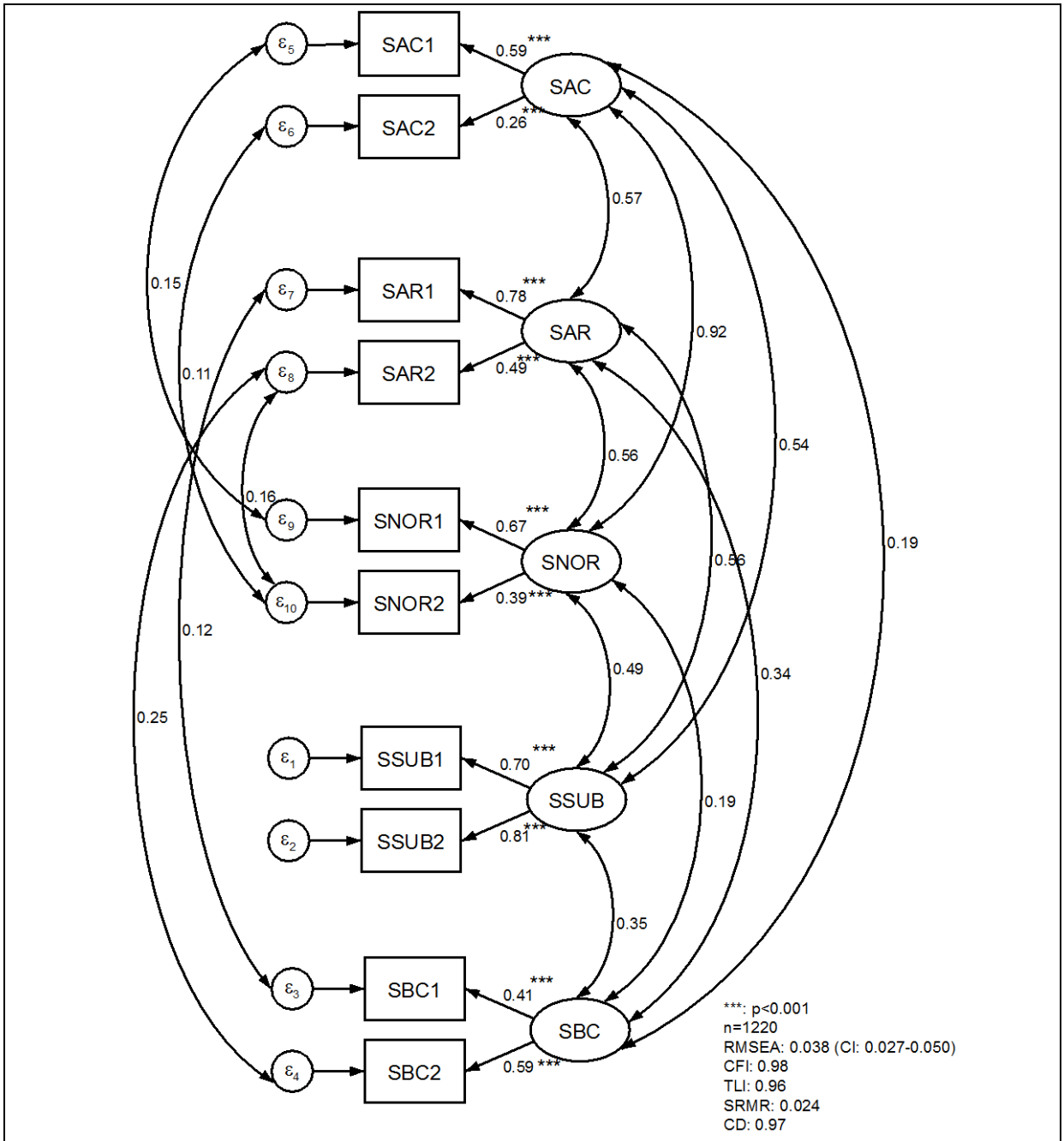


Figure 43. Confirmatory factor analysis model of the MPA online survey data for two-item VBN/TPB constructs. Standardised parameters depicted. See Table 20 for a list of parameters (S=survey data; i.e. e.g. SAC=Survey Awareness of Consequences).

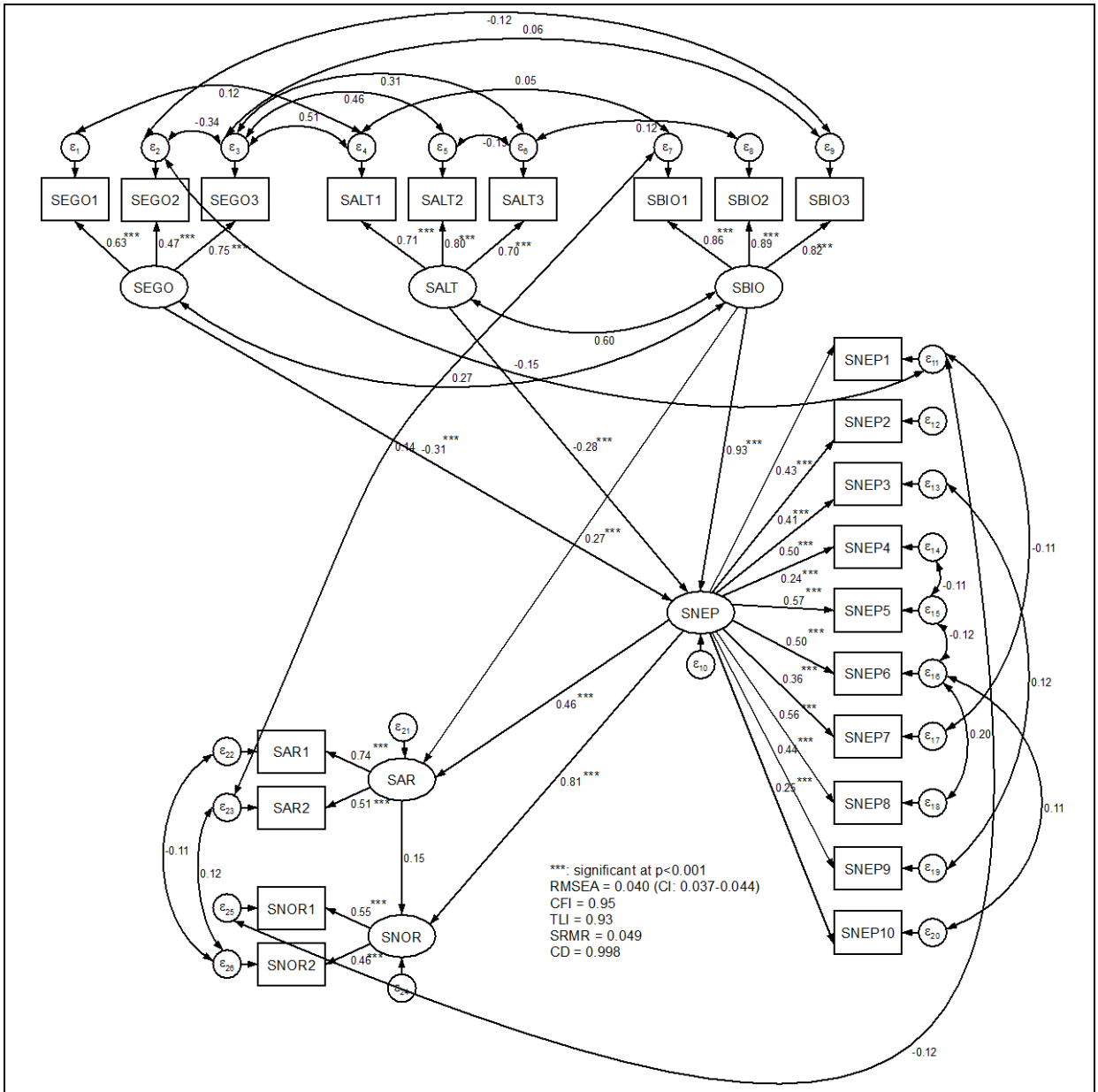


Figure 44. Structural equation model of the MPA online survey data based on the Values-Beliefs-Norms model. Standardised parameters depicted. See Table 20 for a list of parameters (S=survey data; i.e. e.g. SAC=Survey Awareness of Consequences).

Annex 4 Forth case study stakeholders and participants

Table 50. Forth case study: list of stakeholders invited to the Stage 1 workshop.

