

Matthew Roberts/The Wildlife Trusts

# Nature Connections 2016

## Conference Report: Implications for Research and Practice

March 2016



#NCx2016



College of Life and Natural Sciences

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College of Life and Natural Sciences

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## Welcome

For many years, I have personally been aware of the importance of connecting with nature for my own and my family's well-being and the importance of re-connecting with nature for wider society. Therefore, I am very pleased to present the Nature Connections 2016 Conference Report. The University of Derby launched this conference series in 2015 to complement its developing national/international profile for expertise in this area. With kind support from our 2016 conference partners the annual conference has rapidly grown to become an established international forum bringing together practitioners, researchers and policy makers from a wide range of disciplines. This enables the sharing of work and ideas that will help us build our understanding of the significance of nature connection in addressing society's big challenges, such as health inequalities and environmental sustainability, and how to optimise its role in supporting the delivery of positive outcomes for both people and the environment.

This report captures the key issues emerging from Nature Connections 2016 and importantly sets out some challenges and priorities for action. These provide valuable insight for the Strategic Research Groups and Sector Working Groups (facilitated by some of our conference partners) who are enabling a more strategic approach to the use of natural environments to deliver outcomes for people, as well as helping to share insights to communities of research and practice.

I am pleased that the University of Derby was instrumental in launching and supporting the new Nature Connections Research Network and I look forward to hearing about its progress in maintaining momentum between the annual Nature Connections conferences and to watch it start to respond to, inform and consolidate progress in this area.

This conference report also provides useful context for another report about to be published by Natural England and other partners in this conference, which will share the findings of a pilot to develop a new national indicator for nature connection.

To mark the University of Derby's keen interest in this area of research we will also be creating a Chair of Nature Connections research to provide clear leadership and a focal point nationally and internationally for research in this area. An endowed position would also represent the wider work in this area, supporting and facilitating progress for those supporting the role and clearly we will be looking for partnerships in establishing this new role.

I hope you find this report useful and will be able to join me at the [Nature Connections conference in 2017](#).

## **Executive Summary**

### **Background**

Over the last 15 years, nature connection has become a recognised, measurable construct – one that describes an individual's subjective sense of their relationship with the natural world.

Although this is a relatively new and emerging area of research and practice, evidence suggests that nature connection is an important factor in positive mental health and wellbeing, acting as a mediator of wellbeing outcomes. In fact, the wellbeing benefits of nature have been reported as being as important in terms of effect size as established factors such as income and education (Capaldi, Dopko & Zelenski, 2014). Evidence also points to nature connection being linked to the development of pro-environmental outcomes.

At a time when there is an urgent need to address health inequalities and support a more sustainable approach to the environment, there also appears to be a cultural disconnect with nature in many western societies. There is now a real need to develop a better understanding of our connection with nature and identify how research and practice can support and inform decision makers going forward.

### **The Nature Connections 2016 Conference**

The international Nature Connections conference, led and hosted by the University of Derby in June 2016, was an important step in better understanding the scale and scope of existing research and practice, exploring evidence of how nature connection works, its role in delivering health and wellbeing outcomes, and how the key attributes of nature connection could be better incorporated into the design of future nature-based interventions.

The conference had a specific aim to identify the current challenges and priorities for research and practice, and to do this by bringing together researchers and practitioners from a wide variety of disciplines with an interest in nature connection.

This conference report provides a summary of both the current literature and the evidence shared at the conference, including presentations from the UK, Australia, Canada, Norway, Germany and Eire.

The conference and its report were both kindly supported by a partnership of organisations with an interest in research and practice in this area, including Natural England, RSPB, The Wildlife Trusts, National Trust and Historic England.

### **Key findings**

The conference highlighted that awareness of the construct of nature connection and of the tools that exist to measure it rests mainly within a relatively small research community. Among practitioner communities, whilst contact with nature or exposure to nature is being used extensively to support outcome delivery, there was relatively little evidence that there was awareness (or evaluation) of the construct of nature connection; rather that the term nature connection was being used more generally to mean contact with nature or exposure to nature. This reflects the key theme to emerge from the conference, which was the need and opportunity to enable a more

collaborative approach between research and practice communities working in this area, one that helps build the evidence base not only on contact with nature but on nature connection, and one that actively includes the many disciplines with an interest in this area such as education, health, psychology, planning, and environment.

