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Monitoring and Evaluation of Nature Improvement Areas: Year 2 (2013-14) Progress Report

ANNEX: Literature Review:

Social and Economic Benefits Associated with Natural Environment Initiatives and their Contribution to Wellbeing

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Collingwood Environmental Planning Limited

in partnership with GeoData Institute and Cascade Consulting

Collingwood Environmental Planning

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Photograph Credits:	**Cover photograph:** Warton Volunteer Day: Our Lady of Lourdes Eco Club -have lunch in the area they have cleared (Tania Crockett) (Morecambe Bay)

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1. Introduction

1.1 Purpose of this report

This report had two main aims:

- To provide supporting evidence on the consideration of social and economic benefits of the Nature Improvement Areas (NIAs) and;
- To help ensure that the Monitoring and Evaluation (M&E) of the NIAs is grounded as far as is possible on the latest and accepted evidence by drawing on the various existing evaluation frameworks and methodologies.

This report seeks to be descriptive, to identify range of social, economic and wellbeing[1] benefits associated with natural environment initiatives, the weight of evidence and how they might be considered within existing tools and frameworks.

This report is a formal deliverable from the M&E of NIAs Phase 2 project (Deliverable 8). It forms one part of Work Package 3 (WP3) the overall aim of which was to explore approaches for evaluating the social, economic and wellbeing benefits of NIA partnership activities. The results of WP3 have fed directly into the M&E of the NIAs including the Year 1 and Year 2 M&E Progress Reports[2] and will also input to the Final Report in Year 3 and more details on that are provided in Section 4.3.

1.2 Definitions and scope

A number of key issues relate to understanding, measuring and assessing the social, economic and wellbeing benefits derived from engagement with the natural environment. Three key issues are highlighted below.

- Firstly, there are issues of language: the term 'benefits' used within an economic framework largely relate to benefits which can be monetised, whereas within a more multi-disciplinary approach the word is used to mean positive effects or impacts of an activity for individuals, communities or society. Within this report the term 'benefit' is used in its widest sense.
- Secondly, the NIA M&E framework[3] which this literature review is seeking to inform, considers the *'social and economic benefits and contributions to wellbeing'* of NIA partnership activities, however existing models of wellbeing (e.g. those of the New Economics Foundation (nef)[4] and The Office for National Statistics (ONS)[5]) consider wellbeing as an overarching concept that includes 'social' benefits (such as social connectedness), social capital and 'economic' benefits (e.g. employment). Sub-section 2.1 discusses these different frameworks of wellbeing and concludes that 'wellbeing' as an overarching term is best used in this context to include social and economic benefits.
- Thirdly, ecosystems services play a central role within the policy and practice debates around the benefits of the natural environment. For example, the National Ecosystems Assessment (2011) provides a useful framework for the consideration of a wider set of benefits of the natural environment than have perhaps traditionally been examined, such as the benefits of recreation, tourism, heritage for wellbeing. This allows the consideration of

[1] Note that generally throughout this report we have spelt 'wellbeing' as one word rather than hyphenated (well-being) for consistency. However, both versions are in common use in the UK. Some key sources in the UK drawn on for the literature review such as The Office for National Statistics (ONS) use 'well-being' and where this is the case in document titles, quotes etc we have retained this spelling.
[2] http://publications.naturalengland.org.uk/publication/5542385517854720?category=2430109
[3] http://publications.naturalengland.org.uk/publication/5542385517854720?category=2430109
[4] http://www.neweconomics.org/issues/entry/well-being
[5] http://www.ons.gov.uk/ons/guide-method/user-guidance/well-being/index.html

multiple benefits from one ecosystem, thereby illustrating how nature provides not only practical resources and goods (e.g. water, clean air), but also enjoyment, positive physical and mental health effects and employment. Key aspects of the ecosystems services framework, specifically in relation to cultural ecosystems goods and services are discussed further within this review.

This report considers the social and economic benefits associated with natural environment initiatives, potential assessment methods and tools and explores the literature on the direct and indirect social and economic benefits associated with being in contact with the natural environment. It does not consider any costs associated with natural environment initiatives, or any related environmental dis-services[6]. Social and economic benefits are explored by reviewing the natural environment's contributions to wellbeing, which has been framed around health, social development and connections, education and learning and economic benefits. It is recognised that in reality the benefits of natural environment initiatives are delivered across these categories, but this is a useful way of discussing the variety of benefits.

The report also explores how specific natural environment initiatives have led to social and economic benefits. It includes selected examples of initiatives and identifies methods and tools that have been used to evaluate and understand the social and economic benefits and contributions to wellbeing.

1.3 Methods

The literature was collected and synthesised using the following process:

1. Review of submitted tender materials for the NIA M&E Phase 2 project to identify main literature cited.
2. Discussions between M&E Phase 2 project team experts to identify literature sources and examples of natural environment initiatives and methods and tools.
3. Use of internet and research database searches including 'snowballing', where references from relevant papers, reports and initiatives are explored.
4. Discussions and analysis with the internal project team to draw out the lessons and key findings as well as the structure for the report.
5. Internal iterations of draft versions of the report.
6. Draft report shared with the Steering Group, who provided input and literature recommendations.
7. Final report drafted.
8. Peer review – the Defra project officer appointed two peer reviewers whose comments were received and acted on.
9. Final report delivered

In addition, there was a significant degree of coordination with other Work Package leads and team members to share emerging learning from the NIA M&E Phase 2 project.

[6] Environmental dis-services are aspects of the environment that produce conflicted opinions in individuals or communities, for instance one group may see an aspects or use of the environment as a benefit (such as mountain biking or fruit picking, and another may view it negatively. See Lyytianki et al. (2008) and others for more on this subject.

2. Benefits Associated with the Natural Environment

This section provides evidence for social and economic benefits associated with interactions with the natural environment. It begins by introducing the concept of wellbeing as an overarching term to include social and economic benefits before outlining a framework to support the identification of benefits associated with the natural environment.

Three approaches to conceptualising general wellbeing, its drivers and domains are briefly reviewed[7] including:

1. Defra's capitals approach.
2. The Office for National Statistics (ONS) definition of wellbeing domains.
3. nef's dynamic approach.

Following this the report reviews frameworks and typologies focussed on conceptualising the role of the natural environment in relation to aspects of wellbeing:

1. National Ecosystems Assessment (2010) ecosystems services framework.
2. Newton's (2007) benefits to wellbeing of interactions with the natural environment.
3. O'Brien and Morris's (2013) typology of benefits to wellbeing from interactions with trees, forests and woodland.
4. Keniger's (2013) typology of benefits to individual wellbeing from interactions with nature.

This takes the review from a general consideration of wellbeing to a more specific focus on the benefits to wellbeing of natural environment initiatives.

2.1 Wellbeing: conceptual frameworks

There is no single definition for wellbeing (Newton, 2007; Defra, 2009), for the purposes of this report we consider the Defra (2009) definition:

> "*… a positive physical, social and mental state; it is not just the absence of pain, discomfort and incapacity. It requires that basic needs are met, that individuals have a sense of purpose, that they feel able to achieve important personal goals and participate in society. It is enhanced by conditions that include supportive personal relationships, strong and inclusive communities, good health, financial and personal security, rewarding employment, and a healthy and attractive environment.*" (Defra, 2009)

What is important for this review is that 'wellbeing' is multidimensional and inclusive of social and economic aspects, and that in these general frameworks of wellbeing, the natural environment is clearly indicated as a factor influencing wellbeing.

Wellbeing has come to prominence over the past decade in the UK, with it becoming a key concept within UK Government crossing health, welfare (old age and children), sustainable development and local government policies (Cabinet Office and Prime Minister's Office, 2010; Maxwell *et al.*, 2011; Harper and Price, 2011; Natural Capital Committee, 2012). For instance, the UK is considering wellbeing measures within policy at global and national scales (Harper and Price, 2011; ESRC, 2012). The ONS has been considering wellbeing measures as part of their Measuring National Well-being

[7] These approaches were chosen as they reflect the general approaches to wellbeing drawn upon by UK government over the past 5 – 10 years (2005-2014). As noted in 2.1 the ESRC has carried out interesting work on Wellbeing in Developing countries ESRC, 2012

programme since 2010. In 2012 they produced the *Measuring National Well-being: Life in the UK 2012* report, which provided an overview of wellbeing in the UK and will be updated and published annually (Office for National Statistics, 2012a)[8].

2.1.1 Capitals approach

The 'capitals approach' is used by Defra and was developed in the context of understanding the social impacts of policy and their effects on wellbeing. The approach considers four types of capital and their stocks and flows in relation to general wellbeing (Figure 1). These capitals are:

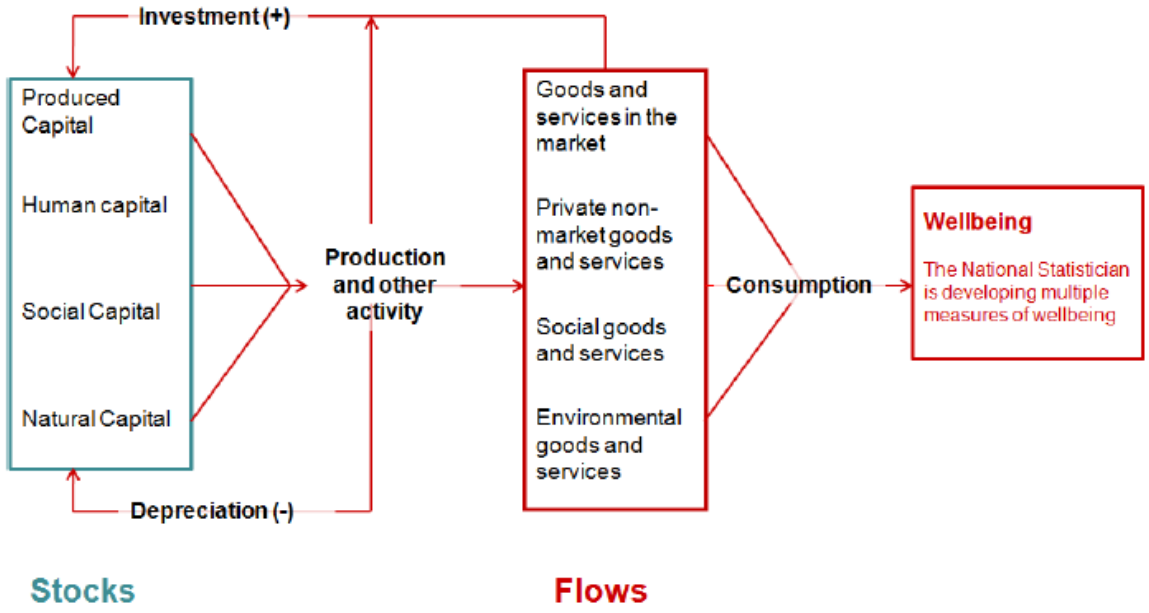
- Produced capital describes human-made means of production and includes machinery, equipment and infrastructure.
- Human capital relates to the "*knowledge, skills, competencies and attributes*" of individuals.
- Natural capital includes ecosystem services, natural resource inputs and environmental services for economic production, natural assets with amenity and productive use, and non-material benefits such as recreational and spiritual benefits.
- Social capital is described as the "*stock of social networks together with shared norms, values and understandings that facilitate cooperation within or among gro*ups" (Cote and Healy, 2001, in Harper and Price, 2011).

These capital 'stocks' combine to produce outcomes that then either produce feedback loops, increasing or decreasing the original capitals, or result in 'flows' that result in goods and services. Wellbeing is then understood to be derived from the consumption, or experience, of these goods and services (Harper and Price, 2011). This framework focuses on the factors that are associated with wellbeing rather than with the concept of wellbeing itself. Within Defra the concept of wellbeing is based on the ONS work (described in Section 2.1.2).

Within the capitals framework the natural environment is conceptualised as 'natural capital' producing environmental goods and services that influence wellbeing. It uses the same economic framing of stocks, flows, capitals, goods and services as the ecosystem services approach discussed in more detail in Section 2.2.1.

[8] The ONS is explicitly considering wellbeing associated with the natural environment, although to date this has been limited to access to the nature and environmental outputs such as greenhouse gas and energy consumption as one among many other measures (ONS, 2013a). In mid-2012 the ONS released a consultation on accounting for the value of nature in the UK and this work is continuing to be developed (ONS, 2012b).

Figure 1: A stocks and flows framework for capitals, goods and services, and wellbeing



Source: Defra's *'Framework for understanding the social impacts of policy and their effects on wellbeing* paper for the *Social Impacts Taskforce* (Harper and Price, 2011)

2.1.2 ONS wellbeing approach

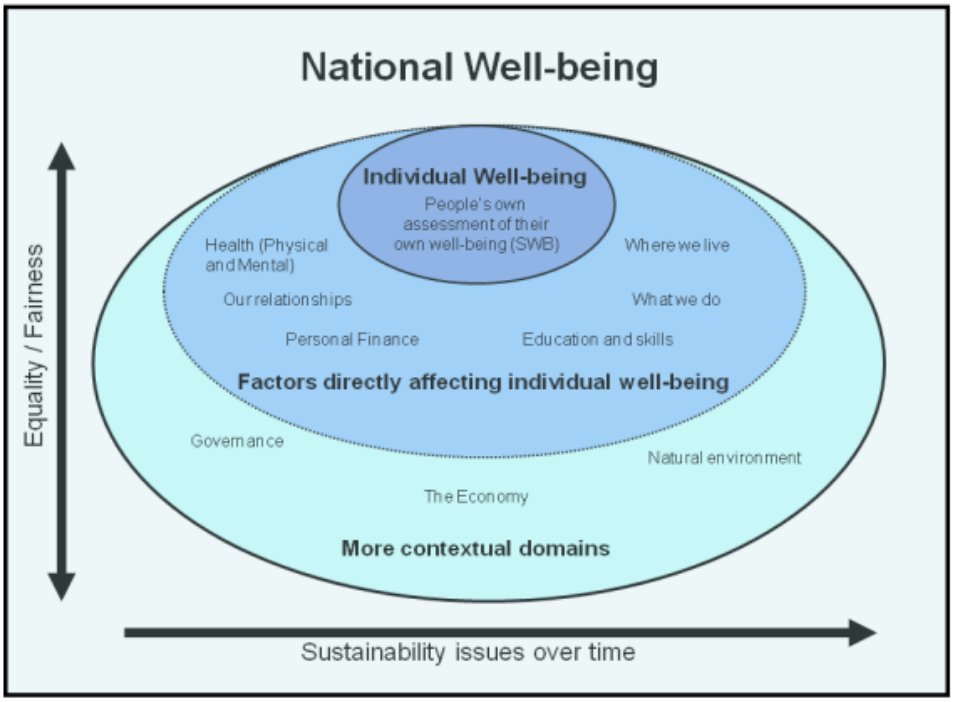
The ONS has been developing indicators of wellbeing (ONS, 2014a) and investigating factors associated with subjective wellbeing (ONS, 2011a). Following a 2012 consultation ten 'domains' were identified to measure "national well-being", each of these domains has a number of indicators. The domains are:

1. Individual wellbeing (e.g. life satisfaction, happiness, anxiety)
2. Our relationships (e.g. Satisfaction with family/social life)
3. Health (e.g. physical and psychological, satisfaction with health)
4. What we do (e.g. employment, engagement with cultural, sporting activities, satisfaction with employment/leisure time)
5. Where we live (e.g. crime and fear of crime, access to natural environments, access to transport)
6. Personal finance (e.g. income, wealth, satisfaction with income/wealth)
7. Education and skills (e.g. number of qualifications)
8. Economy (e.g. net income per head, inflation)
9. Governance (e.g. numbers voting, trust in government)
10. Natural environment (e.g. total green-house gas emissions (millions of tonnes); protected areas in the UK (Millions hectares); energy consumed within the UK from renewable sources; household waste that is recycled)

These ten domains make up the "National Wheel of Well-being" (ONS, 2014b) which is used to provide updates on the state of national wellbeing (see for example ONS, 2014c). There have been discussions within ONS around there being a core of wellbeing and the factors associated with that core, see for example Figure 2 which was part of the national consultation (ONS, 2011b). Figure 2 provides a conceptualisation of the relationships between the different aspects, with personal subjective wellbeing being at the core and influenced by other factors. This framework provides a

place for the natural environment, as both 'contextual variable' and as part of 'where we live' one of the factors affecting subjective wellbeing.

