Trialling a method to quantify the 'cultural services' of the English landscape using Countryside Survey data

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ABSTRACT

Increasing pressure on natural resources driven by population growth and higher levels of individual resource consumption have led to the need to measure and ultimately place values on the diversity of ecosystem services supported by land in order to manage it appropriately. The complexity underlying the provision of many seemingly simple ecosystem services, e.g. drinking water, make the process of identifying and making appropriate measures far from simple. Cultural services, defined as the nonmaterial benefits that people obtain from ecosystems, comprise a range of experiences of nature which enhance human well-being in a variety of ways. Measurement of the experiential benefits of ecosystems has proved difficult, despite their acknowledged importance. This paper describes a novel approach for providing measures of cultural services at national scale (England). The interdisciplinary approach described combines data from a national survey of the biophysical components of the UK countryside with data collected from regional assessments of experiential qualities of landscape in England. The paper discusses the results, merits and limitations of the datasets and approaches used.

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Introduction

Increasing pressure on natural resources and concerns about environmental change has led to a re-casting of the functioning of natural and semi-natural ecosystems in terms of human requirements both currently and in the future (Daily et al., 2009). Termed 'ecosystem services', these provide a focus for policy makers seeking to ensure sustainable land use and have become part of the language of scientists and politicians working in this area (Ellison, 2009; Defra, 2007). Although the launch of the Millennium Ecosystem Assessment (MEA, 2005) illustrated considerable intellectual development surrounding the understanding of ecosystem goods and services, they continue to provide significant challenges for scientists. Alongside the need to frame and define what ecosystem services constitute, is the challenge of how to measure and understand interactions between services in any given ecosystem (Carpenter et al., 2009; Feld et al., 2009; Nelson et al., 2009). Ultimately, being able to fully value ecosystems should help to determine the extents and type of ecosystems which are retained and, where necessary, protected.

Cultural services are defined as the nonmaterial benefits that people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation and aesthetic experience, including, for example, knowledge systems, social relations, and aesthetic values (MEA, 2005). It is widely recognized that landscapes provide people with these services and that they may ultimately be of key importance for ensuring the protection of those landscapes through people's commitment to nature conservation (Angulo-Valdes and Hatcher, 2009; Dunlap et al., 1993). Whilst many studies acknowledge the importance of considering cultural services in evaluating land use options few have attempted to provide measures of them as they relate to specific ecosystems/landscapes/regions. Thus whilst there are now numerous indicators for the majority of ecosystem services, there are very few for cultural services (Feld et al., 2009). This may, in part, be due to the fact that these services require very different measures to those generally used by biophysical scientists (Daily et al., 2009). More often than not the approaches used by quantitative scientists to measure/value cultural services have included economic methods (Angulo-Valdes and Hatcher, 2009; Zhang et al., 2010; Martin-Lopez et al., 2009; Costanza et al., 1997) or methods using habitat extent or use (Raudsepp-Hearne et al., 2010). In other cases no measures are attempted as a result of cultural services falling outside of the sphere of markets and therefore becoming invisible in traditional economic analyses (e.g. (Swinton et al., 2007; Pejchar and Mooney, 2009). In these cases the fact that cultural services are based on personal and local value systems (Pejchar and Mooney, 2009) results in their

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not being incorporated alongside more quantifiable service measures.

Studies which provide information about the cultural services offered by particular ecosystems or regions are more usually based on the collection of qualitative data from people who use, or visit, those areas (Sodhi et al., 2010; Raymond et al., 2009; Suckall et al., 2009). Such studies may attempt to understand the complexity of cultural services at different locations by identifying different aspects of cultural services, e.g. spiritual, aesthetic, tourism (Sodhi et al., 2010) which are accessible at those sites and eliciting opinion (through questionnaires or interviews) on their value. Raymond et al. (2009) went a step further using both in-depth interviews and a mapping task to quantify cultural (or community) values and assign them to specific areas within the South Australian Murray-Darling Basin.

These studies provide valuable information on cultural services which can be used for the management of ecosystem services through land use options within specific regions. For large scale management of ecosystem services it may be necessary to identify more generic methodologies which can be used for measuring cultural services at national scales. Such an approach might rely on information about the presence and extent of different landscape components at a large scale, along with associated qualitative information on the cultural value of these components. If measures for cultural services are not available for comparison with measures for other ecosystem services then the risk is that they will be undervalued or omitted.