Some presentations were able to showcase the progress that can be made by working in this way, including methods to evaluate nature connection in both national and local applications.

The design of future nature-based interventions will require a more strategic, integrated research programme in nature connection which should:

- Develop a simple, consistent description/narrative to articulate what a connection with nature is, why it is important (in relation to supporting delivery of outcomes), and how to evaluate it in practical situations.
- Gather evidence to strengthen our understanding of;
  - How nature connection is linked to, or mediates, physical health, wellbeing, pro-social, and pro-environmental outcomes.
  - The qualities of natural environments and the types of experiences that facilitate nature connection (including those mediated by technology).
  - Whether and how childhood experiences develop nature connection, and the role these have in determining the outcomes of adults.
  - The influence of culture and socio-cultural factors on nature connection in a UK context, informed by an understanding of nature connection in an international context.
  - The relative importance of contact with nature and nature connection in delivering outcomes, and their role in driving people's use of green space.

The University of Derby's Nature Connections Conferences have been successful in bringing together a multi-disciplinary group of researchers and practitioners together to form the Nature Connection Research Network (NCRN). The NCRN, working with the Strategic Research Groups for Outdoors for All and Learning in Natural Environments and their associated Working Groups of practitioners, are ideally placed to respond to the findings of this conference, and show leadership in progressing the identified challenges. They offer an immediate infrastructure and forum to enable wider integration and a more strategic approach.

The next Nature Connections conference will take place in [2017](#), once again hosted by the University of Derby on 27<sup>th</sup> June 2017.

## **Introduction**

Humanity's move away from nature has occurred over the last several centuries and while this has provided many benefits, it has triggered other changes and implications. Humanity has lived for a relatively short time during the evolutionary process as a species within urban towns and cities, and consequently has developed brains which are hardwired with a pre-disposition towards nature (Wilson, 2002). As a result, the effect of a loss of contact with nature through urbanisation on physical and mental wellbeing is currently unknown (Maller et al., 2009).

The need to discuss and address the apparent disconnect from nature and its implications led to the Nature Connections Research Group at the University of Derby establishing the Nature Connections conference in 2015. The second annual conference took place in June 2016 (Nature Connections 2016, NCx2016). Both conferences were attended by researchers and practitioners from a range of disciplines with an interest in the human-nature relationship. The partnership supporting the NCx2016 conference and this report were drawn from The Connection to Nature Working Group (a sub group of the Strategic Research Groups for Outdoors for All and Learning in Natural Environments, with the aim of enabling a more strategic approach to research and practice in this area).

Nature connection is a growing area for research and practice, although its origins can be traced back to pioneering ecologists such as Aldo Leopold and Theodore Roszak (Mayer & Frantz, 2004) and beyond that, through the study of humanity's early evolutionary history and affiliation with nature (Kellert & Wilson, 1993). The feeling of being part of a wider natural community (Mayer, Frantz, Bruehlman-Seneca & Dolliver, 2009) is the essence of nature connection, and this has become a focus of academic research due to the wellbeing (Capaldi, Dopko & Zelenski, 2014) and possible pro-environmental benefits it may lead to (Tam, 2013a).

For the purposes of this report we refer to nature connection as being an individual's subjective sense of their relationship with the natural world. Encompassing both affective and experiential sense of belonging to the natural world and relating to a person's sense of their interconnectedness with nature or their sense of inclusion in nature, it captures a breadth of concepts including cognitive appraisals, inclusion of self in nature, appreciation of nature and emotional affiliations.

This report sets out the key themes to emerge from the conference on the ways in which the natural environment and more specifically, nature connection, might help address some of societies challenges; especially those related to delivering positive physical health, mental health and wellbeing, and pro-environmental outcomes.

### **This report outlines:**

- the context and background to nature connection.
- a summary of the existing literature on the outcomes/benefits of nature connection.
- a summary of the key themes that emerged from research and practice shared at NCx2016.
- suggested priorities for action and next steps.