Community groups	***Business***
Bonnybridge Heritage Group	Atkins
C&M Community Consulting	BP
Clackmannanshire Alliance	* Forth Ports
Clackmannanshire Field Studies Society	Fuji Grangemouth
Communities Along the Carron	Impact Solutions
Community Green Initiative	**Ineos Chemical Grangemouth**
Community Planning Partnership Falkirk	* Ironside Farrar
Denny & Dunipace Heritage Society	Polimeri Europa
Falkirk Area Biodiversity Partnership	* **Scottish Power**
Falkirk Environment Trust	* Scottish Water
Falkirk Invasive Species Forum	***NGOs***
Falkirk Schools Gateway Charity Trust	* Archaeology Scotland
Forth District Salmon Fisheries Board	* **British Trust for Ornithology**
* Forth Estuary Forum	Bug Life
* Forth Fisheries Trust	Bumblebee Trust
Friends of Kinneill Foreshore Group	Butterfly Conservation
Green Dog Walkers	* **Central Scotland Forest Trust**
River Avon Federation	* Centre for Ecology & Hydrology
River Carron Fisheries Management Group	Friends of the Earth Falkirk
* The Helix Trust	* Historic Scotland
Government	* Marine Conservation Society
*** Clackmannanshire Council**	* National Trust for Scotland
*** Falkirk Council**	* **RSPB**
*** Fife Council**	* Scottish Coastal Forum
*** Forth Valley & Lomond LEADER (EU)**	* **Scottish Flood Forum**
*** Marine Scotland**	* **Scottish Natural Heritage**
*** Scottish Govt Directorate for Built Environment**	Scottish Railway PreservationTrust
Scottish Govt Environmental Assessment Team	* Scottish Wildlife Trust
*** SEPA**	* SUSTRANS
*** Stirling Council**	* WeBS
Landowners	***Other***
Callendar Estates	* University of Stirling
* Crown Estate	
Estate of the Earl of Marr	
* NFUS	
* Scottish Land and Estates	
* Included on the initial list of stakeholders. Stakeholder organisations indicated in bold print participated.	

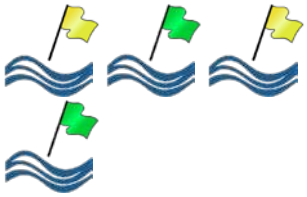
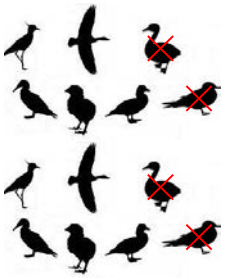
Table 51. Forth case study: community councils participating in DMV workshops grouped by county council.

Clackmannanshire • Alloa; • Clackmannan; • Tullibody, Cambus & Glenochil. *Falkirk* • Airth; • Blackness; • Bo'ness; • Denny & Dunnipace*; • Grahamstown, Middlefield & Westfield; • Grangemouth; • Larbert, Stenhousemuir & Torwood; • Lower Braes.	*Stirling* • Braehead & District; • Broonbridge; • Buchlyvie*; • Cambuskenneth; • Cowie*; • Mercat Cross; • Riverside. *Fife* • Crombie; • High Valleyfield; • Low Valleyfield.
***** Outside the Landscape Initiative boundary.	

Annex 5 Forth choice experiment attributes and models

CE attributes and their levels are given in **Table 52** and **Table 53**.

Table 52. Forth case study: attributes of the DMV choice experiments as they were presented to participants.

Environmental health	
Water quality 	This attribute indicates the water quality of the Inner Forth. Water quality of the Inner Forth is currently moderate. An increase in the total area dedicated to conservation could improve this to 'good' status, because mudflats and saltmarsh absorb some of the pollutants in the water. These qualifications take a wide range of pollutants into account, including heavy metals, agricultural and sewage pollutants. 'Moderate' water quality means the water can be used for sprinkling gardens and irrigation, boating, and limited coarse fishing. 'Good' means the water is more suitable for coarse fishing, and can also be safely used for swimming.
Wildlife and biodiversity	
Total number of birds 	This attribute indicates the total number of birds in the Inner Forth at the winter peak. The Inner Forth provides habitat to many species of waterfowl, waders and divers. Their total number is influenced by how much food is available to them, and this is influenced by the amount of suitable habitat (particularly mudflats and saltmarsh).
Bird species extinct 	This attribute indicates the number of bird species in the Inner Forth that would go extinct in the scenario. In the Inner Forth, 7 wetland bird species (out of 79) are in immediate threat of local extinction. Increasing the habitat and feeding grounds for these birds can help to stop these species going extinct. Local extinction of a species means that it can't be found around the Forth estuary anymore. It may still be found elsewhere in the UK and in the world. Diversity of birds is also an indicator for diversity of life on the Inner Forth overall (insects, plants etc.).
Landscape and recreation	
New woodlands planted 	This attribute indicates whether the new nature conservation area will include a significant proportion of woodland, consisting of native species (for example alder, birch, willow).

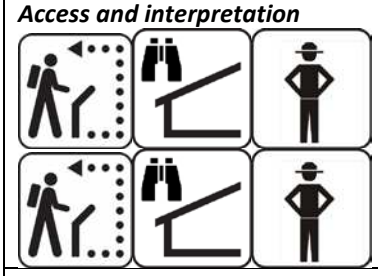
Access and interpretation 	This attribute indicates whether or not there is recreational access to the new conservation area, and what facilities are available. Possible facilities include footpaths and interpretation boards for local wildlife and history, a hide, and regular presence of a guide providing guided walks and events.
Costs per year	
Increase in council tax per household	The plans also have costs. In these hypothetical scenarios, part of the costs of the plan will be met by a contribution from your county council. To raise this, household council tax will be increased by the amount stated in the scenario. The tax rise in the 'business as usual' scenario (Plan C) is always zero in this survey. While in reality much of the funding would come from other sources, such as the Scottish Government, EU or Lotteries, we have left these out in order not to make the choice tasks too complex. All the costs are annual costs. You can consider any one-off costs to have been included in the cost figures by spreading them out over the 50-year period that the scenarios cover, between now and 2061.

Table 53. Forth case study: choice experiment attributes and their levels.

Attribute	*Levels*
Water quality	Moderate (status quo) or good (see Table 52)
Total number of birds (winter mean)	22,000 birds, 28,000 birds (status quo); 31,000 birds; 34,000 birds
Bird species extinct in 50 years	None; 2; 5; 7 (status quo)
New woodlands planted	Yes or no
Access and interpretation	Paths and interpretation boards; paths, boards and hide; path, boards and guide
Increase in council tax per household	none (status quo); 20; 40; 60; 80

Choice models: We developed two mixed logit models in the Forth study and estimated these in NLOGIT 4.0 with 1000 Halton draws. The main attributes are described in the main text. As usual, we estimated WTP = $-\beta_x/\beta_{tax}$. We developed one model with social-economic/demographic interactions with the ASC (Model A) and one model with psychometric interactions (Model B). Here, we evaluated interactions with the ASC and also with the species and tax attributes. In both models, we also considered regional differences across attributes.

Table 54. Forth case study: mixed logit models with demographic interactions (Model A) and with psychometric interactions (Model B).

Parameter (units)	*Model A*						*Model B*†		
				Willingness to pay					
	β	*SE*		*Indiv.*	*Delib. indiv.*	*Group (fair price)*	*β*	*SE*	
ASC	6.121	1.6586	***				4.292	1.4368	**
* Young	-3.208	1.6161	*						
* Male	-1.777	0.9170	T						
Water quality (good vs moderate)	0.165	0.1103	NS	£14.54	£6.33	£3.87	0.177	0.1151	NS
Bird population size (per 1000)	0.038	0.0153	*	£3.31	£1.44	£0.88	0.043	0.0158	**
Paths & interpretation boards present	0.015	0.1087	NS				-0.021	0.1121	NS
Guide present	0.130	0.1223	NS				0.181	0.1274	NS
Hide present									
North of Forth	0.343	0.2957	NS				-0.180	0.1557	NS
South of Forth	0.401	0.1508	**	£35.37	£15.39	£9.42	0.381	0.1002	***
Stirling	-0.104	0.1634	NS				0.327	0.0919	***
Woodland planted									
North of Forth	-0.180	0.1525	NS				0.352	0.3047	NS
South of Forth	0.388	0.0966	***	£34.19	£14.88	£9.11	0.422	0.1564	**
Stirling	0.315	0.0887	***	£27.75	£12.08	£7.39	-0.065	0.1698	NS
Prevent species extinction (per 1)									
Individual	0.203	0.0394	***	£17.90			0.572	0.2236	*
Deliberated individual	0.254	0.0446	***		£9.76		0.619	0.2257	**
Deliberated group	0.405	0.0592	***			£9.53	0.787	0.2307	***
Prevent species extinction * Norms‡							0.114	0.0680	T
Tax (per £)									
Individual	-0.011	0.0042	**				-0.043	0.0174	*
Deliberated individual	-0.026	0.0048	***				-0.057	0.0175	**
Deliberated group	-0.043	0.0064	***				-0.075	0.0180	***
Tax * Ascription of responsibility‡							0.008	0.0041	T
Number of observations	611						624		
Number of Halton draw	1000						1000		
Log-likelihood	-671						-642		
χ^2 (both models 18 d.f.)	598	***					568	***	
Pseudo R^2	0.45						0.44		

*** Significant at p<0.001; **<0.01; *<0.05; T: tendency at p<0.1; NS: not significant;
† Model B includes interactions with the *Tax* parameter; as a result it is not possible to estimate mean WTP directly from the parameters. ‡ Per point on 1-5 Likert scale.
ASC: alternative specific constant (implemented as dummy: 0 for status quo, 1 for other alternatives).
SE: standard error; d.f.: degrees of freedom.

