

# *Integrating cultural values and services in landscape and ecological planning*

Hugh Inwood<sup>1</sup>, Andy Wharton<sup>2</sup>, Helen Davies<sup>3</sup>

The Research Box<sup>1</sup>, Natural England<sup>2</sup>, ADAS UK Ltd<sup>3</sup>

## **Abstract:**

This collaborative paper draws upon literature reviews and findings of two recent UK research studies commissioned by Natural England (Inwood *et al*, 2014, 2015). Both studies have broadly sought to better understand what people perceive and value in their local landscapes and explore how cultural ecosystem services (CES) can be effectively captured, mapped and integrated into proposals for landscape and ecological change. Making Space for Nature (Lawton *et al*, 2010), The Natural Environment White Paper (Defra, 2011) and the European Landscape Convention (CoE, 2000) provided the wider policy context and rationale for both studies.

The broad underlying hypothesis is that public support for ecologically motivated and/or other types of landscape change will become more sustainable and acceptable where the public's cultural values (and the cultural services they benefit from) are fully recognised, acknowledged and integrated into the planning and design of proposals at the outset. Part of the wider challenge of the studies was to explore ways in which the outputs of social science research and public values could be presented, mapped and integrated with natural science and bio-physical data. The first study was firmly set in the context of the creation of ecological networks (econets), whilst the follow up study considered landscape change scenarios that included land use development, reforestation and coastal realignment.

The wider outcomes of both studies advocates and supports the need for further trans-disciplinary and participatory working on landscape-scale projects, where greater collaboration between ecologists, landscape planners/designers, social scientists and the public can encourage holistic and analytic approaches that combine ecology and planning, nature and culture. The paper is split into two parts, first outlining some of the conceptual aspects of cultural ecosystem services, public perceptions and cultural values in the context of landscape change, and second, some findings from more practical work on participatory mapping of cultural values and integration of this information with natural science data.

**Keywords:** *Public perceptions, cultural values, cultural ecosystem services, landscape change, ecological networks, landscape planning, participatory mapping*

## **Introduction**

The planning, design and establishment of ecological networks and other ecologically motivated landscape change is primarily underpinned by natural science and associated evidence and data. This is critical to understanding scenarios and patterns for connectivity, habitat restoration and planning for movement of species. Whilst there are human benefits through ecological connectivity and re-established ecological processes, landscape character, public

perceptions and cultural values are less considered as an underpinning part of the context, and, as a consequence, not always fully integrated into ecological planning and design.

Natural England commissioned studies to help find effective ways of capturing and mapping public perceptions and cultural values in the context of proposed landscape change. The research has used landscape and cultural ecosystem services as the frame and means to engage the public to explore ways of spatially mapping this information – ultimately seeking means of integrating perceptions and cultural values with natural science data, so that future proposals can be designed to incorporate and deliver benefits for both people and nature. The studies have also demonstrated the potential of the tools and methodologies for mapping cultural services with the public to be applied more widely in all sorts of landscape change contexts, whether ecologically driven change or where there is need for new development and infrastructure.

## **Wider context - UK National Ecosystem Assessment**

The UK National Ecosystem Assessment (UKNEA, 2011) endorsed a taxonomy of outputs supplied by ecosystems, namely regulating, cultural and provisioning/supporting services. Importantly, these services lack a market price and thus are difficult to label and value. It reviewed the condition of these services in terms of whether they were stable, improving or deteriorating, and suggested that many ecosystem services were still far below their full potential. It noted that a growing population and widening range of social-environmental impacts brought additional challenges. Whilst regulating and provisioning/supporting services were articulated in some detail, cultural services were confined to a limited consideration of ‘environmental settings’ (i.e. local places and landscapes).