## **Context**

### **Nature connection as a way of addressing health inequalities**

This section provides a very brief overview of the UK policy areas where exposure to nature and nature connection might be beneficial. Further background information can be found in the [Marmot Review](#), the [Natural Solutions for Tackling Health Inequality](#) report and in [summaries of the evidence produced by Natural England](#).

### **Health Inequality**

In the UK there exists an inequality in health, that is thought to begin from the age of 2 years in children (Apouey & Geoffard, 2013) and can endure into adulthood (Case, Lubotsky & Paxson, 2008), with ethnic minorities more likely to experience health inequality (Mangalore & Knapp, 2012). Socioeconomic factors are the main contributors to health inequality, with life expectancy and general health linked to social class; with everyone below the very wealthiest likely to experience some degree of health inequality at some point (Allen & Balfour, 2014). The interactions between social and economic factors are complex and have an effect on physical (Gulliford, Charlton, Bhattacharai & Rudisill, 2014) and mental health outcomes which can increase morbidity (Mangalore & Knapp, 2012). The UK population as a whole has good general health, yet has higher levels of health inequality in comparison to countries that have overall lower levels of general health, such as Sweden and Slovenia (Fosse, Bull, Burstrom & Fritzell, 2014). Bridging the health inequality gap by addressing socioeconomic issues is an important focus for public policy (Allanson & Petrie, 2013) with housing quality, infrastructure, healthy eating, and lowering pollution levels all being identified as important areas to be addressed, particularly in urban environments (Smith et al., 2015).

Taking this into account, the Marmot Review (2014) suggested six areas of policy action; provide the best start for children; maximise the capability and control over life for all children, adolescents, and adults; have employment that is fair and good for all; develop communities and places that are healthy and sustainable; increase and strengthen the impact of ill health prevention. Additionally, the role of nature, especially the availability of green space within the local environment, has been suggested as having the capacity to bridge the health inequality gap (Allen & Balfour, 2014; Logan & Selhub, 2012; Mitchell & Popham, 2008).

### **Obesity and Chronic Conditions**

Chronic ill health is growing at a rapid rate, and includes illnesses such as asthma, hypertension, congestive heart failure, and diabetes (Wagner et al., 2001). Socioeconomic status and social stratification have been linked to chronic health conditions; with children from low income families more likely to have chronic ill health (Case et al., 2008). Treatment of chronic health problems are often medical and behavioural, with interventions more successful if the patient's wellbeing is also addressed, by providing the skills and confidence to manage the condition. This is due to the psychological, emotional, and social demands that managing a chronic health condition creates (Wagner et al., 2001). In addition to chronic ill health, obesity levels over the past few decades have been on the rise and occur across all demographic groups (Wright & Arronne, 2012) with socioeconomic factors also

directly linked to the condition (Lovell, 2016a). Obesity has a detrimental effect on physical and mental health, with the cost to the NHS estimated at £6 billion, rising to £50 billion by 2050 (Lovell, 2016a). Obesity in children is a particular concern, with the prevalence growing worldwide and with it, a greater risk of ill health and premature mortality in later life (Ebbeling, Pawlak & Ludwig, 2002). Within the UK, the rise of childhood obesity occurred from the 1980's (Reilly et al., 2005) with 19% of all 10-11 year olds classed as obese, and a further 14% classed as overweight (Baker & Bate, 2016). Obesity is caused by an excess intake of calories when compared to the amount of energy used, while the underlying cause stems from a range of interacting factors including genetics, psychological and societal aspects, individual physiology, and economic status (Wright & Aronne, 2012). Specific risk factors include sedentary behaviour, watching television for over eight hours a day, parental obesity, lack of sleep, and higher birth weight (Reilly et al., 2005).

The urban environment that enables relatively easy access to unhealthy food, along with a lack of exercise may be especially important for explaining why treatments such as family and school based interventions and medication have largely been ineffective (Ebbeling et al., 2002). This is despite public policy on health in the UK seeking to enable individuals to make positive health choices about their lifestyle regardless of personal circumstance, while minimising any impact from ill health or disease (Gov.uk, 2016a); with a reduction in sugar intake through price levy's, a reduction in sugar in products, and ensuring all children have an hour of physical activity every day now part of official policy (Gov.uk, 2016b). Other governmental campaigns have largely focused on healthy eating in an attempt to tackle obesity such as the Eat Well guide and promoting the 5 A Day initiative (Gov.uk 2016c). In addition, the Change 4 Life campaign by the NHS, which aims to improve levels of physical activity, to encourage people to eat healthier, and live longer has utilised television and online advertising to try and encourage alterations in diet and activity levels in an accessible and non-judgemental way (NHS, 2011).

