Wellbeing and the Natural Environment: A brief overview of the evidence

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SUMMARY

‘Wellbeing’ is receiving much attention by academics, policymakers and practitioners in the UK and abroad. However, little is understood about the wellbeing benefits of the natural environment within the wellbeing literature. This report provides a brief overview of the main literature exploring the links between wellbeing and the natural environment, with a particular focus on contact with green spaces (forests, parks, gardens etc). These will be situated in debates about ecosystems together with broader discussions about how to value the benefits of green spaces to wellbeing. This will be used to provide some guidance on further areas requiring more research.

The Millennium Ecosystem Assessment (MEA) provides a useful framework for exploring these links. From a wellbeing perspective, its value is its recognition of how wellbeing cannot be considered in isolation of the natural environment. This is insufficiently acknowledged in wider wellbeing literature. The MEA has developed a typology of ‘ecosystem services’ – the goods and services the natural environment provides to people – and linked this to human wellbeing. However, this report found that the MEA failed to capture all the wellbeing dimensions as advocated by wellbeing literature. This report therefore uses a framework that distinguishes the physical, mental and social wellbeing benefits of contact with green spaces (See Figure 2). In doing so it provides some initial thoughts on a number of issues:

- What are the wellbeing benefits of the natural environment, particularly green spaces?
- What does wellbeing offer to attempts to value green spaces?
- Can ecosystems approaches be used to value the natural environment/green spaces?
- Can a wellbeing approach be used to value the environment, particularly in relation to ecosystem services?

The MEA ecosystem approach provides a number of advantages to wellbeing theorists. The most important of these is the conceptual framework it provides to explore the interaction between people and the environment. Its typology of ecosystem services is useful for unpacking the specific components of ecosystems and their role in contributing to objective wellbeing. It also emphasises less tangible dimensions such as the natural environment’s role in supporting freedom and choice. Although, the MEA recognises that wellbeing is multi-dimensional it is less clear on how the natural environment makes people think and feel about their lives. More importantly it excludes many of the mental wellbeing impacts (eudaimonic wellbeing) that the natural environment provides. Also missing from the ecosystem approach is an understanding of the various causal mechanisms between ecosystem services and wellbeing. The commissioning of further research to explore the synergies and tensions between ecosystem and wellbeing approaches would assist the development of more accurate methods for valuing the environment and ecosystem services.

The wellbeing academic literature (conceptually and methodologically) has much to offer to ecosystem approaches and attempts to value the environment more generally. Wellbeing is a multi-dimensional state comprising both objective and subjective components. Therefore, any attempts to explore the wellbeing benefits of the natural environment needs to capture both dimensions. The wellbeing literature also emphasises the importance of people’s experiences of the natural environment, particularly the way that it affects how people think and feel about their lives.
Focusing on green spaces as a component of the natural environment provides a useful case study to explore the benefits of ecosystem and wellbeing approaches to valuing the natural environment. This overview highlighted that there is a significant gap in the literature on using wellbeing concepts and methods (academically defined) in the context of the natural environment. Further research using wellbeing frameworks and methods exploring the role of the natural environment would enhance existing attempts to value the environment. Wellbeing methodologies have the potential to provide new ways to value the environment that do not rely exclusively on monetary techniques. This is important in the context of the natural environment since not all benefits can be expressed in monetary terms. That is not to say that such methods should be discounted. Rather, subjective wellbeing measures have been shown to be reliable and robust and could be used to augment existing approaches to valuing the environment. With further development, they could be used to provide monetary values.

At the same time, it is important to note that most of the work on subjective wellbeing measures comprises hedonic measures. Further work is required to develop other wellbeing measures (e.g. eudaimonic wellbeing measures). This re-emphasises the importance of using a range of different methods from different disciplines to unpack these relationships. Similarly, such methods should not exclusively rely on quantitative or monetary methods. Rather, more work should be taken to demonstrate the value of a multi-disciplinary approach that combines both qualitative and qualitative methods. Conceptually, wellbeing provides frameworks to enhance our understanding of the relationships between the natural environment and people. More work should be carried out to draw on these frameworks to develop new measures of wellbeing for different contexts. For example, the way that mental and social wellbeing is supported by ecosystem services is insufficiently elaborated in the MEA.

In relation to green spaces, this report found a wealth of material exploring the generic wellbeing benefits of the natural environment. Although these did not always use the terminology of wellbeing per se, they did cover aspects that were known to be related to wellbeing (e.g. physical health, mental health, relationships, security etc). Key points include the following:

- The natural environment provides synergistic physical, mental and social wellbeing benefits.
- There is much controversy over what constitutes robust and reliable evidence. Since many of the wellbeing-related studies are framed in the context of physical and mental health, there is criticism that many of the existing studies do not meet the medical professions’ requirements for robust clinical and quantitative evidence. There is also a tendency to discount a range of in-depth and rich qualitative studies, but such research is important for unpacking and explaining the relationships illustrated through quantitative research methodologies. Further work in this area should seek to combine both quantitative and qualitative methods to explore the wellbeing benefits of green spaces.
- More work is required to establish how robust and reliable wellbeing measures (SWB) can be used to evaluate the benefits of green spaces. This could augment existing monetary evaluations and should be supported by more in-depth qualitative research of a comprehensive understanding to be reached. Once the role of green spaces in promoting mental and physical wellbeing are better understood, it may be possible to ascribe a monetary value to such benefits using an approach similar to that taken by Layard (c.f. 2006). Future work could include a more systematic review of wellbeing benefits of green spaces in a range of different disciplines that uses a range of different search engines.
- The wealth of material exploring the beneficial wellbeing impact of green spaces does suggest there is a positive impact of interacting/viewing the natural environment that should not be ignored. Future research could compare this with the negative impacts of green spaces (e.g. perceptions of crime and how these relate to green spaces).
- Most of research in this area originates from US, Scandinavia, Holland and Japan. Much more research is required to explore wellbeing benefits in the UK.
- Most of the research focuses on wellbeing benefits of green spaces for the urban population. Green spaces play an important role for the wellbeing of inner city and suburban areas. Less is known about its role in rural areas. A review should be carried out to investigate the role of green spaces in rural communities.

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2 See section 2.1. for definitions of hedonic wellbeing and eudaimonic wellbeing
• There appears to be a lack of research on social wellbeing benefits of green spaces. More research is required to unpack the benefits of different types of green spaces for different groups of the population. This would need to distinguish what type of green space and exposure.

• There are many academics, practitioners and policy makers working directly or indirectly on wellbeing benefits on green spaces. Yet, there is a lack of dialogue on who is doing what and when. In the academic sphere, this is partly a result of the fact that the area covers a range of different disciplines. More multi-disciplinary collaboration and effective partnership is required. A mechanism is needed to bring together existing evidence and the key stakeholders so that interested parties can draw on this and from other stakeholder’s experiences.

1. INTRODUCTION

‘Wellbeing’ is receiving much attention by policymakers in the UK and abroad. The consultation on the UK 2005 sustainable development strategy, Securing the Future, revealed concern that government policy was targeted too much on increasing GDP and neglected wider quality of life issues. The strategy identifies a need to ensure that wellbeing issues are being tackled consistently, in the right way and that government is genuinely making a difference to people’s lives. To fulfil this, the strategy commits the government to get a better understanding of wellbeing by sponsoring “cross-disciplinary work to bring together existing research and international experience and to explore how policies might change with an explicit wellbeing focus” (2005:23).

The strategy also identifies the protection of natural resources and the enhancement of the environment as a key priority. However, research commissioned by Defra on the evidence on factors influencing wellbeing highlighted an absence of research on the links between the natural environment and wellbeing. This is partly because the review was based on large scale data sets that focused primarily on subjective wellbeing measures where it was difficult to control for diffuse variables such as the ‘natural environment’. However, there is a wealth of research that does explore these links, particularly in relation to physical and mental health. Much of this research has been initiated by those interested in the public health and spatial planning agenda. Most of this research relies on experimental research and/or controlled field studies exploring exposure to green environments and its impact on health (particularly in relation to alleviating stress and mental fatigue). A range of theoretical frameworks are used to provide explanations, but few make explicit links between wellbeing and the natural environment. A recent conference exploring these links organised by Natural England concluded it was important to consider these relationships for three key reasons. First, biodiversity is valued more when connected to people and places. Second, the natural environment provides physical, mental and spiritual health and wellbeing. Third, considering this relationship could change people’s attitudes towards preserving and enhancing the natural environment.

The Millennium Ecosystem Assessment (MEA) provides a useful framework for exploring these links. It has developed a typology of ‘ecosystem services’ – the goods and services the natural environment provides to people – and linked this to human wellbeing. The aim of this brief report is to provide an overview of a wider range of evidence on links between wellbeing and natural environment that span beyond subjective wellbeing with a particular focus on the impact of contact with green space. It will add to existing work by taking on a broader wellbeing approach that connects the studies reviewed to the wider wellbeing debate and engages with an ecosystem perspective. This overview concluded that it was more appropriate to use a framework that distinguishes the physical, mental and social wellbeing benefits of contact with green spaces (Figure 2). This report will also explore the implications of such research to environmental valuation, with a focus on the value of green spaces to wellbeing (as an example of an ecosystem service). The main limitation of this report is that, because of time constraints, it did not undertake a systematic review of the evidence.

3 http://www.neilstewartassociates.com/sh229/
2. BACKGROUND

2.1: Defining and measuring wellbeing

There is no single agreed definition of wellbeing: it is a broad and contested term, interpreted in many different ways with significant overlap. At a generalised level, it is useful to distinguish between objective and subjective dimensions of wellbeing (McAllister, 2005). Objective dimensions capture the material and social attributes (recognised as important for fostering wellbeing) that contribute or detract from an individual or community’s wellbeing. This covers the level or wealth, provision of education and health care, infrastructure and so on. Broadly speaking they include factors deemed important for society’s welfare and are easily measured at the population level. In comparison subjective dimensions capture an individuals’ assessment of their own circumstances: what they think and feel. It is this area that has displayed a great deal of activity more recently amongst psychologists and economists.

Much of the academic literature distinguishes between hedonic and eudaimonic approaches to wellbeing (Waterman, 1993; Kahneman et al, 1999, Keyes et al, 2002, Ryan and Deci, 2001). It is these debates which have had the most influence over attempts to develop measures of wellbeing; largely in the realm of subjective wellbeing. Both approaches have distinct views of human nature and of what constitutes the good of society. However, there is a tendency for the two to be conflated under the banner of subjective wellbeing, which can be misleading.

‘Hedonic psychology’ has been described by Kahneman et al (1999) as the study of what makes experiences and life pleasant and unpleasant focusing largely on the preferences and pleasures of the mind and the body. As noted by Ryan and Deci (2001:144), most scholars within this school of thought view wellbeing as comprising subjective happiness and the “experience of pleasure versus displeasure” which includes all judgements about the good/bad elements of life. The primary purpose of such research is to find ways to maximise ‘happiness’. Most research in this strand has used an assessment called ‘subjective wellbeing’ (SWB) consisting of three components: life satisfaction, presence of positive mood, and the absence of negative mood (Diener & Lucas, 1999; Diener, 1984). Collectively, these are often referred to as ‘happiness’. This strand has had a tremendous influence on subsequent efforts to measure wellbeing and develop an understanding of what drives wellbeing.

Eudaimonic theorists clearly distinguish wellbeing as something separate from happiness by arguing that not all desires and pleasures will contribute to wellbeing and may even cause harm. Rather, wellbeing (drawing from the work of Aristotle) should extend beyond ‘pleasure’ to capture the concept of human flourishing that incorporates the idea of realising one’s true potential (daimon) (Ryff, 1995; Ryff & Keyes, 1995; Waterman, 1993; Keyes, 2002). It defines wellbeing in terms of the degree to which a person is fully functioning and engaging in modes of thought and behaviour that provide engagement and fulfilment. It incorporates the idea that wellbeing is about achieving a sense of purpose and meaning in life (i.e. self-realisation) rather than pursuing pleasure. Some of the literature discusses this dimension of wellbeing under the realm of ‘psychological wellbeing’ and positive mental health.

Ryan and Deci’s (2000) Self Determination Theory (SDT) has been particularly influential in specifying what this entails. They argue that eudaimonic wellbeing is fulfilled through the satisfaction of three psychological needs: autonomy (having a sense of control over one’s life), competence (a sense that one is functioning effectively) and relatedness (having positive interactions with others). They also stress that the relative importance of these varies across different cultures. This shares similarities with the work of Ryff (1989) who proposes that psychological wellbeing includes six components: autonomy, environmental mastery, personal growth, positive relationships, purpose in life and self acceptance. Fulfilling these needs is presented as the natural aim of human life which influences many of the meanings and purposes behind human action. Other dimensions that have been shown to be important for psychological wellbeing include feeling fully engaged in one’s activities and finding them challenging.

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4 See Ryan & Deci (2001) for a comprehensive review of research on hedonic and eudaimonic wellbeing.
(Csikszentmihalyi, 1997) and having a sense of curiosity or willingness to learn new things (Kashdan et al, 2004).

In summary, the literature suggests that wellbeing should be treated as a multidimensional phenomenon that captures a mixture of people’s life circumstances, how they feel and how they function. Elements of this are visible in Diener and Seligman’s (2004:1) definition of wellbeing as: “peoples’ positive evaluations of their lives, includes positive emotion, engagement, satisfaction, and meaning”. They recognise that wellbeing incorporates several separable concepts. This raises a number of concerns regarding the tendency of wellbeing to be conflated with happiness which according to mainstream understandings, is only one dimension of wellbeing. This is also expressed by Huppert (2006) who notes that both hedonic and eudaimonic dimensions of wellbeing are important. Hedonic approaches may neglect the fact that positive feelings do not always lead to personal growth and fulfilment; may be transitory and acquired through unsustainable means; and there are times when a state of wellbeing requires the experience of a negative emotional state. Similarly, a state of wellbeing cannot be achieved entirely by realising one’s potential since these behaviours do not necessarily lead to happiness and contentment.

Policy makers see a wellbeing perspective as valuable in challenging accepted ways of viewing policy and thus encouraging innovative approaches. In a number of contexts a wellbeing focus has promoted an increased awareness and recognition of the combined effects of social, economic and environmental factors. It has helped to promote joint working and a more holistic approach to policy making. Defra has worked with other Government departments, the devolved administrations and other stakeholders to develop a common understanding of what wellbeing means in a policy context (Box 1). This is intended to support those wishing to take a greater policy focus on wellbeing and to promote consistency:

Box 1: Common understanding of wellbeing

"Wellbeing is 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. Government’s role is to enable people to have a fair access now and in the future to the social, economic and environmental resources needed to achieve wellbeing. An understanding of the effect of policies on the way people experience their lives is important for designing and prioritising them."