This paper explores potential methods for using quantitative data collected for the Countryside Survey (Firbank et al., 2003) in combination with qualitative data on the cultural services and experiential qualities that landscapes provide to society to measure cultural ecosystem services at a national scale. This work was carried out as part of an exercise recasting the Countryside Survey data in terms of ecosystem services (the CS Integrated Assessment). The opportunity to use emerging research on people's perceptions of landscape to measure cultural ecosystem services came through the involvement and encouragement of a landscape policy specialist (working for the government Department for environment, food and rural affairs (Defra) in England) who was engaging with both projects. The common link between the datasets is their concentration on landscape, one collecting biophysical data on landscape variables at the 1 km scale (in order to provide national estimates), the other collecting qualitative data on people's perceptions of landscapes at regional scales. The UK Countryside Survey (Carey et al., 2008) is a unique country level assessment of the UK's natural environment which has been conducted on a randomly stratified sample of up to 591 (in CS2007) 1 km squares in GB approximately every 8 years since 1978. (This data is combined with that from the Northern Ireland Countryside Survey (NICS) to produce UK estimates.) The random stratification is based on underlying definitions for every 1 km square across GB, termed 'landclasses' which are themselves based on a combination of 40 variables describing the physical landscape in those squares including, for example, climate, soils, topography and geology (Bunce et al., 1996). England was divided into 29 landclasses in CS2007 (Fig. 1). CS collects detailed data on the presence and extents of different habitat types (e.g. broadleaved woodland, moorland grassland) and landscape features (e.g. individual trees, hedges and walls) within sample squares which are subsequently used to provide estimates at landclass, regional and country levels for the GB. Thus, in CS, the physical landscape underlies the sampling strategy (landclasses) and the mosaic of habitats and landscape features which constitute the land cover recorded in the sampling squares provide measures of landscape.

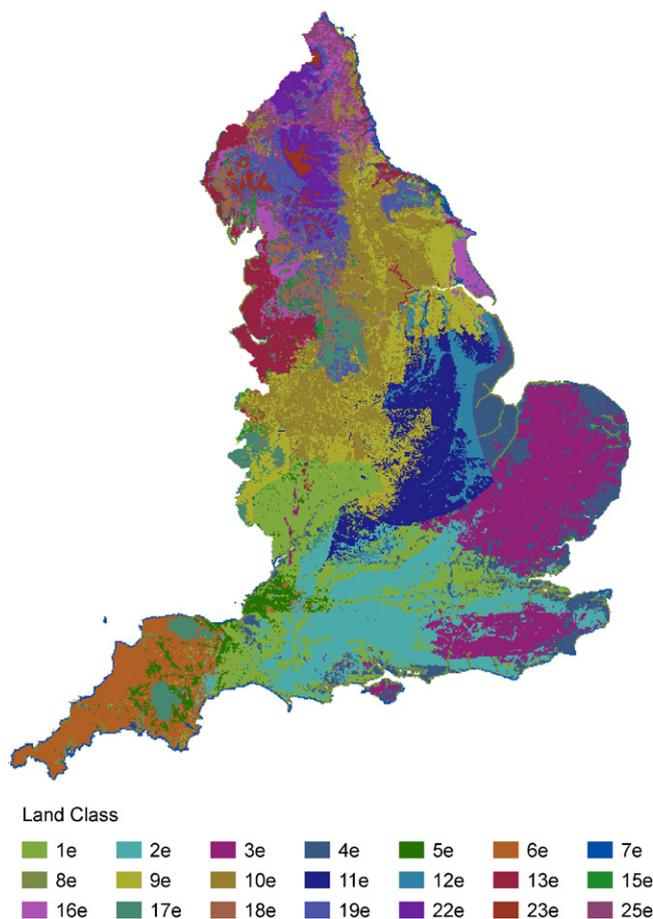Data on the cultural services and experiential qualities that landscapes provide to society resulted from an extensive qualitative social research study (The Research Box, 2009) designed to provide baseline evidence for a report commissioned by the UK government's advisor on the natural environment for England (Natural England). The research was, in part, aimed at understanding whether cultural ecosystem services including, for example, spiritual enrichment and aesthetic enjoyment, correlate to particular landscape characteristics or particular landscape features. The research was designed to provide qualitative material to aid in the updating of National Character Area descriptions and their associated strategic objectives for the future. The English Natural Character Areas[1] (NCAs) divide England into 159 areas with similar landscape character. The character descriptions of each NCA, described in a set of eight regional volumes, highlight the influences which determine the character of the landscape, for example land cover. The NCAs are a widely recognised national spatial framework, for a range of applications including the targeting of agri-environment schemes. The qualitative research was focused on eight NCAs across England.