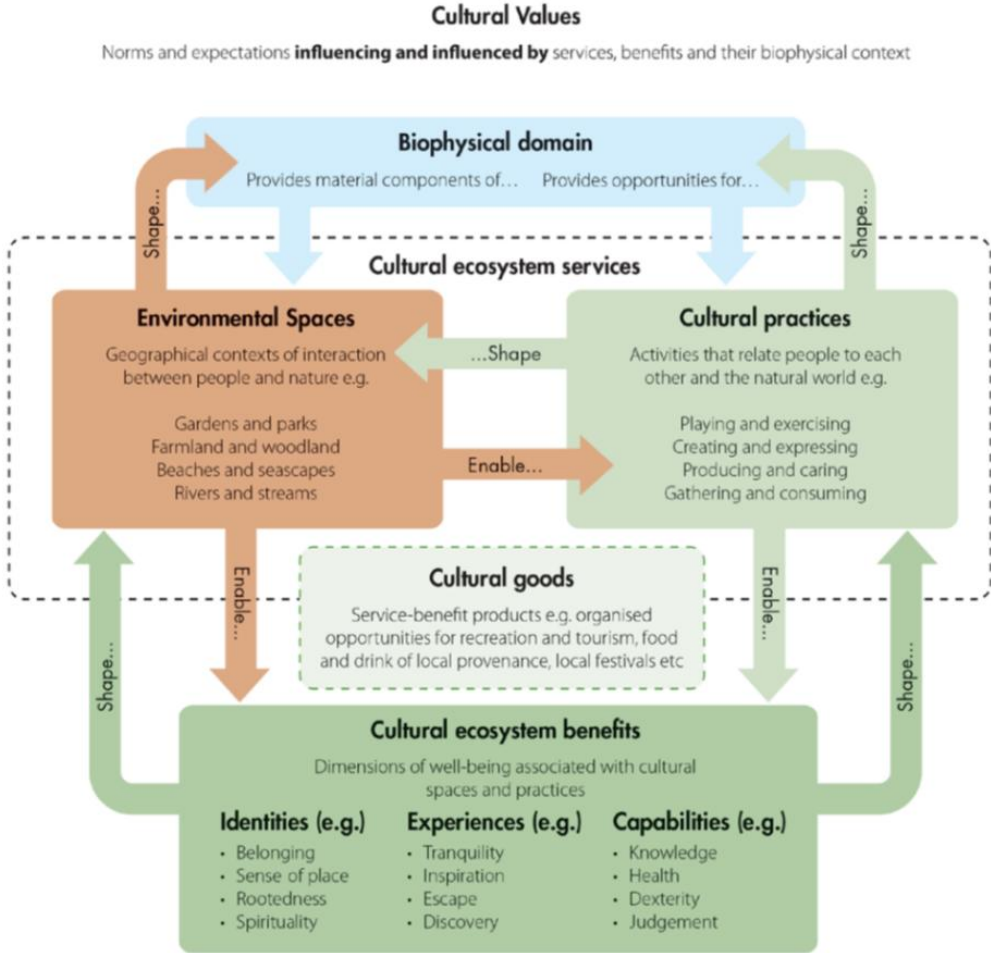
Despite its rather narrow consideration of cultural services, the NEA recognised that environmental settings could be associated with a wide range of goods that emanated from culturally valued places, such as productive commodities (e.g. food, fibre, energy), security benefits (e.g. flood and erosion control), and social benefits (e.g. recreation, spiritual values, noise control, aesthetic value). These cultural values were associated with all the ‘broad habitat types’ identified in the NEA; we may reasonably infer, therefore, that they would also be associated with the future habitats resulting from ecological networks.

The NEA identified cultural services as those that were derived from environmental settings (places where humans interact with each other and with nature). In addition to their natural features, the NEA suggested that such settings were imbued with the outcomes of interactions between societies, cultures, technologies and ecosystems. As such, they could provide opportunities for outdoor learning and recreation; in turn, exposure to these opportunities could deliver aesthetic satisfaction, improvements in health and fitness, and an enhanced sense of spiritual well-being. The NEA was unequivocal that failure to include non-market values in decision-making would result in a less efficient resource allocation; hence it was essential to convey the values of non-market ecosystem services to land managers. However, overall, the interpretive and practical detail given on cultural services by the NEA was quite limited.

UK Government guidance<sup>1</sup> recommends that all decision-makers – from wealth-producing entrepreneurs to voluntary community groups – adopt an ecosystem approach when planning and managing the natural environment. Such an approach considers whole ecosystems, values the services they provide, and comprehends the way that the natural environment works as a system. The guidance suggests that an ecosystem approach entails thinking about the spatial scale of social-environmental interactions, and the people involved in supplying and receiving ecosystem services and benefits. It also advocates that practical tools are developed to

facilitate this approach to decision-making. However, in current research, the whole notion of cultural services (and how to integrate in decision-making) remains relatively underdeveloped, relative to the nature and economic valuation of biological and physical resources.

Some further exploration of cultural ecosystem services has been taken forward in the follow-on stage of the UK National Ecosystem Assessment (Church *et al*, 2014) which, *inter alia*, gives further attention to: cultural ecosystem services and how they can be better understood and operationalised into a range of decision making contexts alongside economic analyses; societal responses to possible future ecosystems changes; and the development of tools for use by a range of key user groups from the public, private and voluntary sectors. It has attempted to refine the conceptual and empirical notions of environmental settings, and clarify the terrestrial and marine spaces which constitute environmental settings, how landscapes relate to and constitute environmental settings, and the ways in which the significance of settings may change over time (Fig. 1). Since environmental settings range in scale from the very local (domestic gardens and ponds) through to national landscapes and seascapes – econets and ‘re-wilded’ landscapes clearly play an important part in this evolving continuum. The follow-on work has gathered a range of empirical evidence regarding people’s uses, preferences, benefits and significance of environmental settings.



**Figure 1. Conceptual framework for defining Cultural Ecosystem Services (Church et al, 2014)**

## Values people attach to ecosystem services

Landscapes are rich amalgams of a wide range of human and non-human elements, both seen and unseen, and consequently of infinite variety (Stephenson, 2008). They provide an abundance of services to people, in ways that benefit both our physical needs and quality of life. One of the most intractable issues in relation to the Econets, Landscape and People (EcoLaP) study for Natural England (Inwood *et al*, 2014) was to consider how to assess, map and quantify cultural ecosystem services.

Despite its methodological challenges, one of the best-known examples is the attempt to map tranquillity (CPRE *et al*, 2005). This less tangible topic was first defined using a participatory appraisal approach, working with groups of people. The researchers used non-directive questions to stimulate participants to discern their perceptions, values and beliefs, and express these through a range of user-friendly techniques such as spider diagrams, ‘graffiti walls’, visual representations, mapping, bean voting, circle diagrams and unstructured interviews. Having defined tranquillity in a way that could be operationalised, its elements were then matched to nationally available datasets, by reference to a project steering group and literature review. Models were constructed of contributory factors likely to be associated with ‘people’, ‘landscape’ and ‘noise’, and how these contributory factors might be mitigated or intensified by physical environmental properties. Further weighting and adjustment of variables then allowed maps of relative tranquillity to be produced by GIS.