Figure 2: National Well-Being Framework



Source: ONS, 2011b

The ONS wellbeing indicators have provided a step change in the appreciation and measurement of wellbeing at the national level and provide a place for the natural environment as a factor influencing personal wellbeing.

Despite this, when considering national wellbeing the ONS has, to date, limited consideration of the environment to access to nature and environmental outputs such as greenhouse gas and energy consumption (ONS, 2013a). In mid-2012 the ONS released a consultation on accounting for the value of nature in the UK and this work is continuing to be developed (ONS, 2012b). Whilst ONS has carried out some statistical work looking at the relationship between subjective wellbeing and other factors, specifically the 'what we do' aspect of Figure 2 (ONS, 2013), it has yet to carry out similar work with 'where we live' and the contextual impact of the natural environment on subjective wellbeing.

2.1.3 nef dynamic framework for general wellbeing

nef (2011) have developed a dynamic framework for general wellbeing that integrates previous frameworks (Figure 3). The framework describes how external conditions and personal resources combine to contribute to 'function' and the satisfaction of needs, which then allow people to experience positive emotions and 'good feelings'.

This model is similar to that of Harper and Price's (2011) capitals approach, with social capital being comparable to personal resources and human capital, produced and natural capital being similar to external conditions. The role of the natural environment is less pronounced in this framework, but nef (2005) provides an overview of the relationship between the environment and wellbeing. The framework also shows the feedback loop of positive emotions and wellbeing on personal resources.

The dynamic aspect and the inclusion of subjective wellbeing (how people feel) in the nef model were included in the ONS wellbeing framework (ONS, 2011c). The 2011 paper by nef was intended

to inform the government debate on the measurement of wellbeing and was based on previous research as nef (2011) explain:

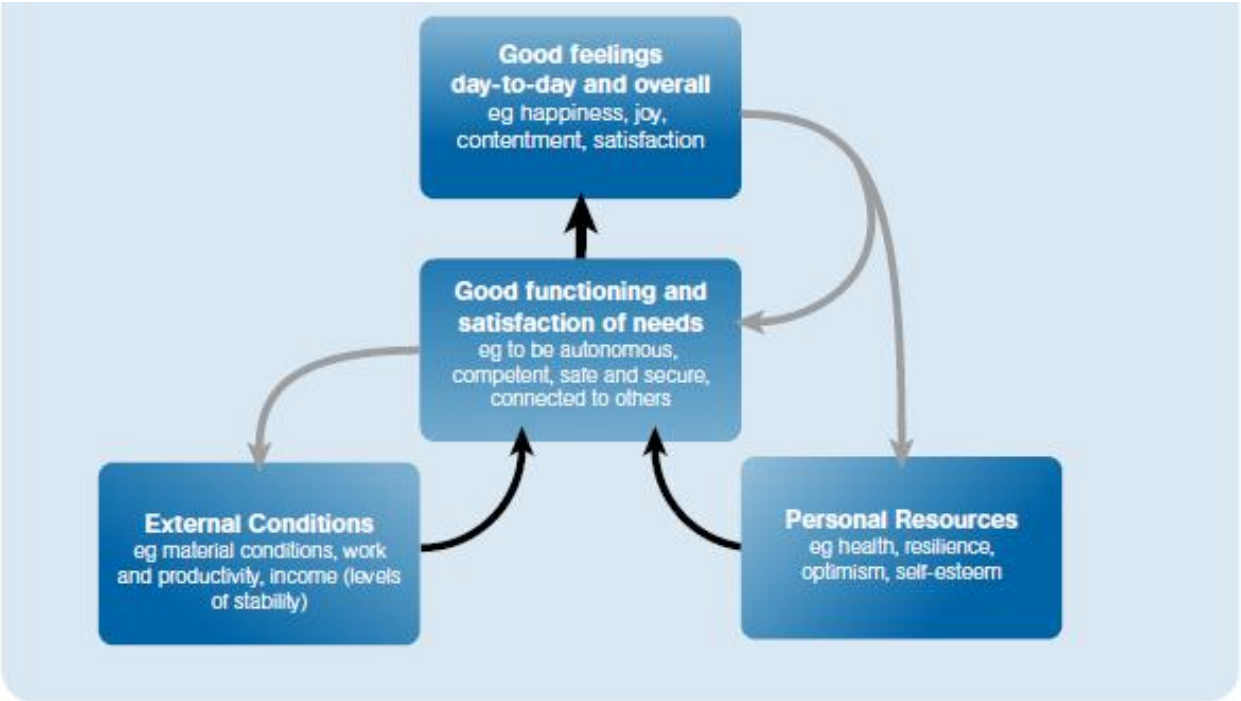
> "*Our approach to measuring well-being is based on nef's dynamic model, developed for the Government Office for Science's 2008 Foresight project. This model draws on contemporary psychological research and ancient philosophy, and depicts well-being as a dynamic process. The model uses the idea of flourishing: people are 'flourishing' when they are functioning well in their interactions with the world and experience positive feelings as a result. A flourishing life involves good relationships, autonomy, competence and a sense of purpose, as well as feelings of happiness and satisfaction.*" (nef, 2011, p. 2)

What is clear is that wellbeing is a complex construct, with much work still to be carried out to evaluate the key factors that affect it. The nef paper considers this complexity and provides an underlying theory of wellbeing: self-determination theory (as defined by Ryan and Deci, 2000). This research:

> "*revealed that pursuing aspirations that lead to the satisfaction of three basic psychological needs would subsequently lead to high reported well-being, over the short-term and the long-term. The needs are as follows:*
>
> - *Autonomy – a feeling of choice and authenticity about your thoughts and behaviours.*
> - *Competence – a sense of efficacy and self-esteem, and a sense that you can have a meaningful impact on the world around you.*
> - *Relatedness – feeling that people care about you, and feeling close to others.*
>
> *More recent work has also floated a fourth psychological need – that for security. Whilst we endorse further exploration of this need, it has yet to be integrated into the theory in a coherent fashion.*
>
> *According to SDT [self-determination theory], well-being is achieved by "behaving in ways that satisfy psychological needs": functioning well.*" (nef, 2011, p. 14)

The satisfaction of these needs leads to good feelings and satisfaction with life as the model suggests. It is really helpful to have a framework that provides some explanation as to *why* different activities might lead to improved feelings of satisfaction etc., as this potentially provides a way of distinguishing which activities might be most beneficial to wellbeing. Indeed, nef's 'Five ways to wellbeing' (nef, 2008) does this by distilling the research into five key aspects: connecting with others; being active; taking notice; continuing to learn; and giving to others. Understanding how interactions with, and being in, the natural environment can facilitate these aspects could be a useful approach to unpacking the wellbeing benefits of those interactions.

Figure 3: A dynamic framework of wellbeing



Source: nef, 2011

2.2 Wellbeing and the natural environment

The previous sub-section explored some of the conceptual models describing wellbeing and the factors contributing to wellbeing. This sub-section considers frameworks and evidence for wellbeing benefits from interactions with the natural environment.

Section 2.2.1 provides an overview of ecosystems services in relation to wellbeing, together with three key review papers that provide frameworks for thinking about the benefits of the natural environment in relation to wellbeing.

Research on the effects of the natural environment on the health (psychological and physical) aspects of wellbeing (see Clayton, 2012 for review chapters), provides some explanations for why contact with nature may link to increases in subjective wellbeing and these are discussed in more detail in sub-section 2.2.2.

2.2.1 Ecosystems services

Wellbeing with regard to the natural environment is increasingly being framed in terms of 'ecosystem services', which have been defined as "*the benefits people obtain from ecosystems*" (MA, 2005). This concept links the benefits, goods and services that the environment provides with specific constituents of wellbeing. In this way it seeks to provide a consistent framework to understand the marginal changes in the natural environment and related impacts to wellbeing.

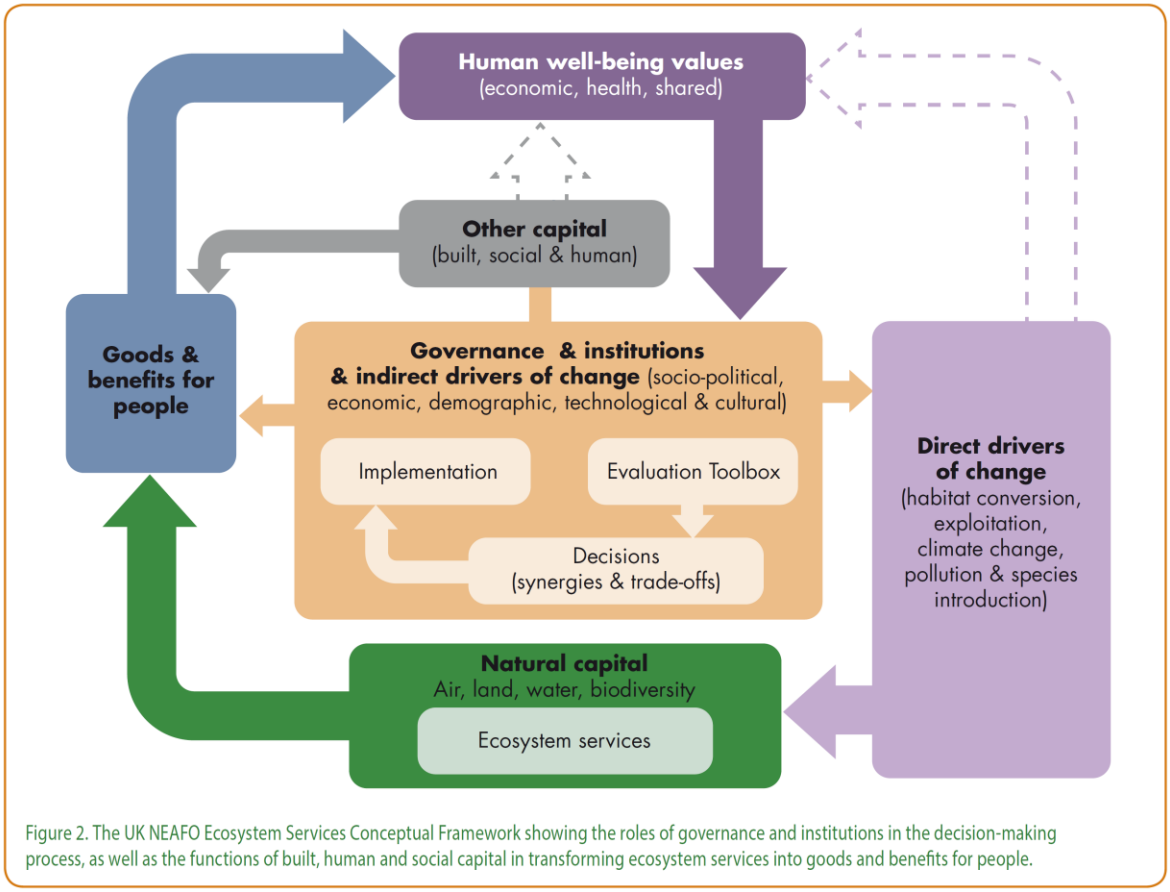
These benefits tend to be underestimated or completely overlooked within 'traditional' decision making and the concept of ecosystem services seeks to overcome this by making the contribution of the natural environment to wellbeing more explicit.

Putting the role of ecosystems at the heart of debates around wellbeing received a step change with the development of the Millennium Ecosystem Assessment (MA) (2003). Within this assessment links were made between the types of services ecosystems provide (supporting, provisioning, regulating and cultural services) and constituents of wellbeing such as security, basic material for a good life, health and good social relations. The UK National Ecosystem Assessment (UK NEA) drew

on the MA experience within a UK context and sought to remedy some of its inconsistencies. As the UK NEA synthesis report (UK NEA, 2011) says: *"the UK NEA also incorporates post-MA advances, especially for the economic valuation of ecosystem services and focuses on 'final ecosystem services' developed to avoid the double counting of services which are part of a suite of primary processes, including supporting services*" p. 15.

Figure 4 shows the latest conceptual framework from the UK NEAFO project (UK NEA, 2014), this updates the 2011 conceptual framework by including the roles of governance and institutions and also shows the importance of "other capitals" in transforming ecosystems services into goods and benefits for people.

Figure 4: The UK NEAFO Ecosystems Services Conceptual Framework showing the links between ecosystems, ecosystem services, goods, valuation, human wellbeing, change, processes and scenarios and roles of governance and institutions.



Source: UK NEA, 2014

Within the UK NEA (UK NEA, 2011), wellbeing is measured in terms of economic value, health value and shared social value:

"Three categories of valuation are implemented in the UK NEA in order to reflect actual or potential well-being. Economic valuation, health benefits and shared (social) values are different ways of measuring value and, therefore, overall well-being." (UK NEA, 2011, p. 20-21). This quote shows how the UK NEA focussed on measuring value/wellbeing. We would suggest that this does provide a specific framing of wellbeing which is perhaps narrower than that of nef and ONS definitions.

In contrast, the concept of wellbeing used in the NIA M&E Framework reflects the broader definition of wellbeing, both determinants and constituents. The measurement of wellbeing in this broad

sense is focussed on measuring its value (in monetary and non-monetary terms) rather than using specific ways of measuring value as a proxy for wellbeing as the UK NEA does. However, within the UK NEA Follow On project (UK NEAFO) (UK NEA, 2014) there has been further development in terms of describing the benefits to wellbeing with respect to cultural ecosystems services. Part of the UK NEAFO project sought, to develop indicators for cultural ecosystem services, together with developing a new conceptual framework for the linkages between cultural ecosystem services, values and benefits. This conceptual framework presented in the UK NEAFO synthesis report, includes three dimensions of wellbeing as cultural ecosystem benefits:

- Identities (e.g. belonging, sense of place, rootedness, spirituality)
- Experiences (e.g. tranquillity, inspiration, escape, discovery)
- Capabilities (e.g. knowledge, health, dexterity, judgement)

These three dimensions articulate and measure some of the experienced benefits of nature that are discussed in later sections of this paper, and which were less explicit in the original UK NEA report. Cultural ecosystem services are just one type of final ecosystem services elaborated on in the UK NEA framework.

Figure 5 shows the range of services that deliver specific goods. Whilst all the services are ultimately vital for human wellbeing, our focus is on understanding the cultural services and the role of environmental settings in providing wellbeing benefits to people

Figure 5: Ecosystem services in the UK NEA classified according to ecosystem service type and final / intermediate services

Table 2.2 Ecosystem services in the UK NEA classified according to both ecosystem service type (provisioning, regulating, cultural and supporting) and whether or not they are final ecosystem services or intermediate services and/or processes. For each final ecosystem service an example of the good(s) it delivers is provided in italics.

Ecosystem processes/intermediate services		Final ecosystem services (*example of goods*)	
Supporting services	• Primary production • Soil formation • Nutrient cycling • Water cycling	**Provisioning services**	• Crops, livestock, fish (*food*) • Trees, standing vegetation, peat (*fibre, energy, carbon sequestration*) • Water supply (*domestic and industrial water*) • Wild species diversity (*bioprospecting, medicinal plants*)
• Decomposition • Weathering • Climate regulation • Pollination • Disease and pest regulation • Ecological interactions • Evolutionary processes • Wild species diversity		**Cultural services**	• Wild species diversity (*recreation*) • Environmental settings (*recreation, tourism, spiritual/religious*)
		Regulating services	• Climate regulation (*equable climate*) • Pollination • Detoxification and purification in soils, air and water (*pollution control*) • Hazard regulation (*erosion control, flood control*) • Noise regulation (*noise control*) • Disease and pest regulation (*disease and pest control*)

Source: (UK NEA, 2011, p. 17)

'Environmental settings'[9] (a final cultural ecosystem service) which arise from the interaction of other services with other types of capital (e.g. human, social):

> *"Our proposition is that environmental settings represent a final cultural ecosystem service. The intermediate services that underpin this cultural ecosystem service are geophysical, hydro-meteorological and biological products and processes. These intermediate services will be crucial in shaping environmental settings even though many people will be unaware of the influence of some of these processes. In the expert discourse of the UK NEA, these are*

[9] For the purposes of this review 'wild species diversity' is considered to be an aspect of 'environmental settings'.