Annex 6 Hastings visions

The following text was developed by facilitators after workshop 1 on the basis of SWOT analysis results, and presented to participants.

Visions of 'Hastings 2030'

The four visions below give hypothetical (and sometimes extreme) examples of the way that Hastings might look in 2030. We do not suggest that these are mutually exclusive or the only possibilities but instead separate themes of future change into visions focused on environmental, cultural and economic development using the information we gathered during the first workshop. The events described in the visions will depend on many national and global drivers external to Hastings but we limit the content of the visions and the goals to factors over which the Hastings community has some influence.

1. Green Hastings

- Hastings has committed to environmental protection and conservation;
- within the town, no development is permitted on green belt land which is protected for conservation of wildlife and biodiversity. There is an increased area of surrounding countryside designated as protected areas and nature reserves;
- bathing water quality has been improved following the installation of a new sewage treatment plant and the town is acclaimed for the quality of its beaches.;
- measures such as flood defences have been constructed to protect the Hastings shoreline from rising sea levels from future climate change;
- Beachy Head East and Meridian East are now managed as Marine Conservation Zones. Large-scale commercial fishing is banned in these areas but other activities are permitted although subject to seasonal restrictions;
- investment in community projects focused on green areas and activities (e.g. allotments and local food project, community woodlands);
- the pier has been regenerated and is now a major attraction;the fishing fleet has remains stable through local support and improvement of local supply chains;
- the fishing fleet is a recognised voice in sustainable fisheries management nationally and internationally;
- community support for local shops;
- significant investment in rail travel and cycle paths;
- the town has used sustainable sea-food and other sustainably grown local food to market itself as a green tourist destination.

2. City of Culture

- Named city of culture in 2017, Hastings has invested in extensive cultural regeneration and has put considerable effort into marketing a cultural brand. The old town has been awarded World Heritage Status;
- there are new art galleries and museums accompanied by an increase in the number of cafes restaurants, pubs and hotels to cater for tourists;
- new cultural venues have been developed for creative businesses;the pier has been regenerated and is now a major attraction;
- festivals have become larger and more frequent and draw large numbers of visitors into the town;

- the fishing fleet is widely promoted and is the centre of educational and festival events celebrating traditional fishing practice and seafood;
- the fishing fleet is a recognised voice is sustainable fisheries management nationally and internationally;
- targeted education projects help bring more young people into the fishing fleet;
- the University has expanded and attracts students from around the world;
- there are new community centres and investment in engagement and learning projects;
- the pier has been regenerated and is now a major attraction;
- the proposed marine conservation zones at Beachy head East and East Meridian are not designated because of funding shortages, the government claims.

3. Greater London (*renamed by participants to Greater City)*

- Hastings has succeeded in attracting substantial external investment allowing extensive economic regeneration and population expansion;
- transport links have been improved with expansion and improvement of the local road network, including upgrading of the A21 to London, and a high speed rail link allowing daily London commuters to live in Hastings;
- large business sites have been developed in the area including north-east Bexhill and North West Hastings which has led increased employment opportunities;
- the University has also expanded and is an important local employer;
- large-scale housing development is underway on the outskirts of Hastings and Bexhill including affordable housing schemes;
- a range of modern sports facilities have been built including a new swimming pool;
- several large hotels have been built to cater for large-scale tourism;
- the development of large out-of-town retail parks has led to a gradual decline of local shops, which have largely been converted into cafes and tourist outlets;
- the pier has been regenerated and is now a major attraction;
- the proposed marine conservation zones at Beachy Head East and East Meridian are not designated because of funding shortages, the government claims;
- the fishing fleet is a recognised voice in sustainable fisheries management nationally and internationally.

4. Business as usual

- the on-going recession means that funding is not secured for further cultural regeneration although the town continues to promote its rich history and traditions as it has done successfully though festivals and other events for many years;
- external investment in infrastructure fails to materialise and problems with traffic congestion continue;
- the proposed marine conservation zones at Beachy head East and East Meridian are not designated because of funding shortages, the government claims;
- there is little scope for development of local affordable housing schemes and job shortages remain problematic in Hastings;
- the pier has been regenerated and is now a major attraction.

Annex 7 Hastings rules of the hypothetical 'European Sustainable Development 2030' fund

The following rules were presented to participants:

- fund application of maximum £45 million to be spent from 1 Jan 2015 to 1 Jan 2030;
- spending of up to 50% of this allowed in the first 5 years;
- a broad remit fund that allows spending on the following goals:
  Social and cultural
  1. increased social justice;
  2. increased community cohesion;
  3. well-educated population;
  4. strong cultural identity;

  Economic
  5. reduced unemployment;
  6. economic growth;

  Environmental
  7. resilience to climate change;
  8. conservation of biodiversity;
  9. reduced pollution;
  10. increased engagement with nature;

- at least five goals need to be addressed covering each of the three categories;
- indicators of success need to be clearly proposed for each of the targeted goals;
- besides addressing these goals, investments need to promote and enhance long-term sustainability.

Annex 8 Hastings SWOT analysis results

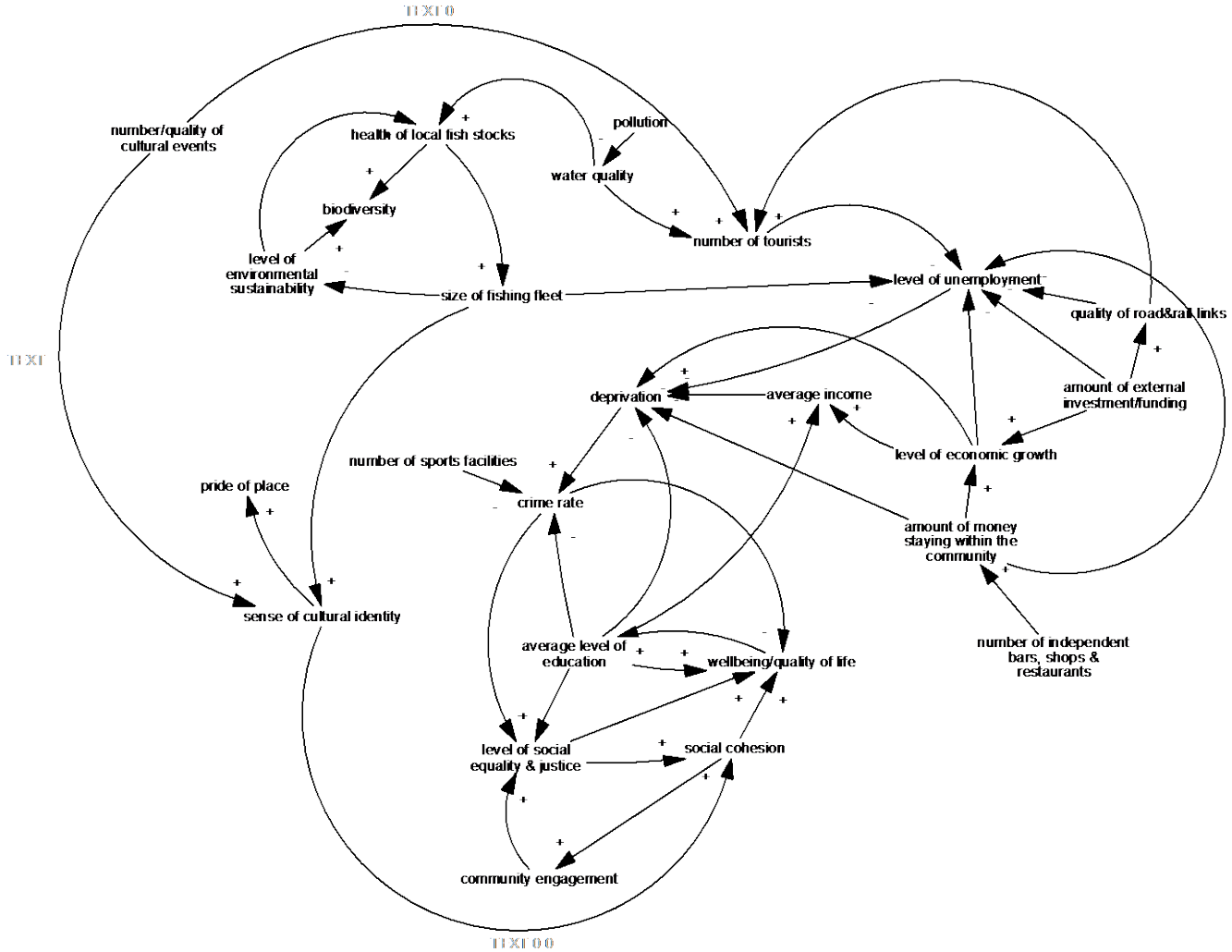
Table 55. Hastings case study: SWOT analysis results. Environmental, social, cultural and economic strengths, weaknesses, opportunities, threats of/to Hastings, plus drivers of change, and actions to exploit opportunities and address weaknesses, as identified by participants for the short, medium and long term.