Measurement

In principle, the measurement of wellbeing is influenced by the approach used to define wellbeing. In practice, there are several measures that have dominated (notably income). Again, it is useful to distinguish between ‘objective’ and ‘subjective’ measures of wellbeing (McAllister, 2005). By far the most powerful and dominant of measures has been the objective economic measures of income such as GDP. With the growing realisation that people’s evaluation of their lives matter, subjective wellbeing measures (predominantly life satisfaction and happiness) are increasingly being recognised as providing a more complete assessment of wellbeing.

Objective measures tend to cover standard measures of welfare including economic indicators of progress such as GNI and GDP and social indicators such as mortality, health and education. Economic measures of wellbeing, primarily income and/or GDP, have dominated the policy arena as surrogate measures of wellbeing for many years. This is a reflection of an overarching dominance of economics in social science and policy making. Put simply (and according to standard economics), more income equates with more

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6 This is underpinned by the foundational concept of utility. Utility was interpreted as preference satisfaction (desire fulfilment). Preferences are inferred from the choices people make: preferences revealed by the option an individual
choices. The more choices a person has, the higher quality of life they have because they have more options or courses of action to increase wellbeing. On this basis, income is presented as a sufficient measure of wellbeing and economic growth has been regarded as the primary means of fostering wellbeing. This has been justified considering that economic growth has historically been necessary to provide the goods and services (material preconditions) to meet basic levels of human needs such as food and shelter and welfare services such as education and health. The dominance of economic indicators can also be explained by their longer history of development and because they tend to fit with national priorities (i.e. increased economic growth). They are consequently easier to calculate, widely available, updated frequently, and are ultimately regarded as more rigorous.

In the 1960s, the ‘social indicators’ movement highlighted the need to measure non-economic aspects of people’s lives that could not be captured from income measures of wellbeing. What followed were a range of what were often interpreted as measures of basic needs fulfillment capturing levels of nutrition, housing, education, health, mortality, environmental quality, poverty and so forth (McGillivray, 2006; Offer, 2006). These complemented attempts to adjust economic measures to take more account of non-market goods and services. Examples of such approaches include the Physical Quality of Life Index (PQLI) which combined infant mortality, life expectancy and adult literacy into a single index (Morris, 1979) followed by the Human Development Index (HDI), launched in 1990. HDI is arguably the most widely used and well known composite index of wellbeing (i.e. it continues to be extensively used within research and policy work). Heavily influenced by Sen’s capability approach, it combines US$ PPP GDP per capita, life expectancy at birth, adult literacy and the combined primary, secondary and tertiary education enrolment ratio. It has been extended to cover gender differentials in these areas (i.e. Gender Development Index GDI). Numerous and ongoing attempts have also been made to include sustainability in wellbeing assessments (c.f Neumayer, 2006). See McGillivray (2006) and Donovan and Halpern (2002) for a comprehensive account of these.

However, as the provision of goods and services has increased with economic growth/prosperity and societies have become more affluent, it is now argued the relationship between economic prosperity and wellbeing has broken down (Easterlin, 1996; Offer, 2006). This is often referred to as the ‘Easterlin paradox’. It is now widely acknowledged that although economic progress is important for wellbeing, income can no longer be relied upon as the main measure of wellbeing because it does not give a full account of quality of life. This has been highlighted by what can be considered the most thriving area of research on wellbeing: subjective wellbeing (SWB). Psychologists have been leading the way in developing ways to measure wellbeing which gives more emphasis to people’s multidimensional evaluations of their lives. The most widely used measures to date stem predominantly from hedonic traditions of wellbeing which combine measures of people’s cognitive judgements of life satisfaction with their affective evaluations of emotions and mood. This involves a reflexive assessment of a person’s quality of life involving a survey question asking respondents to rate their levels of satisfaction or happiness at a general level and then for specific domains such as health and education. These measures have been shown to be empirically robust and reliable. Generally, the domain specific questions are considered more accurate, but it raises questions about how to weight these aspects. Subjective global wellbeing measures have been used to provide convincing and robust evidence that as income has increased; life satisfaction and happiness have actually plateaued. This has been accompanied with increases in depression, and decline in social connectedness (Diener and Seligman, 2004; Putnam, 2001; Putnam and Helliwell, 2006). Economists are taking these findings seriously and using SWB measures to explore a range of effects.

Although the single-item global measures of SWB have reigned as the main measure of wellbeing in current research, it is important not to lose sight of how different theorisations of wellbeing require different measures. These are important in illustrating the multi-dimensional nature of wellbeing. It is beyond the remit of this paper to give a comprehensive account of the different measures of wellbeing. The Defra commission research on personal influences of wellbeing (Dolan et al, 2006a) provides a useful summary of how wellbeing measures vary according to different accounts of wellbeing (See Table 1).

<table>
<thead>
<tr>
<th>Wellbeing Account</th>
<th>Wellbeing Measure</th>
</tr>
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</table>

Table 1: Wellbeing measures according to different wellbeing accounts

chooses from a given set of options. According to welfare economics, social welfare was assumed to be a function of individual utility, with utility interpreted as revealed preferences. Income was used as a proxy for utility (Burchardt, 2006). Happiness questions are said to be more appropriate for capturing short term reflections influenced by mood, whereas life satisfaction questions are measuring more long term stable evaluations (Helliwell and Putnam, 2006).

Largely because of their use in international surveys and economic research.

<table>
<thead>
<tr>
<th>Preference Satisfaction</th>
<th>Income</th>
</tr>
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<tbody>
<tr>
<td>Quality adjusted life years (QALY)</td>
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<table>
<thead>
<tr>
<th>Flourishing</th>
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<tbody>
<tr>
<td>Psychological wellbeing scale</td>
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<tr>
<td>Orientation to happiness</td>
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<table>
<thead>
<tr>
<th>Subjective wellbeing: Hedonic</th>
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<tbody>
<tr>
<td>Positive and negative affect scale (PANAS)</td>
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<tr>
<td>Affectometer 2</td>
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<tr>
<td>Day reconstruction method</td>
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</tbody>
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<table>
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<tr>
<th>Subjective wellbeing: Evaluative</th>
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<tbody>
<tr>
<td>Satisfaction with life scale</td>
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<tr>
<td>Personal wellbeing index</td>
</tr>
<tr>
<td>Life satisfaction</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Combined</th>
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</thead>
<tbody>
<tr>
<td>Centre for Epidemiological Studies Depression Scale (CES-D)</td>
</tr>
<tr>
<td>CASP-19</td>
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<tr>
<td>General Health Questionnaire (GHQ)</td>
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</tbody>
</table>

Dolan et al (2006a)

The recently launched sustainable development indicators include a section devoted to wellbeing measures (indicator 68). These include a selection of existing sustainable development indicators (supported by additional related measures) that were shown to affect wellbeing, together with new wellbeing measures. This includes an overall SWB measure of life satisfaction and domain specific measures. These are summarised in Box 2 below:

**Box 2: Wellbeing measures**

<table>
<thead>
<tr>
<th>39. Fear of crime</th>
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<tbody>
<tr>
<td>Perceptions of anti-social behaviour *</td>
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<table>
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<tr>
<th>41. Workless households</th>
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<tbody>
<tr>
<td>43. Childhood poverty</td>
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<tr>
<td>45. Pensioner poverty</td>
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<table>
<thead>
<tr>
<th>47. Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>50. Healthy life expectancy</td>
</tr>
<tr>
<td>Self-reported general health *</td>
</tr>
<tr>
<td>Self-reported long-standing illness *</td>
</tr>
<tr>
<td>51. Mortality rates (suicide)</td>
</tr>
<tr>
<td>Mortality rates for those with severe mental illness *</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>57. Accessibility</th>
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<tbody>
<tr>
<td>59. Social justice</td>
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<tr>
<td>60. Environmental equality</td>
</tr>
<tr>
<td>62. Housing conditions</td>
</tr>
<tr>
<td>66. Satisfaction with local area</td>
</tr>
<tr>
<td>Trust in people in neighbourhood *</td>
</tr>
<tr>
<td>Influencing decisions in the local area *</td>
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<table>
<thead>
<tr>
<th>68. Wellbeing</th>
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<tbody>
<tr>
<td>Overall life satisfaction</td>
</tr>
<tr>
<td>Overall life satisfaction by social grade *</td>
</tr>
<tr>
<td>Satisfaction with aspects of life *</td>
</tr>
<tr>
<td>Satisfaction with aspects of life, by social grade *</td>
</tr>
<tr>
<td>Satisfaction with aspects of life, by age *</td>
</tr>
<tr>
<td>Frequency of positive and negative feelings *</td>
</tr>
<tr>
<td>Frequency of positive and negative feelings, by social grade *</td>
</tr>
<tr>
<td>Frequency of feelings or activities which may have a positive or negative impact on wellbeing *</td>
</tr>
<tr>
<td>Level of participation in sport *</td>
</tr>
<tr>
<td>Access to green space *</td>
</tr>
<tr>
<td>Level of participation in other activities *</td>
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<tr>
<td>Positive mental health *</td>
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</tbody>
</table>


**2.2. Wellbeing and the natural environment**
The review on influences of personal wellbeing highlighted an absence of research on the link between wellbeing and the natural environment (Dolan et al, 2006a). This is partly because it was
based on large scale data sets that focused primarily on subjective wellbeing measures where it is
difficult to control for diffuse variables such as the natural environment. To date, the best example
of subjective wellbeing research making links to the natural environment has been research by van
used Geographical Information Systems (GIS) to conclude that consideration of amenities such as
climate, environmental and urban conditions are critical when analysing subjective wellbeing. Their
research demonstrated that the inclusion of spatial variables increased the explanatory power of
their happiness function, highlighting the importance of spatial dimensions in determining
wellbeing.

The nef project exploring the link between wellbeing and sustainable development briefly
discusses the effects of the environment on physical and psychological wellbeing (Marks et al,
2006). Climate change is identified as having the most negative impacts on physical wellbeing at
localised and global level. Related effects include resource degradation, ozone depletion, global
cycles of elements, biodiversity loss, chemical contamination of food and water, and alien or
invasive species. The report also documents research suggesting the positive impact of
engagement with the natural environment (particularly green spaces) on psychological wellbeing
individually and at the community level. For example, it links availability of communal green
spaces in urban areas to higher levels of community cohesion and social interaction amongst
neighbours (Kuo et al, 1998; Kuo & Sullivan, 2001ab). It also makes reference to Pretty et al’s
(2005a) work on the impact of access to green space on both physical and psychological
wellbeing. The nef report concludes that “preservation and promotion of public-access green
spaces would probably have a positive impact on psychological wellbeing. This applies both to the
conservation areas such as national parks and to community parks and gardens in urban areas”. It
also reviews some evidence illustrating the negative impact of localised environmental damage to
psychological wellbeing (e.g. areas experiencing intense resource exploitation and people living
near toxic waste sites). However it notes that these impacts are mediated through changes in
perceive autonomy and acute sense of loss rather than a direct effect.

The report on international policy interventions on wellbeing identified a number of case studies
where interventions promoting green space (parks, community gardens and allotments) had
reported wellbeing benefits (Levett-Therivel, 2007). These included improved communication
between social groups, increased feelings of self-worth, greater sense of community, relaxation
and increased physical health. In summary the Defra commissioned research highlights a gap in
research exploring the links between wellbeing and the natural environment. However, this does
not necessarily mean that it doesn’t exist as will be illustrated in section 3.

2.3. Wellbeing and an ecosystems approach

An ecosystem approach is widely recognised as a valuable way to analyse the relationship
between people and the environment and for this reason has been endorsed by the Convention on
Biological Diversity (CBD, 1992). The CBD describes the ecosystem approach as a strategy for the
“integrated management of land, water and living resources that promotes conservation and
sustainable use in an equitable way….humans, with their cultural diversity, are an integral
component of many ecosystems” (MEA, 2003: 11). It therefore provides a useful framework to
conceptualise the link between wellbeing and the natural environment. It also enables a better
gasp of living within environmental limits, which describes the limits of the planet’s environment,
resources and biodiversity (Defra, 2005). The fact that 60% of the world’s ecosystems services
are being degraded and used unsustainably and presents significant challenges to maintaining the
wellbeing of current population and future generations (MEA, 2003).

The Millennium Ecosystem Assessment (MEA) framework for understanding ecosystems and the
services they provide is regarded as being consistent with the CBD. The MEA was established by
the former United Nations Secretary-General (Kofi Annan) in 2000 to assess the consequences of
ecosystem change for human wellbeing and establish the scientific basis of action needed to
enhance the conservation and sustainable use of those systems and their contribution to human
wellbeing. Ecosystems are defined as functional units comprising the dynamic interaction of plants,
animals, microbes and non-living environment. Ecosystem services are regarded as the benefits that people obtain from ecosystems. MEA identifies four ecosystem services summarised in Box 3 below:

**Box 3: Ecosystem services**

<table>
<thead>
<tr>
<th><strong>Provisioning services:</strong></th>
<th>the products obtained from ecosystems including food, fresh water, fuelwood, fibre, biochemicals and genetic resources.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regulating services:</strong></td>
<td>the benefits obtained from regulation of ecosystem processes such as air quality maintenance, climate regulation, erosion control, disease regulation, water regulation, water purification, storm protection and pollination.</td>
</tr>
<tr>
<td><strong>Cultural services:</strong></td>
<td>the nonmaterial benefits obtained from ecosystems through spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences. This covers the role that ecosystems play in contributing to cultural diversity, spiritual and religious values, knowledge systems, educational values, social relations, inspiration, aesthetic values, sense of place, cultural heritage values, recreation and ecotourism.</td>
</tr>
<tr>
<td><strong>Supporting services:</strong></td>
<td>the services necessary for the production of all other ecosystem services such as soil formation, nutrient cycling and primary production. They differ from the other three types of services because their impacts on people are either indirect or occur over long period of time. The other categories in comparison have relatively direct and short-term impacts on people.</td>
</tr>
</tbody>
</table>

The MEA recognises that changes in the ecosystem services have a direct effect on human wellbeing through impacts on security, the basic material for a good life, health and social and cultural relations. Together, these elements are influenced by and have an influence on the freedoms and choices available to people. These are illustrated in Figure 1 overleaf.

The MEA defines wellbeing as having “multiple constituents, including basic material for a good life, freedom and choice, health, good social relations, and security. Wellbeing is at the opposite end of a continuum from poverty, which has been defined as "pronounced deprivation in wellbeing". The constituents of wellbeing, as experienced and perceived by people are situation-dependent, reflecting local geography, culture and ecological circumstances” (MEA, 2003: 3). Interestingly, the MEA approach to wellbeing shares the ‘common understanding’s emphasis on wellbeing as a multi-dimensional ‘experienced’ state that includes what people value being and doing. It is particularly useful for capturing the detail of the natural environment’s role in objective wellbeing. For example, how it contributes to basic needs through water, food, fuel etc as well as health and security. The MEA also notes the trade-offs on wellbeing over time across different groups and generations, which was highlighted by the research on links between wellbeing and sustainable development (Dolan et al, 2006b) as illustrated by the following quote:

“the relationship between ecosystem change and human wellbeing has both current and future dimension. The overexploitation of ecosystems may temporarily increase material wellbeing and alleviate poverty, yet it may prove unsustainable” (MEA, 2003: 81)

Although MEA make reference to some elements of subjective wellbeing with its reference to freedom and choice (elements of eudaimonic wellbeing), it doesn’t go into great detail. For example it does not elaborate on how the natural environment contributes to a person’s functioning in society and how it shapes people’s goals and aspirations. Similarly, it is not clear on how the natural environment affects mood, happiness, satisfaction and feelings (elements on hedonic wellbeing). By far its greatest omission is the lack of reference to the impact of the natural environment on mental health. Consequently, the MEA is weak when conceptualising how the natural environment makes people think and feel.