Methods

Quantitative data collection

Countryside Survey methodologies are well documented and complex (Firbank et al., 2003). Full methodologies for the most recent survey (2007) are available at www.countrysidesurvey.org.uk. Relevant methods are summarised in brief, below. In CS2007

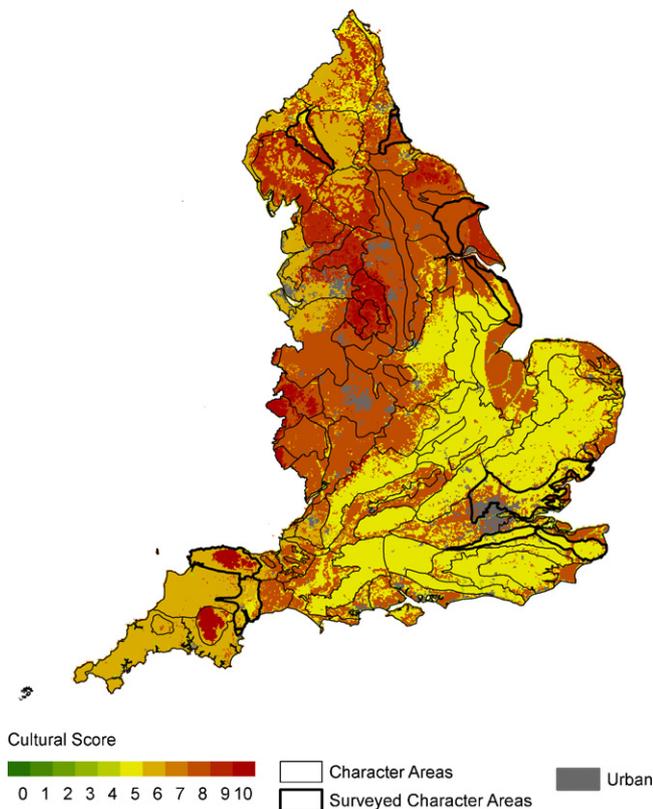**Fig. 1.** Countryside Survey land – classes for England.

Fig. 2. Cultural service 'scores' for charismatic landscapes (relating to woodland, water, altitude and coast) for CS landclasses (England only). Black lines indicate boundaries of Natural Character Areas, boundaries in bold delineate the eight National Character Areas in which the qualitative research was carried out.

data on habitat extent was collected using a digital field mapping system based on ESRI ArcGIS 9.2 (ESRI, 2006). Using the digital mapping system, field surveyors delineated and mapped areas of different habitat types, effectively converting the 1 km square to a mapped format, at a resolution of 20×20 m for areal features and recording all linear (>20 m in length) and point features present within sample 1 km squares. Surveyors were provided with a field handbook containing a vegetation key and detailed definition of habitats, linear and point features. Vegetated habitats were assigned both a detailed vegetation category and a Broad Habitat. Broad Habitats (BHs) form the UK's framework for reporting on biodiversity (Jackson, 2000). Data collected using the digital mapping system was entered into a database containing both spatial and attribute information for all polygons, lines and areas recorded in the sample squares. OS data on elevation in the CS squares also formed part of the quantitative dataset.

Qualitative data collection

Data collection consisted of an extensive programme of qualitative social research with representative groups of the public undertaken for and published by Natural England (NE). Methods are described in detail in the report 'Experiencing Landscapes' (The Research Box, 2009) and summarised in brief, as relevant, below. The research comprised of over 150 members of the public surveyed in 16 focus groups and extended creativity sessions, plus 16 in-depth interviews. Eight NCAs across England were targeted, covering seven regions and a mix of landscape types (Fig. 2). Participants came from a mix of socio-economic groupings, gender and age groups, and included people living in, working in, or using the areas concerned. Eight cultural services adapted from the

Millennium Ecosystem Assessment (MEA, 2005) were examined through the research (sense of place, cultural heritage, inspiration, escapism, relaxation, spiritual, learning and recreation). As well as describing their responses to landscapes in terms of these services, individuals were prompted for their responses to particular landscape features which were subsequently categorised according to the eight services. Twenty individual landscape features were focused on, in order to understand the services and benefits associated with them and to identify landscape features which had high value for the participants.