	Short term: ≤ 5 years	Medium term: ≤ 20 years	Long term: > 20 years
Environmental			
Strengths & opportunities	Marine stewardship certification Climate Fresh produce Marine protected areas Marine environmental research		Hills and countryside By the sea Sustainable fishing
Weaknesses & threats	Poor water quality Short term threat from MPAs Flooding Transport	Bathing water quality Cliff erosion Beach accretion Lack of marine environment information available	Climate change: wind and wave
Drivers of change	Water quality Pride	Climate change Threat to fish stocks FLAG	
Actions	Raise awareness of consequence of failure to act Fisheries and science working together	Enforcement of MPAs	Partnership working EA.SW Defra funding for coastline protection Shoreline: holding the line Surface water management plan for inland flooding Shoreline management plan for flooding and coastal erosion Lower consumption
Social			
Strengths & opportunities	Community Community space: link to fishing industry Varying sporting activities Community Pride of place Lifestyle Old town community	Education, Upskilling, Aspiration, Attainment New university	Education Diversity
Weaknesses & threats	Traditional family Crime Gentrification Isolation, disconnection Transport links	Low wages Social deprivation Housing capacity Stereotyping Social deprivation Bathing water quality Low economy	Impacts of social relocation to Hastings Lack of young fishermen

	Short term: ≤ 5 years	Medium term: ≤ 20 years	Long term: > 20 years
Drivers of change	Welfare reform Transport Deprivation Lack of engagement/disenfranchised Local pubs and community centres Struggling Economy Pride Changing values: less interest in fishing	Sewage pollution Key figures (volunteers) in community	Declining organised community involvement
Actions	Extension of fishing fleet Shared goals and responsibilities Communities works and space e.g. CoC Community inclusion	SW/Env agency action plan Connectivity and cooperation New sporting facilities including a swimming pool	Education
Economic			
Strengths & opportunities	Link road to Bexhill Independent shops, bars and restaurants Cost of living Tourism International students Tourism: 1066, smugglers	Clusters of industry and business New building Language schools Job opportunities related to university	By the sea Education Long term benefit from MPAs Increasing visitor numbers Europe Fast rail link
Weaknesses & threats	Lack of train transport to London Difficult to attract people with right skills Highly skilled move out Loss of funding Second home ownership Seafood and wine as a loss Fish quotas Retail multinational out of town Economic deprivation Quotas Government cuts Crime CFP reform	Transport Increasing congestion Budget cuts Road connections Effect of climate change on tourism Lack of jobs Lack of harbour (to bring in yachts)	
Drivers of change	Transport Deprivation Average income CFP reform and European Commission Tourism	Politics small and large Economic regeneration Budget cuts	Fishing Industry

	Short term: ≤ 5 years	Medium term: ≤ 20 years	Long term: > 20 years
	Welfare Reform		
Actions	Engage with foreshore trust	Keep jobs we have and develop new ones through innovation and good service Promote the opportunity for tourism Evidence based lobbying for the industry Attract funding from outside the town	Improved transport links Higher paid jobs
Cultural			
Strengths & opportunities	History Bonfire, Jack in the green, pirates Herring fair Seafood and wine Cultural diversity Volunteers Art and art galleries Cultural open space Museums Link road Fishing Lifestyle Festivals International connections Classroom on the coast	Communications Partnerships Cultural regeneration City of culture Pier regeneration Built heritage	Jack in the Green
Weaknesses & threats	Local media	Loss of cohesion: cultural separation	
Drivers of change	Food Education Tourism	Finance e.g. last public library closes	
Actions	Harness culture to educate and upskill	Valuing heritage Attracting funding from outside town More promotion of Hastings Attract higher spending tourists e.g. through festivals	

Annex 9 Hastings conceptual system modelling results



Model 1

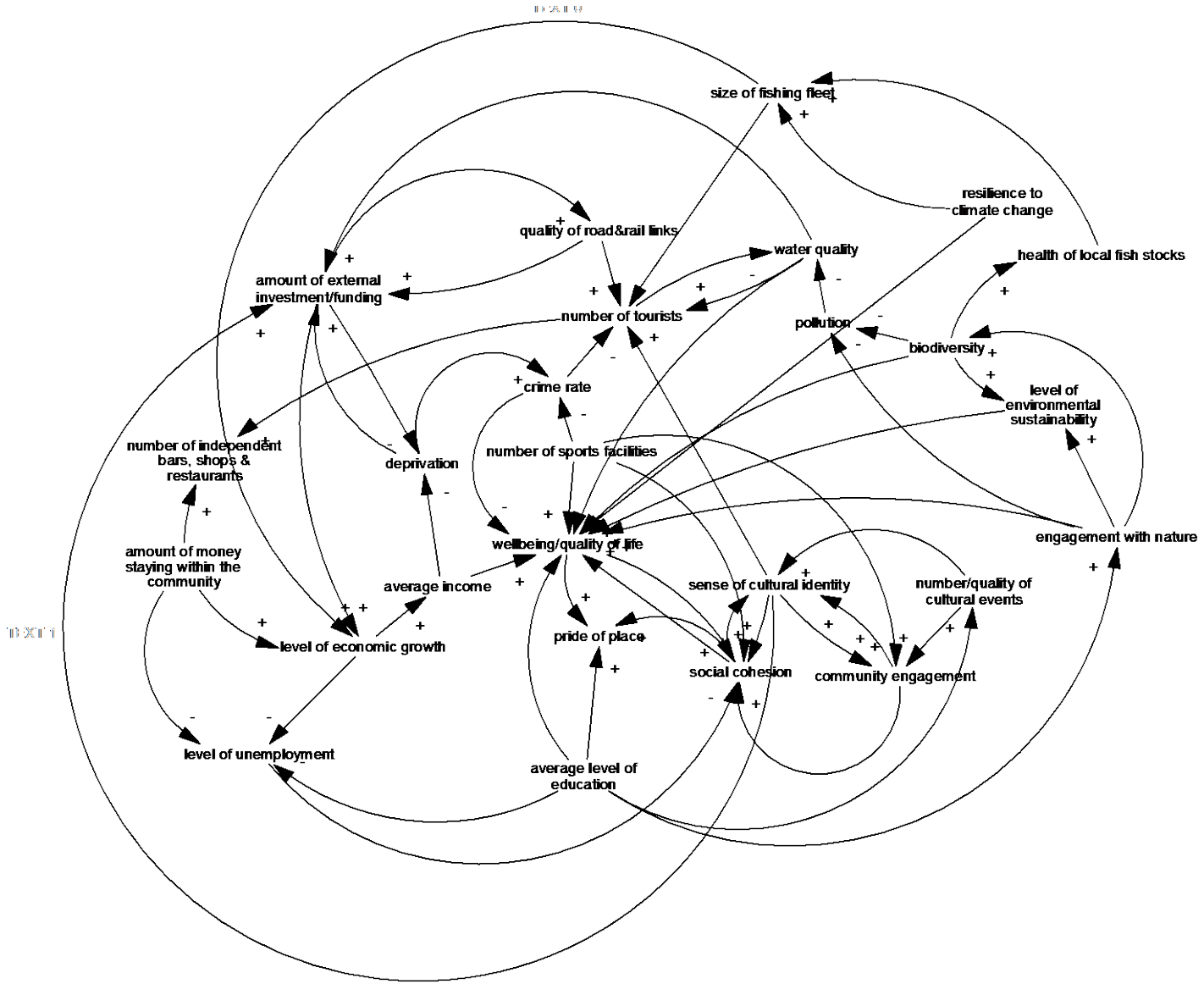
Model 1: perceptions of impact of drivers perceived by participants:

- *fish quota:* impact on the dynamics of the balancing feedback loop between health of fish stocks, size of the fleet and environmental sustainability;
- *MCZ/MPA designation*: idem;
- *climate change*: impacts on the fishing fleet through more extreme weather. There is an interaction with the role of quota's; quota's are not available for species that may increase locally as a result of climate change;
- *reduced consumerism*: negative impacts on economic growth with potential economic and social consequences (unemployment), but there might be an increase in spending locally as a result of changes in attitudes, and potential improvement in environmental variables; effects are thus mixed and dynamics are complex.