A recent study in East Germany (Plieninger *et al*, 2013) involved spatially explicit participatory mapping of the complete range of cultural ecosystem services – and some ‘disservices’ – as perceived by local residents. Their methods included a combination of mapping exercises and structured interviews, analysed by statistical and GIS-based techniques. It suggests that the objectives of natural scientists will be better met when accompanied by an explicit inclusion of ‘soft’ ecosystem services. One interesting possibility is that the measurement of public interest in econets, for example, should not be based purely in visual apprehension, but should also consider active engagement in the landscape as a way of experiencing and valuing it. In terms of the role of social sciences in econet planning, the authors make some telling observations, notably:

- cultural services are, in contrast to most regulating and supporting services, directly experienced and intuitively appreciated by people. Therefore, they are motivators for owning, managing, and conserving land, often being even more important than traditional livestock or timber production
- most cultural services are enjoyed in “bundles” and can thus foster the orientation of ecosystem services management toward multifunctionality. As such, the holistic nature of cultural services can help overcome the widespread tendency to design incentive tools for individual ecosystem services in isolation, which often has been accompanied by unintended side effects on other ecosystem services.

### *Perceptions of landscape and landscape change*

One concern amongst planners of econets is that landscapes designed for biodiversity might not align with the public’s aesthetic preferences. Aesthetic perceptions of ‘ecological’ landscapes have been investigated in a number of studies, for example Gobster, Nassauer & Daniel (2007). Junker & Buchecker (2008) examined the relationships between aesthetic preferences and ecological objectives where rivers were being restored to more naturalistic conditions. Hence, they considered the interface between ecological quality as evaluated by experts and people’s evaluations of visual attractiveness. This entailed using some interesting

measures of naturalness in rivers, as a consistent yardstick against which to evaluate viewers' responses. The study sought to answer four research questions:

- does the public's perception and assessment of the naturalness of different river restoration scenarios correspond to experts' assessments of eco-morphological quality?
- how does perceived 'naturalness' relate to people's aesthetic preferences?
- how do the perceived satisfaction of needs and the usability of river restoration scenarios for recreation and leisure purposes influence people's assessments of their aesthetic appearance?
- to what extent can people's aesthetic assessments of river restoration scenarios be explained by the variables: eco-morphological quality, perceived naturalness, satisfaction of needs and suitability for recreation and leisure purposes?

Their method entailed volunteers evaluating visualisations of varying degrees of 'before and after' treatment of stretches of rivers – through Likert-scale responses – and posing various questions about perceived naturalness and potential amenity, as well as known influential variables such as level of education and age. Statistical analysis – notably F-tests – of the data indicated that:

- public preferences are more compatible with nature conservation than is often thought and more than planning authorities tend to expect;
- public perceptions of the naturalness of different river restoration scenarios coincided more closely than expected with expert assessments of eco-morphological quality;
- there was a very strong relationship between perceived naturalness and aesthetic preference – but this relates to what people perceive as natural rather than actual naturalness;
- how well a river restoration scenario is perceived to satisfy people's needs – and thus how suitable it is for recreation and leisure purposes – strongly influences how positively they assess its aesthetic appearance. Although, perhaps reassuringly, people generally appeared not to require recreational infrastructure in more naturalistic stretches.

### *The rationale for incorporating cultural values*

Whilst generic methods of public engagement and consultation fall within local statutory frameworks, there is no explicit requirement to engage the local population through research or participation. This is particularly so since econets are often being established in land use settings that lie largely outside the statutory planning regime.

Why should landscape and ecology professionals incorporate cultural values, in terms of public perceptions of culture and nature, into the design of econets? If there is no specific policy framework that requires the input of local people at the design stage – bearing in mind that the involvement of people will probably have budgetary implications – there is no clear obligation or incentive for those planning them.

In theory, the rationale for incorporating cultural values lies in delivering landscape and cultural services through ecological network design, planning and implementation. In doing so, the ecological networks will support sustainable development, in terms of connectivity and biodiversity conservation, human well-being and cultural-natural resilience (Selman, 2012).

A number of tangible and intangible benefits have been identified that may flow from actively involving the public and incorporating their perceptions in econet design. These include:

- recognition that local landscapes have meaning to people and that their beliefs and opinions count
- provision of evidence that the designers have recognised the cultural impacts of their design, as well as that of other ecosystem services
- evidence that local inputs have been taken into consideration, through local participation and involvement (a bottom-up approach)
- an improved design that has meaning for people and their use of the landscapes in question
- better social connectivity and community coherence
- greater support, engagement and commitment from local people
- the mutual understanding of public perceptions, on the one hand, and technical solutions at the landscape level for societal problems on the other – overcoming fear for changes, resistance and addressing conflicts at an early stage, before opinions have become entrenched
- future management and maintenance that is more effective and affordable, through the commitment of local people, leading to a more sustainable outcome

Conversely, there are a series of potential risks from not building public perceptions into the design stage of econets, including:

- potential community resistance to the concept or its implementation
- more specific protest from particular groups in the local population
- eventual failure of the econet through a lack of commitment and resource from local people (econets are not sustainable without their involvement)
- cultural alienation, leading to a decline in use of the landscape by local people and a loss of local identity
- missed opportunities for education or recreation
- potential problems arising from actual or perceived negative aspects of the econet.