There is growing interest in helping address these issues by increasing access to natural environments, which has been shown to have an overall positive relationship to decreases in the prevalence of obesity (Lovell, 2016a), through increased physical activity levels, and as a cost-effective intervention (Lovell, 2016b).

### **Mental Health and Wellbeing**

Mental health and wellbeing can also be affected by inequalities, with mental ill-health on the rise and thought to be the largest cause of disability in the UK; whilst also affecting physical health, personal relationships, and acting as a barrier to engagement with work and education (Lovell, 2016c). Inequality in mental health between ethnic groups is linked to income, employment, and education. Individuals who experience mental health problems are also often subject to social exclusion and income linked morbidity (Mangalore & Knapp, 2012). This is problematic, as individuals with depression and anxiety, a common mental health issue within the UK population, are less likely to have improvements in their mental health if they are from a lower socio-economic status and have experienced social isolation (Fone et al., 2014). Within urban environments, gender differences exist, with girls having lower overall mental wellbeing, happiness, and more depressive symptoms than boys (Smith et al., 2015). As of 31<sup>st</sup> January 2016, a total of 1,462,057 cases of mental health issues were referred to professional services in the UK (Gov.uk,

2016d), while common mental health issues such as depression and anxiety are estimated to affect one fifth of all adults within the UK population (BPS, 2013). In England, the cost of mental health issues as a result of loss of output, money for health and social care, along with the human cost (FPH, 2010) was estimated to be £105.2 billion in 2009/10, although this is likely to be an underestimated figure (Centre for Mental Health, 2011).

The cost to the UK economy, along with personal implications for the individual, family, and friends has made addressing mental health issues a priority for NHS policy, which aims to improve quality of life, lower premature mortality and improve experiences of care for those with mental health issues (Department for Health, 2016). National campaigns which seek to de-stigmatise mental health and ensure appropriate treatment is accessed by those with mental health issues have been implemented by charities such as Mind, Rethink, and the Mental Health Foundation (Mental Health Foundation, 2016). Good mental health is believed to be crucial to a good overall health for the UK population (The Royal College of Psychiatrists, 2010). As such, surveys of the general public conducted by the Office for National Statistics (ONS) have begun to measure wellbeing in addition to traditional measures of demographics, income, and employment to assess the state of the nation (Office for National Statistics, 2016). Despite this, a recent comparison of 160 countries found the UK ranked 16<sup>th</sup> in the world for wellbeing but the growth of the nation's wellbeing score was ranked at 141, placing the UK in the bottom 25<sup>th</sup> place; indicating economic growth has not equated to a growth in wellbeing in the country (Beal, Rueda-Sabater, Yong & Heng, 2016).

General exposure to natural environments at both the individual and population level have been linked to positive mental health outcomes, with interventions that utilise nature associated with positive outcomes, while also being cost-effective (Lovell, 2016c).

### Climate Change and Loss of Species

Humanity has become a geo-physical force in nature (Wilson, 2002) with human behaviours thought to be the main cause of climate change (Davis, Le & Coy, 2011) and other environmental issues including the widespread loss of natural species (WWF, 2010). As urbanisation increases, humanity is losing the opportunity to have meaningful experiences with nature (Pyle, 2003). This is further compounded with natural environments being accessed less by those aged 16-24, and individuals from a low socioeconomic status or from a black or ethnic minority group (Natural England, 2013). In conjunction with the western perception that humanity is culturally unique and therefore above nature (Catton & Dunlap, 1978), there is a growing disconnect between people and nature (Lovell, 2016d) that is thought to contribute to environmental degradation and harm (Schofield & Margulis, 2012). As a result, environmental sustainability has arguably become the most pressing issue of the 21<sup>st</sup> century and will require widespread behavioural change to meet the challenges a change in climate and loss of nature will bring (APA, 2014); that will have an impact not just on wider nature but to humanity's physical and wellbeing also.