Model 1: key feedback loops and important chains identified by participants:

- balancing feedback loop between size of fleet, sustainability, and health of fish stocks (interacting with dynamics around climate change, MPAs/MCZs, and quota);
- education can increase social justice, improving well-being, and increased well-being can lead to more education (reinforcing loop);
- education can increase average income, reducing deprivation; less deprivation can lead to increase in average level of education (reinforcing loop);
- economic growth can lead to more external investment, reducing unemployment directly and leading to improvement in infrastructure that can reducing unemployment, leading to more economic

Model 1: variables not included: gentrification, resilience to climate change, engagement with nature.


size of fishing fleet
resilience to climate change
quality of road&rail links
water quality
health of local fish stocks
amount of external investment/funding
number of tourists
pollution
biodiversity
crime rate
level of environmental sustainability
number of independent bars, shops & restaurants
deprivation
number of sports facilities
wellbeing/quality of life
engagement with nature
amount of money staying within the community
average income
sense of cultural identity
number/quality of cultural events
level of economic growth
pride of place
social cohesion
community engagement
level of unemployment
average level of education

Model 2

Model 2: perceptions of impact of drivers perceived by participants:

- *fish quota*: impact on size of the fleet, through this on tourism, economic growth and unemployment;
- *MCZ/MPA designation*: effects are unclear, differing perceptions of what the impacts might be, depending on how the politics unravel;
- *climate change*: impacts on biodiversity (e.g. invasive species) and increased wind impact negatively on the fishing fleet;
- *reduced consumerism*: negative impacts on bars, shops etc; less money/income; increased deprivation; at the same time less waste and environmental benefits.

Model 2: key feedback loops and important chains identified by participants:

- improved education can drive more engagement with nature, improving environmental variables and hence fisheries and tourism, leading to improved economic outcomes and (through both environmental and economic linkages) improved well-being and quality of life;
- increased education could also improve the number or quality of cultural events, cultural identity and pride of place, improving social cohesion, well-being and quality of life;
- external investment can have various effects incl. reducing deprivation and crime, enhancing infrastructure and tourism;
- improved infrastructure could increase tourism, supporting independent bars, shops and restaurants and employment, well-being and quality of life.

Model 2: variables not included: Gentrification, social equality and justice**.**

Annex 10 MPAs DMV contingent valuation attributes

Table 56. MPAs case study: contingent valuation attributes and their levels

Attribute	*Description presented*	*Levels*
Marine landscape	These are details on the type of sea floor and marine landscape, including features that scientists have indicated are of conservation importance.	See Table 57.
Underwater objects	Potential underwater objects that could be found at the dive site are a **rock formation** (for example: a vertical wall, gully or archway), or a **shipwreck**.	Wreck and rock-formation are presented together but form two attributes in the statistical design and analysis. Each consists of an absence/presence dummy.
Sea life	This will indicate some of the animals that you have the chance to encounter at the site. Note that there may be other sea life present in addition to what is featured here. We will consider: • **seal** (grey or common); • **sea bird colony** (e.g. puffins, cormorants, kittiwakes); • **octopus.** We will also consider the presence of **specimen fish**, or any type of **large fish** (for example: ray, dogfish, cod, ling or other large fish over 50 cm/20 inches). We will indicate if you are likely to encounter large/specimen fish, otherwise you are likely to encounter small fish only.	Fish and sea-life are presented together but form two attributes in the statistical design and analysis. Fish: large/specimen fish absent/present dummy. Sea life: as in description plus a 'no seal, sea bird colony or octopus present' base level.
Vulnerable species protected	**There are 40 marine species around the UK that scientists have identified as endangered or vulnerable and that are to be protected by new marine protected areas**. They include particular species of fish, dolphins and whales, crabs, shrimps and lobsters, anemones, jellyfish, snails, sea horses, oysters and mussels, algae and others. Click here to see a list of these species. Here we will indicate how many of these species would be present in the area**. Please note that it is very unlikely that you will encounter, see or catch any of these species at the site.**	Four levels: 0, 5, 10, 15
Access	Here we will indicate how you can access the site. The options are: • Accessible by shore and boat; • Access by shore only, boat use prohibited; • Access by shore, boat, and pier; • Site out at sea, can only be reached by boat.	Four levels: as in description.

Attribute	*Description presented*	*Levels*
Other restrictions	Some activities are not allowed in the area. These could include: • **no dredging & trawling** (restrictions on commercial fishing); • **no potting & gillnetting**; • **no anchoring & mooring** (safety lines for diving and use of anchor in emergencies allowed).	Four levels: • no restrictions (base level); • no dredging & trawling; • no dredging & trawling, no potting & gillnetting; • no dredging & trawling, no anchoring & mooring.
Size of protected area	The size of the protected site in square kilometres. Not all features of the site will occur everywhere within it. 1 km^2 is about the size of 130 football fields. Around two and a half km^2 fit into one square mile.	Four levels: 1, 10, 100, 1000 km^2
Travel distance	The distance that you have to travel to get to the site from your home (all sites are within the UK).	Six levels: 5, 20, 50, 100, 200, 400 miles; each *plus* distance participant to coast. Participant presented with actual number; e.g. if participant lives 25 miles from coast he may be presented with 30, 55, 125, 225 or 425 miles).

Table 57. MPAs case study: marine landscape attribute levels with substrate/habitat combinations

Attribute level	*Description*	*Descriptive text*	*Mapped habitat FOCI (England) and Search Features (Scotland)*
1	No particular features		N/a
2	Mostly sandy or gravelly seafloor with oyster, mussel or flame shell beds	Beds of horse mussels, blue mussels, oysters or flame shells. These shellfish species tend to form dense reefs on the seafloor and provide a food source for other animals.	Blue mussel beds (*Mytilus edulis*), file/flame shell beds (*Limaria hians*), horse mussel beds (*Modiolus modiolus*) and native oyster beds (*Ostrea edulis*).
3	Mostly muddy seafloor with oyster, mussel or flame shell beds	Beds of horse mussels, blue mussels, oysters or flame shells. These shellfish species tend to form dense reefs on the seafloor and provide a food source for other animals.	
4	Mostly rocky seafloor with oyster, mussel or flame shell beds	Beds of horse mussels, blue mussels, oysters or flame shells. These shellfish species tend to form dense reefs on the seafloor and provide a food source for other animals.	
5	Mostly rocky seafloor with large kelp and seaweeds	Different species and sizes of seaweed grow on rocks and boulders. They provide shelter for young fish and other animals.	High energy infralittoral rock: rocky habitats with macroalgae (*Laminaria spp.*)
6	Mostly rocky seafloor with anemones, soft corals, and sponges	A rocky habitat where all sorts of anemones, soft corals, or sponges grow. Among these animals are many slow growing species.	Fragile sponge and anthozoan communities on subtidal rocky habitats.