**Figure 1: Ecosystems and wellbeing**
In summary, the MEA ecosystems approach presents a way of conceptualising and understanding the links between the natural environment and wellbeing. Its added value from a wellbeing perspective is its recognition that wellbeing cannot be considered in isolation of the environment. This firmly repositions wellbeing in the context of sustainable development by emphasising the finite nature of ecosystems services; thus highlighting the necessity of wellbeing focused policy to recognise environmental limits. This makes an ecosystems perspective an attractive approach to conserving, managing and enhancing the natural environment across policymaking and delivery. Although it recognises the multi-dimensional nature of wellbeing, it is weak on capturing how the natural environment makes people think and feel. A significant omission is its failure to capture the impact of natural environment on mental wellbeing. The next section investigates how suitable the ecosystems framework is for exploring the wellbeing benefits of 'green spaces', as one component of the natural environment.

### 3. WELLBEING AND GREEN SPACES: AN OVERVIEW OF THE EVIDENCE
The idea that engaging with nature has beneficial impacts on wellbeing is prevalent across many cultures and societies. One has only to look at the range of sacred places set in natural landscapes that have a role in the spiritual wellbeing of individuals for different cultures (the Ganges for the Indian Hindus and the Himalayas for Tibetan Buddhists (Frumkin, 2001; Burns, 2006; Smyth, 2005). In 1984, Wilson presented the Biophilia hypothesis to describe an innate (i.e. hereditary) emotional affiliation of humans to nature that goes beyond nature’s role in providing basic needs to include the need for aesthetic, intellectual, cognitive and spiritual meaning and satisfaction (Bird, 2007; White & Heerwagen,1998). This theory argues that we have a natural instinct to desire contact with nature that is evolutionary and inherited. It also proposes that this has been crucial for guaranteeing genetic fitness and competitive advantage as well as contributing to personal fulfilment. The theory suggests that human identity and personal fulfilment is dependent on our relationship to nature. This relationship is not restricted to the human need to exploit the material components of environment for sustenance (objective wellbeing), but also related to its role in human’s emotional, cognitive, aesthetic, and spiritual development (subjective wellbeing).

This inherent link between people and environment is recognised by a number of scholars. Nakamura and Csikszentmihalyi (2003: 84) argue that “humans are socioculturally and historically situated actors whose experience is constituted jointly by environment and person. A person’s goals influence transactions with the environment - but only through transactions with the environment will a self be realized”. This is shared by Leopold (1949) and Suzuki (1990) who have argued that the protection of natural environment is vital for the human’s wellbeing. Similarly, Pigram (1993: 402) argues that humans have a “genetically coded pre-disposition to respond positively to natural-environment content’. Kellert (1993) uses the biophilia notion to examine nine aspects of human’s alleged biological basis for having an affiliation with natural environment which is summarised in Table 2 below. Many of these functions include various subjective, objective and relational dimensions of wellbeing (i.e. role of natural environment in meeting objective/material basic needs, its role in promoting autonomy, relatedness and competence etc).

### Table 2: Kellert’s typology of biophilia values

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilitarian</td>
<td>Practical and material exploitation of nature</td>
<td>Physical sustenance/security</td>
</tr>
<tr>
<td>Naturalistic</td>
<td>Satisfaction from direct experience/contact with nature</td>
<td>Curiosity, outdoor skills, mental/physical development</td>
</tr>
<tr>
<td>Ecologistic-Scientific</td>
<td>Systematic study of structure, function and relationship in nature</td>
<td>Knowledge, understanding, observational skills</td>
</tr>
<tr>
<td>Aesthetic</td>
<td>Physical appeal and beauty of nature</td>
<td>Inspiration, harmony, peace, security</td>
</tr>
<tr>
<td>Symbolic</td>
<td>Use of nature for metaphorical expression, language, expressive thought</td>
<td>Communication, mental development</td>
</tr>
<tr>
<td>Humanistic</td>
<td>Strong affection, emotional attachment, 'love' for nature</td>
<td>Group bonding, sharing, cooperation, companionship</td>
</tr>
<tr>
<td>Moralistic</td>
<td>Strong affinity, spiritual reverence, ethical concern for nature</td>
<td>Order and meaning in life, kinship and affiliational ties</td>
</tr>
<tr>
<td>Dominionistic</td>
<td>Mastery, physical control, dominance of nature</td>
<td>Mechanical skills, physical prowess, ability to subdue</td>
</tr>
<tr>
<td>Negativistic</td>
<td>Fear, aversion, alienation from nature</td>
<td>Security, protection, safety</td>
</tr>
</tbody>
</table>

Source: Kellert (1993)

The remainder of the paper will focus on the wellbeing impacts of one component of the natural environment: ‘green spaces’. A broad definition of ‘green spaces’ is used in this report to include woodlands and forests, agricultural land, rural landscapes (both man-made and natural), nature reserves and parks, and a range of urban green landscapes including gardens, parks, allotments and tree-lined walkways. Green spaces is a topic receiving much policy interest in the context of growing threats to the natural environment linked with an increasingly urbanised society, a lifestyle characterised by sedentary living (associated with rising levels of obesity) and rising levels of stress and mental illness.

Much has already been written about the links between green spaces and wellbeing, often in context of spatial planning and domestic health policy, covering both physical and mental health.

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10 It is beyond the remit of this report to explore all components of the natural environment and their relationship to wellbeing
However, most of the published literature originates from America, Scandinavia and Japan. There is also much controversy over what constitutes reliable and robust evidence since many of the studies are practically oriented and have not always been evaluated. Often, they do not meet the requirements of medical and theoretical writing, which is dominated by the need for quantitative results on objective health outcomes. This is at risk of excluding more intangible dimensions of wellbeing that are not easily quantified (e.g. autonomy, sense of place). This is recognised by Henwood (2003: 13) who notes that “changes to more intangible aspects of wellbeing (e.g. sense of comfort, rootedness, restored mental vigour) and the fabric of communities that are health sustaining or enhancing are important issues for consideration”. Moreover, many of the studies that are written up are not always published in international literature or are scattered across journals of different disciplines or within grey literature. Other criticisms of existing studies include the fact that much of research is experimental, originating from laboratory experiments, or controlled field studies and carried out under extreme conditions (Groenewegen et al, 2006). As is the case with many interdisciplinary research areas, there also appears to be a lack of communication amongst the different disciplines that rely on different methodologies.

Nevertheless, the sheer volume of material written on this subject suggests that there is a relationship between the natural environment and wellbeing, and it is generally positive. There is also consensus that there needs to be more exploration of these benefits in the UK. There are already a substantial number of good reviews of the evidence (Pretty et al 2005a, Morris, 2003; Henwood, 2001; Bird, 2007; Frumkin, 2001; RMNO, 2004; Maller et al, 2002). This report aims to provide a brief overview of this literature and investigate how suitable an ecosystems approach is for exploring the wellbeing impacts.

Much of the research tends to conflate wellbeing with ‘health’ or use it to refer to the cultural and/or spiritual/aesthetic or therapeutic value of green spaces. It is easy to understand why this is the case. For example, the World Health Organisation (WHO) defines health as “a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity”. This definition has been criticised for capturing aspects that correspond more to happiness than health. This report uses the ‘common understanding’ of wellbeing developed by the Whitehall Wellbeing Group to recognise that ‘health’ is one dimension of wellbeing (Box 1). The common understanding also notes that wellbeing has physical, mental and social components and recognises the importance of an individual having a sense of control and autonomy.

Some research distinguishes between the benefits of a) viewing nature b) being in the presence of nature c) active participation and involvement with nature (Pretty et al 2005a; Brown & Grant, 2007). Other research differentiates between the physical, mental and social wellbeing benefits as illustrated in Figure 2 overleaf. How are these different wellbeing dimensions accommodated in the MEA ecosystem approach? (See Figures 1 & 2).

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11 Time constraints did not permit a comprehensive review of literature using well-established search engines.
Figure 1 demonstrates the role that supporting, provisioning and regulating services play in providing the basic needs (e.g. food, water etc) of what MEA calls ‘basic materials for a good life’. These provide the essential components of what we can call objective wellbeing and will not be reviewed in this report. At first glance, many of the wellbeing benefits depicted in Figure 2 correspond with what MEA calls ‘cultural services’: the nonmaterial or intangible benefits obtained from ecosystems. These cover the role that ecosystems play in contributing to cultural diversity, spiritual and religious values, knowledge systems, educational values, social relations, inspiration, aesthetic values, sense of place, cultural heritage values, recreation and ecotourism.

Exploring how these relate to the determinants and constituents of wellbeing is less clear. Some of the social wellbeing benefits (e.g. sense of place) and elements of spiritual and cultural value of green spaces are covered under ‘good social relations’. Some elements of how green space is linked to reduced crime and aggression could be covered under ‘security’. Many of the physical wellbeing benefits in Figure 2 could be related to ‘health’ (e.g. being free from avoidable disease) within Figure 1. However, the MEA focuses more on the physical health dimensions rather than mental health. This is a significant omission according to the wellbeing literature which emphasises the importance of positive mental health under ‘eudaimonic wellbeing’. Although MEA makes reference to ‘freedoms and choice’ (an important dimension of eudaimonic wellbeing) it excludes other components essential for functioning effectively in society. As a result, the MEA fails to capture the role that interaction and views of green spaces have in relieving stress, anxiety, promoting recovery and their role in personal development. This reinforces the earlier point that MEA struggles to grasp how the natural environment influences how people think and feel.

For reasons outlined above, this report uses Figure 2 as a more appropriate framework for capturing the wellbeing benefits of green spaces. Although the MEA framework is particularly strong in depicting objective wellbeing benefits of the natural environment, Figure 2 accommodates a wider range of wellbeing benefits in the context of green spaces according mainstream conceptualisations of wellbeing.

This overview has grouped the studies under the themes of Figure 2 where most research under that particular aspect falls. However, there are many areas of overlap pointing to synergistic
wellbeing benefits of green spaces on physical, mental and social wellbeing. This is particularly the case between physical and mental wellbeing impacts.

Box 4: Recommendation for further development of MEA framework

<table>
<thead>
<tr>
<th>Suggested avenues for further work:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explore how the MEA ecosystem approach has been used to explore wellbeing using concepts from the wellbeing literature. Part of the problem is that wellbeing constituents and determinants have not been unpacked sufficiently using a wellbeing framework. Apart from the reference to ‘freedom and choice’, a significant omission is the mental wellbeing impacts of interaction with the natural environment. Further work could explore how to incorporate recognition of this within ecosystem approaches.</td>
</tr>
</tbody>
</table>

3.1. PHYSICAL WELLBEING

There is substantial evidence demonstrating the positive impact that physical activity has on wellbeing (Morris, 1994; Bird, 2004; Williams, 2006). Most of the literature in this area focuses on the physical health effects and many studies link this to mental wellbeing. Increased levels of physical activity are known to have both a preventative role in cardiovascular and musculo-skeletal diseases and inhibiting stroke and cancer. It also has a positive effect on range of health determinants such as body weight, blood pressure, cholesterol levels and so forth. These links have been recognised by Government resulting in a universal recommendation that individuals should engage in at least 30 minutes of moderate intensity physical activity, on five or more days of the week (DoH, 2004; Wanless, 2002). Engaging in such activity is said to reduce the risk of premature death from cardiovascular disease, cancer and reduces risk of type II diabetes and enhance mental wellbeing. Walking is the main activity used to reach this target (Ogilvie et al, 2007; Williams, 2006). Less certain, is the role that green space has in promoting physical activity and whether physical activity in green spaces results in greater wellbeing benefits more generally.

General health outcomes

Two studies in the Netherlands and one study in Japan are often cited to assert the link between the natural environment and physical wellbeing. The first Dutch study (de Vries et al, 2003) comprised a sample of 17,000 people and recorded the number of health problems (using GP patient records) together with patient’s own perceptions of their physical and mental health problems experienced over a period of two weeks. This data was then mapped across the amount of green space in the patient’s neighbourhoods using a database of environmental characteristics. Statistical analysis revealed that overall, people living in areas with more green space experienced better general health. The relationship was particularly significant for older people, housewives and lower socio-economic groups. No relationship was found between the health problems of children. A later study using a sample of over 250,000 people compared people’s subjective rating of health and compared this with the amount of green space in their living environment. A significant relationship was found between the perception of general health and amount of green space within 1km and 3 km. The relationship was found to be stronger amongst lower socio-economic groups, particularly amongst older and younger groups (Maas et al, 2006). A Japanese longitudinal study of the links between walkable green spaces and mortality rates amongst 3000 elderly Tokyo residents over the age of 70 over a five year period (Takano et al, 2002) is also cited to assert a positive relationship between access to green spaces and health. Making adjustments for age, sex, social class and income, the study revealed a correlation between living in a neighbourhood with abundant green space and lower mortality rates. A major criticism of this study is it did not investigate whether the surrounding green spaces were actually used for walking.

A recent review of some of this data by the Health Council of the Netherlands (RMNO, 2004) urges caution with the interpretations of these studies, particularly in relation to causality. The Dutch study determined exposure to green space according to where the respondent lived, and does not allow for variations and duration of exposure. It also ignores the role that different personality traits might have: how this influences desire to pursue healthy lifestyle. More importantly, it fails to distinguish whether access to green spaces makes people healthier, or healthier people move to greener areas (i.e. selection effects). Both the Japanese and Dutch study can also be criticised for using generic indicators of health such as mortality and people’s own perceptions of their health rather than the prevalence of specific disorders (aetiology). The Dutch review recommends more longitudinal research.

Workplace health
Little research has explored link between worker's physical wellbeing and nature. Kaplan's (1993) study of 615 officer workers investigated the impact of views of nature from the workplace. Views of natural elements were linked to fewer health problems amongst other factors. Although it can be debated whether 'plants' within the workplace constitute ‘green spaces’, as discussed earlier views (as opposed to directly interacting) of nature/natural elements in internal and external settings have been shown to promote wellbeing. Some studies have demonstrating that plants make people calmer and more relaxed (Lewis, 1992, Randall, et al, 1992, Ulrich & Parsons, 1998, Larsen et al, 1998). Fjeld et al (1998) study of 51 office workers in Oslo discovered that the average number of health problems decreased after plants were placed in the office. A second study explored the effect of artificial daylight lamps and plants and found a decrease in the reported number of health problems after these had been added (Fjeld & Bonnevie, 2002; Kötter, 1999). A third project explored the addition of new daylight lamps and plants amongst 16 office works and also discovered a reduction in complaints (Fjeld & Bonneview, 2002). However, these reports have not been published in scientific journals nor statistically analysed. Other studies have investigated the impact of plants on productivity; however the robustness of these studies has been questioned (Kötter, 1999; Lohr et al, 1996; Shibata & Suzuki, 2002). Interestingly, Larsen et al (1998) conducted statistical analysis that revealed a decline of productivity with more plants despite the participant's assessment of improved performance. However, participants did report improved levels of mental wellbeing (i.e. enhanced mood and felt more comfortable).