There is some evidence that these benefits can be attained, and problems avoided, from a number of existing projects that have mapped, planned and monitored cultural ecosystem services (Alessa, Kliskey & Brown, 2008; Hernández-Morcillo, Plieninger & Bieling, 2013; Van Berkel & Verburg, 2014; Pinto-Correia & Carvalho-Ribeiro, 2012 ).

However, we also need to be careful here about the term ‘public’. There may be different publics, such as the general public and specialist publics (e.g. farmers, volunteers) who may shift camps depending on the context. Engagement of ‘the public’ does not always mean participatory techniques which aim to reflect the views of a balanced, non-partisan profile of the catchment population – teachers, conservationists, farmers, anglers etc. are all members of ‘the public’.

#### *Tackling public perception in the context and planning of econets*

Public perception is undeniably an important issue to take into account when planning for econets. Moreover, plan implementation requires a sound understanding of the development that the plan proposes. This requires in turn considering perceptions of the meaning of that precise landscape being planned, and of the functions of its elements. Such functions are not only ecological, but also social and economic, and this implies considering public perceptions.

Perceptions specifically of a network could be emotional and cognitive reactions to visually perceiving the actual network. One could argue that few of the public would actually perceive a network, except perhaps in relation to a traditional farmed landscape with lots of field boundaries. However, some literature suggests that people like landscapes that have econet characteristics. For instance, patterns and rich structures concur with people's need for visual complexity, provided that fragmentation processes have not gone too far and resulted in a visually chaotic landscape. Perceptions are not always visual. Experiences, which may include important types of local knowledge, may be imprinted on the memory in combination with the landscape setting.

Perceptions of benefits related to econets, moreover, could occur even though the network is not 'visually apprehended' as such, when people appreciate things that would not be so abundant if there were no functional econet. For example, there is empirical evidence that people can intuitively perceive high biodiversity – or, at least, proxies for high biodiversity. There is also evidence that people value the cultural capital in complex landscapes, and can help with the mapping and valuation of social and cultural ecosystem services. These would tend to be enhanced where effective spatial connections exist between individual hotspots, although people may not be aware of landscape connectedness as such.

### *Landscape & econets: perceptions, design and scale*

Literature reviews for the Natural England's EcoLaP study have shown that little consideration is given to public perceptions in econet design. European econets have mainly focused on ecological issues, as they were originally developed to solve ecological problems. With time, however, this ecological connection has been used to link key territorial areas such as city and countryside.

Various examples of studies were found where the public's views and reactions had been solicited, but the ways that these were used were not really pertinent to the aims of the Natural England studies. The involvement of the public has been, for example, to encourage wildlife-friendly gardening and conservation volunteering, but not to specifically involve them in reinforcing econets and wider benefits *per se*. Any explicit involvement in the development of ecological network attributes tended to be with 'specialist publics', such as farmers, transport planners and river managers.

Regarding 'landscape scale', it can be argued that there is no single right 'scale', but it is important to retain the term 'landscape' as a link between science and social science. Landscape is easily recognised and understood by people and therefore accepted by communities as an 'umbrella' concept (Egoz, Makhzoumi & Pungetti, 2011) to contain the bigger by size, but smaller by concept, econet.

Econet design, planning and management implies creating future landscapes. However, in the European Landscape Convention, landscape means 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors'. This axiomatically applies to econets. Yet econets will work at various complementary scales, and this cross-scale interaction is pivotal to landscape resilience and to social learning (Selman, 2012). Econets have to be about more than biodiversity conservation. 'Networks' as such might rarely be perceived by the public, although the enhanced supply of benefits that results from the improved linkages (ecological networks and stepping stones) between nodes (core areas) may well be perceived and valued. It is therefore the 'multifunctional' argument that will lead to better and more successful design, implementation and maintenance.

# **Capturing public perceptions and mapping cultural values in the context of landscape change**

## **EcoLaP research foundations**

Landscape change (including the establishment of ecological networks) has impacts on the people who use the landscapes in question. An important input to landscape-change design should therefore come from an understanding of the perceptions of local people towards the changes in question – for example, how will the changes impact on their enjoyment and appreciation of the landscape?; will the changes have equal impacts on all local people (or will there be winners and losers)?; how could the proposals be revised to enhance the public's perceptions (and do so whilst retaining nature conservation and ecosystem service aims)?

The EcoLaP study can be considered as foundation research. It included some small-scale pilot research that tested different methods of capturing people's perceptions in the context of a potential ecological network in Bedfordshire's Greensand Ridge Nature Improvement Area. It included public focus group work in Cheshire's Sandstone Ridge to understand perceptions of existing econets<sup>2</sup>. The research found that members of the public local to the Greensand Ridge NIA could identify the highs and lows of cultural service delivery in geographic areas of different scales – and could separately identify the individual cultural services (such as inspiration, beauty, tranquillity and the presence of wildlife, for example). Specifically, the public could locate these services on maps.