> *regulating, supporting and provisioning services. In public discourse, as we have seen above, they are simply **'the natural environment'** and **'nature'**.*
>
> *Through the interactions between these other ecosystem services and human intellectual, material and social capital over very long periods of time, environmental settings emerge as a final cultural ecosystem service from which a number of time- and space-specific cultural goods arise—these were termed '**benefits'** by Fisher et al. (2008)."* (UK NEA, 2011, p. 646, our emphasis)

Environmental settings are the product of interactions between the physical environment and human behaviour. As with the nef model of wellbeing there is an underlying framework that suggests how environmental settings contribute to human wellbeing - The Max-Neef's Human-Scale Development Matrix (Max-Neef, 1992; UK NEA, 2011). This matrix suggests that beyond the need for subsistence there are a number of human needs which people strive to satisfy: protection, affection, understanding, participation, leisure, creativity, identity and freedom. The UK NEA chapter on cultural ecosystem services elaborates on how environmental settings fulfil our need for spaces for interaction and provide the place for the fulfilment of our other needs e.g. leisure, protection etc.

The UK NEAFO project has elaborated the conceptual approach to cultural ecosystems services (Figure 6 after Fish and Church, 2013).

Figure 6: Conceptual framework for the linkages between cultural ecosystem services, values and benefits emphasising the importance of the interaction between environmental places and cultural practices

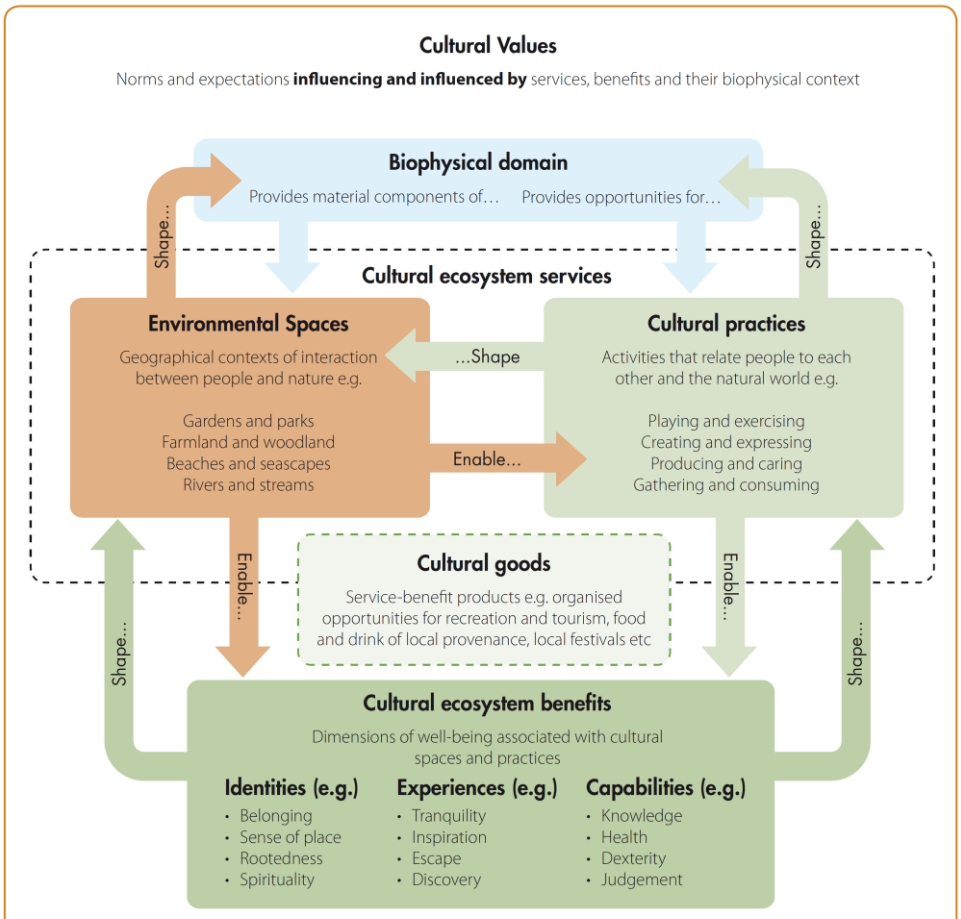


Figure 15. A conceptual framework for the linkages between cultural ecosystem services, values and benefits, emphasising the importance of the interaction between environmental places and cultural practices.

Here the term "environmental spaces" replaces the term "environmental settings".

> *"'environmental spaces' are what the UK NEA described as 'environmental settings'; they are places, localities, landscapes and seascapes that provide opportunities for interactions between people and nature and are associated with a range of cognitive, social and physical benefits to well-being. This change in terminology reflects feedback from stakeholders in the production of this study." (UK NEA, 2014)*

The other key aspect of the new framework is the concept of cultural practices and it is the interaction of these with environmental spaces that gives rise to the cultural ecosystems benefits. In the first UK NEA (UK NEA 2011) cultural goods described in five categories:

1. Leisure, recreation and tourism goods
2. Health goods
3. Heritage goods
4. Education and ecological knowledge goods
5. Religious and spiritual goods

This was used as a way of discussing evidence for different types of goods or benefits and is a useful classification of cultural 'goods' under which the empirical evidence for those goods is discussed within the UK NEA and that discussion is considered further in Section 3. The UK NEAFO work does not use this set of five categories in the same way but rather focuses on the dimensions of wellbeing that are derived from the interactions between cultural practices and environmental spaces, and is conceptually clearer and provides a very useful approach going forward with this work[10].

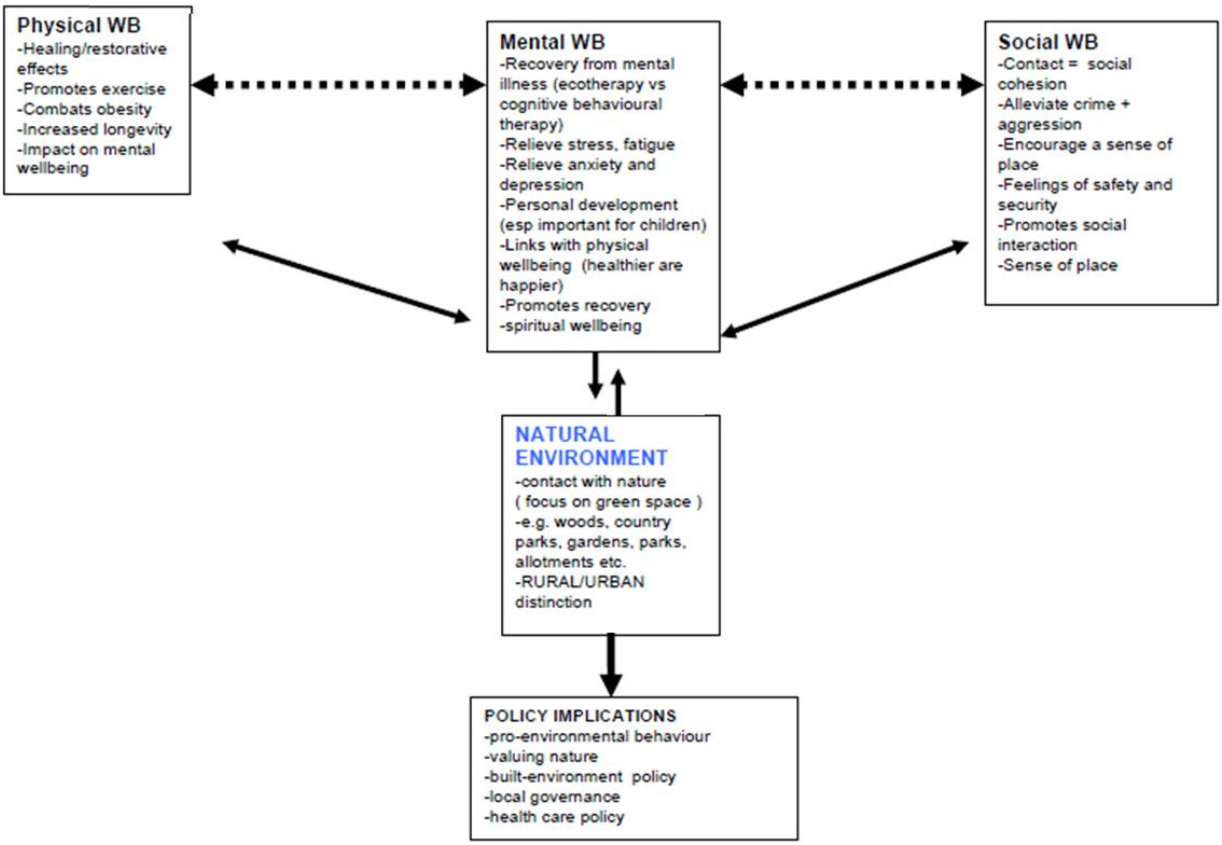
2.2.2 Newton's framework (2007): benefits of interactions with the natural environment

Newton (2007) carried out an overview of wellbeing and the natural environment for Defra showing the benefits of interactions with the natural environment in terms of physical, mental and social wellbeing with a specific focus on green spaces (Figure 7). This includes a discussion of the way the MA (MA, 2003) approaches wellbeing and the natural environment, highlighting apparent weaknesses in capturing the impact of the natural environment on mental wellbeing. Her review emphases the impacts of the natural environment on a range of mental wellbeing aspects with a focus on 'green space'. From that comprehensive review she provides a summary of the physical, mental, and social wellbeing benefits of green spaces, concluding that there is good evidence for the social, mental and physical wellbeing benefits from green spaces and comments on the synergistic effects of exercising in a green space with give both physical and mental wellbeing effects (Mind, 2007).

Newton (2007) also comments on the tendency to discount qualitative sources of evidence, as well as those quantitative studies that are not in line with medical community criteria of robust research. She suggests that both quantitative and qualitative data is needed to understand the processes at play in creating wellbeing. She also comments on the need for academics from different disciplines who are working on this topic to collaborate and develop multidisciplinary approaches to evaluating these benefits.

[10] This report and work on this WP was carried out largely before the publication of the UK NEAFO project (UK NEA, 2014). Because of this we have drawn more on the evidence presented in UK NEA (2011) in framing our categories of benefit.

Figure 7: The well-being benefits green spaces (Newton, 2007)



Source: Adapted from Newton, 2007

2.2.3 Keniger *et al.* (2013) – Benefits of interacting with the natural environment

Keniger *et al.* (2013) provide a review of 57 papers using a systematic approach[11] to provide a typology of the types of settings that are used within the studies. The review shows that these settings range from indoor spaces to broad regional landscapes. The review proposes a typology of interactions between people and nature providing much needed clarity and organisation of the different strands of literature in this area. Keniger *et al*. (2013) discuss six categories of benefit:

- Psychological
- Cognitive
- Physiological
- Social
- Spiritual
- Tangible

The review considers the strength of evidence for these different types of benefit at the level of the individual, and suggests that studies on the psychological and physiological benefits of interactions

[11] They describe their search terms as the following: "*search terms were combinations of "nature", "interaction", "benefit", "health" and "biodiversity". Studies were included if they presented findings about one or more benefits of interacting with nature in some form. Studies were excluded if they reported the benefits of nature for humans but did not focus on a specific interaction at an individual level*" (Keniger et al, p. 915).

with the natural environment dominate and that little work has being carried out on the spiritual and aesthetic benefits (for exceptions see: Heintzman 2000 and 2009.

Keniger *et al*. (2013), like Newton (2007), comment on the range of disciplines that are involved, and note caution in relation to the methodological robustness of studies in this area. For instance they reflect: that samples are often opportunistic; self-reporting methods are frequently used which may not have good reliability; the time frames of research are short term so long term benefits are poorly explored; and other variables such as gender, age, etc. which may confound findings are not clearly explored. All of these issues point to the need for more thorough research in the area.

However, in agreement with Newton (2007), they conclude:

> "*Overall there is good evidence to suggest that natural settings can have multiple beneficial effects...some types of benefits have been much more heavily studied than others: psychological, cognitive and physiological featured most prominently with fewer studies on social, spiritual and tangible benefits. Given the possible wider societal benefits from increased social cohesion (Aldous, 2007) or the role that spiritual well-being might play in influencing the way people value nature (Orams, 2002) the latter benefits deserve considered attention in future research."* (p. 929)

2.2.4 O'Brien and Morris (2013)

O'Brien and Morris (2013) draw on 31 studies undertaken since 2001 to carry out a meta-analysis of the quantitative data and a meta-synthesis of qualitative data on the benefits associated with trees, woodlands and forests in Britain. From this they developed a typology of the benefits gained from these settings, complementing Newton's focus on green spaces.

The framework proposed to explore the benefits associated with the natural environment is divided into:

- Health
- Social development and connections
- Education and learning
- Economy
- Symbolic / cultural / spiritual significance
- Nature / landscape connections

Their quantitative analysis provides the overall headings with the qualitative research giving more detail within each of those categories. Table 1 provides more detail for each of the categories.

This typology combines quantitative and qualitative research with respect to trees, woodlands and forests, giving a more nuanced picture of the types of wellbeing benefits which can be further examined in relation to other types of natural environments. As with the Keniger (2013), and Newton (2007) it provides a robust analysis of data, shedding light on the complexity of the wellbeing benefits of interactions with the natural environment.

Table 1: Typology of wellbeing benefits gained from trees, woodlands and forests and associated activities (adapted from O'Brien and Morris, 2013)

Wellbeing category	Wellbeing type	Activities
Health	Physical wellbeing	Activities involved in physical activity, action and movement
	Mental restoration	Spending time in woodland. Wide range of recreational and leisure activities
	Escape and freedom	Distancing oneself (physically and mentally) from sources of anxiety in everyday life
	Enjoyment and fun	Recreational and leisure activities such as picnicking, cycling and walking
Nature/landscape connections	Sensory stimulation	Experiencing woods through all the senses
	Nature connectedness	Wide range of imaginative and contemplative activities, watching TV, watching and appreciating wildlife
	Landscape improvements	Seeing improvements in the landscape quality
	Screening/shelter	Activities enabling avoidance of disturbance
	Gathering	Gathering non-timber forest products
	Sense of place	Activities in woods that connect people with particular places, acts of remembrance
Education and learning	Personal development	Training in woodland management, apprenticeships and volunteering
	Education and learning	Informal and formal education such as Forest school, learning about and in the woods.
Social development and connections	Strengthening social relationships	Socialising with family and friends, and sharing leisure and recreational activities
	Creating new social relationships	Making friends and meeting new people
	Participation and capacity building	Participation in management decisions, volunteering and community activities
Symbolic/cultural/spiritual significance	Symbolic/cultural	Experiencing and interpreting the symbolic, cultural and historic significance of woods through direct and indirect forms of access
	Sense of ownership	Physical access, gathering non-timber forest products, getting involved in community activities and volunteering.
	Meaning and identity	Experiencing woods as symbols of national, regional, local and personal identities and wide range of activities that contribute to sense of self
	Religious and spiritual expression	Creative, interpretative, imaginative, contemplative and observational activities

2.2.5 Frameworks for examining wellbeing benefits associated with interactions with the natural environment

Table 2 provides an overview of the different categories of wellbeing benefits from the natural environment used within the papers reviewed in this report. It is hard to provide an exact comparison as different authors have different frameworks in which to consider wellbeing, its determinants and constituents. However, this table shows that:

1. There are numerous benefits that have been empirically identified as associated with interactions with nature
2. There is some agreement as to the nature of those benefits

Table 2: Comparison of benefits/ 'goods' associated with interactions with the natural environment[12]

MA (2003)	Newton (2007)	UK NEA (2011)	Keniger *et al.* (2013)	O'Brien & Morris (2013)
	Mental well-being	Health	Psychological Wellbeing	Health
	Physical wellbeing		Physiological	
Educational		Education and ecological knowledge	Cognitive (Cognitive Ability or Function)	Education and Learning
	Social		Social	Social Development and Connections
Spiritual and religious		Religious and spiritual	Spiritual	Symbolic/Cultural/Spiritual Significance
Aesthetic				
Inspirational				
			Tangible (Material Goods)	Economy
Sense of place				Nature/Landscape Connections
Recreation and ecotourism		Leisure, recreation and tourism		
Cultural heritage		Heritage		

2.3 Wellbeing benefits from interactions with the natural environment

Based on the review in sub-section 2.2., as summarised in Table 2, the following categories are proposed to capture the range of benefits expressed through the different approaches:

1. Health
2. Education and ecological knowledge
3. Symbolic, Spiritual, Sensory
4. Social development and connections

[12] As identified by MA (2003); Newton 2007 NEA (2011); Keniger et al. (2013) and O'Brien and Morris (2013)

5. Economic – including recreation, leisure, tourism

These categories are intended to be used as a way of ordering the evidence rather than developing a new framework. These categories are used because we suggest they capture the range of benefits expressed across the different frameworks, they are clearly distinct and easily communicated to the range of stakeholders across the NIA M&E project.