Attribute level	*Description*	*Descriptive text*	*Mapped habitat FOCI (England) and Search Features (Scotland)*
7	Mostly muddy seafloor with sea-pens, burrowing animals and fireworks anemones	A muddy habitat where you may find long slender sea-pens and a variety of burrowing animals, including shrimps, small lobsters and burrowing fireworks anemones.	Sea pen and burrowing megafauna communities.
8	Mostly sandy or gravelly seafloor with honeycomb or Ross worm colonies	Honeycomb worms or Ross worms, grow in very dense colonies of many thousand tubes, which often look like a honeycomb. They provide a hard surface for other animals and plants to grow on, and hiding spaces for snails and crabs.	Subtidal & intertidal biogenic reefs on sediment: Honeycomb worm reefs (*Sabellaria alveolata*) and Ross worm reefs (*Sabellaria spinulosa*).
9	Mostly rocky seafloor with honeycomb or Ross worm colonies	Honeycomb worms or Ross worms, grow in very dense colonies of many thousand tubes, which often look like a honeycomb. They provide a hard surface for other animals and plants to grow on, and hiding spaces for snails and crabs.	
10	Mostly sandy or gravelly seafloor with sea grass or eel grass beds	These plants grow in very dense patches, which look like underwater meadows. They provide young fish and shellfish with hiding spaces, and pipefish and sea horses may be found here.	Sea grass beds (*Zostera spp.*).
11	Mostly muddy seafloor with burrowing sea urchins and brittle stars	This muddy area hosts burrowing heart urchins and brittle stars, a relative of the sea stars.	Inshore deep mud with burrowing heart urchins (*Brissopsis lyrifera*) & brittle stars (*Amphiura chiajei*).
12	Mostly sandy or gravelly seafloor with scallops and sea urchins	This sandy gravelly patch of seafloor is characterised by scallops, a shellfish with two shells, and different species of sea urchins. Life can be rich at this site and support sea snails, red seaweed, and sea cucumbers.	Subtidal sands and gravels.
13	Mostly sandy or gravelly seafloor in tide swept channel	These environments are characteristic for their strong currents. They are found at the entrances to fjords, lochs and lagoons, between individual islands, and between islands and the mainland. The plentiful supply of food brought in on each tide supports rich and varied communities of marine life.	Tide swept channel.
14	Mostly rocky seafloor in tide swept channel	These environments are characteristic for their strong currents. They are found at the entrances to fjords, lochs and lagoons, between individual islands, and between islands and the mainland. The plentiful supply of food brought in on each tide supports rich and varied communities of marine life.	

Attribute level	*Description*	*Descriptive text*	*Mapped habitat FOCI (England) and Search Features (Scotland)*
15	Mostly rocky seafloor with rocky habitats in estuary	The rich and sheltered waters of estuaries provide nursery grounds for fish, and rocky areas are particularly important for this.	Estuarine rocky habitats.
16	Mostly muddy seafloor with intertidal boulders	The under surfaces of boulders (stones of at least 10 inches diameter) provide a living space for a wide variety of life and are an important refuge for the eggs of fish, dog whelks and sea slugs.	Intertidal under boulder communities.

Annex 11 MPAs DMV contingent valuation statistical analysis

Since WTP values were assumed to be positive and significantly skewed, WTP from the CVM questions was transformed using the natural logarithm. Thus we modelled that:

$$\log(WTP_{CVM} + 1) = \beta_0 + \beta_1 X_1 + \cdots + \beta_k X_k + u_i \quad (1)$$

with β_0 the intercept, β_k the regression weight for an attribute or individual characteristic X_k and u_i the residual, which is assumed to be normally distributed with a mean of zero. While the use of payment cards for CVM has significant advantages (e.g. cognitive ease for respondents, reduction of starting point bias), exact WTP is not elicited from respondents. Instead, WTP is assumed to lie in the interval between the amount indicated and the next higher amount. Estimating using midpoints or lower bounds can lead to bias, which can be avoided by using interval regression (Cameron & Huppert, 1989). We applied a random effects specification to account for the clustered nature of the data. Birol *et al.* (2008) provide further detail on analysis of multi-attribute payment card data using random effects interval regression. We used the Stata 12 *xtintreg* procedure (StataCorp Ltd) with 12 quadrature points; robustness of the estimation was verified by estimating additional 8 and 16 quadrature point models to check the coefficients were stable.

In addition to the attributes, we included sex, age, income, angler/diver support for MPAs, and membership of an environmental organisation as model parameters in initial models. We also interacted all variables apart from marine landscape with the stage variable to search for significant differences between stages for each variable. Significance of interactions was evaluated with multiple hypotheses Wald-tests. If interactions with none of the stages achieved p<5%, the interaction was dropped. Wald post-estimation for hypothesis 1 tested on significant differences between the individual valuation tasks during the workshop and the online survey (stage 1 vs 2 and stage 1 vs 4), for hypothesis 2 between individual valuation tasks (stage 2 vs 4) and group valuation tasks (stage 3 vs 5), and for hypothesis 3 between group valuation and individual valuation tasks (stage 2 vs 3 and stage 4 vs 5).

Parameters were dropped if $p \geq 10\%$, as here we were mainly interested in the relative importance of attributes and interactions, not the predictive capacity of the model as a whole. The resulting model at this stage was then used as the basis for two final models. The first (Model A) incorporated the mean of 14 subjective well-being indicators (described in Section 4.4.2.3, above) as a parameter. The second model (B) included psychometric parameters: biospheric, altruistic and egoistic values; New Ecological Paradigm (NEP) as a measure of environmental worldview; awareness of consequences and ascription of responsibility beliefs; environmental norms; environmental subjective norms; and perceived behavioural control; psychometric factors were detailed in Section 4.1.4. We used psychometric parameters based on survey data and included a second parameter constituted of the difference between the survey and workshop results where means differed significantly between them. Again, insignificant interactions and parameters were dropped as described above. A third model (C) was developed to specifically look at differences between how marine landscape was evaluated in the online survey vs the workshops. We implemented this separately from the other models as the attribute had 16 levels and we had a relatively small sample size of 1,040 observations (20 per participant).

Annex 12 MPAs DMV contingent valuation model results

Results of the interval regression models used to analyse the contingent valuation data from the five stages of data collection (detailed in Section 4.4.2.1, **Table 32** and **Figure 31**) are given in **Table 58** and **Table 59**, below. Because WTP was estimated as the natural log of the parameters (**Equation 1**, p266), it is not possible to establish WTP figures per individual attribute. However, the coefficients (*β*) in **Table 58** provide an indication of the relative importance of each attribute; a negative sign means the parameter has a negative influence on WTP.

Table 58. MPAs case study: contingent valuation interval regression models.