Data integration

Data integration was the key challenge given that the two datasets concentrate on very different aspects of the landscape; one focused on quantifying the extent and quality of habitats and landscape features which make up an area of landscape, the other on how the constituent features of a landscape impact upon human wellbeing (the provision of cultural services). However, given the rationale behind the Countryside Survey, i.e. to provide data which are representative of the GB countryside, it was evident that a combination of the two datasets may provide potential for mapping cultural services at national scales. The starting point for data integration was a discussion between researchers with detailed knowledge of each of the surveys, in order to identify potential common ground for data integration. It was established that CS was able to provide quantitative estimates of the presence and extent of landscape features for each 1 km square on the basis of square landclass. A decision was taken to use CS habitat data to map cultural services based on the features gaining highest overall scores across all cultural services in the qualitative study which were; coast, water and woodland (The Research Box, 2009, Table 1). It was also decided to include 'relief' Ordnance Survey (OS) data providing a measure of the extent of altitudinal variability within a square since the importance of high points (as part of a view or from which to view) was frequently referred to as important for cultural services by participants in the qualitative research. 'Height' per se was not included as one of the 20 landscape features explicitly focused upon in the research.

The CS dataset contains a large range of data representing the many different forms that habitat components take. For example, woodland may be represented by a small clump of trees or by a larger area of broadleaved or coniferous habitat, or even by a hedge. Water in the landscape comes in many forms and may, for example, be dependent on the relief of the landscape with ditches and ponds typical of some areas and waterfalls and lakes typical of others.

The qualitative researchers were provided with a range of potential measures from the Countryside Survey database for the chosen habitats which included those finally selected (1–4 below) alongside; *area of Coniferous Woodland, lengths of hedges, lines and belts of trees, numbers of individual trees, lengths of streams and numbers of ponds*. Altitude and relief figures were provided from the OS data for each 1 km square. The difficulties posed in trying to equate different types of measures (e.g. length (m) of streams, numbers of ponds and areas (Ha)), as well as the landscape features focused on in the qualitative research, led to the final selection of the following as representing the features which had clearly emerged as important for the delivery of cultural ecosystem services:

(1) Woodlands: Area of (Broad Habitat (BH)) Broadleaved and Mixed Yew woodland (km^2). Broadleaved was the preferred woodland type delivering; calmness/tranquility/peace/spiritualism and opportunities for leisure and escapism.
(2) Water: Area of (BH) Standing Open Water and Canals, Area of (BH) Rivers and Streams (km^2). The presence of water was seen

Table 1
The delivery of cultural services by different landscape features.

Landscape Feature	History	Place	Inspiration	Calm	Leisure/activities	Spiritual	Learning	Escape
Water, rivers streams	Low	Medium	High	High	High	High	Medium	High
Bogs & Marshes	Low		Low		Medium	Low	Medium	
Coast	Medium	High	Medium	Medium	High	High	High	High
Mountains & Hills	Medium	Low	High	Medium	High	High	Low	High
Moorland	Low	High	High	Low	Medium	High	Low	High
Grassland	Low		Low		Low	Low		
Woodland & Trees	Medium	Medium	High	High	High	High	Medium	High
Field Systems	High	High	Medium	High	Low	Low	Low	High
Hedges, walls, lanes	High	High	Low	High	Medium	Medium	High	
Villages	High	High	Low	Medium	High	Low	High	Medium

Reproduced from The Research Box (2009).

to increase the effective delivery of many cultural benefits of landscapes including recreation, calm/tranquility, escape, spiritual feelings and inspiration.

(3) Relief: Mean altitude (m) and Relief (m) (difference between maximum and minimum altitude). Altitude was viewed as integral to many landscape experiences allowing a sense of perspective and providing inspiration and escapism.

(4) Coastal area: Area of (BH) sea (km²). The coast was seen as important for leisure activities as well as being a key facet of Britain as an island nation providing a sense of place and tranquility.