**Recovery in hospitals and prisons**

Arguably the most cited research to demonstrate the physical wellbeing effects of nature has been Ulrich's (1983) study of the impact of a view of nature from a hospital window on recovery following gallbladder surgery. Patients with a view of trees performed better on a range of health outcomes compared to those with a view of a wall. They stayed in hospital for less time, required fewer and weaker medication, and had fewer negative comments on nurse’s reports. However, RMNO (2004) notes caution whilst interpreting these results. First this study included a small group of patients over a period of 9 years where results may be misleading since a patient with view of trees could be compared with a patient six years later with a view of a wall. This therefore does not account for the fact that there may have been changes in the quality of post-operative treatment or medication. There are also doubts as to whether a reliance on nurse's notes is an adequate measure of health outcomes. More importantly, there is dispute over whether the patient’s improved recovery can be attributed to the view of nature per se or whether it is more stimulating and interesting compared to a blank wall. A more recent similar study by Diette et al (2003) investigates the impact of a view of nature (landscape) combining the sounds of birdsong and a babbling brook on patients preparing for bronchoscopy.

The study revealed that the group exposed to the landscape and nature sounds had higher levels or pain control (50%) than those without the view. Another well-cited study includes Moore's (1981) investigation of the prisoners in Michigan. Prisoners whose cells faced farmlands and trees were found to have a 24% lower frequency of sick visits than those facing the internal yard.

**Urban green spaces**

Much of the research on physical wellbeing has focused on the direction and magnitude of relationships between physical activity and the characteristics of the natural environment. For example, the frequency of physical activity in relation to perceptions of safety in parks, attractiveness, size and design (Humpel et al, 2002; Maller et al, 2002). Often cited, are two large scale Australian studies that conclude that ease of access moderated by the attractiveness and size influence the use of public open spaces. Attractiveness features that encouraged walking included trees, water features, birdlife and size (Giles-Corti & Donovan, 2002; Giles-Corti et al, 2005). Burns (2006) notes how positive emotional experiences results in a positive feedback mechanism that encourages people to seek more pleasurable interactions with nature.

In Europe, Ellaway et al's (2005) cross-sectional study demonstrates high levels of physical activity and reduced levels of obesity in areas with higher levels of greenery and lower levels of graffiti. These studies suggest that accessible green space does play a role in promoting physical activity, and consequently physical wellbeing. These studies support the assertion that green spaces are a major resource for physical activity. These are significant findings in light of an increasingly sedentary society and declining quality and quantity of urban green spaces (Barber, 2007; Brown & Grant, 2007). In Britain, Cabe Space (2004) recommends that "access to good quality, well maintained public spaces can help to improve physical health". A recent report form the House of Commons on “Enhancing urban green space” (2006) recognises the role that good quality green spaces has in enhancing the quality of urban life and contributing to government objectives such as improved health, more sustainable neighbourhood renewal and better community cohesion, particularly in more deprived areas. Poor quality green spaces in urban areas are likely

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12 This involves the uncomfortable procedure of inserting a fibre-optic tube in the patient's lungs.  
13 To find out more about the wellbeing benefits of parks, see the annotated bibliography by Maller et al (2002)
to further decrease the use and enjoyment of green spaces and may have negative repercussions on people's physical wellbeing. For a useful account of these debates and structures in place to address this, see Barber (2007). One of the arguments for this decline is an inability to adequately measure the benefits of green spaces. This would suggest that wellbeing debates offer a number of ways to address the shortcomings of attempts to quantify and qualify the benefits of green spaces. The increasing sophistication of subjective wellbeing measures provides useful avenues for further research along these lines.

However, a key limitation of existing work in this area is its reliance on observational studies and there needs to be more investigation of the specific attributes of the natural environment that are likely to increase levels of physical activity (NICE, 2006). An area of work that is beginning to address this include interventions that use the natural environment as a setting for physical activity; otherwise known as ‘green exercise’ and will be discussed in the following section.

**Green exercise: an illustration of the synergistic physical and mental wellbeing benefits**

‘Green exercise’ includes a range of activities which advocate the synergistic benefits of carrying out physical activities whilst simultaneously being exposed to nature (Pretty et al, 2003; 2005ab; 2007a). Although most of the emphasis is on the physical wellbeing benefits, there is increasing evidence pointing to its mental wellbeing impacts. Frequently cited examples of such initiatives in the UK are summarised in Box 5 below:

**Box 5: Green exercise initiatives in the UK**

- **Walking the way to health initiative (WHI):** ‘Walking’ is increasingly recognised as the most effective and cheapest way to keep people active to improve physical and mental wellbeing. Since it is an everyday activity, it is available to most people. Compared to other forms of exercise, it has a high adherence rate, does not require equipment or expense. It consequently provides an easy and convenient way to improve both physical and mental wellbeing. In spite of this, there has been a substantial reduction in the amount of walking that we do.

  WHI was launched in 2000 by the Countryside Agency and the British Heart Foundation to encourage people from poor neighbourhoods to walk more. It was aimed at people over 45, ethnic minorities, low income groups and those at risk of illness due to lack of exercise. Members can choose to walk with companionship or use publicised routes to walk on their own. Pretty et al (2005a) note that apart from the Dawson et al (2003) there has been little empirical data to evaluate the full extent of the impact of WHI. An evaluation of this initiative revealed that walking in green surroundings gives people extra incentives to continue to participate.


- **BTCV ‘Green Gym’**: Initiated by the British Trust for Conservation Volunteers (BTCV) following a successful pilot in 1997. It promotes participation in local nature conservation activities to improve the fitness and health. It is largely aimed at sedentary people and intends to extend this to help people with mental health problems and other socially excluded groups. It includes a range of initiatives such as community gardens, managing local woodlands, tree-planting and maintaining public paths. Members can refer themselves or are referred by a GP. Although an evaluation of the scheme in Sonning Common and Portsllade was restricted by the small number of participants, the scheme was shown to have positive physical and mental wellbeing effects (decreased weight, increased fitness levels, lower depression and anxiety scores Reynolds (1999, 2002)

  [http://www2.btcv.org.uk/display/greengym](http://www2.btcv.org.uk/display/greengym)

There are many more green exercise initiatives in the UK at different stages of development. Although there is a wealth of rich qualitative data documenting the wellbeing impacts of such schemes, these have not been taken seriously by the medical establishment (Reynolds 2002 and Countryside Agency 2003 being the exception). CJC (2005) notes that few green space based health programmes have been adequately evaluated making it difficult to draw firm conclusions on their effectiveness. As a result, little attention is given to the emotional benefits of green spaces (Pretty et al, 2005a). CJC (2005) recommends more large-scale surveys to related green spaces accessibility and use to health outcome measures such as health related quality of life (HRQOL).

Pretty et al (2007a: 212) note that “the health benefits of green exercise have not been quantitatively compared to exercise or nature alone”. A number of research projects undertaken by the University of Essex led by Professor Jules Pretty involving more than 3000 people have sought to address this gap. In 2005, they undertook a study under carefully controlled laboratory simulation conditions demonstrating that views

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14 Similarly, more research is required to quantify and measure the mental wellbeing impact of engaging with green spaces.
of pleasant green rural and urban pictures whilst engaging in physical activity reduced blood pressure, enhanced mood and improved self-esteem to a greater extent than carrying out the exercise a) alone b) whilst viewing unpleasant images of rural and urban environments (Pretty et al, 2005b). The implications of reduced blood pressure to physical wellbeing are significant considering that blood pressure is an important measure of cardiovascular health. The policy implications are considerable in light of the economic costs of physical illness. Indeed, a recent report by DoH (2004) notes that a 10% rise in adult physical activity would save the UK £500 million per year and save 6000 lives. Pretty et al (2005b) highlight that further work should investigate the effects of green exercise across different social groups to determine the impact of green space on individuals experiencing high blood pressure and low mental health status.

A later study by the same group took these findings one stage further to investigate the effects of exposure to different scenes in real environments (rather than laboratory simulations) whilst engaging in different types, durations and intensities of physical activity. This research explored the effects of different forms of green exercises (walking, cycling, horse riding, fishing, canal boating and conservation activities) with 263 participants in ten locations in the UK on participant's physical and mental wellbeing (Pretty et al, 2007a). The research used various well established measures of physical and mental health such as the Euroqol EQ-5d, the General Health Questionnaire, Rosenberg’s Self Esteem Scale and the Profile of Mood States test (POMS). The research highlighted significant improvements in mental wellbeing, re-emphasising the synergistic relationship between the physical and mental wellbeing impacts of interaction with green spaces. Key findings included significant reductions in levels of anger, depression, confusion and tenseness after engaging in green exercise. Levels of self-esteem were also found to increase significantly. A major limitation of this study was the fact that the sample included people who were already engaged in green exercise activities and could arguably be considered healthier in comparison to the general population. Moreover it does not include people that are “habitually inactive” (i.e. a control group). Nevertheless, this raises questions about why people are not engaging in regular exercise and/or visiting green spaces. This touches upon broader wellbeing issues (that are captured in common understanding). For example, Pretty et al (2005a) highlight a number of physical and social and cultural factors that might inhibit participation in such activities. Physical constraints include the accessibility of green spaces, the presence of obstacles that might inhibit contact (i.e. major roads) and the extent to which different groups of people are independently mobile (adults, children, disabled etc). Social and cultural factors include the perception of areas related to fear of crime, or the fact that socio-cultural restrictions on mobility related to different social groups. For example CRN (2001) identified low participation rates in countryside recreation amongst young people, low-income groups, ethnic minorities and disabled people.

Two more recent studies commissioned by the mental health charity Mind on the links between green exercise and wellbeing carried out by the University of Essex demonstrates the value of ecotherapy as a valid treatment for mental distress. The key findings are summarised in Box 6 below. They re-emphasise the intrinsic link between a) physical and mental wellbeing, b) and the added benefit to both physical and mental wellbeing of undertaking physical activity in green spaces.

**Box 6: Key findings of Mind research**

<table>
<thead>
<tr>
<th>Green exercise with local mind groups:</th>
</tr>
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<tbody>
<tr>
<td><strong>Details:</strong> Sample size was 108. Activities included gardening projects (52%), walking groups (37%), conservation work (7%), running (3%) and cycling (1%):</td>
</tr>
<tr>
<td>-90% said that the combination of nature and exercise was most important in determining how they feel</td>
</tr>
<tr>
<td>-94% felt that green exercise benefited their mental health</td>
</tr>
<tr>
<td>-90% felt that taking part in green exercise benefited their physical health</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outdoor versus indoor exercise:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Details:</strong> 20 members of local Mind associations took part in two walks to explore role of environment on the effectiveness of exercise for mental wellbeing. (a green walk in Woods Country Park with varied landscape of woodlands, grasslands and lakes and an indoor walk in a shopping centre)</td>
</tr>
<tr>
<td>Self Esteem: 90% had increased self-esteem after green walk. 44% experienced reduced levels of self-esteem following indoor shopping centre walk</td>
</tr>
<tr>
<td>Mood: 71% reported decreased depressions levels following green walk. 22% reported increased in depression and 33% reported no change in depression for indoor walk. 53% reported decreased feelings of anger after green walk compared to 33% for the indoor walk and 45% reported no change. 71% felt less tense after green walk compared to 50% experiencing an increase of tension. 71% reported feeling less fatigued and 53% reported more vigorous after green walk. 88% saw and overall improvement in mood after green walk whilst 44.5% felt in worse mood after indoor walk.</td>
</tr>
</tbody>
</table>
The wide range of wellbeing benefits provided by green exercise, based on research by the University of Essex involving over 3000 people is summarised in Table 3 below.

Table 3: Wellbeing benefits of green exercise

<table>
<thead>
<tr>
<th>Principles</th>
<th>Subcategories</th>
<th>Descriptors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>b. Animals and wildlife</td>
<td>Direct bonding with pets (eg. dogs and horses) and wild animals (eg. birdwatching).</td>
</tr>
<tr>
<td></td>
<td>c. Memories and knowledge</td>
<td>Visiting special places where memories and stories are evoked and recalled (childhood associations), story-telling, personal identity, links to myths, stimulation of imagination, ecological literacy.</td>
</tr>
<tr>
<td></td>
<td>d. Spiritual</td>
<td>Large scale and longevity of nature in contrast to humans, transformative capacity of green nature, oneness with nature.</td>
</tr>
<tr>
<td>2. Sensory stimulation</td>
<td>a. Colours and sounds</td>
<td>Diverse colours of nature and landscapes, views of landscape, beauty of scenery, bird-song and sounds of other animals, light (especially sunrise / sunset), visual and aesthetic appreciation of landscapes.</td>
</tr>
<tr>
<td></td>
<td>b. Fresh air</td>
<td>Smell and other senses, being outdoors, exposed to all types of weather, changing of seasons, a contrast to indoor and city life, escape from urban pollution.</td>
</tr>
<tr>
<td></td>
<td>c. Excitement</td>
<td>Adrenalin rush, exhilaration, fun, arising from a physical activity or experience of risk (eg, rock-climbing), sense of adventure.</td>
</tr>
<tr>
<td>3. Activity</td>
<td>a. Manual tasks</td>
<td>Learning a skill and completing a manual task (eg, conservation activity), challenging, fulfilling and rewarding, sense of achievement, leading to a sense of worth and value.</td>
</tr>
<tr>
<td></td>
<td>b. Physical activity</td>
<td>Enjoyment of the activity itself and the physical and mental health benefits associated with it, makes people feel good, more energetic, less lethargic.</td>
</tr>
<tr>
<td>4. Escape</td>
<td>a. Escape from modern life</td>
<td>Getting away from modern life, relaxing (as a contrast), time alone or with family, a time to think and clear the head, peace and quiet, tranquility and freedom, privacy, escape from pressure, stress and the ‘rat-race’, recharging batteries.</td>
</tr>
</tbody>
</table>

Many of the studies cited here illustrate the synergistic relationships between physical and mental wellbeing. This has been noted by the UK Chief Medical Officer’s report (DoH, 2004): “physical activity helps people feel better, as reflected in improved mood and decreased state and trait anxiety. It helps people feel better about themselves through improved physical self-perceptions, improved self-esteem, decreased physiological reactions to stress, (and) improved sleep”. Burns (2006: 416) cites a number of researchers to conclude that the “happier a person is, the healthier they are likely to be, the better they will recover from illness, and the longer they are likely to live” (Danner et al, 2001; Maruta et al, 2000; Ostir et al, 2000; Valliant, 2002). Fredrickson and Levenson (1998) demonstrated that positive and optimistic people had higher levels of physical wellbeing, suffering less from severe illnesses and if they did become ill had better recovery rates. Argyle (1997) has explored how positive attitudes have enabled the body to function more healthily, put less stress on body and resulted in fewer reports of physical breakdowns. Pretty et al (2005a) draws on Berger (1996) to demonstrate the links between an active lifestyle and positive mental wellbeing benefits such as enhanced mood and stress reduction, positive self-concept and higher quality of life. Conversely, decreased levels of mental wellbeing have been linked to decreased physical wellbeing on a number of levels. For example, sustained stress or trauma increases vulnerability to viral infection and a weak immune system (Stewart-Brown, 1998; Cohen et al, 1991, 1997). Kubzansky et al (1998) demonstrated that long-term states of anxiety increased the risk of hearth disease and premature death. Depression has been associated with a range of chronic physical illness such as asthma, arthritis and diabetes, stroke and heart disease (Turner & Kelly, 2000); Jonas & Mussolino, 2000; Ostir et al, 2001).