Model A				*Model B*				*Model C*			
Parameter (unit)	***β***	***SE***		***Parameter (unit)***	***β***	***SE***		***Parameter (unit)***	***β***	***SE***	
Distance (10 miles)	-0.022	0.002	***	Distance (10 miles)	-0.019	0.002	***	Distance (10 miles)	-0.022	0.002	***
Vulnerable species (1 sp)	0.017	0.006	*	Vulnerable species (1 sp)	0.020	0.007	**	Vulnerable species (1 sp)	0.015	0.006	*
Seal	0.142	0.073	T	Seal	0.213	0.076	**	Seal	0.145	0.074	T
Octopus	0.190	0.080	*	Octopus	0.269	0.083	**	Octopus	0.268	0.081	**
Shipwreck	0.223	0.063	***	Shipwreck	0.203	0.065	**	Shipwreck	0.226	0.064	***
Stage 1	Base			Stage 1	Base			Large fish	0.347	0.064	***
Stage 2	0.065	0.492	NS	Stage 2	1.059	0.683	NS	Access 1	Base		
Stage 3	-1.568	0.495	**	Stage 3	1.614	0.684	*	Access 2	-0.038	0.135	NS
Stage 4	-0.971	0.488	*	Stage 4	0.483	0.687	NS	Access 3	0.187	0.084	*
Stage 5	-1.715	0.490	***	Stage 5	0.492	0.689	NS	Access 4	-0.261	0.083	**
Access 1	Base			Access 1	Base			Restrictions 1	Base		
Access 2	0.062	0.251	NS	Access 2	0.103	0.265	NS	Restrictions 2	0.461	0.090	***
Access 3	0.247	0.159	NS	Access 3	0.383	0.165	*	Restrictions 3	0.602	0.093	***
Access 4	-0.169	0.156	NS	Access 4	-0.055	0.160	NS	Restrictions 4	0.402	0.099	***
Stage 1 * Access 1	Base			Stage 1 * Access 1	Base			Workshop	-1.107	0.205	***
Stage 2 * Access 2	-0.339	0.415	NS	Stage 2 * Access 2	-0.380	0.427	NS	Habitat 1	Base		
Stage 3 * Access 2	0.671	0.415	NS	Stage 3 * Access 2	0.609	0.427	NS	Habitat 2	0.207	0.372	NS
Stage 4 * Access 2	-0.128	0.398	NS	Stage 4 * Access 2	-0.133	0.415	NS	Habitat 3	-0.308	0.289	NS
Stage 5 * Access 2	-0.785	0.399	*	Stage 5 * Access 2	-0.856	0.415	*	Habitat 4	-0.103	0.286	NS
Stage 2 * Access 3	-0.053	0.249	NS	Stage 2 * Access 3	-0.100	0.262	NS	Habitat 5	0.196	0.286	NS
Stage 3 * Access 3	0.077	0.250	NS	Stage 3 * Access 3	-0.243	0.262	NS	Habitat 6	0.461	0.286	NS
Stage 4 * Access 3	-0.173	0.237	NS	Stage 4 * Access 3	-0.266	0.246	NS	Habitat 7	0.246	0.305	NS
Stage 5 * Access 3	-0.376	0.238	NS	Stage 5 * Access 3	-0.509	0.247	*	Habitat 8	-0.130	0.306	NS
Stage 2 * Access 4	-0.055	0.258	NS	Stage 2 * Access 4	-0.149	0.267	NS	Habitat 9	0.203	0.310	NS
Stage 3 * Access 4	0.180	0.259	NS	Stage 3 * Access 4	-0.081	0.268	NS	Habitat 10	0.170	0.304	NS
Stage 4 * Access 4	-0.036	0.243	NS	Stage 4 * Access 4	-0.159	0.251	NS	Habitat 11	-0.494	0.284	T
Stage 5 * Access 4	-0.691	0.243	**	Stage 5 * Access 4	-0.800	0.251	**	Habitat 12	0.619	0.309	*
Restrictions 1	Base			Restrictions 1	Base			Habitat 13	-0.065	0.373	NS
Restrictions 2	-0.063	0.174	NS	Restrictions 2	-0.160	0.179	NS	Habitat 14	0.515	0.336	NS
Restrictions 3	0.280	0.178	NS	Restrictions 3	0.232	0.184	NS	Habitat 15	-0.526	0.339	NS
Restrictions 4	0.026	0.193	NS	Restrictions 4	-0.124	0.199	NS	Habitat 16	-0.173	0.315	NS
Stage 1 * Restrictions 1	Base			Stage 1 * Restrictions 1	Base			Habitat 1 * workshop	Base		
Stage 2 * Restrictions 2	0.357	0.258	NS	Stage 2 * Restrictions 2	0.321	0.267	NS	Habitat 2 * workshop	0.399	0.418	NS
Stage 3 * Restrictions 2	0.547	0.258	*	Stage 3 * Restrictions 2	0.700	0.268	**	Habitat 3 * workshop	1.437	0.346	***
Stage 4 * Restrictions 2	0.998	0.264	***	Stage 4 * Restrictions 2	1.187	0.272	***	Habitat 4 * workshop	0.919	0.345	**
Stage 5 * Restrictions 2	0.788	0.264	**	Stage 5 * Restrictions 2	0.911	0.273	**	Habitat 5 * workshop	0.863	0.334	*
Stage 2 * Restrictions 3	-0.027	0.258	NS	Stage 2 * Restrictions 3	-0.023	0.266	NS	Habitat 6 * workshop	0.470	0.341	NS
Stage 3 * Restrictions 3	0.380	0.258	NS	Stage 3 * Restrictions 3	0.429	0.266	NS	Habitat 7 * workshop	0.740	0.354	*
Stage 4 * Restrictions 3	0.705	0.256	**	Stage 4 * Restrictions 3	0.958	0.268	***	Habitat 8 * workshop	0.519	0.357	NS
Stage 5 * Restrictions 3	0.337	0.257	NS	Stage 5 * Restrictions 3	0.356	0.268	NS	Habitat 9 * workshop	0.843	0.367	*
Stage 2 * Restrictions 4	0.246	0.322	NS	Stage 2 * Restrictions 4	0.365	0.330	NS	Habitat 10 * workshop	0.915	0.355	*
Stage 3 * Restrictions 4	-0.126	0.322	NS	Stage 3 * Restrictions 4	0.005	0.331	NS	Habitat 11 * workshop	1.341	0.337	***
Stage 4 * Restrictions 4	0.746	0.280	**	Stage 4 * Restrictions 4	1.043	0.291	***	Habitat 12 * workshop	0.344	0.365	NS
Stage 5 * Restrictions 4	0.906	0.280	**	Stage 5 * Restrictions 4	1.056	0.292	***	Habitat 13 * workshop	0.857	0.423	*
Large fish	0.255	0.125	*	Large fish	0.245	0.131	T	Habitat 14 * workshop	0.541	0.389	NS
Stage 1 * Large fish	Base			Stage 1 * Large fish	Base			Habitat 15 * workshop	1.261	0.389	**
Stage 2 * Large fish	0.179	0.234	NS	Stage 2 * Large fish	0.173	0.245	NS	Habitat 16 * workshop	0.506	0.364	NS
Stage 3 * Large fish	-0.328	0.234	NS	Stage 3 * Large fish	-0.259	0.246	NS	Angler	-0.327	0.121	**
Stage 4 * Large fish	0.191	0.202	NS	Stage 4 * Large fish	0.140	0.207	NS	Well-being	0.123	0.070	T
Stage 5 * Large fish	-0.313	0.202	NS	Stage 5 * Large fish	-0.406	0.208	T	Constant	1.396	0.336	***
Habitat 1	Base			Habitat 1	Base			Log-likelihood	-2105		
Habitat 2	0.332	0.184	T	Habitat 2	0.166	0.195	NS	χ^2 (45 d.f.)	364		***
Habitat 3	0.587	0.159	***	Habitat 3	0.527	0.164	**	*Pseudo* R^2	0.08		
Habitat 4	0.483	0.160	**	Habitat 4	0.454	0.165	**				
Habitat 5	0.698	0.144	***	Habitat 5	0.722	0.148	***				
Habitat 6	0.605	0.163	***	Habitat 6	0.576	0.169	**				
Habitat 7	0.653	0.154	***	Habitat 7	0.661	0.155	***				
Habitat 8	0.085	0.166	NS	Habitat 8	0.035	0.174	NS				
Habitat 9	0.681	0.175	***	Habitat 9	0.677	0.181	***				
Habitat 10	0.690	0.157	***	Habitat 10	0.743	0.161	***				
Habitat 11	0.402	0.161	*	Habitat 11	0.349	0.166	*				
Habitat 12	0.656	0.165	***	Habitat 12	0.574	0.170	**				
Habitat 13	0.326	0.172	T	Habitat 13	0.371	0.183	*				

Model A				*Model B*				*Model C*		
Parameter (unit)	***β***	***SE***		***Parameter (unit)***	***β***	***SE***		***Parameter (unit)***	***β***	***SE***
Habitat 14	0.761	0.168	***	Habitat 14	0.901	0.170	***			
Habitat 15	0.247	0.165	NS	Habitat 15	0.248	0.170	NS			
Habitat 16	-0.001	0.179	NS	Habitat 16	0.091	0.187	NS			
Angler	0.081	0.170	NS	Angler	0.109	0.184	NS			
Stage 1 *Angler	Base			Stage 1 *Angler	Base					
Stage 2 *Angler	-0.394	0.185	*	Stage 2 *Angler	-0.495	0.197	*			
Stage 3 *Angler	-0.597	0.185	**	Stage 3 *Angler	-0.797	0.198	***			
Stage 4 *Angler	-0.419	0.186	*	Stage 4 *Angler	-0.469	0.198	*			
Stage 5 *Angler	-0.603	0.186	**	Stage 5 *Angler	-0.919	0.199	***			
Well-being	0.013	0.097	NS	Altruistic & Biospheric†	0.153	0.080	T			
Stage 1 * Well-being	Base			Stage 1 * Altruistic & Biospheric	Base					
Stage 2 * Well-being	-0.064	0.106	NS	Stage 2 * Altruistic & Biospheric	-0.205	0.086	*			
Stage 3 * Well-being	0.266	0.107	*	Stage 3 * Altruistic & Biospheric	-0.277	0.086	**			
Stage 4 * Well-being	0.068	0.106	NS	Stage 4 * Altruistic & Biospheric	-0.110	0.086	NS			
Stage 5 * Well-being	0.309	0.107	**	Stage 5 * Altruistic & Biospheric	-0.005	0.086	NS			
Constant	1.651	0.441	***	Egoistic	-0.153	0.088	T			
Log-likelihood	-2047			Stage 1 * Egoistic	Base					
χ^2 (69 d.f.)	478		***	Stage 2 * Egoistic	0.274	0.095	**			
Pseudo R^2	0.10			Stage 3 * Egoistic	0.123	0.095	NS			
				Stage 4 * Egoistic	0.221	0.095	*			
				Stage 5 * Egoistic	0.025	0.095	NS			
				Egoistic change	0.030	0.060	NS			
				Stage 1 * Egoistic change						
				Stage 2 * Egoistic change	-0.003	0.065	NS			
				Stage 3 * Egoistic change	0.053	0.065	NS			
				Stage 4 * Egoistic change	-0.054	0.065	NS			
				Stage 5 * Egoistic change	0.132	0.065	*			
				Subjective norms	0.197	0.124	NS			
				Stage 1 * Subjective norms						
				Stage 2 * Subjective norms	-0.260	0.133	T			
				Stage 3 * Subjective norms	-0.287	0.133	*			
				Stage 4 * Subjective norms	-0.344	0.133	*			
				Stage 5 * Subjective norms	-0.254	0.133	T			
				Constant	0.534	0.620	NS			
				Log-likelihood	-1830					
				χ^2 (84 d.f.)	482		***			
				Pseudo R^2	0.12					

*** Significant at p<0.001; **<0.01; *<0.05;T: tendency at p<0.1; NS: not significant; SE: standard error; d,f.: degrees of freedom; sp: species.