Policy has sought to address the issues of climate change and loss of species. The Paris Climate deal in 2015 created a legally binding, global deal between 195 countries (including the UK) which set out an action plan to curb emissions of carbon

dioxide and other greenhouse gasses in order to keep any rise in temperature to a maximum of 1.5 °C (European Commission, 2016). The UK Department for Environment and Rural Affairs (DEFRA) seeks to safeguard the natural environment so that it is cleaner and healthier, which in turn will benefit the economy and lead to prosperity and wellbeing (DEFRA, 2016). Attempts have been made to utilise environmental education to support sustainable behaviours, but the effectiveness of educational/cognitive approaches to create behaviour change has not been demonstrated (Lieflander, Frohlich, Bogner & Schultz, 2012); a greater focus on experiential, rather than cognitive pathways may be required. Despite widespread awareness of the environmental issues caused by human behaviour, harmful environmental practices still continue (Berenguer, 2007). This may be due to the value-action gap that must be bridged if the much needed changes in behaviour are to occur (Natural England, 2015). In nature conservation, the current trend of emphasising humanity as a part of nature and conservation efforts benefitting both (Flikke, 2014) may be a step towards facilitating greater behavioural change. This has led to research attention turning towards the human-nature relationship (Perkins, 2010) as a route to enabling pro-environmental behavioural change (Tam, 2013a).

## Nature connection research and practice

### Nature Connection: Research

Nature connection research is relatively new, one that traces its roots back to the work of ecologists such as Aldo Leopold and Theodore Roszak (Mayer & Frantz, 2004). Nature connection can be defined as the subjective sensation of belonging to a wider natural community (Mayer et al., 2009) with the focus on the relationship between an individual and wider nature. The nature connected relationship is multi-dimensional, and can be comprised of a cognitive sense of self (Schultz, 2001), emotional attachment or affiliation (Muller, Kals & Pansa, 2009), along with individual learning and experience (Nisbet, Zelenski & Murphy, 2009). As such, a range of terms have been used to describe a nature connected relationship including Connection to Nature (Mayer & Frantz, 2004), Nature Relatedness (Nisbet, Zelenski & Murphy, 2009), Emotional Affiliation with Nature (Kals, Schumacher & Montada, 1999), and Inclusion of Nature in Self (Schultz, 2001) to name but a few. While the terms used to describe nature connection vary, they all essentially describe the same construct (Tam, 2013a) and have been investigated both qualitatively and quantitatively (Lovell, 2016d). When quantitatively assessed, explicit psychometric measures have often been used, either in correlational designs (Hinds & Sparks, 2011; Nisbet, Zelenski & Murphy, 2011) or as part of an experimental methodology (Mayer et al., 2009; Nisbet & Zelenski, 2011).

At present, thirteen measures of nature connection have been produced for use with children or adults, with research suggesting these measures share a degree of conceptual overlap, along with good reliability and validity (Tam, 2013a). Nature connection has been linked to a range of wellbeing outcomes from vitality (Capaldi et al., 2014; Russell et al., 2013) to self-esteem and improved body image (Swami, Nordheim & Barron, 2016). To a lesser extent, a connection with nature has been associated with pro-environmentalism; specifically pro-environmental attitudes (Mayer & Frantz, 2004) and pro-nature behaviours (Richardson, Cormack, McRobert & Underhill, 2016; Richardson, Sheffield, Harvey & Petronzi, 2016), with new research suggesting links to educational attainment also (Richardson, Sheffield,

Harvey & Petronzi, 2016). Given that nature has been suggested to increase positive affect and thereby wellbeing, the decrease in time spent in nature due to urban living, and a growing disconnect from nature may ultimately have an impact on positive psychological functioning (McMahon & Estes, 2015). This makes the investigation of how to facilitate nature connection an important topic area for research, with a systematic approach to investigating the routes to nature connection an important next step (Zylstra, Knight, Esler & Le Grange, 2014; Lumber, Richardson & Sheffield, in review). Unfortunately, the majority of research into nature connection has been theoretical, with more research required that utilises an applied methodology (Clayton, 2012) and more work to identify and evaluate the activities that facilitate nature connection in practice. Emerging research in this area has shown a connection with nature can be increased through noticing the good things in nature (Richardson, Hallam & Lumber, 2013; Richardson & Sheffield, in press) and engaging in nature based activities (Richardson, Cormack, McRobert & Underhill, 2016). There is also some evidence that increasing nature connection is better facilitated by arts based (Bruni, Winter, Schultz, Omoto & Tabanico, 2015), sensory and meaningful emotion based activities (Richardson, Cormack, McRobert & Underhill, 2016; Richardson et al., 2013), rather than those that are knowledge based (Lumber et al., in review).