In summary, there are a growing number of studies showing that access to green spaces near to home and work encourages people to take up various forms of exercise (cycling and walking). The physical wellbeing benefits of increased physical activity are undisputed. This in turn has a number of substantial economic benefits (Wanless, 2002; DoH, 2004). An increasing number of studies have shown that engaging in physical activities has positive mental wellbeing impacts and these are further enhanced if they are carried out in green spaces (SDC, 2007a). From a medical perspective, there needs to be more evaluation of
programmes specifically linked to health benefits (CJC, 2005). The main limitations of existing studies specifically looking at benefits of physical activity in green spaces is they have not been adequately evaluated, thus making it difficult to draw firm conclusions about their effectiveness. CJC (2005) recommends more large-scale surveys to relate green space accessibility and use to health outcome measures such as health related quality of life (HRQOL). Similarly, Pretty et al (2007a) note that more work is required to quantify the mental wellbeing impacts of such activities. The following section discusses this more in depth.

3.2. MENTAL WELLBEING

There is a growing amount of work exploring the links between the natural environment and mental wellbeing. This covers a number of inter-related issues: role of natural environment in improving cognition, concentration and attention; facilitating restoration (improving mood, reducing stress); personal development (children and older people) and alleviating aggression. Many of these issues are not covered in the MEA’s assessment of the wellbeing benefits of interacting with the natural environment.

Mental wellbeing issues have received increasing attention on the policy agenda with recent statistics that claim that 300 out of 1000 people in Britain experience mental health problems every year (Bird, 2007). The World Health Organization (WHO) predicts that depression will be the second largest single cause of ill health by 2020. In the UK, mental health has also been linked to the wellbeing debate through the work of Richard Layard who has recommended that Cognitive Behavioural Therapy (CBT) would result in substantial economic savings for the Government as illustrated in Box 7 below:

Box 7: Layard’s views on the cost of depression and anxiety to Britain’s economy

“According to WHO, one half of all the suffering due to ill-health in Western Europe is due to mental illness. It accounts for as much suffering as all physical illnesses put together. And the bulk of this suffering is due to depression and anxiety. There is also a huge economic cost, because depression and anxiety make it much more difficult, or impossible to do a job. And, even if in work, you are much more likely to need days off. The resulting loss of output can be calculated as £17 billion, or 1½ of GDP. Much of this cost falls on the Exchequer, which loses in consequence roughly £9 billion in benefit payments to mentally ill people and reduced tax receipts. There are now over 1 million mentally ill people receiving incapacity benefits, more than the total number of unemployed people on unemployment benefits (JSA). So in Britain mental illness has now taken over from unemployment as our greatest social problem”.

Source: Layard (2006: 1030)

In principle, once the physical and mental wellbeing benefits of access to green spaces are better understood, it could be possible to attribute a monetary value to green spaces as has been carried out by Layard. The financial savings could be significant as suggested by the evidence below.

Burns (2006) argues that natural environments operate as a reciprocal inhibitor of depression. He explains that nature provides multiple stimuli that result in pleasurable input. In comparison to human-made environments, natural environments have softer, more pleasing stimuli that have a better ‘biological fit’. Interaction with the quality of natural stimuli consequently makes it difficult to be depressed at the same time. He concludes that the psychological or mental benefits gained from human-nature interactions can be found at the cognitive, affective and behavioural levels. Burns (2006) draws on McAndrew (1993) and Fredrickson (2000) to demonstrate how natural landscapes are intrinsically satisfying and evoke contentment.

Many studies suggest that people use environmental resources for physical activity as part of their strategy for improving mental health (Mental Health foundation, 2000). There has been a substantial amount of research that argues that natural areas are actively pursued by people to restore themselves from stresses of everyday lives (Mace et al, 1999). Mace et al (1999) quote over 100 studies that have found convincing evidence that natural environments play important role in facilitating recovery from stress, and that stress reduction consistently emerges as the key perceived benefits of a wilderness experience (Knopf, 1987; Ulrich et al 1991). Viewing natural scenes is said to improve various dimensions mental wellbeing such as mental alertness, attention, better cognitive performance (Hartig, et al 1991, 1996; Cimprich, 1993, 2003; Tennessen and Cimprich, 1995).

Two key explanatory frameworks used to elucidate the mental wellbeing impacts of contact with natural environment are Kaplan and Kaplan’s Attention Restoration Theory (1989) and Ulrich’s psycho-evolutionary stress reduction theory (1979; 1983; 1991). Both draw on Wilson’s biophilia thesis to a certain extent. Ulrich
(1983) argues that contact or simply looking at natural spaces triggers physiological and psychological responses underpinning recovery from stress (e.g. reduced blood pressure, muscle tension pulse rate etc). He relates this to our evolutionary relationship with nature which stimulates an early-warning function located in the limbic system of the brain to interpret scenes of nature as places of safety and survival resulting in positive emotional reactions. Together, this explains our preferences for natural environments (e.g. presence of water, curving sightlines etc). Parsons (1991) goes into more depth about the brain structures that trigger autonomic stress response. Kaplan and Kaplan’s Attention Restoration Theory (1989) argues that contact with nature provides recovery from attention fatigue which describes a situation of memory loss, diminished ability to focus, irritability, frustration and impatience from overusing our existing attentional mechanisms. Contact with nature is said to have a restorative effect by enabling individuals to distance themselves from routine activities and thoughts (i.e. being away) and focus attention in a way that requires little effort (i.e. fascination). The main point of departure between the two theories is how stress is theorised and how one interprets the relationship between stress, attention fatigue and recovery. Ulrich argues that stress causes attention fatigue and prefers to use the term ‘autonomic physiological arousal’. In contrast Kaplan believes these are two separate components. Hartig et al (2003) maintain that the difference between these two approaches rests on measurements and timing. Bird (2007: 45) summarises the key differences between the two approaches as following “ART is a more voluntary method (in the right frontal cortex of the brain) which affects thought processes and so is measured by psychological parameters, whereas the psycho-physiological stress recovery theory is an involuntary reaction based much deeper in our brain (limbic system) which is measured physiologically”.

Most studies use these explanatory frameworks as a starting point to explain the restorative effects of the natural environment. Particularly influential in this area has been the work of Hartig and colleagues who have focused on the how nature can be used to address attention deficits from overwork or over-concentration (1991; 2003). Various studies involving demanding tasks in different contexts with and without green spaces (green room and green walk) demonstrated that people recovered more rapidly from attention-demanding tasks in the greener environment. The main constraints of this research is the difficulty of isolating the impacts of cumulative short exposures (i.e. looking out a window, short walks) and longer less frequent exposures (i.e. weekends away). Similarly, it is difficult to distinguish where the beneficial impact of places is due to the green space alone or the memories associated with those areas.

Views of nature have been shown to improve cognition, concentration and attention in a study of college students (Tennessen & Cimprich, 1995). This has also been shown to be the case with some studies looking at the impact of including plants in working environments (as described earlier)

Plants (gardens, horticulture, allotments) and wilderness experiences

Although the evidence on the physical wellbeing effects of gardening and horticulture are limited, the Centre for Child and Family Research (CCFR) based at Loughborough University, conclude there is substantial evidence demonstrating its positive mental wellbeing effects. The first study to explore this in 1955 demonstrated significant increases in improved self esteem, self confidence and social interaction amongst people with mental health problems and learning difficulties (O’Reilly and Handforth, 1955). Other groups said to benefit from social and therapeutic horticulture include people who misuse alcohol or substances, and offenders’. It has also been suggested that therapeutic horticulture can facilitate social inclusion. For more discussion of the wellbeing benefits of therapeutic horticulture, see Sempi et al (2002).

The use of green environments as a form of therapy has a strong tradition in the institutional health care arena for people with poor mental health and vulnerable groups such as the elderly (Parr, 2005; Smyth, 2005). There are a multitude of schemes where gardens, allotments and walks in natural environments (woodlands, country parks etc) are being used as a form of therapy to treat mental illness. The charity Mind (2007) has recently launched a campaign to advocate ‘eco-therapy’ as a clinically valid treatment for mental distress (See Box 6). As mentioned earlier, a number of studies by the group at University Essex exploring impact of ‘green exercise’ revealed substantial mental wellbeing effects in addition to physical wellbeing effects.

‘Horticultural therapy’ describes the use of plants by trained professions to reach clinically defined goals (Growth Point, 1999). As mentioned in the previous section, although it can be disputed whether ‘plants’ constitute ‘green space’, they are included here because their use and/or views of green plants (i.e. in

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15 They also argue that nature provides a feeling of ‘extent’ and ‘complementarity’: that we are part of an overall larger context and that we are within a supporting and harmonious environment. These variables in natural ecology provide optimal levels of functioning.

16 Terry Hartig based at Uppsala University, Sweden is one of the lead researchers in this area. For more of his research in this area, see his publications at: http://www.ibf.uu.se/PERSON/terry/publ.html
workplace or act of gardening) have been shown to have a number of wellbeing benefits. ‘Therapeutic horticulture’ describes the process where individuals can develop wellbeing using plants and horticulture and can be achieved through active or passive involvement (Lewis, 1996; Frumkin, 2001, 2004; Sempik et al, 2002). These concepts have also been linked to the notion of ‘therapeutic landscapes’ advanced by geographers (Gesler, 1992; Henwood, 2003). Work in his area closely overlaps with research focusing on a ‘sense of place’; thus overlapping with social wellbeing. The main focus of this research is that specific landscapes contribute to a sense of identity and cultural roots, and provide a location for social networks and a setting for therapeutic activities. It specifically explores how the inter-relationship between environment and societal factors can promote wellbeing, particularly health in the context of the healing and recovery process. Palka (1999: 30) defines therapeutic landscapes as places that “promote wellness by facilitating relaxation and restoration and enhancing some combination of physical, mental and spiritual healing”. It is in this context that therapeutic environments (such as gardening and allotments) are used to assist people suffering from physical or mental ill health.

Today there is increasing recognition that horticultural activity need not be strictly clinically-orientated but can be used in a generalised way to improve the wellbeing of the individual (Parr, 2005; Sempik et al, 2002). This is particularly relevant in the context of today’s high-stress society where anxiety and depression are increasingly prevalent. The reported wellbeing benefits of garden work amongst vulnerable groups span physical, mental and social wellbeing effects. These include improved self-esteem and self-confidence, development of work and social skills, improved independence, opportunities for emotional expression and reflection, enhanced spiritual and sensory awareness, useful employment, increased physical activity and exercise, better nutrition from the consumption of healthy food, improved opportunities for social (Sempik et al, 2002; Morris, 2003). A recent study of green spaces in Sheffield concluded that the psychological benefits gained by green space users increased with levels of species richness. It also demonstrated that people were able to perceive the differences in species richness (Fuller et al, 2007). Various studies have demonstrated enhanced feelings of inspiration, comfort and lifting of mood when interacting with nature through gardening as a leisure activity or in a healing context. However, most of the evidence in this area relies on qualitative accounts and there is lack of quantitative data. Both Frumkin (2001; 2004) and Pretty et al (2005a) note that in spite of strong messages that gardening has wellbeing benefits, strong empirical evidence is lacking.

Wilderness experiences present another example of how green spaces can be used as a form of therapy for people with stress or mental illnesses. Frumkin (2001) cites a number of studies to demonstrate the positive mental wellbeing impacts of wilderness experiences (e.g. inspiration and comfort), particularly amongst emotionally disturbed children and adolescents (Berman and Anton, 1988). Greenway's (1995) research identified increases in 'sense of aliveness', energy and wellbeing and 90% of respondents identified that the excursion had helped them to break various forms of addiction. However, the main constraint of much of this research on wilderness experiences is that it originates from those with commercial interests.

From a wellbeing perspective, the way in which the natural environment provides a space to escape stress and alleviate mood, parallels some of the conceptual thinking on eudaimonic wellbeing in terms of assisting people to meeting their goals, find meaning in activities fulfil their potential.

**Personal development: children and older people**

Increasingly there is more research suggesting the positive role that the natural environment plays in children and young people’s wellbeing. Environmental quality (soil degradation, pollution and climate change) are known to affect the children’s overall wellbeing through its influence on food quality, air quality and opportunities for children to play in outdoor spaces (Huby & Bradshaw, 2006; SDC, 2007b). There is a large body of research that explores the role that nature plays in the personal development of children. A useful review of this is provided by Steuer et al (2006). Two strands are often cited: the role of children’s ‘play’ in the natural environment to personal development and work showing how nature enhances concentration, discipline and can be used as treatment for attention deficit/hyperactivity disorder (ADHD).

Gebhard (1994) has written extensively about the role of ‘play’ in the natural environment to children’s socio-emotional development. ‘Play’ is an important component of a child’s functional development, teaching them to enjoy freedom, exercise choice, explore risk etc. Playing in the natural environment is not only important for physical wellbeing (i.e. better agility and coordination Fjortoft, 2004); it also plays role in mental wellbeing. It allows children to test their boundaries and take risks; it generates a sense of freedom and adventure and teaches children important lessons of how to interact with other people (Maan, 2005). This work is supported by a number of developmental psychologists such as Winnicott, Piaget and Searles who have explored the role of interactions between humans and non-human environment for mental health. Wohllin and Heft look at how exploring the environment freely enhances children’s cognitive development. These findings reinforce
the multi-dimensional nature of wellbeing and the importance of eudaimonic wellbeing (i.e. providing the
to traditional play areas including streets and wild spaces such as woodlands etc.
The loss of natural spaces for play is partly linked to increasing urbanisation and associated increases in
traffic, parental fear of traffic, bullying and abduction (Bird, 2007; Pretty, 2007b; Tranter & Doyle, 1996;
Valentine & McKendrick, 1997). Coupled with changing perceptions of what is important for children’s
development, there has been a shift towards more regulated play environments. The wider significance of
this shift has been that children are losing an affinity with nature which they may have developed had they
had the opportunity to engage in play areas in natural environment at a younger age. This has implications
attitudes and positive environmental beliefs amongst adults (Ewert et al, 2005). Bird (2007: 54) reiterates
that adult’s attitudes to the environment and the time they spend in woodlands and green spaces is strongly
influenced by their experiences as children. A Scottish study (Bell et al, 2003) demonstrated that people who
visited woodlands as a child were more likely to visit them in adulthood. Bixler (2002) and Ewert et al (2005)
carried out studies of adolescents that found that those who had more time outdoors, or interacting with
wilderness were more likely to have positive perceptions of the environment. Kahn & Friedman (1995) uses
the term “environmental generational amnesia” to describe how younger generations are using their
experience of nature as children as a measure of environmental degradation in the future. As growing
numbers of children have less experiences of connecting with nature, this benchmark is eroding. Pyle (1978)
describes this as an ‘extinction of experience’ which has implications for how people value the environment
in the future.