## **Morecambe Bay Cultural Services Study**

A more recent study in the Morecambe Bay area for Natural England was designed to build on the foundations of the EcoLaP research and to help develop practical tools and advice as to how cultural service information gathered from the public could be best used alongside natural environmental data for the benefit of econet design and other landscape change proposals. Morecambe Bay landscapes, with their internationally-significant wildlife and habitats, have already seen considerable community and stakeholder engagement activities – led by the Morecambe Bay Local Nature Partnership<sup>3</sup> and its partners, as well as the Arnsdale & Silverdale AONB partnership.

Three landscape focus areas were selected to provide the opportunity for going beyond current understanding by explicitly bringing together public perceptions and natural science data in a mapped (GIS) form. The aim was that this integrated evidence would form the basis for a demonstration of how such outputs could practically inform, guide and influence future landscape-change plans. The three chosen focus areas were:

- The Duddon Valley – to look at landscape change in the form of woodland planting
- The Arnsdale and Silverdale AONB – helpful from a forward/development planning perspective and the relationship with wider GI/econet opportunities
- The Lancaster/Morecambe/Heysham triangle – to look at urban and coastal fringe issues.

In each focus area, an extended participatory workshop was held with members of the public. Participants were invited beforehand to use one of two tools developed for the study for capturing their experiences of the landscape and for geo-locating these 'cultural services' – a Participatory GIS tool (PGIS) and a smartphone Landscape App. The PGIS tool operates as an interactive website that can be remotely accessed by the public, for example in advance of



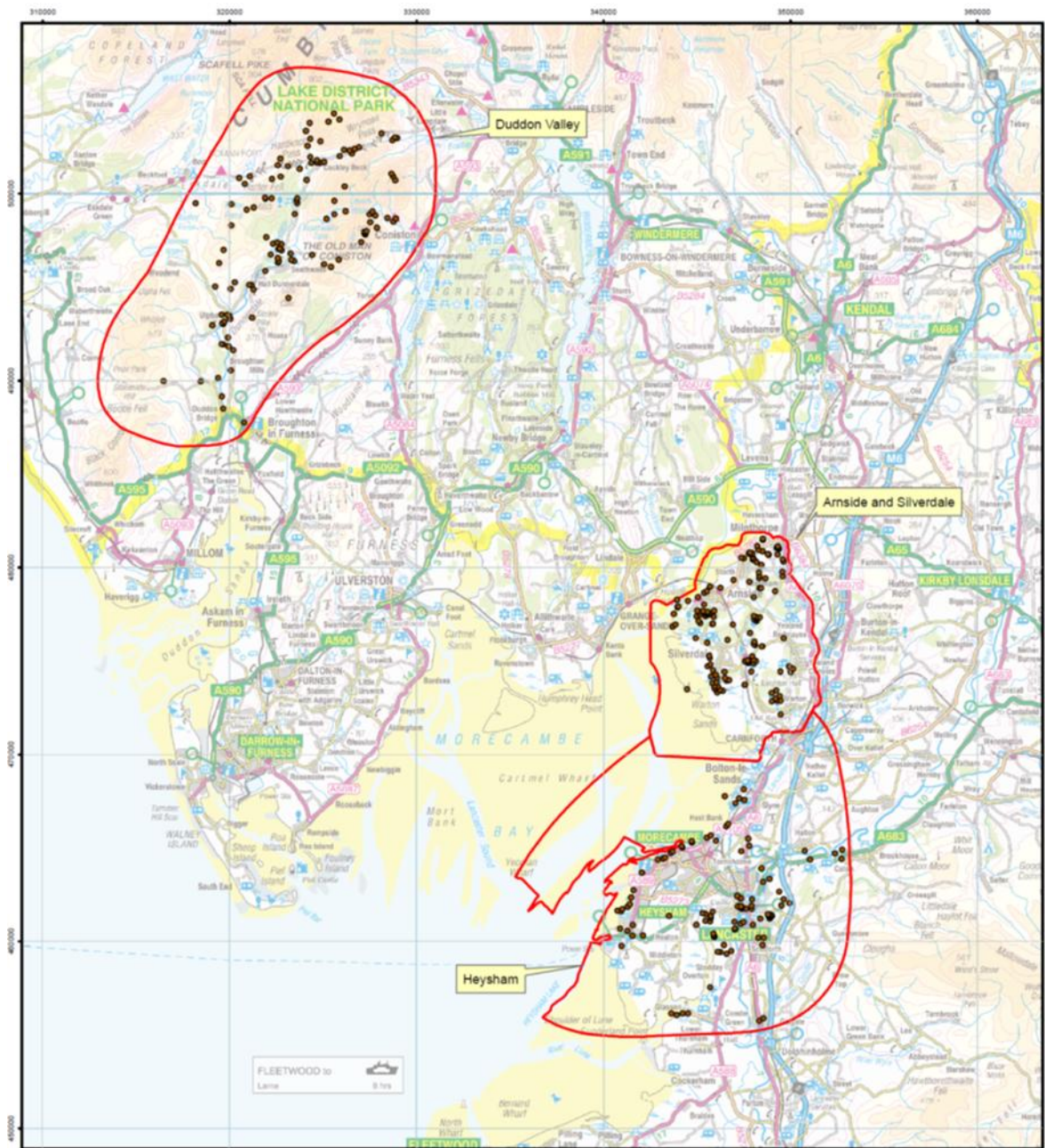
participatory mapping sessions or (to extend the reach of sessions) by providing a means of capturing perceptions of other members of the public. The tool captures simple information about the user, including respondent demographic profile details (age, gender, home postcode) the frequency and purpose of their outdoor visits and their affiliations (e.g. wildlife memberships).