Developments responding to the need for enabling a strategic approach to research and practice in nature connection in the UK include work by the University of Derby, its Nature Connections Conferences which have become allied with the partners supporting this conference report - RSPB, The Wildlife Trusts, National Trust, Historic England, and Natural England, through the Strategic Research Groups for Learning in Natural Environments and Outdoors for All and their Working Groups. As noted above, these initiatives have led to the formation of the NCRN as a forum for the wider community of researchers and practitioners working in this area.

### Nature Connection: Practice

Separate from the sphere of academic research, the practice of engaging people with nature has traditionally been fragmented and focused on particular activity types or outcomes. Relatively little practice involves evaluation of the new construct of nature connection; rather practice tends to focus on enabling and evaluating exposure to, or contact with nature.

Increasing awareness of the inequalities in people's access to nature through surveys such as the [Monitor of Engagement with the Natural Environment](#) has begun to be reflected in programming and funding opportunities.

Within formal learning contexts there has been a move to focus on learning outside the classroom in natural environments, with outdoor learning being promoted as a way to support teaching practice and [learning](#) across the curriculum, rather than just teaching and learning about the natural environment itself. Large scale delivery projects in this area include [Natural Connections](#) and [Learning Away](#). The recent establishment of the [Learning Outside the Classroom Sector Working Group](#) reflects a desire for the various delivery sectors with an interest in this area to work in an increasingly coherent way in providing services to schools.

In informal or non-formal contexts, campaigns such as [Breathing Places](#) and more recently [Project Wild Thing](#) by The Wild Network, aim to encourage greater contact with nature and more outdoor time for children, families, and communities, for the variety of outcomes this can bring including enjoyment and to better their physical and mental health.

Improving physical and mental health outcomes through nature, under the umbrella terms of green care or ecotherapy, promote the use of nature for physical health and wellbeing, by linking healthcare systems with activities often drawn from agriculture, animal keeping, and gardening (Bragg & Atkins, 2016; Haubenhofer, Elings, Hassink & Hine, 2010). This wealth of diverse delivery programmes are often motivated by commitment to the beneficial outcomes of nature connection, however very few have shown an awareness of, or have adopted recognised measures of nature connection in their impact evaluations. Recent exceptions include the research/practice partnerships between the RSPB and the University of Essex and The Wildlife Trusts and the University of Derby.

As above, most practice currently facilitates and evaluates contact with nature rather than nature connection, however recent developments are helping to develop a more strategic and coherent approach to the improvement of practice including a new focus on nature connection, for example via the Working Groups for sectors with an interest in Outdoors for All and Learning Outside the Classroom, in partnership with Strategic Research Groups in these areas and with the NCRN.

## **Summary of Literature on the Benefits of Nature Connection**

It is important to recognise that there is a difference between exposure or contact with nature and nature connection, especially when discussing the physical and mental wellbeing, and pro-environmental benefits they relate to. While exposure to nature does not necessarily lead to nature connection, nature connection itself has been found to predict further engagement (and therefore exposure) with nature (Nisbet & Zelenski, 2013; Zelenski & Nisbet, 2012). Exposure to nature and nature connection are clearly related, however this report reflects the conference theme and focuses on the benefits of nature connection and enabling nature connection. For summaries of the links between exposure to nature and a number of health outcomes please see recent evidence summaries published by Natural England, including those on [mental health](#) and [physical benefits](#). A fuller review of research in this area, and the links to workplace wellbeing, is also available (Richardson, Maspero, Golightly, Sheffield, Staples & Lumber, 2016).