A second strand of research, often using Attention Restoration Theory, has demonstrated the role of nature
study of rural children showed that nature served as a ‘buffer’ against stress. In particular, contact with
nature is said to help with treatment of ADHD, which is common amongst children and is linked to social
problems (e.g. anti-social behaviour, drug abuse) (Taylor et al, 1991).

Interaction with green spaces has also been said to provide significant benefits for older people. It provides
a means to maintain physical activity, concentration, reduce stress and overall improved quality of life. The
opportunities for social interaction that green spaces provides is important for alleviating stress (Miligan et al,
2004) and the aesthetics of the outside and tranquil environment were found to be beneficial for their mental
wellbeing (Kweon et al, 1998). The overlaps between physical, mental and social wellbeing as emphasised
the multi-dimensionality of wellbeing and the synergistic impacts of green spaces. There is evidence that
older people value nature highly and that interaction with green spaces other than improved levels of
concentration but also reduced stress (Talbot & Kaplan, 1991; Ottosson & Grahn, 2005). In particular,
gardening has been shown to provide substantial physical wellbeing effects such as improved physical health,
improved rehabilitation from long term illnesses as well as mental wellbeing benefits such as reduced
French study using a sample of 2000 people to demonstrate how gardening reduces the risk of dementia
(Fabrigoule et al, 1995). An underlying benefit of interaction of green spaces that underpins mental
wellbeing, is the impact that interacting with green spaces contributes to feelings of personal worth. The
eudaimonic wellbeing literature tells us that fulfilling important personal goals is a crucial determinant of
wellbeing (i.e. Ryan and Deci’s Self-Determination Theory). Several aspects of the natural environment have
been found to promote the conditions for people to develop a sense of purpose. For example, wilderness
trips promote autonomy, competence and relationships. Recreational activities provide opportunities for
people to escape causes of stress and trauma where they can reflect on their goals. Activities in the natural
environment have also been shown to improve mood.

**Spiritual wellbeing**

Less discussed in the literature or explored using empirical research are the links between what we can call
spiritual wellbeing and nature. Burns (2006) provides a useful discussion of this. He draws on an earlier
review which demonstrated that people with stronger spiritual beliefs tend to be happier and better protected
against depression than those with no sense of spirituality (Burns and Street, 2003). Elements of this are
also reflected in the recent Dolan et al (2006a) report on personal influences of wellbeing that highlighted
how regular engagement in religious activities was positively associated with life satisfaction and positive
emotions. Burns (2006) also notes that people who have a greater sense of spirituality are more equipped to
deal with major adversity and physical illnesses. The link between spirituality and nature is not new.
Throughout history, people have worshiped elements of nature (animals, trees and mountains) and many

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17 I have included ‘spiritual’ wellbeing under mental wellbeing because it plays an important role in providing meaning to
people’s lives and determining whether they feel they have a sense of purpose.
cultures have turned to natural places as sacred sites with special power and healing qualities. Others who have explored this connection include Fredrickson and Anderson (1999), Heintzmann (2000) and Williams & Harvey (2001). Fredrickson & Anderson (1999) describe the spiritual inspiration that comes from wilderness experiences. Morris (2003) also explores how many of the activities carried out in green spaces provide a multi-sensual and stimulating experience that increases intellectual thought and aesthetic reflection.

3.3. SOCIAL WELLBEING
The term ‘social wellbeing’ is used here in its broadest sense to capture the positive wellbeing effects of social cohesion, integration and inclusion. The previous sections have already alluded to the overlaps between the various wellbeing benefits of interacting directly and indirectly with green spaces. However, in comparison to physical and mental wellbeing, the social wellbeing benefits of contact with green space have been relatively under-explored.

We know from research on wellbeing that stable and secure intimate social relationships play a significant role in people's experience of wellbeing (Dolan et al, 2006a; Diener et al, 1999; Diener and Seligman, 2002; Seligman, 2002). Others have highlighted the specific link between social and mental wellbeing where close intimate social relationships based on trust and affection are vital for psychological growth (Reis and Gable, 2003; Burns, 2000, 2006). Social connectivity has also been shown to have a role in the physical wellbeing of individuals in both rural and urban areas (Dalgaard & Tambs, 1997; Taylor et al, 1998; Judd et al, 2002). To date, existing literature exploring the specific social wellbeing benefits of contact with green space point to its role in promoting social cohesion, alleviating crime and aggression and generating a sense of place.

Several studies show how green spaces in a range of forms (parks, allotments, streets etc) in urban areas encourage more social interaction and bring people together (Ward Thompson, 2002; Armstrong, 2000; Milligan et al, 2004). The case study of community gardens in the Levett-Therivel report also points to these connections (2007) and how these can also be used to enhance interaction across different ethnic groups and different ages. These studies have been influential in emphasising that 'places' (rather than people alone) have an equally important role in influencing behaviour. The most cited set of studies illustrating these links took place in the Robert Taylor Homes; one of the poorest neighbourhoods of Chicago, USA. This area presented a novel opportunity for a natural experiment to compare relatively socio-economically homogenous areas with and without vegetated environments. Coley et al (1997) not only revealed a preference for areas with trees but also concluded that the presence of trees significantly increased the use of public spaces. Subsequent studies demonstrated stronger neighbourhood social ties (NST) in the areas with more green matter (Kuo et al, 1998; Taylor et al, 1998). These were measured by the extent of social activities, more visitors, those who knew more of their neighbours and reported more concern for helping and supporting one another, and had stronger feelings of belonging. The researchers concluded that the prevalence of more green common spaces resulted in more face-to-face contacts that reinforced social capital in the area. Another study in the same area, focusing on older people (64-91), found higher levels of the social integration of older people when there were higher levels of exposure to green spaces (Kweon et al, 1998).

Kuo’s (2001) study of the effect of nature on those living in poverty notes the link between poverty, anxiety and depression. Kuo argues that poor inner-city environments generate chronic mental fatigue through crowding, noise, together with the stresses of poverty and single parenting. He notes that these are linked with a sense of loss of control over one’s life which has been shown to be an important dimension of people’s wellbeing according to wellbeing theorists (see Section 2). Kuo (2001) concludes that chronic mental fatigue is more prevalent amongst those living in poverty. Inspired by Kaplan’s attention restoration theory, his research demonstrates that nature has a rejuvenating quality in tackling mental fatigue and enhances the ability of individuals to manage major life issues. Bird (2007) notes that more research is required to explore how increased contact with nature can reduce anxiety and depression amongst those living in poverty.

Further research by the same group found that interaction with green spaces also reduced negative social behaviours such as aggression and violence. Bird (2007: 82) cites a number of studies that link mental fatigue with aggression and violence:

- Effort is needed to seek alternative ways to deal with a confrontational situation. The more tired a person is, the less likely they are able to think about alternatives (Dodge & Crick, 1990)
- Mental fatigue is linked to irritability which in turn is linked to aggression (Warm & Dember, 1986, Coccaro et al, 1997)
- Mental fatigue also leads to impulsive behaviour and losing control is a key dimensions of violent behaviour (Kaplan, 1987; Brady et al, 1998)
Kuo and Sullivan (2001a) investigate aggressive behaviour amongst 145 single mothers in a similar large housing complex with different levels of exposure to natural vegetation. The study revealed that mothers with views of nature and trees displayed lower levels of aggression towards the adult partner and child. Another study by the same authors (2001b) revealed residents living in ‘greener’ surroundings reported lower levels of fear, fewer incivilities, and less aggressive and violent behaviour. Various studies of Alzheimer patients also found lower levels of aggression amongst patients with contact of nature (Whall et al, 1999; Mooney & Nicell, 1992). Taylor et al (2002) have also shown how greener surroundings have been linked to higher levels of self-discipline amongst girls.

RNMO (2004) argue that more research is required to investigate the role that green facilities have in shaping the social quality of communities. This is particularly the case for the UK. An example of an initiative exploring these links are summarised in Box 8:

**Box 8: Public spaces and social relations in East London (Rowntree, 2006)**

- Qualitative research in a multi-ethnic area of East London exploring the role of public spaces as social arenas and their potential for promoting social cohesion between different ethnic groups revealed that:
  - The social value of public spaces lay in opportunities for mixing with others and developing local attachment, and in people’s memories of places. The possibilities for casual social encounters were a key element in people’s commitment to their area, while memories of familiar places created a sense of belonging or safety.
  - Public spaces are an important arena for experiencing ethnic diversity on an everyday basis.
  - Everyday places have therapeutic functions. Green spaces are places to unwind, enjoy leisure activities, observe others, seek solitude or appreciate the natural environment.
  - Current policy agendas recognise the role played by the environment in health and well-being, but the therapeutic properties of public open spaces are not restricted to design, nature or aesthetics. They include social elements through shared and collective use.

Source: Rowntree (2006)

Some research suggests that the degree of social capital and inequality in a community (combined with levels of trust, tolerance and participation) has a role in people’s physical wellbeing (i.e. health) (Wilkinson, 1996, 2000, Cooper et al, 1999, Kawachi et al, 1997, Kawachi & Kennedy, 1999). However, this is an area that also requires further exploration.

Green spaces also contribute to a sense of place and this plays an important role in fostering social cohesion and identity (Henwood, 2003; Frumkin, 2003). Tuan (1971) argues that a sense of place, and the sense of space around the places defines our places and sense of who we are. These notions strike a chord with much of the literature on eudaimonic wellbeing which argues that we strive to reach ‘meaning’ in our lives. For a more detailed discussion of this, see Henwood (2003). Henwood and Pidgeon (2001) explore the symbolic role of woods and trees to people’s personal worlds and local community and cultural environments in North Wales. In particular they highlight how woods, forests and trees facilitate individuals to relive and recall valued personal and family memories that are important to individual wellbeing. Their study also supports the wider critique of contingent valuation approach to environmental valuation because of its insensitivity to a wider range of intangible goods and values that come under the wellbeing rubric. For example, it fails to capture the symbolic meanings of woods and forests and the role that these play in people’s wellbeing. One could argue that these are the sort of dimensions one can never put a monetary value to because people do not regard these in monetary terms, and because they mean different things to different people. In such circumstances, qualitative methods are more appropriate for gathering evidence on how people think and feel about such matters. At the same time, it warns that we should not discount the role of the economic value of forests. The study also demonstrated the value of psychological dimensions to environmental valuation.

**3.4. STRENGTH OF RESEARCH AND AREAS REQUIRING FURTHER RESEARCH**

In spite of the caution and controversy regarding the ‘robustness’ of evidence and reluctance to publish non-significant findings that have undergone rigorous statistical tests, the number and variety of different studies showing the different ways in which interaction with nature has a positive impact on wellbeing should not be discounted. This is particularly the case with regards to the mental wellbeing effects; a dimension of wellbeing that is not adequately covered by the MEA ecosystem approach.

This section briefly summarises the views of various overview reports on where more research is required. It would appear that there is consensus that whilst there is a substantial amount of research investigating the broad wellbeing effects of green spaces, little is known about the impact of variation in quality of green space
and variation amongst different social groups. Frumkin (2001; 2003) notes that if research in this area is to be taken seriously by the medical establishment, researchers need to be clearer on how they define exposure to nature, what types of nature and how this is measured. An overriding point made by most publications is the need for environmental health specialists to engage more with other specialists working in these areas (e.g. engineers, builders, policymakers). There also needs to be more clarification of outcome variables that do not exclusively focus on disease or the consequences of ill health (this is also reiterated by CJC report). Progress in the development of wellbeing measures could fill this gap, particularly in context of positive mental health measures. See Box 9 below:

**Box 9: Measures of positive mental health**

The Department of Health is building on research commissioned by NHS Health Scotland to develop and test the suitability of a measure of positive mental health at the population level. The new measure developed through this research is the Warwick Edinburgh Mental Wellbeing Scale (WEMWBS) which asks respondents to score how often a set of 14 positive statements of mental wellbeing applies to them.

WEMWBS covers most aspects of positive mental health currently in the academic literature, including both ‘hedonic’ and ‘eudaimonic’ perspectives of wellbeing: positive affect (feelings of optimism, cheerfulness, relaxation), satisfying interpersonal relationships and positive functioning (energy, clear thinking, self acceptance, personal development, mastery and autonomy). Items are summed to give an overall score.

Source: Sustainable Development indicators in your pocket (2007)

The report by the Health Council of Netherlands (RMNO, 2004) concludes that much of the empirical research evidence relates to effect of natural environment on recovery from stress and attention fatigue. Much less known is about the role of exercise, social contact and influence on the development of children. It argues that more work should investigate the different effects of different types of greenery, and clearly distinguish interaction on daily basis from more prolonged effects of interaction linked to recreational greenery. Further additional points are:

- The evidence on nature’s role in stress and attention fatigue is strong, but more work is required exploring the effect of duration and frequency of exposure to prevent stress-related illness in the long term. Research should investigate the difference between nature in immediate living environment and nature further away.
- More work required to determine whether ‘green’ living and working environments encourages people to exercise on a daily basis (particularly the role of different types of nature and distance from living and working environment).
- In terms of the evidence on how green spaces facilitate social contact, more research is needed to explore impacts in areas that are not poor and role of other green facilities (e.g. gardens, allotments and collective gardens).
- There is insufficient empirical and quantitative evidence on the role of natural environment in the development of children. The role of natural environment in personal development needs more research because of existing methodological limitations, particularly nature’s role in developing a sense of purpose.

Much of the above is reiterated by the CJC (2005) report on the economic benefits of accessible green spaces of physical and mental health. Additional points on gaps in evidence are:

- Quantitative information on the relative risk impacts of green space on mental health and wellbeing such that the value of psychological benefits from green space (from physical activity and visual use) can be derived.
- Evidence on how the quantity and quality of green space affects autonomous use, and how people incorporate green space within the variety of strategies they use to maintain physical and psychological health.
- Alternative or supplementary bases for economic analysis such as QALYs and HRQOL measures.