All areas were expressed as a proportion of the land cover of the CS sample squares. Following a process of trial and error which involved the use of potential measures represented by raw and transformed data, a final approach was identified. An initial issue was the degree of variability within the CS data. For example, within landclass 1 (undulating country, varied agriculture, mainly grassland) the extent of woodland within the sample km squares ranged from 0.7% to 48.9% – the latter could be considered as woodland, the former probably not. In view of this variability, it was decided to calculate a 'probability' that each landclass contained the features in question. This probability informed the later weighting for the degree of cultural service provided by the landclass.

The weighting was assessed separately for each of the CS data variables listed above, using the following scale: none (0), low (1), medium (2), and high (3) by the team of landscape experts responsible for the qualitative research. For most areal variables the higher the score, the greater the probability of finding the Broad Habitat (BH) in question within the landclass and the greater the extent of that BH (in % cover). So for water BHs and for sea the more likely you were to find either of them in a landclass and the greater the extents of them within that landclass the higher the score. The exception was Broadleaved Woodland, where the research indicated that extensive cover was less highly valued than a mixture of woodland and open areas (e.g. fields). The approach taken echoed that used in The Research Box (2009) work, where the extent to which different features provided cultural services was assessed through qualitative interview, using a scale of zero to high (see

Table 1). In this work it was assumed that the scale, zero-high could be adequately represented by a numerical scale from 0 to 3 and that the score was additive across all features.

The approach used here made no distinction between the eight separate cultural services examined in the qualitative research (The Research Box, 2009, Table 1) – the weighting for each 'feature' within each landclass relates to all services in combination. The scores for each of the variables within each landclass were summed to provide an overall score (or cultural service measure) for that landclass. (NB landclass divisions are at least partly dependent on altitude as an underlying variable.) Landclass scores were mapped by colour coding each value and presenting that value for every 1 km square. As data is available for all GB landclasses, early maps, produced when various potential measures represented by raw and transformed data were being trialled, included all GB landclasses. However, since the qualitative research was focused only in England, and not in Scotland or Wales, final mapping was produced for England only in ESRI ArcGIS 9.2 (ESRI, 2006) (Fig. 2). Fig. 2 also includes (in bold) the boundaries of the 8 National Character Areas in which the qualitative work took place.

Results

As this study was primarily an exploration of potential approaches for the mapping of cultural services, the process adopted was as important as the product. The final methodology decided upon emerged from a process of trial and error which involved numerous discussions between researchers and various iterations of potential service maps. The two main issues arising from this process were:

1. Identifying measures which provided a balanced interpretation of the potential landscape in each 1 km square.
2. Selection of appropriate scale at which to extrapolate results.

Essentially the approaches described in the methods section provide the results of this period of methodological exploration. Ultimately human judgement was used alongside actual values relating to the presence and extent of the various habitats to provide service measures for each landclass.

In terms of scale it was decided that it was appropriate to extrapolate measures from the 8 character areas in England used for the qualitative work to the whole of England. Early maps of GB, using raw data, provided little information on service variability across England as a result of high values for the 4 features used in Wales and more particularly, Scotland. Whilst, it may be true that both Wales and Scotland score more highly than England in terms of cultural services, the qualitative study was specifically focused on perceptions of the services provided by landscapes in National Character Areas in England. Hence, it was decided that the results of the study should be presented for England alone.

Even when presented for England alone it is clear that measures of cultural services arrived at are contained within a relatively narrow band, illustrating that most of England's landscapes provide a degree of cultural services. This supports a key finding from the Experiencing Landscapes research (The Research Box, 2009) that all landscapes (even those that are local and mundane) are important for delivering cultural services. However, it would appear that some landscapes which are regarded as nationally important (the Lake District and the South Downs would be examples) seem not to be scored as highly as one might expect. Potential reasons for this are explored below.

The map has been tested against what is known about the extent of cultural service delivery within the eight NCAs as revealed through the qualitative research. Numerical values were ascribed to the scores for the different landscape features (shown for all NCA's together in Table 1) and summed to provide a score for each individual NCA (The Research Box, 2009, Table 2). This score for each NCA was then compared to those derived from the quantitative mapping exercise. Broadly speaking, the scores derived for each NCA, based on the landclass incidence within the NCAs, is supported by the qualitative research findings (The Research Box, 2009). Whilst this finding is somewhat circular, it does provide some confirmation that the quantitative data do adequately reflect the qualitative data.