A series of zoomable maps are provided on which people can place digital pins that denote locations where they experience cultural services (leisure, solitude and tranquillity etc.). People are able to place as many pins as they want within the map area. Ordnance Survey maps and satellite views of the area provide the background for this activity and also provide geographic context when capturing sites of interest on the map. Both maps and satellite are on a zoomable scale, so that people can identify a detailed location or a more 'fuzzy' locality. Locations are recorded as lat/long coordinates. In addition to placing pins on the PGIS map, people are able to record free-form notes against the cultural service locations. The website also provided the ability to upload pictures that users may have taken of the place of interest.

The cultural services examined in the tool comprised an agreed set of five themes:

- active outdoor recreation (walking, cycling, etc)
- local history, heritage and learning
- solitude, calm and tranquillity
- beauty and inspiration
- wildlife and nature

The research process provided a total of 385 pins eligible for statistical and spatial analysis, placed by 46 users. A map of the pin locations in the three focus areas is shown overleaf (Fig.2). Analysis of the PGIS data has revealed that the five broad Cultural Ecosystem Services (CES) represented through the case studies (recreation, local history, tranquillity, beauty, and wildlife) are enjoyed more in certain land cover types than others. For example, though 14% of the overall pins were allocated to 'wildlife and nature', the proportion is noticeably higher for heather grassland (at 38%) and neutral grassland (20%) compared to other land cover types. At the other end of the scale, and perhaps unsurprisingly, only 7% of pins in urban land cover were assigned to this CES benefit. Interestingly, a high proportion of pins placed in broadleaf woodland were attributable to 'wildlife and nature' (17%), whereas only 8% of pins in coniferous woodland were. This suggests that the relationship between biodiversity and habitat type is recognised by the general public.





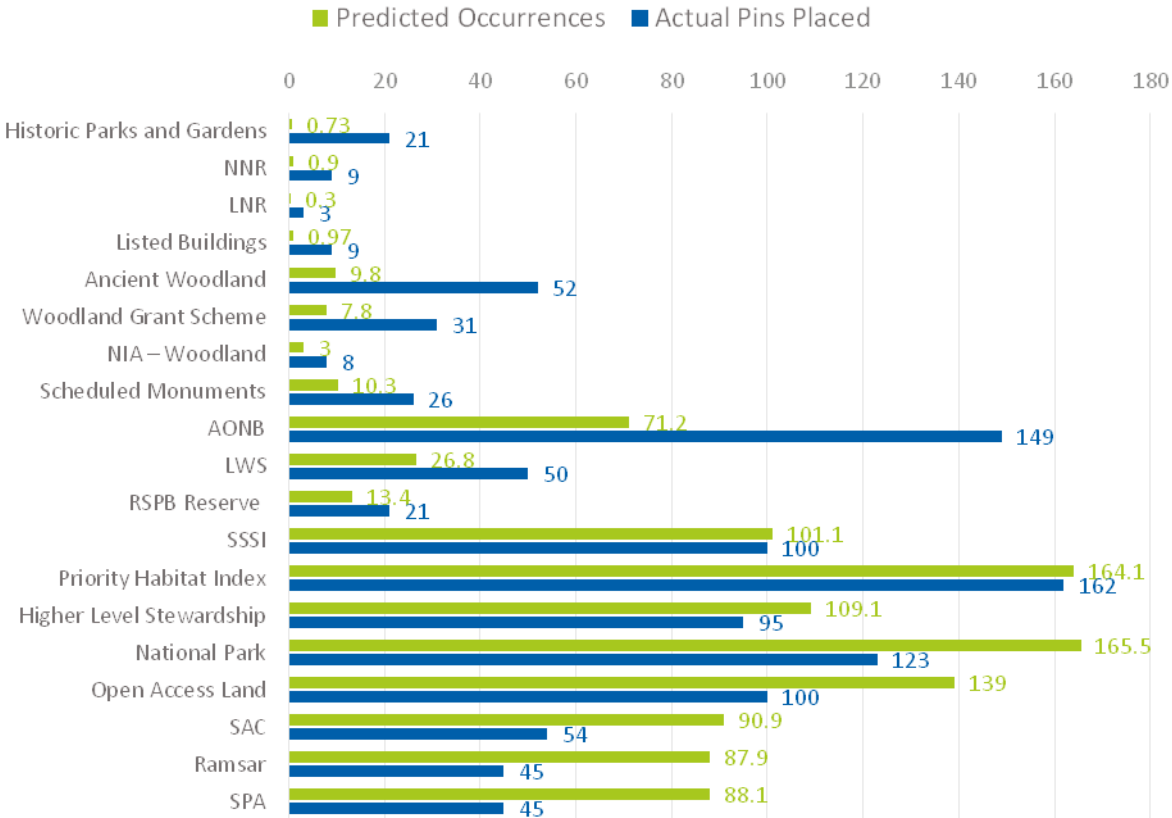
<p><b>Morecambe Bay Cultural Services Study</b></p> <p><b>PGIS Pin Locations</b></p> <p>Prepared For: Research Box and Natural England</p> <p>Drawn By: Michael Image    Date: 10 Jun 2015</p> <p>Verified By: Marlon Frandsen    Date: 10 Jun 2015</p>	<p><b>Legend</b></p> <ul style="list-style-type: none"> <li>• Pin Locations (All)</li> <li>▭ Extended Study Areas</li> </ul>	<p>0 5 10 15 Kilometres</p> <p>Scale 1:200,000 at A4 size</p> <p><small>This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. ADAS licence AL10002033 June 2015 For reference purposes only. No further copies may be made</small></p> <p style="text-align: center;">    </p>
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Figure 2. Morecambe Bay study PGIS pin locations