This section starts with a discussion about what is meant by 'interactions with nature' and then considers the evidence of the different benefits types under these five categories.

2.3.1 Defining interactions with nature

An important issue to clarify before providing a detailed discussion of the types of benefit from the natural environment is what types of interactions with nature are considered in the studies examined. For example, going for a walk in the park is very different from signing up to be a conservation volunteer for a local nature reserve.

Interactions with the natural environment can be differentiated into three types: indirect, incidental; and intentional (Burls, 2007; Keniger *et al.*, 2013).

- **Indirect** interactions include times when individuals are able to experience nature without being physically present in it, such as viewing nature in a picture or through a window (Kaplan, 2001)
- **Interactions** with nature as a by-product of another activity are incidental and include walking to work (Natural England, 2009)
- **Intentional** interactions with nature when individuals actively interact with nature through recreational activities and volunteering (Keniger *et al.*, 2013)

An overview of examples of these three types of interactions leading to benefits from the natural environment is presented in Table 3.

Table 3: Indirect, incidental and intentional interactions with the natural environment and relevant benefit types (in brackets)

Indirect	Incidental	Intentional
Viewing nature through hospital windows (Physical Wellbeing)	Walking to work through the natural environment; Breathing in cleaner air as a result of more trees (Physical Wellbeing)	Green gyms and conservation activities (Physical Wellbeing)
Viewing the natural environment (Mental Wellbeing)	Being in the natural environment (Mental Wellbeing)	Being in the natural environment (Mental Wellbeing)
	Participating in community activities in the natural environment (Social Development and Connections)	Participating in conservation activities (Social Development and Connections)
Viewing the natural environment during academic work (Education and Learning)	Educational visits with non-environmental aim (e.g. historical re-enactment trips) (Education and Learning)	Educational visits with environmental learning aim (e.g. pond-dipping) (Education and Learning)
	Recreational activities and tourism for areas surrounding green spaces (Economy)	Recreational activities and tourism for green spaces (Economy)

Indirect	Incidental	Intentional
Perceived aesthetic appeal to business for views of the natural environment (Economy)	Aesthetic appeal to business for being in the natural environment (Economy)	Aesthetic appeal to business for being in the natural environment (Economy)
Land and property being able to view, or be near to, the natural environment (Economy)	Ability of woodland to sequester carbon from the atmosphere (Economy)	Ability of coastal wetlands to protect areas from flooding; ability to sequester carbon (Economy)

Whilst identifying indirect interactions is relatively simple as the benefits are experienced without being physically in the natural environment, the distinction between incidental and intentional interactions is less clear. The difference between these two interactions depends upon the motivations behind the activity occurring in the natural environment. If people are undertaking activities in the natural environment specifically to improve their mental wellbeing then they are intentional interactions, however if they are undertaking activities for another purpose and it leads to mental wellbeing benefits then these are incidental interactions.

2.3.2 Health

There is good evidence for the health benefits of interactions with the natural environment and it is clearly and area of interest for practitioners and policy makers (Ecosystems Knowledge Network, 2012/2013). Pretty *et al.,* (2011) within the UK NEA suggest there are three types of health benefits from ecosystems:

- **Direct positive effects**
  - Mental health (Kaplan 2001; Pretty *et al*. 2005; Pretty *et al*. 2007).
  - Physical health (Laumann *et al*. 2003; Kampman *et al*. 2007; Pretty *et al*. 2007).
- **Indirect positive effects**
  - Facilitating nature-based activity and social engagement (by providing locations for contact with nature, physical activity and social engagement), all of which positively influence health (Coley *et al*. 1997; Kuo *et al*. 1998; Ward Thompson 2002).
  - Providing a catalyst for behavioural change in terms of encouraging the adoption of healthier lifestyles (improving life pathways, activity behaviour and the consumption of wild foods) (Wells & Lekies 2006; Pretty *et al*. 2009).
- **Reducing the threats and incidence of pollution and disease vectors**
  - Via a variety of purification and control functions such as local climate regulation, noise reduction and scavenging of air pollutants (Morecroft *et al*. 1998; Pitcairn *et al*. 1998; Bignal *et a*l. 2004).

The UK NEA (Pretty *et al.*, 2011) provides an overview of these benefits and is drawn upon in the following sections. Hartig *et al.* (2014) also provide a useful overview of Nature and Health.

Physical wellbeing

Contact with the natural environment can have physiological benefits for people, including a range of medical and health-related benefits through increased physical exercise, and decreases in existing health inequalities caused by unequal wealth distribution. Pretty *et al.* (2011) provide a comprehensive review of the direct and indirect positive effects on physical health from interactions with the natural environment.

Intentional and incidental interactions with the natural environment can have a positive effect on people's physical health and functioning. The physical benefits from these interactions with nature can be extended through specific outdoor activities for example intentional interactions, such as green gyms (Box 1), can involve members of the public in a pre-arranged session of conservation activity in the natural environment and have been found to yield physical health benefits (nef, 2012a). The 'blue gym' concept referring to coasts has also been posited within the literature recognising the different health benefits of various habitat types (Depledge and Bird, 2009)

Box 1: Green Gyms

Isle of Wight Green Gym

The project began in 2003 and continues to run weekly session in 2013. The group was funded by The Footprint Trust for the first 18 months of its existence and is now independent and run by volunteers. The green gym is aimed at people of all ages and includes adults and children with learning difficulties. They are working to help improve the Island's countryside through practical conservation work and improve the health of the participants through involvement in the sessions. The activities are funded by charitable donations, which are complemented by online donations through their profile on the 'local giving' website.

The project's progress has not been measured directly. Although the groups continued existence, distribution, number of participants and formal awards provide an indication of its success.

The group has been in existence for a decade and has worked at over 130 different sites across the Isle of Wight with over 400 people participate. The weekly sessions last three hours each and there is anecdotal evidence of the sessions boosting the physical and mental health of those involved. The project was awarded the 'Queen's Award for Voluntary Service' in 2009 in recognition of their work. This is the highest award that is can be given to local volunteer groups across the UK and recognises outstanding work done in their own communities.

Further information can be found on their website (http://www.footprint-trust.co.uk/greengym.htm).

Image credit: http://www.footprint-trust.co.uk/greengym.htm

If people have good perceived and/or actual access to green space then they are 24% more likely to be physically active than if they have no access to green space (Natural England, 2009). This can be the result of incidental or intentional interactions; walking to work may necessitate passing through green spaces or people may intentionally choose to walk through green spaces on their walk to work.

If this 24% increase in the likelihood of people being more physically active was universal and extended to the population, then it is estimated that the life-cost averted saving to the NHS could be approximately £2.1 billion per annum (Natural England, 2009). This life-cost averted model is based on cardiovascular heart disease, stroke and Type 2 diabetes.

Pretty *et al*. (2011) conclude that access to nature can encourage participation in physical activity (green exercise) and that individuals with easy access to nature are three times as likely to participate in physical activity and, therefore, are 40% less likely to become overweight or obese. Whilst it is difficult to disentangle cause and effect between whether having access to greenspace causes greater physical activity or if people who enjoy physical activity choose to move to areas with

access to nature, it is clear that, by encouraging activity through participation in 'green exercise', there are multiple health benefits to be realised (Pretty *et al*., 2011).

The natural landscape can also act as a shelter from the surrounding human environment and screen people from noise, heat, weather and pollution (English Nature, 2003; nef, 2012a; Thompson *et al.*, 2012; O'Brien and Morris, 2013). This can reduce mental stress and also the physical stresses experienced from bad weather (i.e. storms), high temperatures (i.e. green spaces acting as cool areas in urban environments during heat waves) and pollution (i.e. from particulate matter in the air)

Interactions with the natural environment can also bring medical benefits such as the reduction in incidences of some health conditions including cardiovascular and respiratory diseases (Keniger *et al.*, 2013) as well as lowering heart rate and blood pressure.

Those suffering from circulatory disease experienced a 29.7% lower mortality rate from being in greener areas compared with less green areas (Faculty of Public Health, 2010). This study used the Generalised Land Use Database 2001, which classifies land use into nine categories, one of which is green space and includes parks, open spaces and agricultural land. They excluded domestic gardens and areas less than $5m^2$ such as single or small clumps of trees (Mitchell and Popham, 2008). The reduction in the mortality rate of those suffering from circulatory disease was determined to be a result of living near green space and not due to socio-economic differences; the study accounted for differences in wealth and the higher likelihood that more affluent areas would have more green space.

Longevity benefits have also been found from being able to walk through green areas and tree-lined streets in Japan, with senior citizens enjoying these opportunities being more likely to live for a further five years as opposed to those who did not (nef, 2005).

In relation to reductions in heart rate and blood pressure, Pretty *et al*. (2011 p. 1163) sum up research in this area

> "*Thus, viewing nature can have a relaxing effect on autonomic functions (the unconscious regulation of internal bodily activity), decreasing heart rate and blood pressure measurements."*

Pretty *et al.,* (2011) reviewed studies comparing rural with urban scenes and found that viewing rural scenes had an impact on lowering blood pressure and heart rate whereas urban scenes did not.

Incidental and intentional interactions with green spaces and the natural environment both lead to a decrease in respiratory complaints (English Nature, 2003; nef, 2012). The decrease in respiratory complaints was attributed to reduced air pollution levels that were mitigated by the absorption of air pollutants, such as ozone, by plants and trees (European Commission, 2011). Some initiatives seek to capitalise upon these benefits (Box 2).

Trees and green spaces can provide shade for people during periods of high temperatures and heat waves, these spaces are cooler than the surrounding built environment (English Nature, 2003; Forest Research, 2010a). These 'cool area' benefits can be accessed from both incidental and intentional interactions. People may benefit from the cooler temperatures as a by-product of another activity (incidental interactions). These medical benefits have been found to extend into recovery and rehabilitation after illness for patients with views of nature through their hospital windows (Ulrich *et al.*, 1991)

Maller *et al*., 2006; Faculty of Public Health, 2010). These patients also had a more rapid recovery and a reduced need for pain relief through this indirect interaction with the natural environment.

Box 2: Natural Environment Initiatives for Health

Discovery Quest in Norfolk

discovery quest
building on peoples' strengths
Community
Walking therapy programme for adults living in Norfolk

The project was funded by an Access to Nature grant in 2010 and delivered by Julian Support in partnership with a range of organisations. Discovery Quest was a one year walking therapy project designed to provide opportunities to observe and learn about a variety of wildlife. It was undertaken in three parts of Norfolk and aimed to engage adults with enduring mental health difficulties.

Discovery Quest assessed the benefits of the scheme by measuring both physical and mental health. Physical health was recorded before and after participation in the scheme by measuring their Body Mass Index (BMI) and waist to hips ratio. Mental health changes were measured using the Warwick Edinburgh Mental Well Being Scale (WEMWBS), the Rosenberg Self Esteem Scale (RSE) and the Profile of Mood States (POMS).

The majority of participants showed a statistically significant improvement in wellbeing, self-esteem and total mood disturbance. There were also physical benefits of participating in the Discovery Quest project with 96% experiencing a decrease in their BMI and over half experiencing a decrease in their waist to hips ratio, both representing a reduction in health risk. These results are from the Discovery Quest 2010 participants.

The project continues to be run in 2013 and more information can be found as part of Access to Nature's Early Findings report (http://publications.naturalengland.org.uk/file/10620067) or on Discovery Quest's website (http://www.discoveryquest.org/).

Mental wellbeing and restoration

The natural environment can benefit the psychological wellbeing of individuals through a restorative effect that can help to facilitate recovery from mental fatigue (Kaplan, 1992). For instance, the natural environment has been shown to reduce individual's stress levels, enhance their moods and self-esteem and reduce depression (Ulrich *et al*., 1991; Bird, 2007; Burls, 2007; Pretty *et al.*, 2011; nef, 2012a).

Incidental and intentional interactions with woodlands and forests in Britain have also been shown to improve individual's psychological wellbeing and lead to enjoyment and fun (O'Brien and Morris, 2013). White *et al*., (2013) explored the link between mental distress, as measured through life satisfaction, and green space. This was based on the Generalised Land Use Database 2001 classification system including areas categorised as 'green space' or 'domestic gardens'. By including domestic gardens, the research included benefits from indirect interactions such as viewing green space, as opposed to other studies that use only land classified as green space (such as Mitchell and Popham, 2008). White *et al*., (2013) shows that individuals were happier when living in urban areas with greater amounts of green space as this led to lower mental distress.

> "*Research suggests that there is a link between the amount of accessible greenspace and psychological well-being as contact with nature can help individuals to recover from stress, protect them from further stress and improve concentration. Furthermore, the more frequent the visits to nearby natural spaces, the lower the incidence of stress.*" (Pretty *et al*., 2011, p. 1159)

Green exercise can be extended to include green gyms (as described in Box 1), which have mental wellbeing benefits from interactions with other people as well as interactions with the natural environment. Green gyms seek to attract people who have never carried out conservation volunteering and encourage people to improve their health by engaging in practical conservation activities. The benefits include reduced social isolation, increased social support and an enhanced quality of life (Reynolds, 2000).

The incidental and intentional mental wellbeing benefits of nature have been recognised by mental health organisations, which have looked towards a 'new green agenda' for mental health (Mind,

2007). This is under the term of 'ecotherapy' that focuses on using the natural environment to benefit mental health (Forest Research, 2010b; nef, 2012a). Mind (2007) undertook studies on green exercise, physical activity in the natural environment, at local Mind groups with 108 people being surveyed. They found that 94% experienced improved mental health, including increases in self-esteem and mood. A review analysing 10 UK studies, involving 1252 participants, found that both men and women benefited from green exercise through improved self-esteem and mood, with the greatest self-esteem improvements seen in the mentally ill; the presence of water in the surrounding environment led to further positive effects (Barton and Pretty, 2010).

Pretty *et al.,* (2011 p. 1160) use the term 'green care' as an umbrella term for initiatives developed from "*the idea that contact with nature could be effective in therapeutic applications*". Green care covers: social and therapeutic horticulture; animal assisted interventions; care farming; green exercise therapy; ecotherapy and wilderness therapy. Green care focusses on therapeutic benefits for particular populations who may have significant mental health problems. Box 3 includes an example of 'green care'.

Box 3: Natural Environment Initiatives for Mental Health

Eco Health at Avon Tyrrell

The project was run by UK Youth and received £150,000 of funding from 'Ecominds'. It aimed to engage with people who are recovering from long-term mental distress and to improve self-esteem, confidence and happiness. The project provided social contact, training and support through gardening and conservation work. They provided places for up to eight people who then participate in the project for two to four days weekly for three months.

More information can be found on their website (http://www.mind.org.uk/help/ecominds/ecominds/funded_projects/medium_grants#avon)

Health inequalities

The term health inequalities describes the evidenced relationship between poverty and poor health. Specifically, people on lower incomes are also more likely to have poorer health outcomes than those on higher incomes. These health inequalities manifest themselves through increased risk factors for cancer and circulatory diseases, from smoking, physical inactivity and obesity. There is also evidence that it can adversely affect early childhood development and influence educational achievement and economic status. Health inequalities have an impact on economic productivity, and one study estimated these losses at £31-33 billion per year for the UK (Marmot, 2010). In addition, the reduced tax revenue and higher welfare payments, due to illnesses that could have been prevented in those at the low end of the social gradient, is in the range of £20-32 billion per year for the UK (Marmot, 2010). The cost of treating the various illnesses associated with health inequality in the UK is estimated to rise from £2 billion per year (2010) to nearly £5 billion per year in 2025 (Marmot, 2010).