Table 59. MPAs case study: variables used in the contingent valuation models in Table 58.

Parameter	*Description*
Distance	Distance from the participant's home to the MPA in 10 mile increments
Vulnerable species	Vulnerable species protected within the MPA; coefficient per increment of 1 species
Seal	Grey or common seal present in the MPA (base level = not present)
Octopus	Octopus present in the MPA (base level = not present)
Shipwreck	Shipwreck present in the MPA (base level = not present)
Large fish	Large/specimen fish present in the MPA (base level = only small fish present)
Stage 1	Online survey (valuation stage 1; base level)
Stage 2	First individual valuation in workshop (valuation stage 1)
Stage 3	First group valuation in workshop (valuation stage 3)
Stage 4	Second individual valuation in workshop (valuation stage 4)
Stage 5	Second group valuation in workshop (valuation stage 5)
Workshop	All workshop stages combined i.e. valuation stages 2-5 (base level = online survey)
Access 1	Access by shore and boat (base level)
Access 2	Access by shore only
Access 3	Access by shore, boat and pier
Access 4	Access by boat only
Restrictions 1	None of the restrictions (base level)
Restrictions 2	No dredging and trawling
Restrictions 3	No dredging, trawling, potting and gillnetting
Restrictions 4	No dredging, trawling, anchoring and mooring
Habitat 1	Mostly muddy seafloor, no particular features (base level)
Habitat 2	Mostly sandy or gravelly seafloor with horse mussels, blue mussels, oysters, or flame shells
Habitat 3	Mostly muddy seafloor with horse mussels, blue mussels, oysters, or flame shells
Habitat 4	Mostly rocky seafloor with horse mussels, blue mussels, oysters, or flame shells
Habitat 5	Mostly rocky seafloor with large kelp and seaweeds
Habitat 6	Mostly rocky seafloor with anemones, soft corals, and sponges
Habitat 7	Mostly muddy seafloor with sea-pens, burrowing animals and firework anemones
Habitat 8	Mostly sandy or gravelly seafloor with honeycomb or Ross worm colonies
Habitat 9	Mostly rocky seafloor with honeycomb or Ross worm colonies
Habitat 10	Mostly sandy or gravelly seafloor with sea grass or eel grass beds
Habitat 11	Mostly muddy seafloor with burrowing sea urchins and brittle stars
Habitat 12	Mostly sandy or gravelly seafloor with scallops and sea urchins
Habitat 13	Mostly sandy or gravelly seafloor in tide swept channel
Habitat 14	Mostly rocky seafloor in tide swept channel
Habitat 15	Mostly rocky seafloor with rocky habitats in estuary
Habitat 16	Mostly muddy seafloor with intertidal boulders
Angler	Participant stated to be an angler (base level = diver)
Well-being	Mean of 14 subjective well-being indicators; workshop data (Section 4.4.2.3). Coefficient per point on 5 point Likert scale.
Altruistic & Biospheric	Mean of 3 biospheric and 3 altruistic items*; survey data; combined as strong covariance between altruistic and biospheric factors. Coefficient per point on 9 point Likert scale.
Egoistic	Mean of 3 egoistic items*; survey data. Coefficient per point on 9 point Likert scale.
Egoistic change	Difference in means of egoistic values between survey data and workshop data. Coefficients per point difference on Likert-scale.
Subjective norms	Mean of 2 subjective norms items* post-deliberation. Coefficient per point on 5 point Likert scale.
* For psychometric item descriptions see Table 20, p121.	

Annex 13 MPAs well-being indicators: Details of analysis and differences between survey and workshops

Details of analysis: To understand the dimensions of well-being experienced by divers and anglers, the results from the survey data were initially analysed through exploratory factor analysis (EFA) using the *psych* package in R 2.15.2 (R Development Core Team). Principle axis factoring (pairwise deletion of missing data) with oblique rotation (*oblimin*) was used to identify meaningful groups of indicator statements measuring distinct dimensions of well-being following the approach outlined in Fuller *et al.* (2007) and Dallimer *et al.*(2012) (see Tabachnick & Fidell, 2001 for a detailed discussion of factor analysis). Factors were constructed from statements with factor loadings of 0.32 and above [Costello & Osborne consider this to be a minimum criterion (Costello & Osborne, 2005)] and Cronbach's alpha was calculated to evaluate reliability. Indicator statements that did not load onto the factors and were associated with single-measure *a priori* constructs of well-being were considered as single-measure dimensions on the basis of their face validity if they were congruent with one of the constructs identified *a priori* from the literature; in this case they were included in subsequent analyses. The responses to the indicator statements were treated as continuous over the 5-point response scale. As there was a similar positive skewness across all individual items, we proceeded with conventional inter-indicator correlations.

Following the EFA we tested the fit of our resulting model using confirmatory factor analysis (CFA). This was carried out using the *sem* package in R 2.15.2 (R core development team). Results from the CFA included three factors identified in the EFA and three of the four single-measure dimensions of well-being. Due to the high inter-correlation among the factors and single-measure dimensions, all co-variances were included in the model. Composite scores for participants were calculated by taking the means of the indicator statements within each factor and these were used in subsequent analysis. This straightforward approach has the benefit that missing values can be easily dealt with (Gorsuch, 1983; Tabachnik & Fidell, 2001).

To test the effects of deliberation upon subjective well-being we used two models; firstly a general linear model (GLM) to compare differences between all participants who completed the online survey and/or the workshop well-being exercise (i.e. using complete participant data) and secondly a generalised linear mixed model (GLMM) to analyse how the composite scores of individuals (individual change data) were influenced by participating in the deliberative workshop process (implemented using *gamm* procedure in R with a quasi-binomial distribution). We looked at whether scores were different among divers and anglers and also whether the type of deliberative workshop (MCA or DMV) influenced perceived well-being.

Differences in subjective well-being reported by survey and workshop participants: Overall results and results that indicate individual changes as a consequence of participating in one of the workshops are given in the main text. Here we will briefly discuss the differences in results between *all* participants of the survey vs *all* participants of the workshops, not just the group of individuals who participated in both.

There were sufficient sample sizes in the complete participant data to compare responses of divers and anglers (**Table 60**). Divers reported significantly higher scores for engagement and interaction with nature and place identity if they had attended a workshop compared to the survey but no difference was observed among anglers. This pattern was also observed for therapeutic value but only for divers who participated in MCA workshops. For the single-measure dimension spiritual value, divers' scores were higher in MCA workshops compared to the survey results. Memory/transformative value was scored higher by divers for both types of workshop while social bonds was highest after the DMV workshops. In contrast anglers' scores for social bonds were lower

in DMV workshops compared to the survey. It must be noted that although the differences described above were statistically significant, scores were generally at the positive end of the scale for both the survey and workshops with average scores for groups of divers and anglers ranging from 3.53 to 4.64 (**Table 60**).

Table 60. MPAs case study: well-being results: all survey participants vs all workshop participants, mean factor scores and standard deviations

Dimension	*Divers/anglers*	*Survey*	*DMV workshops*	*MCA workshops*
Engagement and interaction with nature	D	4.06±0.63	4.24±0.79 *	4.36±0.48 *
	A	3.98±0.74	4.03±0.61	4.15±0.59
Place identity	D	3.56±0.79	3.85±0.96 *	3.84±0.83 *
	A	3.85±0.83	3.81±0.83	4.02±0.56
Therapeutic value	D	3.99±0.72	3.93±0.99	4.15±0.65 *
	A	4.10±0.77	3.91±0.85	4.17±0.61
Spiritual value	D	3.85±0.92	3.86±1.13	3.86±1.00
	A	3.83±0.97	3.53±1.00 *	4.25±0.62 *
Memorable/Transformative value	D	4.28±0.74	4.57±0.86 *	4.64±0.65 *
	A	4.17±0.84	4.32±0.57	4.42±0.51
Social bonds	D	4.00±0.86	4.19±1.12	4.27±0.90
	A	3.82±0.91	3.63±1.05 *	4.00±0.85
* Significantly different from survey at p<0.05.				