A number of environmental GIS datasets were mapped to identify their relationship with the users' pin locations. Datasets showing statistically significant positive correlation (at the 5% level) with pin location, i.e. those for which far more pins were placed than would be predicted by their surface area if all pins were placed randomly, are shown at the top of Fig.3 (up to and including RSPB Reserve). Datasets for which few fewer pins were placed than would be expected (significant at the 5% level) are shown at the bottom (National Park onwards).



**Figure 3. Predicted occurrences of PGIS pins compared to their actual presence in the focus areas**

Combining cultural and natural environment data is complicated by the fact that the latter are commonly associated with physical features on the ground, whereas the cultural values that people place on a particular landscape could be influenced by family tradition, local history, sounds or smells etc. This study has therefore sought to assign the cultural data spatially, at a similar scale and functional unit to the natural environment data. Given that respondents used pins to identify the locations where they experience CES in the landscape, this data has been integrated into a GIS environment as point data. The GIS tool then allows for the spatial integration and analysis of this information with other natural environment datasets.

The principal objective of the analysis was to observe the extent of spatial correspondence with natural environment data such as land cover types, environmental designations or land under conservation management. This data was sourced from providers in polygon format. These were expanded by a 100m buffer for Listed Buildings and Scheduled Monuments to allow for the setting of these locations to be taken into consideration. The relationship between pin locations and each individual data set was analysed by means of a binomial test. An assumption was made that users could place pins anywhere in the extended study area, and that the number of pins in a given data set boundary would follow a binomial distribution. The

expected number of pins for each data layer was calculated pro-rata from the percentage of the extended study area taken up by the particular data set. The observed number of pins placed in each data set boundary was then compared to this expected number using a binomial test with a 5% significance threshold. The test was applied in both directions, as areas of non-correspondence (where users seem to “avoid”) as well as correspondence were of interest.

There is a strong correlation between CES benefits and certain specific natural and built environment data layers (land cover types, environmental designations or land under conservation management). People who took part in this study find particular importance or value in areas of land and/or designations relating to woodland (particularly ancient woodland), nature reserves, historic parks and gardens, listed buildings, scheduled monuments, and AONBs.

### *Incorporating cultural value information into decision-making*

Valuation is an essential process for integrating ecosystem services into decision making. This can be done in monetary terms, or else measured in another quantitative manner that enables decision makers to see clearly whether the service is improving or declining. Quantitative analysis has been undertaken for many provisioning services such the amount of food produced from arable land, and also some regulating services such as the amount of carbon sequestered by a forest. However, as noted by Tratalos *et al.* (2015), “...*cultural ecosystem services tend to be viewed as an intangible realm where applications of quantitative methods appear inappropriate or highly context-specific*”, meaning they are often overlooked in decision making.

The spatial analysis revealed that there are a number of geographic areas or specific locations in the Heysham area that provide people with CES benefits that are not reflected through any environmental designation or land under conservation management. Without statutory or non-statutory protection, these special areas are more likely to undergo a change in land cover or land use, e.g. through development, that could reduce the CES benefits these areas can provide, potentially to the extent that the value is destroyed. In particular, there are places that people find important for their beauty, tranquillity, local history and recreation benefits. In order to factor such areas into local decision making, it may be necessary for local authorities to add a ‘cultural ecosystem services’ evidence layer to their GIS database. It could then be used in much the same way as the other GIS data layers a local authority holds, for consideration in strategic level planning and development management decisions. The areas providing CES benefits would not have the same level of protection as formal designated sites, but should nevertheless be considered during decision making. Having a GIS layer for CES benefits presented alongside other GIS layers used in decision making would make its incorporation into land use planning decisions feasible and transparent.

The Morecambe Bay study has developed one methodology (the PGIS Tool) – and adapted another (the Landscape App) – which have both proved capable of capturing the locations within the landscape that the public values. Uniquely, these locations have been captured in such a way that they can be digitally mapped and then compared with other data sources, including ecological and land-use datasets. The study has shown that people can use web-based tools or smartphone apps in order to identify places that are important, or special, to them. And they can identify why these places are special – whether this is for recreation, or because they experience inspiration, beauty tranquillity or a sense of history (as examples) at these places.