A large-scale study of 336,348 patient records in the UK showed that populations exposed to the 'greenest' environments had significantly less health inequality than those in areas with less green space (Mitchell and Popham, 2008). The amount of green space available is influential on conditions such as obesity, circulatory disease, mental health, chronic stress and asthma, all of which are illnesses associated with health inequalities (Forest Research, 2010a). Explanations for this effect suggest that access to green spaces allows individuals to gain physiological and mental health benefits from physical exercise, improved air quality and the mental restoration effect mentioned previously. Green spaces may also alleviate the increased stress caused by poverty, which can increase the risk of various diseases including heart disease and decreases to blood pressure (as well as mental health benefits) (Mitchell and Popham, 2008). Mitchell and Popham (2008) conclude

"*Populations that are exposed to the greenest environments also have lowest levels of health inequality related to income deprivation. Physical environments that promote good health might be important to reduce socioeconomic health inequalities." P. 1655.*

2.3.3 Social development and connections

Social benefits can be understood as any positive social effect attributable to the natural environment at the individual, community or national scale (Keniger *et al.*, 2013). Examples include social development and connections, meaning the strengthening of existing social relationships and new ones through sharing activities. Social development can be enhanced by participation in volunteering, community activities and social support schemes (Pretty *et al.*, 2011).

Social connections are shaped by interactions with other individuals and expressed through social networks that can range from close-knit family and friends to looser hierarchical networks between individuals in organisations (Twigger-Ross *et al.*, 2011).

Individual

At an individual scale contact with the natural environment can increase social capital (Forest Research, 2010b; New Economics Foundation, 2012a). The ONS (2013b) defines social capital as

> "*networks together with shared norms, values and understandings that facilitate co-operation within or among groups*". Social capital can also be understood as the "*goodwill that is engendered by the fabric of social relations and that can be mobilized to facilitate action*" (Adler and Kwon, 2002:17).

There are different types of social capital including: bonding, bridging or linking. Bonding social capital refers to close-knit networks of family and friends; bridging social capital refers to looser networks that can provide access to a wider pool of resources by bringing people involved in different groups together; linking social capital refers to hierarchical networks between people in local areas and organisations that can lead to collective action (Twigger-Ross *et al.*, 2011). These three types of social capital are relevant at both the individual and community levels.

Social capital can be measured by focusing on an individual's levels of trust of their neighbours and neighbourhoods, their membership of clubs, societies and social groups, and how much social contact with family and friends they have in their lives (ONS, 2013b).

Social capital describes how social relationships can be used to extend people's access to and influence over institutions (DFID, 1999). Social capital can also help people by providing moral and material support in post-disaster situations (Fernandez-Bilbao and Twigger-Ross, 2009; Pitt, 2008). It has helped workers find jobs, facilitated entrepreneurship, strengthened supplier relations and is believed to influence career successes in addition to other benefits (Adler and Kwon, 2002).

Incidental and intentional interactions with the natural environment have been found to increase individual's social capital through conservation volunteering (nef, 2012a) and other natural environment initiatives such as Neighbourhoods Green and Pocket Parks (Boxes 4 and 5). Volunteering allows individuals to create new social relationships and strengthen existing ones, which can lead to an increase in social support and a reduction in social isolation (Reynolds, 2000). It can also bring together people from different organisations / communities and subsequently lead to expanded social networks with wider pools of resources.

Box 4: Natural Environment Initiatives for Social Development and Connections

Neighbourhoods Green

Neighbourhoods Green began in 2003 in order to raise the profile of the green and open spaces owned and managed by social landlords. The project is supported by CABE space, Natural England, Groundwork UK and the Green Flag Plus Partnership. There are several partnerships across the UK working to highlight the importance of green space for residents of social housing. They believe that increased green space plays an important role in people's health and wellbeing, social development, and in developing community cohesion.

Results have been understood in terms of changes to the green spaces and in community participation. These have been described in terms of landscape changes, hours spent volunteering and the financial value of the volunteers' time.

One partnership (Barrowcliff Green Oasis) was deemed as successful as it engaged over 500 local residents who contributed over 700 hours in volunteering; it valued their time at nearly £6,000. The partnership planted nearly 9,000 trees and over 40 fruit trees. Individual partnerships have also received awards such as the Green space and biodiversity project by the Raven Housing Trust, which received a Sustainability Housing Award in 2010.

More information can be found on their website http://www.neighbourhoodsgreen.org.uk/about

Image credit http://www.neighbourhoodsgreen.org.uk/upload/public/rotating-header/slide-4.jpg

Community

The literature focuses on social benefits primarily at the community (or local) level as opposed to the national level – this is due in part to methodological challenges. At the community level there is evidence that contact with the natural environment can strengthen community cohesion (nef, 2012a). This occurs as green spaces provide a neutral space for interactions between community members and because conservation volunteering can help to build trust among community members. These green space-centred activities can improve links between certain groups of people (Ockenden, 2007); an example is in the use of community activities in the natural environment to break down barriers and combat mental health discrimination (Ecominds, 2013).

There is evidence that levels of social interaction can be directly influenced by the availability of green space (Coley, *et al.*, 1997; Ward Thompson, 2002). The increased use of green spaces by members of the public can reduce crime rates; especially crimes related to anti-social behaviour, vandalism and violence (Forest Research 2010b; Faculty of Public Health, 2010; nef, 2012a).

Conversely, the use of green spaces can lead to vandalism, verbal and physical abuse, household waste dumping and social conflicts (O'Brien, 2005). One study found that young girls experience conflicts with adults, rival groups of young people and between girls and boys in parks and open spaces (Tucker and Matthews, 2001). There are also differences in the perceived safety of green areas such as urban woodlands, with landscape design, possibility for overview and control, vegetation density, and vegetation character and maintenance interacting to affect perceived personal safety (Jansson *et al.*, 2013).

Some small-scale studies suggest that vegetation cover is positively correlated with decreased crime (i.e. less crime in areas with more trees), Kuo and Sullivan (2001) found this to be the case after accounting for the number of apartments per building, building height, vacancy rate and number of occupied units per building. However, this may be due to local factors that were unaccounted for in these studies as they focused on specific local areas and did not compare across multiple areas (Bell *et al.*, 2008).

The use of the natural environment as a learning environment has been shown to reduce pupil truancy and indirectly benefit the community by reducing associated anti-social behaviour (Dickie *et al.*, 2011).

Box 5: Natural Environment Initiatives for Social Development and Connections

Pocket Parks

The Pocket Parks Scheme is operated by Northamptonshire County Council with the aim of helping local people own, manage and care for public green spaces in their local community. The pocket parks themselves are green spaces owned and managed by local volunteers.

There appear to be no formal structures in place to monitor and evaluate this project. There is anecdotal evidence that is found on Northamptonshire County Council's website and the scheme has received awards that can be used to measure its impact.

Pocket parks have cultural, environmental and social benefits. Culturally they reinforce a positive link between local authorities and communities, provide venues for heritage and cultural activities and are cultural assets for future generations. Environmentally they ensure the sustainable and economic management of green space, raise environmental awareness and the promotion of biodiversity through conservation projects, contribute to the maintenance of existing facilities and acquisition of new ones and promote green tourism and the local economy. Socially they make communities safer and more sociable and assist with the regeneration of run-down areas, provide public access to green space, involve local people in environmental decision-making processes and develop people's skills and self-confidence. The scheme has received awards such as the National Royal Institute of Chartered Surveyors (1995); it has also been recognised as a model of best practice with the award of Beacon Status Improving Urban Green Spaces (1992). Individual pocket parks have also won awards.

The initiative has now been taken up by the Mayor of London with plans for 100 pocket parks across the city (GLA, 2012).

More information can be found on their website
http://www.northamptonshire.gov.uk/en/councilservices/leisure/pocket-parks/pages/default.aspx
Image credit http://www.northamptonshire.gov.uk/en/councilservices/Leisure/pocket-parks/PublishingImages/banner.jpg

2.3.4 Symbolic, spiritual, and sensory benefits

Symbolic, spiritual, and sensory benefits are perhaps the least researched benefits associated with interactions with nature (Newton, 2007; Church *et al.*, 2011; Keniger, 2013) yet they are clearly identified in the literature as key benefits, valued by individuals, communities and society.

None of the reviews examined for this report provided much detail on these benefits and they are clearly an area for further investigation. Work Package 5 of the UK NEAFO project (Church *et al.*, 2014), examined cultural ecosystems services and this work includes these benefits ways of collecting data. Despite this there is still a lack of research on this benefit type.

Symbolic

The environment symbolises significant event/activity/emotion relating to personal, cultural or national identities. O'Brien and Morris (2013) refer to the personally symbolic - the fields where you played as a child - through to the nationally symbolic - for example the oak as a symbol of British life (strong, sturdy and reliable) - and historical value from associations with folk heroes such as Robin Hood, and of festivals such as Christmas pine trees (O'Brien and Morris, 2013).

This quality of cultural/national symbolism is picked up on in the UK NEA (Church *et al*., 2011) through the heritage 'goods' category which suggests a similar role of the natural environment in evoking both personal and national symbolism.

A survey carried out for English Heritage in 2000:

> "C*onfirmed that people's ideas and values relating to heritage are both idiosyncratic in terms of their everyday lives and environmental settings, as well as consensual when considering what constitutes national heritage.*" (Church *et al*., 2011 p. 665)

Individuals can benefit from green spaces in urban environments through experiences of place attachment; the human feeling of a place (Bird, 2007). Place attachment to green spaces, such as urban forests, is one aspect of social cohesion and the inclusion of green spaces can benefit the wellbeing of urban society (Hladnik and Pirnat, 2011). They can also resonate and contribute to individual's sense of cultural identity (English Nature, 2003). Research in the field of environmental psychology has examined place and identity (for reviews see: Fresque-Baxter and Armitage, 2012; Twigger-Ross, Bonaiuto and Breakwell, 2003) providing theoretical frameworks for the role of the physical environment in the creation and maintenance of personal identity. A key feature is the role of place in maintaining continuity of self through its ability to evoke memories and emotions associated with those memories in place. Whilst that work has not been directly focussed on the natural environment it provides a useful explanatory framework.

Spiritual

Interactions with the natural environment have been found to have spiritual benefits and to create a sense of awe and wonder (O'Brien and Morris, 2013). They can facilitate spiritual growth and may have particular spiritual meaning associated with religious beliefs (Burls, 2007; O'Brien and Morris, 2013), for example the belief of environmental stewardship and leaving the Earth in a better state for future generations is present across several religions.

O'Brien *et al*. (2008) found that volunteers involved in a conservation activity spoke of a spiritual connection to nature and reflections on reasons for connection with nature. Newton (2007) makes the point that:

> "*Throughout history people have worshipped elements of natures (animals, trees, and mountains) and many cultures have turned to natural places as sacred sites with special power and healing qualities.*" (p. 29)

There are multiple definitions of "spiritual wellbeing" with Keniger proposing "*a sense of connectedness, a sense of purpose, a sense of awe and inspiration, and faith in a larger reality*" (Keniger, 2013, p. 926), and that these may or may not be associated with specific religions. Heintzman (2009), in his review of leisure and spiritual wellbeing also notes that there are many definitions

> *"Lists of leisure benefits use a variety of terms to describe spiritual benefits……MacDonald and Schreyer (1991) explained spiritual benefits of leisure as the "capacity to engage in spiritual expression" and the "opportunity to experience a sense of spirituality" (p.188) and which may lead to re-creation, comfort, peace, feelings of belonging, humility, introspection, personal development, connectedness with others, and creativity. Spiritual benefits have also been defined in terms of nourishing the spirit (Johnson, 2002), renewal of the human spirit*

> *(Driver et al, 1996) and reconnecting or restoring our sense of relatedness "with our fundamental ground of being" (Dustin, 1994, p231)" Heintzman, 2009, p.421.*

These multiple definitions together with the qualitative nature of the studies make it harder to assess within an empirical research framework, however, it is clear that there is research to draw upon within this area. There are some questionnaire based methods for establishing connectedness to nature and nature relatedness (Pretty *et al*., 2011) that could be useful in further exploring these issues and gathering more data around these relationships and these are discussed in Section 3.

Sensory

Sensory (or aesthetic) refers to the experience of nature, sounds, smells, colours, together with providing inspiration for creative activities (art, poetry, etc). These benefits arise from experiencing the natural environment indirectly, intentionally and incidentally (O'Brien, 2009; O'Brien and Morris, 2013) and include views, beauty and colours, scenery including wildlife, smells and the sounds from nature (Newton, 2007; O'Brien and Morris, 2013). Seeing the landscape improve over time in areas such as former brownfield land can also benefit individuals (O'Brien and Morris, 2013).

In early 2013 a workshop coordinated by the Biodiversity and Ecosystem Service Sustainability (BESS) network focussed on 'Aesthetic and Spiritual Response to the Environment' and explored with a multidisciplinary group (artists, academics, faith leaders) notions of the aesthetic and spiritual responses to the natural environment. Issues around definitions and descriptions were raised but the importance of these benefits was recognised.

> "*The received view of environmental problems and our responses to them provide us with a limited understanding of what it is to be human, and how we might be cared for and healed. Measures of the influence of our surroundings on human health can be very shallow and we need a richer dialogue between professionals in these realms. Sensory and spiritual experiences could help us identify indicators of human well-being that would map better on to indicators of environmental condition, and articulate such a conversation." Para 9.6.2* (Rodwell, 2013)

2.3.5 Education and learning

Intentional, incidental and indirect interactions with the natural environment can result in educational and learning benefits (Figure 8).

Intentional interactions include educational visits to specific areas of the natural environment that have an explicit environmental learning aim (e.g. for biology and geography subjects). Educational visits based on non-environmental learning aims (e.g. for history and English subjects) can take place in the natural environment, such as historical re-enactments and poetry festivals and are incidental interactions with nature.

Young people can experience cognitive functioning benefits from the natural environment in different ways to adults. Intentional and incidental interactions with the natural environment can support childhood development, especially the development of cognitive and motor skills (nef, 2012a). The natural environment itself can have educational value and provide an effective learning environment (Environment Agency, 2006; nef, 2012a). It can help pupils to develop important social skills such as teamwork, tolerance, group awareness, self-discipline and leadership. Intentional and incidental interactions can also help get apathetic students excited about learning and can help develop a pro-environmental attitude (Dillon and Dickie, 2012).

Practical learning in the natural environment can also benefit children who might struggle with mainstream learning environments and processes and boost their confidence and self-esteem (Natural England, 2013a). Natural England, together with the Natural Connections partnership, is running a three year Demonstration Project (2012-2015) to test and evaluate a new, sustainable delivery model that can support the use of the natural environment in schools in England (Dillon and

Dickie, 2012). Natural environment initiatives exist to provide young people with nature-based skills and qualifications in order to make them more employable (Box 6).

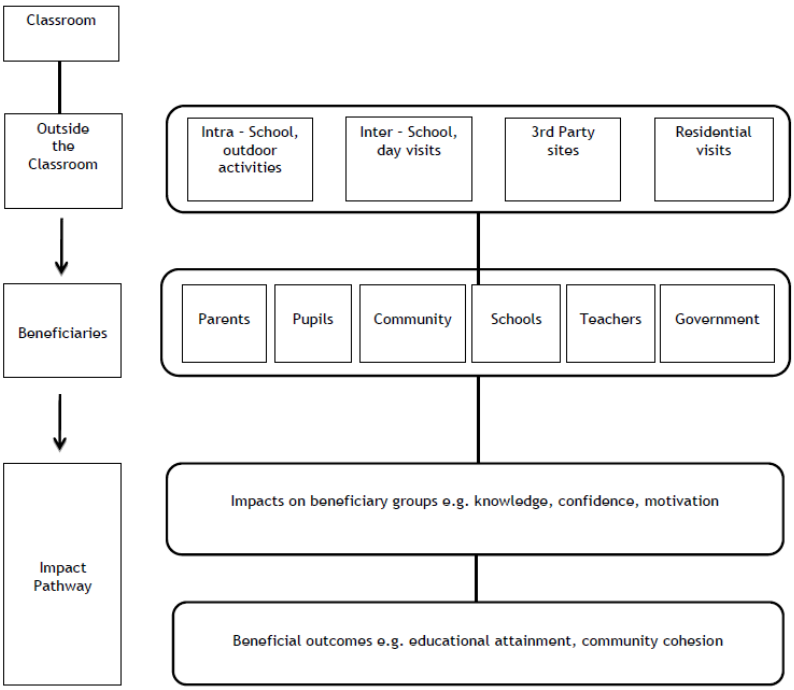
Teachers can also benefit from learning in the natural environment, with such experiences resulting in increased enthusiasm about teaching and the introduction of innovative strategies to the classroom. Visits to the natural environment often involve students, teachers and parents (or community members) and can increase the camaraderie between those involved and strengthen community cohesion (Dillon and Dickie, 2012; Figure 8).