Discussion

The social sciences are central to measuring the value of ecosystem services to people (Daily et al., 2009; Farjon et al., 2009). The paucity of studies which actually attempt to measure landscape cultural services using both qualitative and quantitative data may indicate; the inherent difficulty of combining different types of data, a lack of appropriate data or perhaps unwillingness of scientists to broach disciplinary boundaries (Marzano et al., 2006). In the current culture of providing measures of ecosystem services (TEEB, 2009; Bateman et al., 2010) inability to measure the cultural services provided by the natural environment risks the possibility of those services being valued less than other more easily quantifiable ecosystem services. This research provides evidence of a possible interdisciplinary approach towards providing measures of cultural services for GB and highlights some of the issues raised by the limitations of the datasets used and the approach taken in combining them which are discussed below. The map produced by this exercise is both broadly in line with expected values for cultural services in specific NCA's revealed through the qualitative research (The Research Box, 2009) and in agreement with findings from the research which indicate the importance of all landscapes for delivering cultural ecosystem services.

Datasets

Attempts to produce meaningful maps of service distribution often suffer due to a lack of sufficient data on ecosystem services at appropriate scales (Naidoo et al., 2008; Eigenbrod et al., 2010). In this study two datasets collected in isolation and investigating different aspects of landscape have been combined to produce a map of cultural services in England. Given their separate provenance it is inevitable that the match between them in terms of study scales and measures is imperfect and results in a number of potential issues, discussed below.

The Countryside Survey was designed to report on national level trends in the environment. The qualitative research on capturing the cultural services and experiential qualities of landscape focused on collecting data in just 8 of the 159 English Natural Character Areas (NCA) but sought to identify connections between landscapes and services that were more broadly applicable. The fact that the qualitative research was focused at a more limited scale than CS, may limit its validity as a source of data on national values for particular landscape features. Conversely, it may be argued that landscape preferences tend to be broadly relevant for universal features, although clearly some features may only be experienced locally, e.g. ditches in lowland Britain, or mountains in the Lake District. Hence, expressed local preferences will not always be relevant at larger scales. The inclusion of all GB (Scotland, Wales and England) landclasses in an initial mapping exercise also emphasised the importance of scale, with values for landclasses in Wales and Scotland broadly unrepresentative of those found in England and thereby limiting the potential for revealing differences in cultural service scores across England.

Other research has shown that expressed local preferences will differ according to the background of the individuals surveyed (Suckall et al., 2009). Given the potential for variability in landscape perception both between and within localities, it is apparent that scale needs to be explicitly addressed in any exercise of this kind. Provision of cultural ecosystem services at a local scale will require much finer grained information about local landscapes together with landscape preferences of those benefitting from them. At a national level, as in this study, preferences need to be aggregated at a coarser level to reflect the habitats and features which play a key role in the provision of cultural services for the majority of people. Potentially, the 8 NCAs used in the qualitative research described here may not have provided the full quota of habitats and landscape features which are important for the provision of cultural ecosystem services in England. A spatially distributed sampling framework, similar to that used for CS, may be required for the provision of data representative of England as a whole.

Another key issue relating to scale concerns the scale at which the CS data were collected. The cultural service scores developed inevitably relate to the landscape within the sample 1 km square only. As indicated by the wider qualitative research carried out (The Research Box, 2009) as well as other landscape quality research (Farjon et al., 2009), many cultural services relate to landscape features that are visible to the eye but not in the immediate vicinity (and sometimes at a considerable distance). The qualitative survey showed that openness and distance and seeing far-off horizons were considered important for calmness and a feeling of perspective, i.e. people's place in the landscape. Survey squares are more likely than not to be surrounded by squares containing similar habitats and with similar elevation, meaning that services offered in the immediate vicinity are likely to be consistent with those found in target squares. However, the potential importance of features that are visible but which do not exist within the grid square, either locally or more distantly, needs to be accommodated in any future approaches.

Approach

A key challenge with the approach was how to convert a range of biophysical measures (with potentially diverse units of measurements) into a score representing a cultural service. Initial attempts

Table 2
Tentative summary assessment of the cultural services provided by individual NCAs.