Many of the findings arising from use of the two methodologies have resonance with those from earlier studies into public perceptions of cultural services. For example, analysis has shown that people's special locations are correlated with certain types of land cover – broadleaf woodland, for example, which echoes previous research that has shown the importance of woodland for tranquillity and beauty (Inwood *et al*, 2009, 2011). In this research, the importance of broadleaved woodland for wildlife and nature has also been evident. The previously-reported differences between broadleaf and coniferous woodland in generating CES has also been graphically shown in the findings – three times as many pins were placed in broadleaved woodland. There is also evidence from this study that confirms the importance of water as a generator of cultural services, particularly for delivering tranquillity.

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<sup>1</sup> Defra ecosystem approach research studies, guidance materials and case studies accessed from <https://www.gov.uk/ecosystems-services>

<sup>2</sup> The Cheshire econet project was supported by the Life-Environment Programme of the European Commission to demonstrate in Cheshire (and two localities in Italy) how ecological networks can help achieve more sustainable land use planning and management.

<sup>3</sup> <http://www.morecambabaynature.org.uk/nature-improvement-area>

## References

Alessa, N., Kliskey, A. & Brown, G. (2008) Social-ecological hotspots mapping: A spatial approach for identifying coupled social-ecological space. *Landscape and Urban Planning*, **85(1)**, 27–39.

Church, A., Fish, R., Haines-Young, R., Mourato, S., Tratalos, J., Stapleton, L., Willis, C., Coates, P., Gibbons, S., Leyshon, C., Potschin, M., Ravenscroft, N., Sanchis-Guarner, R., Winter, M., & Kenter, J. (2014) *UK National Ecosystem Assessment Follow-on. Work Package Report 5: Cultural ecosystem services and indicators*. UNEP-WCMC, LWEC, UK.

Council of Europe (2000) *European Landscape Convention*, Florence.

Defra (2011) *The Natural Choice: securing the value of nature*. HMSO, UK.

Egoz, S., Makhzoumi, J. & Pungetti, G. (Ed). (2011) *The Right to Landscape: Contesting Landscape and Human Rights*. Ashgate, London.

Gobster, P., Nassauer, J., & Daniel, T. (2007) The shared landscape: what does aesthetics have to do with ecology. *Landscape Ecology*, **22**, 959-972.

Hernández-Morcillo, M., Plieninger, T., & Bieling, C. (2013) An empirical review of cultural ecosystem service indicators. *Ecological Indicators*, **29**, 434–444.

Inwood, H., Fleming, A., Cole, L., & Minter, R. (2009) *Experiencing Landscapes: capturing the cultural services & experiential qualities of landscape*. Published as Natural England Commissioned Report October 2009 (NECR024).

Inwood, H., Fleming, A., Cole, L., & Minter, R. (2011) *Experiencing Landscapes: towards a judgement-making framework for cultural services & experiential qualities*. Published as Natural England Commissioned Report December 2011 (NECR045).

Inwood, H., Fleming, A., Pungetti, G., Selman, P., Jongman, R., Rackham, & Makhzoumi, J.

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(2014) *Econets, Landscape & People*. Published as Natural England Commissioned Report May 2015 (NECR180).

Inwood, H., Fleming, A., Frandsen, M., Davies, H., & Image, M. (2015) *Integrating cultural values and services in landscape and ecological planning*. Unpublished Draft Report to Natural England by The Research Box and ADAS UK.

Junker, B. & Buchecker, M. (2008). Aesthetic preferences versus ecological objectives in river restorations. *Landscape and Urban Planning*, **85**, 141–154.

Lawton, J.H., Brotherton, P.N.M., Brown, V.K., Elphick, C., Fitter, A.H., Forshaw, J., Haddow, R.W., Hilborne, S., Leafe, R.N., Mace, G.M., Southgate, M.P., Sutherland, W.J., Tew, T.E., Varley, J., & Wynne, G.R. (2010) *Making Space for Nature: a review of England's wildlife sites and ecological network*. Report to Defra.

MacFarlane, R., Hagget, C., & Fuller, D. (2005) *Mapping Tranquillity: Defining and Assessing a Valuable Resource*. Prepared for CPRE & The Countryside Agency, London.

Pinto-Correira, T. & Carvalho-Ribeiro, S. (2012) The Index of Function Suitability (IFS): A new tool for assessing the capacity of landscapes to provide amenity functions. *Land Use Policy*, **29**, 23-34.

Plieninger, T., Dijks, S., Oteros-Rozas, E. & Bieling, C. (2013). Assessing, mapping, and quantifying cultural ecosystem services at community level. *Land Use Policy*, **33**, 118-129.

Selman, P. (2012) *Sustainable Landscape Planning; The Reconnection Agenda*. Earthscan-Routledge, London.

Stephenson, J. (2008). The cultural values model: an integrated approach to values in landscapes. *Landscape in Urban Planning*, **84**, 127-139.

Tratalos, J.A., Haines-Young, R., Potschin, M., Fish, R. and Church, A. (2015). Cultural ecosystem services in the UK: Lessons on designing indicators to inform management and policy. *Ecological Indicators*, (In Press).

UK National Ecosystem Assessment (2011) *The UK National Ecosystem Assessment: Synthesis of the Key Findings*. UNEP-WCMC, Cambridge.

Van Berkel, D. B. & Verburg, P. (2014) Spatial quantification and valuation of cultural ecosystem services in an agricultural landscape. *Ecological Indicators*, **37**, 164-174.