In addition to this, there is evidence that contact with the natural environment can improve individuals' attention span. This is described as the 'attention-restoration hypothesis' which refers to the beneficial effect of natural environments, especially green spaces, on the reduction of the symptoms of ADHD (attention deficit hyperactivity disorder) (nef, 2005; Faculty of Public Health, 2010; Dillon and Dickie, 2012).

Indirect interactions have also been found to improve individuals' attention-span. Evidence of this comes from Tennessen and Cimprich's (1995) study on visual views of nature from the dormitory windows of 72 undergraduate students. The views were categorised as 'all natural', 'mostly natural', 'mostly built' or 'all built'. The study found that more natural views were associated with better performances on exercises designed to measure attention spans.

The estimated annual value of environmental knowledge in 2010 was £2.1 billion: £1.6 billion for GCSE subjects and £0.5 billion for A-level subjects (Dillon and Dickie, 2012). The UK NEA calculated these figures based on its contribution to greater lifetime earnings associated with educational qualifications in relevant subjects.

Figure 8: Identification of the benefits from learning in natural environments



Source: Dickie *et al.*, 2012 p.5

Box 6: Natural Environment Initiatives for Education and Learning

Call of the Wild

The Call of the Wild project is run by Circle of Life Rediscovery in East Sussex and supported by 'Access to Nature' and 'Ecominds' grants. They aim to provide learning opportunities for disadvantaged groups by running woodland days, programmes, camps and training sessions for young people and adults which include schemes such as 'eco-sessions' and 'Forest School Plus'.

There are no formal monitoring and evaluation structures in place. However, participation can lead to individuals' gaining the John Muir Award. This is an educational initiative of the John Muir Trust that is focused on wild places and encourages discovery, exploration, conservation and sharing of the environment.

More information can be found on their website http://www.circleofliferediscovery.com/

Green Academies Project

The Green Academies Project is run by the National Trust and is supported by a £211,000 'Access to Nature' grant. The project is located in Kidderminster, Dudley and Birmingham and is aimed at 16 to 24 years olds who are out of work and not in education. It aims to get participants connecting with their local communities and gaining qualifications to help make them more employable, such as NVQs in Practical Conservation.

There appear to be no formal monitoring and evaluation structures in place. However, one of the main aims is to make participants more employable and so the number of participants who gain NVQs or go onto employment after the scheme could be used as an indicator of project success.

More information can be found on this factsheet http://www.naturalengland.org.uk/Images/Green-Academies_tcm6-26916.pdf / *Image credit http://farm9.staticflickr.com/8336/8144362534_55135ebd3d_z.jpg*

Growing Skills Training Programme

The Growing Skills Training Programme is run by Trees for Cities (based in Tower Hamlets, London) and is supported by a grant from 'Ecominds'. The grant helped to cover the cost of horticulture therapy, soft skills development and accredited training of people with mental distress. Participants are either self-referred or referred by Jobcentre Plus advisors. The project helps them to work towards a City and Guilds Certificate in Work Based Horticulture in order to make them more employable.

There are no formal monitoring and evaluation structures in place. However, one of the main aims is to make participants more employable and so the number of participants who gain qualifications or go onto employment after the scheme could be used as an indicator of project success. There is also anecdotal evidence from the project coordinator that there has been a decrease in vandalism and increase in people using local parks as a result of the project.

2.3.6 Economy

Economic benefits are understood to include beneficial outcomes from the natural environment that affect income, employment opportunities, urban regeneration potential, land and property values, and ecosystem service provision.

Intentional interactions with nature, through recreational and tourism activities, can lead to income from visitors for areas of the natural environment and areas surrounding them. Indirect interactions with nature, such as being near to nature, can increase land and property values and facilitate urban regeneration. Ecosystem service benefits can be classed as arising from both intentional and

indirect interactions with the natural environment. In some cases green infrastructure improvements are actively progressed in order to gain benefits, whilst in other cases ecosystem services (and their associated benefits) increase as a by-product of another activity such as improvements to the state of the environment.

These benefits can vary in geographic scope and be on the local level (i.e. benefits for areas of the natural environment such as Nature Improvement Areas and National Parks), regional level (i.e. benefits for regional areas, including surrounding areas, of the natural environment) and multi-regional level (i.e. benefits from ecosystem services that affect multiple regions and entire countries).

Recreational and tourism activities

The natural environment acts as a resource for recreational visits throughout the year (English Nature, 2003). There are difficulties in obtaining accurate figures for the total benefit derived from recreational use of the natural environment. In some cases the values are from social and cultural benefits, whilst in others it may be based on visitor expenditure. There are also different options for valuing the natural environment, ranging from general estimates of ecosystem services and regional tourism benefits to more site-specific valuations.

At the general level, it is estimated that there are more than three billion outdoor recreational visits made by UK residents each year. These visits are estimated to generate income in excess of £10 billion per year (UK NEA, 2011). From this, woodlands receive approximately 250-300 million day visits per year in Great Britain for 'social and cultural' services; in 2002, these visits were valued at over £1.2 billion per year (at 2010 prices) (UK NEA, 2011). National Parks receive 95 million each year and attract annual visitor expenditure of £3 billion (National Parks England, 2013). The Gross Value Added for National Parks is estimated to be in the region of £4.1 to £6.3 billion (National Parks England, 2013). Nature based tourism in Scotland is estimated to provide approximately £1.4 billion in income and approximately 39,000 full-time jobs (UK NEA, 2011). Site-specific valuations can be found for certain sites, such as Osprey-watching sites. The Royal Society for the Protection of Birds (RSPB) estimates that £3.5 million per year is spent by visitors to these sites in the UK (England Biodiversity Group, 2011).

There is an incidental interaction with the natural environment for areas surrounding National Parks due to visitor spending. Visitors spend £3 billion annually through tourism and recreation, which increases to £4 billion when the National Parks' effect on the surrounding areas is taken into account (National Parks England, 2013). In addition to the direct economic benefits from the increased flow of visitors to the natural environment, there are other positive effects on their surrounding areas that include the ability to attract businesses, facilitate urban regeneration and increase house prices. Surrounding areas can financially benefit by providing accommodation and other services to visitors to National Parks as well as supporting employment.

In 1998 it was estimated that visitors to the English Countryside spent £11.5 billion and this generated approximately 340,000 Full Time Equivalent (FTE) jobs. Walking in the English Countryside was estimated in by Christie and Mathews (2003) to be lead to £6.1 billion of expenditure and supporting between 180,000 to 245,000 FTE jobs. Shiel *et al.* (2002) estimated that the RSPB reserves support more than 1,000 FTE jobs in the UK. In 2013 tourism to the National Parks was estimated to support 48,000 FTE jobs within the National Parks and at least 20,000 FTE jobs in their surrounding areas (National Parks England, 2013). In the Northumberland and Yorkshire Dales the National Parks are both estimated to support nearly three times as many jobs in their surrounding areas than within the National Park boundary itself (National Parks England, 2013).

Urban regeneration

Green infrastructure contributes to the attractiveness of a local area and may help to attract businesses and people to the area and facilitate urban regeneration (Sunderland, 2012). It was

found that environmental attractiveness was a key reason for over 35% of companies relocating to the south west of England (Land Use Consultants, 2006). There was also evidence that the creation of parks and green spaces can influence decisions in locating businesses and new homes (Forest Research, 2010b; nef, 2012a). Box 7 includes some other examples.

Box 7: Natural Environment Benefits for Urban Regeneration

Cheshire and Tameside Mixed Regenerations

Two broadly mixed regeneration investments that involved landscaping, tree planting and rubbish clearance in Cheshire and Tameside both aimed to attract businesses and promote job creation.

The results can be measured through increases in employment in the area relative to the local area.

Winsfield Industrial Estate, Cheshire, experienced a 13% increase in employment after the regeneration, compared to a small decrease in employment in the local area. Portland Basin, Tameside, also experienced a 25% increase in employment compared to an increase of 13% in the surrounding area (Sunderland, 2012).

Natural Environment Benefit for Canary Wharf

The development of Canary Wharf included the £6 million development of Jubilee Park at its centre. The estate itself has 20 acres of open landscaped space both at ground level and as green roofs. This green space feature was then used to help persuade businesses, and their staff, to relocate to the area (Sunderland, 2012).

It is difficult to measure the success of using green development to attract businesses to relocate to the area. The information was not readily available online. However, the Canary Wharf Group has been named one of the UK's Best Green Companies by the Sunday Times in 2009, 2010 and 2011. This award can be used to measure its green impact, but not its success at attracting businesses.

More information can be found on their website http://www.canarywharf.com/aboutus/Corporate--Social-Responsibility/Green-Canary-Wharf/

Restoration of Glasgow Green

The restoration of Glasgow Green, the largest park in central Glasgow, into an attractive green space led to increases in residential property values by £3-4.5 million, increased council tax yields by 47% and increased land values from £100,000 to £300,000 per hectare (Forest Research, 2010a). In addition to the proximity of property to the natural environment, the ability to view at least 20% woodland cover raised the value of an average house by 7.1% (Forest Research, 2010a).

Image credit
http://www.clydewaterfront.com/media/2321988/d27_13211%20et9.jpg

Land and property values

The appeal of and improvement to the natural environment can lead to increases in land and property values of surrounding areas (nef, 2005; Forest Research 2010a). In Cumbria, the generation of a community woodland led to property values in the surrounding area increasing by a total of approximately £15 million (Forestry Commission, 2005). The development also led to £75 million of additional development being added to the area (Forestry Commission, 2005). Interviews with property professionals in case studies of eight significant English park redevelopment projects have found that they expect higher property prices for properties with park views or those near the

park (Sunderland, 2012). This indirect interaction with the natural environment can be through the ability to view nature or the proximity to nature.

The ability to view a forest can raise house prices by 7%, whilst being able to see natural water bodies led to a 5% increase (Sunderland, 2012). The view of a natural landscape added up to 18% to property values in North West England (Forest Research, 2010b). Residents in peri-urban settings are also willing to pay an additional £7,680 per household for views of broadleaved woods, which equates to £4.2 billion across the UK (Forest Research, 2010b).

Proximity to protected areas, local green spaces and rivers, and habitats such as woodlands, farmlands and freshwater bodies are statistically significant factors in explaining higher house prices (UK NEA, 2011).

Residential properties that were located closer to green areas, such as parks, were found to be able to attract a premium in addition to their price: it was found that in Aberdeen, a property located 450m away from a park could potentially attract a premium of between 0.44% and 19% (Sunderland, 2012). In London, a similar effect was observed, with a 0.3 – 0.5% increase in the average house price with every 1% increase in the amount of green space in the ward it is located in (Sunderland, 2012).

Provision and valuation of ecosystem services

Ecosystem services have been measured and valued as part of the UK NEA, in particular the UK NEA sought to understand the economic contribution of these services. One identified benefit was carbon sequestration; it estimated that carbon sequestration by woodlands is valued at £680 million per year in 2009 (UK NEA, 2011).

Other valuations of ecosystem services have been attempted to quantify and value the benefits from the natural environment. In terms of flood defences, England's coastal wetlands provide £1.5 billion of coastal defences annually (England Biodiversity Group, 2011). UK agriculture benefits from pollination services that are worth £440 million per year (England Biodiversity Group, 2011).

3. Methods and Tools

3.1 Measuring wellbeing

O'Brien (2009) builds on the work by Dolan *et al.* (2006) and suggests that wellbeing can be measured through objective lists, preference satisfaction, flourishing accounts and subjective wellbeing (Table 4). Objective lists consist of factors to consider when looking at wellbeing. Flourishing accounts explore psychological wellbeing and focus on people being able to reach their potential. Subjective wellbeing focuses on how people think and how they feel in terms of life satisfaction and happiness.

Objective lists and preference satisfaction are objective measures as they can be measured 'from a distance'. On the other hand, flourishing accounts and subjective wellbeing are more subjective measures as they reply on self-reports from individuals of their internal feelings or attitudes.

As well as these measures of overall wellbeing there are some subjective measures of connectedness/relatedness to nature (Pretty *et al.*, 2011). Specifically, these aim at capturing the cognitive, affective and behavioural relationships people have with nature. Both these scales have been validated and provide robust tools for directly measuring the affective relationship with nature.

Table 4: An overview of the tools used to measure wellbeing

Aspects of wellbeing	Available tools
Preference Satisfaction	Income Quality Adjusted Life Years (QALY)
Flourishing Accounts	Profile of Mood States (POMS) Orientation to Happiness Psychological Wellbeing Scale Flourishing Scales
Subjective Wellbeing	Rosenberg Self Esteem Scale (RSE) The Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) Mappiness Tool Life Satisfaction The Day Reconstruction Method (DRM) Happiness in the Past Overall Happiness Affectometer 2 The Satisfaction with Life Scale Cantril's Ladder Personal Wellbeing Index Positive and Negative Affect Scale (PANAS)
Nature connectedness	Connectedness to Nature Scale (CNS) Nature Relatedness Scale
Combined Measures	The Centre for Epidemiological Studies Depression (CES-D) Scale The General Health Questionnaire CASP-19

3.1.1 Objective tools

The objective measure of wellbeing used to rely heavily on the measurement of economic wealth through indicators such as Gross National Income (GNI) and Gross Domestic Product (GDP). It is increasingly clear that whilst economic progress is important for wellbeing, it can no longer be relied upon as the main indicator for wellbeing as it does not take into account the quality of life (Cabinet Office and Prime Minister's Office, 2010; ONS, 2012a).

Quality of life has been used to describe a range of factors that influence wellbeing and includes measures of health, lifestyle, education, housing and crime. These can be objectively measured in a variety of ways and use data derived from surveys and censuses.

Health can be measured through life expectancy at birth, infant mortality, mortality rates, the provision of healthcare and the incidence of physical and mental illnesses such as depression. Lifestyle can be strongly linked to health and includes the measurement of physiological responses to daily life that include stress levels. Salivary cortisol measurements can be used to measure stress levels, Thompson *et al.* (2012) found that more green space was linked to less stress in deprived communities by using evidence from salivary cortisol patterns from 25 men and women aged 35-55 years old.

Education can be measured through adult literacy and the provision of education within an area through the combined primary, secondary and tertiary education enrolment ratio. Crime can be measured through official statistics on incidences of certain crimes as reported by the police authorities.

These measures can either be used individually to give an indication of wellbeing or in combination with one another in order to attain a broader assessment of wellbeing. The Physical Quality of Life Index (PQLI) and Human Development Index (HDI) both use a variety of these objective measures to measure wellbeing. The PQLI combines infant mortality, life expectancy and adult literacy rates into a single index and the HDI combines GDP per capita, life expectancy at birth, adult literacy rates and the combined primary, secondary and tertiary education enrolment ratio into a composite index of wellbeing (Newton, 2007).