National Character Area (NCA)	History	Place	Inspiration	Calm	Leisure/ Activities	Spiritual	Learning	Escape
Wolds	Medium	High	Medium	High	High	High	Low	High
NTB	High	Low	Low	Medium	High	Low	Medium	High
Exmoor	Medium	High	High	High	High	High	Medium	High
Lincs	Low	High	Low	High	High	High	High	High
DMLP	Low	High	Medium	Medium	High	Low	Medium	Medium
Eden	High	High	High	High	Low	Medium	Low	Medium
Downs	Medium	Medium	Medium	High	High	Low	Low	Low
Devon	Medium	High	High	Medium	High	High	High	Medium

Reproduced from The Research Box (2009).

used raw data to avoid any subjectivity in the relative importance of different aspects of the woodland and water variables on which the study was focused. However, this led to relatively high 'weightings' for some features, in particular lengths of streams and ditches as compared to areas of Broad Habitat, hence the eventual use of simple scoring system for each variable. In reality, people's perceptions of the landscape, and hence the services it provides them are subjective and unlikely to be directly related simply to the *extent* of features (woodland or water, for example). The use of expert opinion in assessing scores for each landclass reflects this complexity, enabling greater sensitivity to the way people perceive landscape than might be possible using a quantitative approach. Inevitably landscape pattern, the position of habitats relative to one another and the topography of the landscape all interact to create more, or less, attractive landscapes. Information on the presence and extent of different facets of the landscape effectively describe the potential for landscapes to deliver cultural services. This approach is a form of benefit transfer (Plummer, 2009) in this case, applying cultural service value estimates for a particular habitat type from one location to others. Correspondence – similarity between the landscape features in the NCAs in which the qualitative work was carried out relative to those in the wider countryside – is likely to be high.

Some pertinent findings from the qualitative research (The Research Box, 2009) show the complexities involved in terms of measures. For example, the research concluded that when 'water' is present in a landscape it is valued in the form of streams, a waterfall, or a lake – but not in roadside ditches, or farm ponds. CS measures the landscape using a very rigorous and detailed approach which would make it possible to estimate the likelihood of coming across these particular features in different 1 km squares. However, this detailed level of data is not explored in this study, mainly because the qualitative research was not designed to take a rigorous approach towards quantifying landscape preferences for each possible feature type. The use of rather more general measures of key landscape features in this study fits with the open solicitation approach used by the qualitative researchers to collect information on landscape preferences.

In this mapping exercise a relatively constrained set of landscape features were used, other potentially important features include; historical features, hedges, walls, lanes and villages which may be more or less important in particular locations. Countryside Survey records the presence and extent of each of these features and in a number of cases a measure of their condition, although not for urban or transport features. This may point to the potential for the development of more complex quantitative measures of cultural services. However, given the subjectivity inherent in measuring cultural services it is perhaps advisable to restrict measures to universally agreed upon features. As pointed to above, these key features are likely to differ according to location and would need to be identified using qualitative research.

Conclusions

This study has indicated the potential for using a mix of qualitative and quantitative data to provide measures of cultural ecosystem services at a national scale. The qualitative research was able to identify particular landscape characteristics/features which correlated to a range of cultural ecosystem services including, a 'sense of history' or identity, spiritual benefits, inspiration and places for escapism, relaxation, education and recreational activities. Using data from a national survey of landscape, it was possible to quantify those landscape characteristics/features and, using the stratification underlying that survey, to provide mapped national estimates of cultural services. As with other mapping of this type (Eigenbrod et al., 2010) detailed analysis of the output (Fig. 2) would require extensive ground truthing involving the collection of both quantitative and qualitative data and would be likely to highlight substantial inconsistencies in the data at local levels. At NCA level the results are supported by the findings of the qualitative work (The Research Box, 2009). At a national level the importance of all landscapes for delivering cultural services and the fact that people value what they experience at a local level (The Research Box, 2009) is reflected by the relatively narrow range of scores across England. However, key issues that may affect the validity of these cultural service measures include; the lack of measures concerning the built environment,[2] the importance of distant views in the provision of cultural services and, for the specific exercise described here, some incompatibilities in the scales at which quantitative and qualitative data are collected. However this exercise does demonstrate the value of linking qualitative and quantitative information to provide measures of cultural ecosystem services which can aid policy decisions about land use options.

Acknowledgements

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[2] Sense of place and social capital and the historic built environment (2009), report of research for English Heritage, available at http://www.english-heritage.org.uk.

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