The report makes the following suggestions for future research to address some of these gaps which include:

1. Research that assesses the factors that would induce sedentary and overweight people to take physical activity in green spaces.
2. Research assessing the feasibility of using the National Health Survey data for estimating the relative contribution of green space to variation in mental health, HRQOL and physical activity levels.

3. Research demonstrating improved monitoring and evaluation methods for physical activity programmes by assessing change in physical activity behaviour, health outcomes and economic measures.

Gaps identified by a recent report by OPENspace\footnote{The Research Centre for Inclusive Access to Outdoor Environments, Edinburgh College of Art} that mapped priorities on green and public space include (Bell et al, 2006):

- **Social and community values:**
  - A research tool is needed to identify what type and amount of social benefits are provided

- **Children and young people:**
  - Research to compare the effects of segregating space between different user groups or children and using space in an integrated way so different social and user groups mix
  - Intergenerational research into the ways in which the use of green space by children and young people is affected by, constrained or facilitated by parents and grandparents

- **Safety and reducing crime:**
  - Not enough is known about the effect of fear and feelings of safety as a barrier to undertaking exercise in green space
  - There needs to be better information on the differences between actual and perceived levels of crime in different types of green space, starting with a benchmarking survey so as to be able to track changes over time

- **Health and wellbeing:**
  - More research into the area of preventative health, to see if green spaces make a difference and how effective it is.
  - Intergenerational research required to see how patterns of healthy activity are transmitted from one generation to the other
  - What are the impacts of green space on health of different social groups? How do different types of green space affect health?
  - What is the impact of green space on overall levels of activity and what are the qualities of different green spaces that encourage or discourage people to become more active
  - What effect is the litigation/risk-averse culture affecting participation in outdoor activity (especially for children)
  - How is it possible to motivate people to follow recommendations to participate in activities recommended to improve their health

For more information on the research this group has carried out, see http://openspace.eca.ac.uk/background.htm

**Research underway to address gaps**

An interesting initiative by Dutch scholars has sought to address some of these gaps with their study on “Vitamin G: effects of green space on health, wellbeing and social safety” (Groenewegen et al, 2006). The authors recognise that much of the existing work on the restorative effects of green spaces has focused on extreme settings. For example, locations with no views of nature at all or where people are likely to be stressed such as prisons and hospitals. They note that “little is known about the positive effects of green space on wellbeing through mechanisms of increased and prolonged activity, and improved social cohesion” (2006:149). The value of their research is how they explore several interrelated aspects of human wellbeing at the same time (self-perceived health, physical complaints, mental health and perceived safety). Their proposed research attempts to get a better understanding of the causal mechanisms that might explain the effects of green space. They propose three projects to answer the following questions:

1. How strong is the relationship between the amount of green space in people’s living environment and their perceived health and wellbeing and feelings of safety and is this relationship stronger for specific population segments and/or types of green space? How can this relationship be explained?
2. Do urban neighbourhoods that differ in the amount and type of green space in the vicinity, also differ in the health, wellbeing and perceived safety of the people living in these neighbourhoods? Have urban neighbourhoods that went through a large change in the amount of green space seem to be the most influential ones?
3. Is having an allotment garden related to health, wellbeing and perceived safety in urban dwellers and how can this relationship be explained?

However, their main weakness is that the research is cross-sectional and therefore cannot exclude selection effects, and they use datasets that have been collected for other purposes. The program also focuses on positive effects of being in the green environment and does not look at potential negative effects (e.g. how green spaces generate fear).

Another promising research initiative currently seeking to address many of the gaps highlighted above is an EU funded initiative known as COST-E39: Forest, trees and human health and wellbeing (2004-2008). The main objective of this project is to increase the knowledge about the contribution that forests, trees and natural places make, and might make, to the health and wellbeing of people in Europe. It includes the following working groups:

WG1 - Physical and mental health and well-being
WG2 - Forest products, forest environment and health
WG3 - Therapeutic aspects including rehabilitation and outdoor education
WG4 - Evaluation in terms of best practice and economic contribution
WG5 - Physical activity, well-being and prevention of illness.

The UK stakeholders include the Forestry Commission. More detail can be found at: http://www.e39.ee/en/m-9/

An additional project that might reveal additional evidence on the wellbeing benefits of interaction with green spaces is the Foresight "Mental Capital and Wellbeing project" located within the Department for Innovation, Universities and Skills (DIUS). It is a two year research project that will report in 2008. It aims to produce challenging and long term vision for optimising mental capital and wellbeing in the 21st Century-both for the benefit of the society, and the individual”. More detail can be found at: http://www.foresight.gov.uk/Mental_Capital/Index.html

4. VALUING THE ENVIRONMENT

This section provides a brief discussion of the policy implications in the context of environmental and wellbeing evaluation and strengths/gaps of research. Attempts to value nature more broadly and environmental goods more specifically have been the subject of much research in the past decade. The main purpose of environmental valuation methods is to measure the benefits of environmental improvement and costs of environmental degradation. The wellbeing literature has the potential to contribute to valuation of natural goods, particularly where distinctions are made between the values of environmental tangible and intangible goods. Tangible goods include the specific physical attributes of the goods which can be quantified in monetary terms. Intangible goods capture the arguably more nebulous qualities of the goods, such as its symbolic, spiritual or cultural properties. For example, wellbeing can help conceptually by providing a better understanding of how we classify environmental goods and the inter-relationship between the two. It can also offer new methods to explore their value such as subjective wellbeing measures.

It is beyond the scope of this report to explore the literature on environmental valuation in depth. Kalof and Satterfield (2005) provide a useful overview of the main trends, approaches and methodologies that have dominated the literature which will be briefly summarised here. They highlight the dominance of economic, primarily contingent valuation (CV) approaches. This method asks an individual to provide a subjective valuation of the natural good by asking them how much they are willing to pay (WTP) to improve the particular environmental good/state or how much they are willing to accept (WTA) for its loss. Such approaches are premised on the belief that preference is synonymous with the pursuit of individual human welfare or self-interest. Henwood and Pidgeon’s (2001) study raises concern on the over-reliance upon a CV approach to environmental valuation which is methodologically incentive to wide range of intangible goods and values. It also supports more consideration of psychological dimensions in environmental evaluation. Much of the literature distinguishes between axiomatic and relativist approaches.

Axiomatic approaches are prevalent amongst ecologists and ethicists and are premised on the belief that “certain categories of value are better, ‘truer’, more important, necessary to life, self-evident and/or intellectually defensible than all others” (Kalof and Satterfield, 2005: xxii). Advocates recognise the limitations of economic approaches and are seeking to identify new valuation methods which take into account the contribution of a good to the maintenance of species diversity, functioning of an ecosystem and the values of particular ecosystem services. A central question of such approaches is the choice of indicators which is
most able to reflect the value of a system, and which indicators can accommodate different scales of component of a system. A key argument amongst ecological economists and ethicists is that the values humans hold for nature is the root cause of environmental degradation. If humans are made more aware of the moral qualities as well as the material, aesthetic and spiritual value of nature, they are more likely to manage nature with respect. The main limitation of such approaches is that few scholars and practitioners have offered an actual schema for enhancing one’s experience and appreciation of the natural, economic, and spiritual qualities of nature. The explanation offered by Kalof and Satterfield is that such approaches are relatively new and they have been overshadowed by relativistic approaches.

Relativistic (sometimes also called subjectivist) approaches have dominated environmental valuation and primarily rely on methods using principles of expressed or revealed preference. Advocates include stakeholders relying on cost-benefit analysis and those concerned with monitoring public opinion. Further work within this discipline has distinguished between ‘held’ and ‘assigned’ values. The former includes underlying values/ideals prioritising modes of conduct and desirable qualities. The latter refers to the relative importance or worth of an object in a given context, which is not characteristic of the object per se but the importance of which is derived, at least partially, from held values (ibid: xxv).

Within relativistic approaches there has been much controversy over the focus on attitudes and preferences and how these relate to what people want and believe (and then how this influences behaviour). Sociologists and psychologists have challenged existing economically dominated perspectives that treat the individual as a rational economic agent and exclude other motivations which are not monetary orientated. Lockwood (1999: 294) notes that most elicitation instruments do not give respondents the opportunity to use different ways (i.e. non monetary) to express their values; thus causing them to offer a response that is against their preferred mode of value expression. Further difficulties arise from the confusion with expressions of value referring to fundamental beliefs and operational expressions of values in terms of context-specific objectives or the means through which desired values are achieved. There is also much debate on the link between values and actions, which has characterised critiques of WTP studies. Several arguments predominate:

First, the assigned values that WTP elicited are problematic because the average respondents’ cognition is bounded. This refers to the difficulty that people have making judgments in specific contexts, because of how people avert complexity by relying on a set of biases to help simplify decision making. Second, there is the argument that the way in which the valuation task is worded or ‘framed’ has a strong influence over the outcome (i.e. framing effects). Other problems with WTP studies include the prevalence of unusually high WTP amounts and ‘protest zeros’ when asked to give a value of an environmental goods. Kalof and Satterwaite explain that these results are often a reaction of discontent to express value in monetary terms. Critiques consequently conclude that the values offered are labile and artefacts of survey design.

Kahneman & Knetsch (1992) argue that many of these problems can be traced to a misunderstanding by economists of the respondent’s intent. Economists using WTP assume that the respondent is a rational agent-consumer who can attribute value easily and accurately. They also assume that a monetary assignation is an accurate measure of the individual’s preference for an environmental good. However, the growing amount of problems associated with studies reliant on such measures (as discussed above) has demonstrated that there are other processes apart from ‘market transactions’ that are influencing respondents. Kahneman and Knetsch conclude that when respondents are asked to evaluate nonmarket goods, they are insensitive to quantity. They also argue that WTP transactions can be compared to the act of contributing to a cause and therefore explain that respondents are purchasing ‘moral satisfaction’ rather than the good itself. These can subsequently be explained as symbolic actions expressing both the intensity of feelings about a good and the moral importance of that good. Kahneman and Sugden (2005) add that many of the problems of CV originate in the differences between preferences and attitudes, and that responses may reveal attitudes rather than preferences. A further study by Baron and Spranca (1997) demonstrates that WTP studies cannot be relied upon because the valuation exercises is an uncomfortable process forcing respondents to make trade offs that present moral and ethical dilemmas that are difficult to resolve. It is also worth nothing that increased interest in wellbeing amongst academics and policy makers has been a

19 There are many different interpretations of what moral standing nature has. A biocentric perspective argues that because nature is ‘alive’ in that it comprises living organisms, it is ‘good’ and deserves moral consideration. An anthropocentric perspective argues that natural environment should be valued because of its human benefits. Merchant (1992) explores the different arguments that can be used to foster environmental ethics. For example, nature should be valued because of its human benefits for a healthy environment; nature has rights and its welfare should be considered; aesthetic attributes of nature; basis of cross-human and human-nature ethic of egalitarianism (i.e. we have obligations to ourselves and other humans and to nature).

20 It is worth remembering that the main concern of relativist approaches is to capture the values held by the public. In contrast, axiomatic studies recognise that some values are more important than others, particularly with regards to the tension between human centric and nature worldviews.
response to the over-reliance on economic measures of progress has failed to adequately capture wider quality of life issues.

However, Kalof and Satterfield note that these various difficulties have given rise to a number of innovative approaches. Increasingly it is recognised that cost-benefit based approaches cannot be exclusively relied upon to give an accurate picture of how the environment is valued because they exclude the “expressions of moral conviction, enchantment, awe, or the kind of spiritual reverie that underpin the many reasons we value nature” (xxxii). An important step forward in environmental valuation has been the recognition that transparency regarding methodological rationale is required. A particular strand addressing this is “constructed preference approaches” (Gregory et al, 1993). This argues that when valuation exercises are simplified into component parts where “participants can examine the multifaceted nature of their decision, value elicitation processes become decision-focused exercises wherein the link between a valued held, a value assigned, and the support or basis for a final decision or policy is clarified” (xxxii).

A number of methodologies have been developed for accounting for costs and benefits of policies in non monetary terms alongside more traditional techniques. In a review of alternative methods for sustainability and appraisal, Stagl (2007) reviews a number of such methods (summarised in Box 10 below). She concludes that appraisal and valuation tools relying on monetary valuations are not always suitable for all aspects sustainable development. She advocates a more ‘differentiated approach’ that is open to the use of a range of different methods. Consideration should be given as to whether wellbeing theoretical frameworks, and the empirical evidence from wellbeing research, could be used to enhance or improve such techniques.

Box 10: Methods of sustainability valuation and appraisal

Deliberative monetary valuation: The use of formal deliberation concerning an environmental impact to express value in monetary terms for policy purposes, and more specifically as an input to cost-benefit analysis.

Social multicriteria evaluation: The combined use of participatory techniques and multicriteria analysis to aid decision making about a number of policy, programme or project options while taking conflicting interests and multiple criteria into account. It highlights transparency and social learning in the appraisal process.

Three-stage multicriteria analysis: The combined use of participatory techniques and multicriteria analysis to aid decision making about policy, programme or project options. The sequencing and choice of participants is based on ‘co-operative discourse’.

Multicriteria mapping: An interview-based multicriteria analysis that focuses on eliciting and documenting detailed technical and evaluative judgements concerning the performance of alternative options.

Deliberative mapping: The combined use of participatory techniques and multicriteria analysis to aid decision making about policy options. The method highlights the need to explore the arguments participants use to justify their judgments.

Stakeholder decision/dialogue analysis: The combined used of group deliberation techniques and (a qualitative form of) multicriteria analysis to aid decision making about policy options.

Source: Stagl (2007)

To date, in the UK, research attempting to value the environment using wellbeing measures has begun. Some interesting work that is currently taking this forward is PhD research by Robert Metcalfe at Imperial College, London supervised by Professor Paul Dolan. The work, funded by Defra and the ESRC, is exploring methods for valuing the environment based on people’s experiences of it. His research will be one of the first to undertake direct comparison of contingent valuation and subjective wellbeing for the same set of individuals. It will also be the first study to use SWB to value environmental goods in the UK. It predominantly relies on quantitative methods (survey data) using SWB measures to ascertain a monetary value of environmental goods.

However, as mentioned earlier, relying exclusively on quantitative methods, particularly those focused on monetary evaluation, generally fail to illuminate the causal mechanisms behind the processes under investigation. This would obviously make it more difficult or even impossible to identify effective policy responses.

What do these debates offer to attempts to value green spaces? How can wellbeing be used to value the environment more generally or place values on ecosystem services? Can ecosystems approaches be used to value the natural environment/green spaces? What do they say about the use of wellbeing approaches to value the environment? Below are some initial thoughts:

To date, most approaches to valuing the environment have been economically determinist (i.e. contingent valuation methods). The “Total Economic Value” (TEV) approach is one of the main frameworks used to
estimate the overall value of an environmental good. It breaks down the overall value of the good into two component parts as summarised by Clinch (2000) below.