Box 8: Combining Objective Tools to Measure Wellbeing

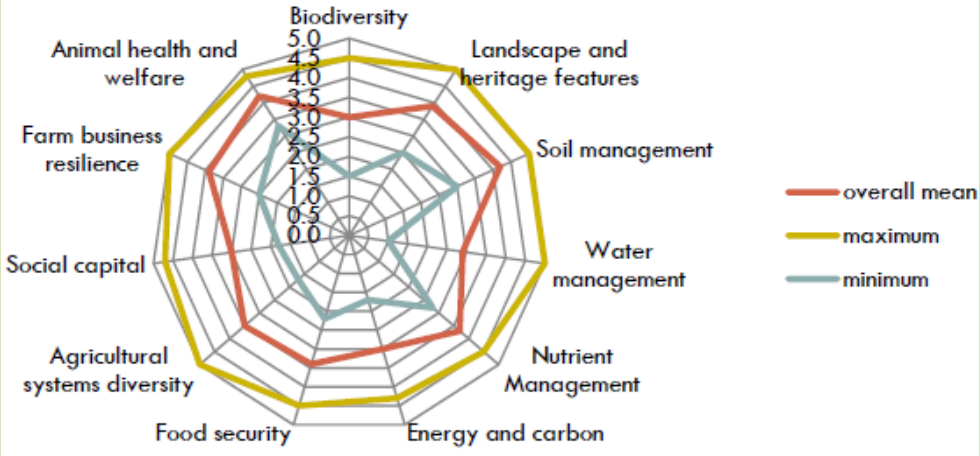
The Physical Quality of Life Index is an attempt to measure the wellbeing of a country and is the average of the basic literacy rate, indexed infant mortality and indexed life expectancy at age one. These are used to describe progress in health, sanitation, education and women's status. Infant mortality implies deaths before age one, which is why life expectancy is taken at age one (Morris, 1980).

Public Goods Tool

The development of this tool was commissioned by Natural England in agreement with Defra and was piloted in 40 farms. It was created to explore the benefits of farming in addition to those associated with food production. There are 11 measures, which are shown on the radar diagram below (*See* Figure 6). They are predominately objective questions to obtain data, but one or two that rely on self-reporting of feels and attitudes such as in the social capital section which asks "how they would describe the working environment at their farm".

Each measure was calculated by combining a range of factors. Social capital was assessed through employment, skills and knowledge, community engagement, corporate social responsibility initiatives and accreditations, public access and human health issues. This tool understands social capital as the extent of training for its employees, the benefits it provides to the local community from public access and the farm's community engagement. In doing so it explores social capital at the level of the individual and community and is comparable to our previous definition.

Feedback was sought by the pilot farms and 12 farmers returned their feedback forms. The feedback was positive, with 8 indicating that they would recommend the tool in its current format. although tool was time consuming to complete all the questions



Public Goods Tool radar diagram (Gerrard et al., 2011)

The Human Development Index is used to rank countries in four tiers of human development: very high, high, medium and low. It was originally published by the United Nations Development Programme and combines GDP per capita, life expectancy at birth, adult literacy rates and the education index (based on primary, secondary and tertiary education enrolment).

3.1.2 Subjective tools

Subjective measures are indicators or measures that rely on self-reporting from individuals of their internal feelings or attitudes. These measures are designed for adults as they rely on self-reporting, for children these measures may be adapted or combined with other subjective or objective measures.

Boxes 9 – 11 provide examples of: subjective wellbeing tools / methods; surveys used to collect information for subjective wellbeing measurement; and, methods used to estimate people's connectedness to nature as an aspect of wellbeing.

Box 9: Wellbeing Tools

The first three tools are international recognised, standardised measures to assess mental wellbeing changes:

The Warwick-Edinburgh Mental Well-being Scale (WEMWBS) is a 14-item scale specifically developed to capture psychological wellbeing. It is designed to measure both hedonic and eudemonic aspects of positive mental wellbeing and enquires about how people have been feeling and functioning over the past two weeks, obtaining a single total score (New Economics Foundation, 2012b).

Profile of Mood States (POMS) is used to measure an individual's psychological wellbeing by listing 65 adjectives that are then rated by subjects on a five-point scale (ranging from 0 = not at all and 4 = extremely). The 65 adjectives are divided into six mood states: tension-anxiety, depression, anger-hostility, fatigue, confusion-bewilderment and vigour-activity. The total mood disturbance is then calculated by adding the scores from the first five mood states together and then subtracting the score from the vigour-activity mood state. Attention needs to be paid to the time frame(s) used (Haythornwaite and Edwards, 2004).

The Rosenberg Self Esteem Scale (RSE) measures an individual's self-esteem by asking ten questions, five of which are positively worded statements and the remaining five are negatively worded ones. The participant responds on a four-point scale ranging from strongly agree to strongly disagree.

The following tools are notable methods to measure wellbeing:

The Day Reconstruction Method (DRM) instructs respondents to write a diary about 'yesterday'. Within this they evaluate episodes of about an hour long, in terms of emotions felt (e.g. impatient for it to end, happy, frustrated/annoyed, depressed/blue, worried/anxious, enjoying myself, tired, stressed) on a scale of 0 'not at all' to 6 'very much'. The number of negative time episodes during an entire day is used to construct a 'U-

Index' (New Economics Foundation, 2012b).

The General Health Questionnaire (GHQ) was developed as a screening instrument to detect psychiatric disorders in community settings and non-psychiatric clinical settings. It asks several questions on psychological wellbeing and, from these, constructs a score. For the purpose of wellbeing research, the GHQ scores are inverted so that a high score represents high wellbeing (rather than as a measure of depression, which is the primary use for which the scale was designed) (New Economics Foundation, 2012b).

Life satisfaction is the most commonly used subjective measure of wellbeing in the literature. The usual wording for the life satisfaction question is as follows: All things considered, how satisfied are you with your life as a whole these days? Please give a score of 0 to 10 where 0 means extremely dissatisfied and 10 means extremely satisfied. However, it is sometimes worded in a slightly different way (New Economics Foundation, 2012b).

Flourishing scales: these measures of wellbeing focus on people being able to reach their potential e.g. having meaningful goals, and developing as a person, this is also sometimes called eudemonic wellbeing. The Flourishing Scale (Diener et al, 2009) is a brief 8-item summary measure of the respondent's self-perceived success in important areas such as relationships, self-esteem, purpose, and optimism. The scale provides a single psychological well-being score.

Box 10: Surveys used to collect information on wellbeing

The following two surveys are used to collect data on the natural environment and wellbeing:

The Mappiness Tool is an online tool recently developed by the London School of Economics (LSE) to measure happiness across space in the UK. The tool is in the form of a smartphone application and asks users for information on their own happiness at certain times during the day. The smartphone application asks how the user is feeling, who they are with, where they are and what they are doing. The data is then automatically sent back to the researchers at LSE via the smartphone (London School of Economics, 2013).

The GreenSTAT Visitor Survey System is an online tool that allows respondents to complete a survey on their visit to parks and green spaces. The survey contains questions on their visits and their perceptions and satisfactions with the space. The system has been designed to provide a national standard approach for this type of data collection (Green Space, 2013).

The Monitor of Engagement with the Natural Environment (MENE),[13] asks questions about a range of environmental spaces (e.g. woodland, farmland, mountain, river, country park, city park, allotment, beach, etc.) and a number of cultural practices(e.g. experiencing peace and quiet, relaxing and unwinding, spending time with family and friends, entertaining children, exercising, walking the dog, enjoying scenery, enjoying wildlife, etc). In the quarterly survey waves, questions are also asked about well-being, in the form of agreement with a number of statements about how the visit made people feel (e.g. I enjoyed it; it made me feel calm and relaxed; it made me feel fresh and revitalised, etc.). As part of the NEA FO project WP5 (Church et al, 2014) data were reanalysed and more data was collected on wellbeing, with question asked more frequently than quarterly. This is an important data set.

The following tools have been used more widely to collect data on wellbeing:

The Office for National Statistics (2012a) is leading a national measuring wellbeing programme that began in 2010. They are using a combination of objective and subjective tools when measuring national wellbeing in the UK. Their report used 40 measures divided over 10 sections that included:

- Subjective wellbeing questions (added to selected ONS household surveys)
- Experimental estimates of Environmental protection Expenditure

[13] The MENE the most comprehensive survey available of people's use and enjoyment of the natural environment in England. MENE is an on-going, face-to-face, in-home omnibus survey of over 45,000 interviews per year. It has been run since 2009 by TNS Research International on behalf of Natural England, the Department for Environment, Food and Rural Affairs (Defra) and the Forestry Commission. Data are collected on use of the natural environment in the 7-day period prior to the interview and detailed information is elicited on a randomly selected visit during that period. The survey is conducted across England and throughout the whole year: a core set of questions is asked weekly, extra questions are asked on a monthly basis and a few additional questions are asked once every three months. MENE is intended to provide baseline and trend information on how people use the natural environment and, uniquely, also collects information on the respondent's home and on the location of the outdoor recreational site visited.

- Economic position of Households
- UK Environmental Accounts
- Effects of Taxes and Benefits on household income
- Natural capital in environment accounts

In 2012 they produced the Measuring National Well-being: Life in the UK 2012 report, which provided a unique overview of wellbeing in the UK today that will be updated and published annually (Office for National Statistics, 2012a).

The British Household Panel Survey (BHPS) (now called Understanding Society) began in 1991 and follows the same representative sample of individuals over time. It is household-based, and every adult member of each sampled household is interviewed. Since its beginnings, it has included the question How satisfied are you with your life overall? (response scale of 1 not satisfied at all to 7 completely satisfied) and Would you say that you are more satisfied with life, less satisfied, or feel about the same you did a year ago? (New Economics Foundation, 2012b).

The **Eurobarometer** is a survey of 300 000 people in 12 European countries. Interviews are one-to-one in people's homes and questions include On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the life you lead? (New Economics Foundation, 2012b).

The **European Social Survey** (ESS) is an academically-driven survey which collects data in over 20 European countries. In 2006/2007, it included a wellbeing module where it asked over 50 detailed questions about components of wellbeing; including 'How much of the time during the past week were you happy?' (on a scale of 1–4) (New Economics Foundation, 2012b).

The **European Values Survey** (EVS) is a nationally representative cross-sectional survey of over 20 European countries undertaken every 9 years since 1981. It includes the question All things considered, how satisfied are you with your life as a whole nowadays? (on a scale of 1'Dissatisfied to 10 Satisfied) (New Economics Foundation, 2012b).

The **World Values Survey** (WVS) grew out of the European Values Survey (EVS) group. It surveys a population sample from over 40 countries every five years. It includes the questions All things considered, how satisfied are you with your life as a whole nowadays? (on a scale of 1 Dissatisfied to 10 Satisfied) (New Economics Foundation, 2012b).

The **International Social Survey Program** (ISSP) is an annual programme of cross-national collaboration on surveys covering topics important for social science research. It covers 41 member countries and includes the question If you were to consider your life in general these days, how happy or unhappy would you say you are, on the whole? (on the scale: 4 very happy, 3 fairly happy, 2 not very happy and 1 not at all happy) (New Economics Foundation, 2012b).

Box 11: Nature connectedness scales

The **Connectedness to Nature Scale** (CNS) is a standardised and validated questionnaire which is a measure of individuals' trait feelings of being emotionally connected to the natural world (Mayer & McPherson Frantz 2004). It has 14 items that are scored on a five point Likert scale (1 (strongly disagree) to 5 (strongly agree). The items are designed to measure an individual's affective, experiential connection to nature. Research using the scale has shown connectedness to nature to correlate positively with ecological behaviours and subjective wellbeing (Mayer and McPherson Frantz, 2004). It has been used in a number of studies and validated (e.g. Mayer et al, 2009; Olivos et al, 2011; Cervinka et al, 2012)

The **Nature Relatedness Scale**: Nature relatedness describes an individual's level of connectedness with the natural world and comprises the cognitive, affective and physical connections people have with nature (Nisbet et al. 2009; Nisbet 2011). The Nature Relatedness Scale is designed to measure an individual's level of connectedness with the natural world. The scale consists of 21 items rated on a five-point Likert scale, from 1 (disagree strongly) to 5 (agree strongly. Scores range from one to five, with a high score endorsing a cognitive, affective and physical connection with nature. Nature Relatedness correlated with environmental scales, behaviour, and frequency of time in nature, supporting the reliability and validity of NR, as well as the contribution of NR (over and above other measures) to environmental concern and behaviour (Nisbet et al, 2009). It has been used in relation to subjective wellbeing and happiness (Nisbet et al, 2011; Nisbet and Zelenski, 2011; Zelenski et al, 2014).

3.2 Valuing wellbeing and the natural environment

This section outlines the 'social return on investment' and the 'total economic valuation approach' as attempts to assign monetary values to wellbeing and the natural environment. The ability to assign monetary values to the benefits of natural environment initiatives enables comparisons to be made between different benefits using cost-benefit analysis and multi-criteria analysis. However, it must be recognised that some benefits cannot be accurately monetised, and the danger is that their 'value' (i.e. importance) is seen as less than those benefits that can be monetised. The preceding sections have shown the benefits of interactions with the natural environment on a wide range of aspects. This section examines ways to monetise some of those benefits.

3.2.1 Social return on investment

The concept looks at outputs from projects and measures them by comparing them with scenarios where the project had not taken place. For example, a community project which led to 20 people moving from being unemployed to finding work could be measured in terms of the social return on these 20 people finding work. The financial cost of the 20 people not being in work, in terms of support payments from the state could be compared to the benefit of the project occurring and finding these 20 people jobs. The benefits would be through the added value in terms of increased taxes and reduced support payments by the state. The difference between these two scenarios could then be compared in financial terms and ultimately compared against the project cost to see whether the benefits exceed the project's costs.

The quantification of the social return of investment from benefits of the natural environment on education and learning has been attempted by Dickie *et al.* (2011). They value the avoided costs of unemployment, avoided Government costs of supporting underperforming schools, avoided costs of ill-health, and the benefits of well-performing schools on local house prices. They also look to the long-term benefits and attempt to value the avoided costs of shortages of STEM (science, technology, engineering and mathematics) skills in the workforce that could make the UK reliant on imported expertise for implementing environmental policies.

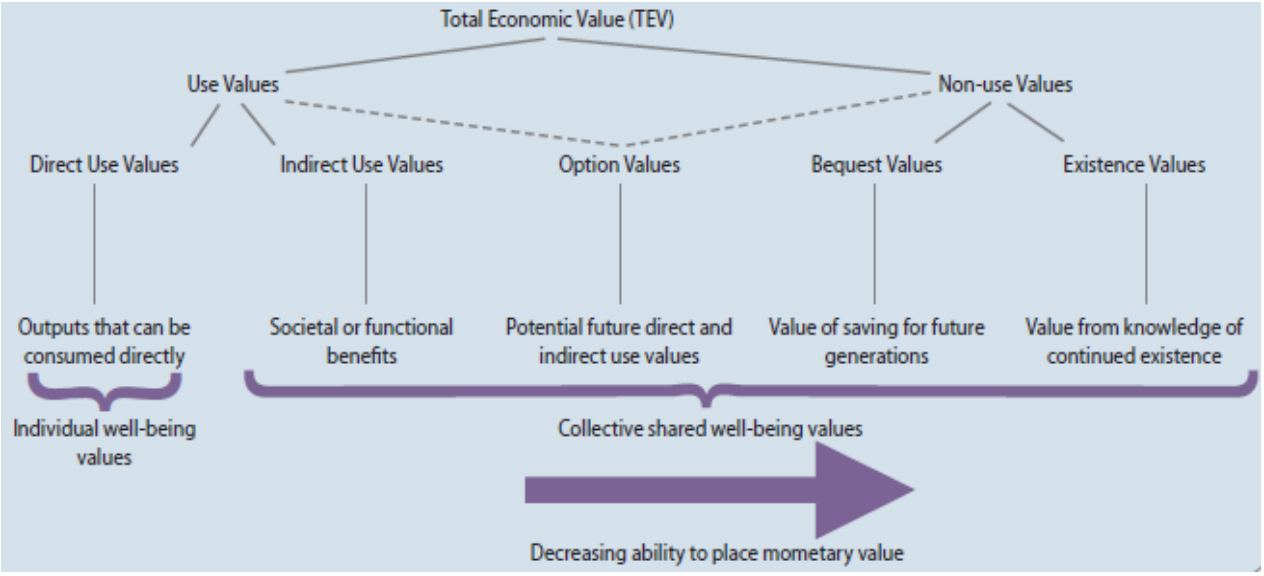
3.2.2 Total economic valuation approach

The Total Economic Valuation (TEV) approach is a well-established framework in economics for understanding and identifying the full range of values we get from a good/service. The framework firstly differentiates between intrinsic/inherent value and extrinsic/instrumental value.