- **Use value**: Direct, Indirect and Option value
  - Direct: actual value from use of the asset (e.g. timber)
  - Indirect: functions and services provided from indirect use of environmental good (e.g. the role that forests might play in reducing flooding downstream)
  - Option**: value individuals place on preservation of asset so they may have option of using it in the future, the value they attach to preserving the asset because it can be used by others (vicarious value), and the value they attach to preserving the asset so that future generations have the option of using it (bequest value)

- **Non-use value**: often described as ‘existence’ values relate to the benefits to individuals of existence of environmental assets even if individuals do not use the asset (e.g. sympathy to animals and plants, intrinsic value of nature)

**How can wellbeing approaches add to existing attempts to value the environment?**

A range of methods gauging revealed and stated preferences are then used to ascertain these values. The previous discussion highlighted the various problems with such approaches. Focusing on green spaces as a component of the natural environment presents a useful example of the shortcomings of existing environmental valuation techniques. When focusing on the wellbeing benefits of green spaces, it becomes very difficult to classify the benefits exclusively as a ‘use’ or ‘non-use’ value. For example, physical wellbeing benefits arise from the direct use of green spaces (e.g. physical exercise in green settings), yet these also have indirect value in terms of mental wellbeing effects. Similarly, would one describe having access to a ‘view’ of natural environment from window as a ‘non-use’ value or ‘indirect-use’ because the individual is not directly interacting with it? How would it be able to account for the synergistic interaction between physical and mental wellbeing benefits? This is symptomatic of larger scale inability of such approaches to capture the intangible aspects of the natural environment and appreciate the interaction between the different wellbeing impacts that green spaces provide. Wellbeing approaches could contribute to addressing these gaps. For example, it provides a selection of subjective wellbeing measures which would provide a better grasp of how people think and feel about the environment. Robert Metcalf’s work suggests that it may eventually be possible to place a monetary value using subjective wellbeing measures, although this work is at a very early stage of development.

However, wellbeing methodology more generally could be used in circumstances where it is not always appropriate to place a monetary value such as the role that the natural environment plays in meeting peoples’ goals and aspirations. In these circumstances, there are a range of alternative methods that can be drawn upon to get an understanding of how the natural environment affects how people think and feel. This is particularly relevant considering wellbeing is a multi-dimensional state, suggesting the need for different methods to capture different dimensions. Such measures would not replace existing methods but could augment and enhance them. Conceptually, wellbeing (and its related frameworks) can enhance our understanding of the relationship between people and the environment, particularly causal mechanisms. The latter can be highlighted through statistical techniques but these struggle to provide in-depth explanations of the processes behind these statistical relationships. A range of techniques for analysing wellbeing – such as those developed by the Wellbeing in Developing Countries (WeD) research group – are being developed. Such techniques could enhance our understanding of the interaction between the tangible and intangible goods that the environment provides. Similarly, more research is required to develop a better understanding of the relationship between wellbeing and ecosystems.

**What does an ecosystem approach add to existing approaches to valuing the environment?** The typology of provisioning, regulating, cultural and supporting services advocated by MEA is useful because it captures a broader range of values provided by the natural environment and then proceeds to make the connection with wellbeing benefits. However, previous discussion has highlighted the significant omission of

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21 Sometimes option values are considered non-use value since they haven’t actually been used, but are an option to use in the future.

22 WeD, based at the University of Bath, defines wellbeing as a multidimensional state “of being with others, where human needs are met, where one can act meaningfully to pursue one’s goals, and where one enjoys a satisfactory quality of life”. The definition indicates that attempts to assess and measure wellbeing require a range of different measures that reflect its material, relational and cognitive dimensions (McGregor, 2007). For more detail on its methodology see [http://www.welldev.org.uk/research/methods-toolbox/toolbox-intro.htm](http://www.welldev.org.uk/research/methods-toolbox/toolbox-intro.htm) and [http://www.welldev.org.uk/research/methods-toolbox/toolbox-intro.pdf](http://www.welldev.org.uk/research/methods-toolbox/toolbox-intro.pdf)
mental wellbeing benefits. Recent research commissioned by the Natural Environment Strategy Unit (NESU) in Defra has begun some initial work on incorporating this approach into mainstream approaches to valuing the natural environment by using TEV by relating these to the MEA provisioning, regulating and cultural service categories (Jacobs, 2007).

However, the report's main focus is on the economic welfare values (based on measures of individual utility and preference) of ecosystem services. For example, it divides the welfare value services into two components:

- Consumer surplus: difference between the price people are willing to pay and the actual price
- Producer surplus: difference between the total income derived from the sale of a product and its costs of production

The methodology to attain these values relies primarily on economic measures such as WTP and GVA (Gross Value Added). In doing so, it fails to adequately capture the wellbeing benefits of various ecosystem services because of the shortcomings of such methods (as discussed earlier). Nevertheless, it provides some useful insights into both the benefits and shortcomings of using an ecosystem approach to value green spaces. On a positive note, the ecosystem approach advocated by MEA is useful for exploring the role that green spaces (trees, woodlands, agricultural fields, etc.) play in providing the preconditions to meet basic needs which is an important dimension of objective/material wellbeing that was not covered in this report. For example, how provisioning services provide food, freshwater, basic genetic resources etc. and how regulating services, regulate our climate and water. All of these play a universal role in contributing towards people's overall wellbeing.

Of greater concern is the failure to capture the mental wellbeing benefits that contact with the natural environment provides (partly due to the inadequacies of the MEA). This is a significant omission considering the wealth of research demonstrating the positive impact that interaction with green spaces has on mental wellbeing. In light of the increased understanding of the costs of mental illness to the British economy, this is an area where monetary valuation is particularly relevant and should be considered in future attempts to provide a monetary valuation of the environment. In principle, the methods used by Layard (2006) to calculate the savings to the economy of providing CBT as a treatment for mental illness could be applied to green spaces. For example, one could calculate how much green space was required (and at what cost) to reduce the incidence of mental and physical illnesses. These figures could then be used to provide an overall estimate of the savings to the British economy of increased provision to green space. Indeed, the recent report on ecotherapy by Mind (2007) quoted DoH's (2004) estimations that a 10% increase in adult physical activity would benefit the UK by £500 million per year, saving 6,000 lives. These figures do not include the potential impact of improved mental wellbeing. Clearly, this is an area that requires more investigation and has significant policy implications considering the financial costs of mental illness to the economy.

Less clear is how to value the more intangible or nonmaterial benefits of green spaces that the MEA has classified under the rubric of 'cultural services' (i.e. spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences and so forth). The Jacobs review (2007) was only able to attribute value to recreational services (informal and specialist). Within this, the report notes that it was not possible to account for 'passive' recreation value gained from simply watching nature or viewing imagery of the natural world. This is a significant omission considering the discussion in section 3 demonstrating the physical, mental and social wellbeing benefits of simply viewing nature. Under social use values, Jacobs (2007) recognises how ecosystems services can contribute to a sense of place and have a spiritual and religious role, but was unable to attribute values. Jacobs (2007) classifies social/cultural heritage, physical/landscape/built heritage and biodiversity as 'non-use' values and used WTP to determine their value. As argued earlier, these are subject to a multitude of problems. Wellbeing concepts and methodologies have the potential to contribute to a more accurate valuation of the wellbeing, particularly in relation to the intangible benefits provided by the environment. However, more work is required to think about how this can be done. It requires more discussion between wellbeing and environmental valuation experts to identify practical steps for achieving this.

In summary, the MEA ecosystem approach is useful for valuing the objective wellbeing benefits of contact with the natural environment. It also provides a useful framework for examining the broader range of services that ecosystems provide that span beyond their material dimensions to capture their intmaterial dimensions. At a conceptual level it is useful because it begins to make connections between natural environment and wellbeing. This has not been substantially explored in the wellbeing literature, particularly in relation to subjective wellbeing. However, its failure to adequately cover the mental wellbeing impacts of contact with natural environment is a significant omission. Similarly, in terms of methodology, it appears that there is still
an over-reliance on economically driven methods which have been shown to have a number of shortcomings in relation to capturing the relationship between the natural environment and wellbeing. More important, not all wellbeing benefits can be captured in monetary terms.

5. CONCLUDING REMARKS

This report set out to explore the wellbeing benefits of the natural environment with a focus on green spaces. It also investigated how an ecosystem approach could be used to provide a better grasp of these links and explored how both a wellbeing and ecosystem approach could be used to value the natural environment. In doing so, it provided initial thoughts on a number of issues:

- What are the wellbeing benefits of the natural environment, particularly green spaces?
- What does wellbeing offer to attempts to value green spaces?
- Can ecosystems approaches be used to value the natural environment/green spaces?
- Can a wellbeing approach be used to value the environment, particularly in relation to ecosystem services?

An ecosystem approach is important for wellbeing research and wellbeing focussed policy because it provides a conceptual framework to explore the interaction between people and the environment. Through its explicit recognition that the natural environment provides wellbeing benefits, it emphasises that wellbeing cannot be considered in isolation of the natural environment. To date, this is insufficiently covered within the wellbeing literature and is important for thinking about wellbeing in the context of environmental limits. In particular, it highlights the role that ecosystem services play in meeting basic needs which is a key constituent and determinant of objective wellbeing. The typology of ecosystem services is subsequently useful for unpacking the specific components of ecosystems and their role in contributing to wellbeing. It also recognises less tangible dimensions such as the natural environment’s role in freedom and choice, thus recognising elements of eudaimonic wellbeing dimensions.

Although, it recognises that wellbeing is multi-dimensional, the ecosystems approach set out in the MEA is less clear on how the natural environment influences how people think and feel about their lives. Some of this is covered under ‘freedom and choice’, but more of the hedonic dimensions of wellbeing are missing. More importantly it excludes many of the mental wellbeing impacts of the natural environment. This is a significant omission considering the costs of mental illnesses to the economy. Also missing from the ecosystem approach is an understanding of the various causal mechanisms between ecosystem approaches and wellbeing. The commissioning of further research to explore the synergies and tensions between ecosystem and wellbeing approaches would assist the development of more accurate approaches towards valuing the environment and ecosystem services.

Wellbeing research (conceptually and methodologically) has much to offer to the ecosystems approach and attempts to value the environment more generally. They have contributed towards the recognition that wellbeing is a multi-dimensional state incorporating both objective and subjective components. Therefore, any attempt to explore wellbeing benefits of natural environment should capture all dimensions. Recognising these dimensions then allows people to look at the interactions and tradeoffs between the different dimensions. In particular, wellbeing approaches provide a new perspective to natural environment valuations by emphasising the importance of how people think and feel about their lives. They also refocus attention on people’s experiences of the natural environment. Methodologically, a wellbeing perspective provides new methods to valuing the nature that can be used to provide both monetary and non-monetary evaluations. In particular, subjective wellbeing measures can be used to overcome some of the anomalies of contingent valuation methods by focusing on people’s experiences rather than their preferences. However, much more work needs to be carried out to investigate how to use these measures in these contexts. Additionally, in terms of wellbeing measures more generally, more work is required to develop eudaimonic wellbeing measures and refine how these can be used to investigate the role of the natural environment to people’s wellbeing (particularly mental wellbeing).

Focusing on green spaces as a component of the natural environment provided a useful case study to explore the value of ecosystem and wellbeing approaches to valuing the natural environment and the difficulties that might arise. This overview highlighted that there is significant gap in the literature of using wellbeing concepts and methods (academically defined) in the context of the natural environment. Further research should seek to use wellbeing frameworks and methods in the context of valuing the environment. Wellbeing methodologies have the potential to provide new ways to value the environment that do not exclusively rely on monetary techniques (e.g. CV and WTP). This is important in the context of the natural environment since not all benefits can be expressed in monetary terms (particularly some of eudaimonic wellbeing dimensions). This is not to say that such methods should be discounted. Rather, subjective
wellbeing measures have been shown to be reliable and robust and could be used to augment existing approaches to valuing the environment. Eventually, with more development, they could also be used to provide monetary values.

At the same time, it is important to note that most of the work on subjective wellbeing measures comprises hedonic measures. Further work is required to develop other wellbeing measures (e.g. eudaimonic wellbeing measures) that would not rely exclusively on quantitative or monetary methods but use both quantitative and qualitative methods. Conceptually, wellbeing provides frameworks to enhance our understanding of the relationships between the natural environment and people. More work should be carried out to draw on these frameworks to develop new measures of wellbeing for different contexts.

In relation to green spaces, this report found a wealth of material exploring the generic wellbeing benefits of the natural environment. Although these did not always use the terminology of the wellbeing literature per se, they did cover aspects that were known to be related to wellbeing (e.g. physical health, mental health, relationships, security etc). Key points were:

- The natural environment provides physical, mental and social wellbeing benefits. There are synergistic effects between these benefits.
- There is much controversy on what constitutes robust and reliable evidence. Since many of the wellbeing related studies are framed in the context of physical and mental health, there is criticism that many of the existing studies do not meet the medical professions’ requirements for robust clinical and quantitative evidence. There is also a tendency to discount a range of in-depth and rich qualitative studies, but such research is important for unpacking and explaining the relationships illustrated through quantitative research methodologies. Further work in this area should seek to combine both quantitative and qualitative methods to explore the wellbeing benefits of green spaces.
- More work is required to establish how robust and reliable wellbeing measures (SWB) can be used to evaluate the benefits of green spaces. This could augment existing monetary evaluations (e.g. CV, WTP) and should be supported by more in-depth qualitative research of a comprehensive understanding is to be reached. Once the role of green spaces in promoting mental and physical wellbeing are better understood, it may be possible to ascribe a monetary value to such benefits using an approach similar to that taken by Layard (c.f. 2006). Future work could include a more systematic review of wellbeing benefits of green spaces in a range of different disciplines that uses a range of different search engines.
- The wealth of material exploring the beneficial wellbeing impact of green spaces does suggest there is a positive impact of interacting/viewing the natural environment that should not be ignored. Future research could compare this with the negative impacts of green spaces (e.g. perceptions of crime and how these relate to green spaces).
- Most of research in this area originates from US, Scandinavia, Holland and Japan. Much more research is required to explore wellbeing benefits in the UK.
- Most of the research focuses on wellbeing benefits of green spaces for the urban population. Green spaces play an important role for the wellbeing of inner city and suburban areas. Less is known about its role in rural areas. A review should be carried out to investigate the role of green spaces in rural communities.
- There appears to be a lack of research on social wellbeing benefits of green spaces. More research is required to understand the benefits of different types of green spaces for different groups of the population. This would need to distinguish what type of green space and exposure influences wellbeing.
- There are many academics, practitioners and policy makers working directly or indirectly on wellbeing benefits on green spaces. Yet, there appears to be a lack of dialogue on who is doing what and when. In the academic sphere, this is partly a result of the fact that the area covers a range of different disciplines. More multi-disciplinary collaboration and effective partnership is required. A mechanism is needed to bring together existing and the key stakeholders so that interested parties can draw on this and from other stakeholder’s experiences. The Appendix includes a list of some other key stakeholders.
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