Intrinsic/inherent value takes a philosophical position and can be described as "*the value of something independent of its value to anyone or anything else*", which rules out objective valuation (Mace and Bateman, 2011).

Extrinsic/instrumental value can be differentiated into 'use values' and 'non-use values' (Figure 9). 'Use values' are easier to assign monetary value to, and include 'direct use values' such as through timber collection or water use. 'Indirect use values' include social and environmental benefits that can be captured through the social return on investment approach. 'Non-use values' are obtained through a non-removable product in nature and are unrelated to current, future or potential use. These include 'bequest values', ensuring that goods/services can be preserved for future generations, and 'existence values', which reflects benefits from simply knowing that a good/service exists. 'Option values' is a challenging component of this approach and there is debate as to where it should be located in framework. It describes goods/services that are valued for their potential to be available in the future.

Figure 9: Diagram outlining the components of the Total Economic Valuation Approach, illustrating the decreasing ability to place monetary value on a range of different interactions with nature



Source: Mace and Bateman, 2011

The TEV approach (Figure 9) can be used to identify the range of values we get from a goods and services within the scope of wellbeing; individual wellbeing and collective shared wellbeing.

This way of considering benefits can be considered the most complete framework for examining the wide range of benefits using an economic lens. The ability of the TEV / ecosystem services framework to deal with the full range of benefits and its role as a meta-framework, meaning it can accommodate numerous other tools and approaches within it (such as surveys, hedonic pricing, stated preference etc.) are also beneficial.

There are some difficulties, for instance it is not always clear how benefits which are measured in different ways should be accommodated. In particular, monetising some benefits but not others (due to their more intrinsic value) may lead to biases within an evaluation framework and can result in some benefits being 'lost'. Examples of potentially lost benefits include social and spiritual benefits.

3.3 Evaluation frameworks from existing natural environment initiatives

Evaluation studies that are similar to the monitoring and evaluation of NIAs have been undertaken and can be used to inform our own evaluation process. Two such studies are evaluations of the Heritage Lottery Fund Landscape Partnership Programme and of the Upland Ecosystem Service Pilots. This Section also includes a summary of evaluations which consider improvements to the quality of the natural environment.

The methods of evaluating these projects are included in this section as they could be useful for informing data collection methods as part of the M&E of NIAs Phase 2 project.

3.3.1 Evaluation of the Heritage Lottery Fund Landscape Partnership Programme 2011

The Heritage Lottery Fund Landscape Partnership Programme was launched in 2004 and funds conservation projects in the UK. The programme has adopted a participative approach to evaluation (Clarke *et al.*, 2011).

Earlier work had suggested that an external evaluation of the whole programme would not be cost-effective due to the scale of the partnership. Therefore it was decided that the funded schemes would take a central role in evaluation and embed monitoring and evaluation in their project planning systems.

They evaluated the national picture of landscape partnership performance over eight months and did the following:

- Produced supplementary evaluation guidance for landscape partnerships (complemented by the establishment of a dedicated website).
- Were in direct contact with all schemes, mostly by telephone and e-mail, but also through a number of site visits.
- Took a lead role in national and local workshops.
- Reviewed evaluation plans contained within their Landscape Conservation Action Plans.
- Collected both output and outcome data from all partnerships, encompassing the full range of landscape partnership activities.
- Completed a supplementary study of the achievements of six partnerships that had recently completed or were nearing completion.

The value of a participative and collaborative approach to evaluation was confirmed and the recommendations include methods of embedding this approach in future evaluations.

3.3.2 Evaluation of the Upland Ecosystem Service Pilots 2012

This evaluation focused on the experiences Natural England's three upland pilot projects that were implementing the ecosystem approach on the ground from 2009-2011. The monitoring and evaluation stages aimed to learn from the processes of engaging local people, building consensus and managing the outcomes in terms of changing ecosystem service provision (Waters *et al.*, 2012).

In the report they firstly define success as not having to achieve the original objectives and deliver the expected outcomes. Instead they focus on the testing of new approaches and ways of working and base success on being able to understand why they did or did not meet the expectations.

The evaluators incorporated existing monitoring systems in their evaluation and used their baselines in order to measure change. They also mentioned the need to assess changes in understanding and subsequent decision making of those involved as well as social capital. They note that the importance of social capital only became apparent as they progressed through the evaluation, but did not collect any information about the baseline state at the start. Their suggestions to measure social capital in future projects are through questionnaires and interviews, or through participant observation of how different stakeholders and partners interact during the process (Waters *et al.*, 2012).

Overall they feel that they have learnt the following from the pilots so far:

- There is a need to understand and measure changes in both the social capital process (engaging people, building consensus) and the natural capital outcomes (changes in ecosystem service delivery).

- A baseline assessment produced for each pilot, using existing data to characterise current ecosystem services provision, provides a baseline against which to monitor change.
- Bespoke monitoring may be required to fully describe the outcomes.
- For many services there is a time lag between changes in land management affecting ecosystem service delivery; modelling may be required to predict likely changes.
- Measuring changes in understanding and attitudes is difficult but needs to be built in from the outset.

3.3.3 Interventions to improve environmental outcomes

A number of initiatives aim at improving environmental outcomes, such as reduced diffuse pollution, and it is worth looking at the extent to which these do, or do not, consider or explore social and / or economic benefits emerging from those improved environmental outcomes. It could be expected that this sort of intervention which is focussed on environmental outcomes might seek to quantify the relative social and economic benefits that result from the improved environmental state – possible through considering increased provision of ecosystem services. However a review of a number of large and high profile interventions of this sort provided no examples of social or economic benefits being considered or evaluated. Examples of some of these initiatives and related evaluations are presented in Box 12.

Box 12: Interventions to improve environmental outcomes

Catchment Sensitive Farming (CSF)

The Environment Agency (2011) commissioned evaluation of the CSF (Phases 1 and 2) – which is an intervention which seeks to reduce diffuse water pollution by working with farmers to reduce sources of water pollution - does not explicitly consider the social and economic benefits that are expected to result from the direct actions of the programme. These direct impacts include: farmer engagement; farmer awareness and attitude; uptake of measure to control pollution; and pollutant losses and water quality but there is no effort to consider indirect benefits.

Evaluation available from: http://www.naturalengland.org.uk/ourwork/farming/csf/evaluation.aspx

Nitrate Vulnerable Zones (NVZ)

NVZs are areas where due to their relative environmental vulnerability targeted reductions of nitrate are facilitated as are certain restriction on nitrate use – often via liaison with farmers and other nitrogen using stakeholders as well as regulation and enforcement. An evaluation / survey of the programme undertaken by the Environment Agency (2010) did not consider the social and economic benefits that are delivered from the programme and neither did two reviews of the proposed NVZ Action Programme Measures undertaken for Defra (2007a; 2007b). Some reviews of NVZs have sought to identify the social and economic benefits (Szoege, *et al.*, 1996) but examples are very limited.

Woodlands for Water

Woodlands for Water is a pan-Government intervention which looks at the potential contribution that woodland measure can make to meeting Water Framework Directive objectives. This is an area where evaluations have sought to look at the social and economic benefits – in this instance by using a cost benefit analysis that was supported by ecosystem services in an ex-ante assessment (Forestry Research, 2011). The entailed looking at existing examples of similar ecosystem based initiatives and using 'benefits' transfer to transpose the results from those examples to the Woodland for Water intervention and to provide an understand of the likely cost effectiveness of the intervention as well as the associated social and economic benefits. These benefits were found to include:

- Improvements to specific aspects of water quality (notably phosphates, nitrates, sediment and pathogens) leading to reduced costs in making water suitable for drinking.
- Increased provision of fish and related food crops.
- Increased biodiversity.

- Increased carbon sequestration.
- Improvements to public health.
- Raised environmental awareness through environmental education.
- Increases to local house values.

(Forestry Research, 2011)

4. Summary

This Section presents a summary of the findings from the review, the proposed categorisation of benefits to be used in the context of the NIA M&E Phase 2 project, and provides some final reflections.

4.1 Summary of findings

A short summary of the findings of this literature review is presented below:

- The range of social and economic benefits associated with the natural environment is significant.
- The categorisation and division of these benefits is not necessarily straightforward, but there are existing options that allow for the effective identification and analysis of these benefits.
- Different benefits can be 'understood' or measured in different ways and any assessment of the range of benefits needs to be flexible to account for these differences.
- Non-material benefits (also referred to as cultural ecosystem services) are co-produced in that they are created through the interactions of the environmental places and the cultural practices of individuals / communities involved.
- Understanding and measuring non-material benefits may not be feasible or possible at higher spatial scales; instead any measurement may be limited to the drivers of these benefits such as access and signage.
- Interventions that do not consider monitoring and evaluation processes at the start of their projects can still be evaluated in other ways. Potential methods include taking into account landscape changes as a result of the intervention, levels of community participation and the change in participation from the start, anecdotal evidence (although the impartiality of the data gained needs to be considered), and formal awards received by interventions.
- Focussing on a single form of measurement, such as monetisation, reduces the range of benefits that are being considered and can result in the loss of certain key benefits from decision making.
- Benefits are associated with interventions which specifically seek to provide social and economic benefits, such as recreational and access interventions, but there are also social and economic benefits that emerge from interventions which seek to improve environmental outcomes – for instance by reducing diffuse water pollution. The second of these categories is potentially more difficult to measure or evaluate but there are examples where this has been done.
- Different methods and tools have different strengths and weaknesses and require different types and quantity of information.

4.2 A categorisation of social, economic and wellbeing benefits

The literature and examples in Sections 2 and 3 illustrate that the range and scale of social and economic benefits associated with natural environment initiatives is extensive. Drawing on the review of existing relevant conceptual frameworks presented in sub-sections 2.1 and 2.2, five categories were proposed which capture the range of benefits expressed through the different approaches:

1. Health

2. Education and ecological knowledge
3. Symbolic, Spiritual, Sensory
4. Social development and connections
5. Economic – including recreation, leisure, tourism

These categories are intended to be used as a way of ordering the evidence to support the monitoring and evaluation of the NIA Programme, rather than as an attempt to develop a new framework. Whilst there are a number of ways of categorising wellbeing we suggest this is a useful framework as it makes explicit the wide range of benefits and these categories will support the precise identification of the benefits from the NIAs in the M&E Phase 2 project.

To illustrate the use of these categories to explore the link between natural environment activities and social, economic and wellbeing benefits, Table 5 provides a summary of the benefits identified by the literature, as described in Sections 2 and 3.

Table 5: Overview of activities and benefits (identified in literature) under benefit categories proposed for use in NIA M&E

Category	Activities	Benefits
Health	• Green gyms/Green exercise • Viewing the natural environment • Being in the natural environment • Shelter and shade	• Medical and health-related • Reduction in incidences of cardiovascular and respiratory illnesses • Life-cost averted model shows NHS could save approximately £2.1 billion/annum from people being more physically active in green spaces • Reduction in social isolation, increased social support and an enhanced quality of life • Longevity benefits • Benefits psychological wellbeing of individuals • Recovery and rehabilitation from illness • Restorative effect to help recovery from mental fatigue from demands of modern life • Makes people feel happier • Shelters and shade reduce mental and physical stress experienced from bad weather, high temperatures and pollution • May alleviate the increased stress caused by poverty and decrease health inequalities
Social development and connections	• Volunteering • Community activities • Social support schemes	• Strengthens social relationships and building new ones • Social development and expanded social networks • Increases social capital: providing moral and materials support post-disasters, helping to provide jobs, facilitating entrepreneurship, strengthening supplier relations, and influencing career successes • Potentially reduces crime rates
Education and learning	• Educational visits to areas of the natural environment • Environmental education courses • Viewing the natural environment whilst studying or learning	• Supports the development of cognitive and motor skills during childhood development • Helps pupils develop social skills: teamwork, tolerance, group awareness, self-discipline and leadership • Inspires pupils about the environment and help develop pro-environmental attitudes • Strengthens community cohesion • Helps children who may struggle with mainstream learning environments, boosting their confidence and self-esteem

Category	Activities	Benefits
		• Makes NEETS (those Not in Education, Employment or Training) more employable through qualifications and skills gained • Improves attention span of young people and adults • Value of environmental knowledge
Economy	• Being near the natural environment • Recreational and tourism activities	• Increases in land and property values • Tourist/visitor expenditure on local and surrounding economies • Increases in employment opportunities • Aesthetic value of the natural environment can help to attract businesses to the area • Potential for urban regenerations • Ecosystem service provision
Symbolic, spiritual, and sensory	• Being in the natural environment • Remembering the natural environment	• Historical value • Contributes to a community's and individual's cultural identity • Stirs a sense of nostalgia and a deep connection within • Creates a sense of awe and wonder • Facilitate spiritual growth • Sensory stimulation • Nature connectedness • Gathering and sense of place

4.3 Use of the literature review within the NIA M&E phase 2 project

The value of this review for the M&E of NIAs Phase 2 project is threefold:

1. To enable a greater understanding of the potential wellbeing benefits that might accrue from the NIA activities.
2. To show how wellbeing benefits can be described and measured.
3. To provide evidence to input into a common framework for the articulation of benefits associated with NIAs and their activities that are open enough to ensure that the full range of benefits can be included.

In effect this literature review formed the basis for the other work within WP3 which included:

- Providing an expanded framing of wellbeing benefits in a structured and accessible format to the NIA practitioners
- Working with NIA practitioners to build capacity in understanding and measuring of wellbeing benefits through workshop sessions and one dedicated workshop
- Using the framework to consider the wellbeing benefits of the NIAs for the YR1 reporting.
- Using the framework to collect additional data using interviews and case studies to provide examples of those benefits for the reporting in Year 2.
- Drawing on reviewed evidence to illustrate potential wellbeing benefits from NIA activities e.g. health benefits from increased volunteering in NIAs for Year 2 reporting.

4.4 Final reflections

The literature in this area is increasing over time and the decision by the UK Government, notably Defra, to frame much of their decision making around this benefit based discussion (see the Natural

Environment White Paper) suggests that arguments made in the literature are being taken on board. The range and nature of these social and economic benefits does present some challenges though.

Measuring, quantitatively or qualitatively the type and scale of any social and economic benefits is not a straightforward process and the extent to which it is possible or even preferable is largely a result of the nature of the intervention, the benefits that are felt to be relevant and of the information available.

The process of exploring the literature has indicated that the classification and description of these benefits is not a simple process and that various competing and complementary definitions and frameworks exist. This means that any attempt to understand these benefits will be subject to significant discussion and debate and is potentially contestable.

Understanding how the benefits are realised, e.g. how having green spaces might improve social interactions still requires further work. The work of Church *et al.* (2014) on cultural ecosystem services is an excellent framework for understanding that benefits arise from the interactions between people and physical spaces and are mediated by their perceptions and values of those spaces. This echoes much of the work on place within environmental psychology (see Relph, 2007 for overview) and it moves the field away from deterministic approaches to people-environment relationships. Future work on these types of benefits should build on this work.

In addition to evaluating wellbeing benefits decision makers might seek to have indicators or proxies to monitor changes in the natural environment. One approach to doing this is monetising benefits. Within this report we have discussed the Total Economic Valuation approach but for the types of wellbeing benefits discussed in this paper this approach is less well developed. Addressing this has been a focus for Work Package 5 of the UK NEAFO project (Church *et al.*, 2014) and although this work was published after the finalisation of the NIA M&E's approach it may inform future decision making processes.

Ultimately, any indicators will need to be underpinned by research into the nature and measurement of those benefits, some of which (e.g. symbolic benefits) are more amenable to qualitative rather than quantitative research. It will be necessary to have monitoring processes that can accommodate this type of data so that these types of benefits are included and counted. Having a framework that enables the description and measurements of all the wellbeing benefits attributed to interactions with the natural environment in itself (without monetisation) is valuable at the UK level and perhaps more so at the local / NIA level. Better understanding what benefits their activities have and for whom should enabling better discussions, and developments of those NIAs.

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