### **Mental Wellbeing**

Results from quantitative questionnaire studies have positively linked nature connection with life satisfaction (Mayer & Frantz, 2004), general happiness (Zelenski & Nisbet, 2012), perspective taking (Russell et al., 2013), along with social and psychological wellbeing (Howell, Dopko, Passmore & Buro, 2011), personal growth, vitality, and meaning in life (Nisbet et al., 2011). Higher levels of nature connection have also been linked to decreases in trait and state anxiety (Martyn & Brymer,

2014) and even brief exposure to nature can have positive benefits through nature connection (McMahon & Estes, 2015; Nisbet & Zelenski, 2011).

Experimentally, walking in nature or viewing virtual nature via a video has been found to increase levels of wellbeing (Mayer et al., 2009), and despite individuals underestimating the wellbeing benefits they may receive, increases in happiness have been found when walking in, and connecting with nature (Nisbet & Zelenski, 2011). Viewing nature which is aesthetically pleasing has facilitated wellbeing benefits through an increased nature connection, with aspects of nature that are aesthetically pleasing or ‘beautiful’ thought to mediate the relationship between nature connection and wellbeing (Zhang, Howell & Iyer, 2014); with the reduction of stress hormones this may bring providing some of the wellbeing benefits described above (Logan & Selhub, 2012). In addition, nature connection is also important for the wellbeing benefits derived from nature exposure, acting as a partial mediator between engaging with nature and mental wellbeing (Mayer et al., 2009). Qualitative studies have linked nature connection to an increase in overall wellbeing in adults; facilitated by indoor plants which are suggested to create a sense of closeness and community with nature (Passmore, 2011). Here, childhood experiences may be important as previous positive interactions with plants and natural landscapes in childhood may be drawn upon to facilitate nature connection (Hawkes & Alcott, 2013; Muller et al., 2009).

Overall, a large body of research has helped establish the wellbeing benefits derived from nature connection (Capaldi et al., 2014) with the differing effect sizes in meta-analyses suggest that it is an increase in positive affect rather than a decrease in negative affect that leads to the wellbeing gains derived from nature connection (McMahon & Estes, 2015). Empirically, the exact mechanisms involved in nature connection and wellbeing still requires a systematic investigation (Hartig, Mitchell, de Vries & Frumkin, 2013); especially given the varied methods that have been employed to date (Russell et al., 2013).

The evidence covered in this sub-section, points to nature connection having a beneficial effect on multiple facets of wellbeing, while also mediating such benefits from exposure to nature; something that may be crucial to the overall health of the UK population by raising the overall wellbeing of the UK given its current low standing when compared to other countries. More importantly, particular mental health inequalities (such as those currently found in urban girls and ethnic minorities) might also be addressed (in part) by nature connection. Given that the scale of wellbeing benefits of nature connection can equal those of established factors such as income and education (which are themselves linked to mental health inequality) this points to the potential role of nature connection in addressing such inequalities.

Facilitating nature connection for wellbeing benefits may require a direct, rather than passive engagement with nature, something that warrants further investigation (Lovell, 2016d). Those most at risk from inequality; including individuals from ethnic minority groups and those of a lower socioeconomic status, are also less likely to visit the natural environment, [more work](#) needs to be done to encourage and facilitate contact with nature and more specifically, nature connection with these groups, for the wellbeing benefits it can facilitate.

## **Physical Health**

The natural environment is thought to have direct physical health benefits (Russell et al., 2013) through the maintenance of air quality, the provision of protection from the elements and flooding (Hartig et al., 2011), through green exercise (Pretty et al., 2007) and by impacting on the physiological systems regulating our emotions and heart rate (Richardson, McEwan, Maratos & Sheffield, 2016). Reviews have outlined the general health benefits of exposure to nature, which point to improved immune functioning through a reduction in cortisol levels (Logan & Selhub, 2012; Russell et al., 2013). A reduction in cortisol can also be achieved through nature connection, as when coupled with the personality trait of openness to experience, it may offer coping options that can buffer against stress or loss, providing resilience to disease through an improved functioning of the immune system (Cervinka, Roderer & Hefler, 2012); with improved immune functioning acting as a central pathway to other physical health benefits (Kuo, 2015).

Nature connection could be a useful aid to improving physical health given it is a predictor or further contact with nature (Lin et al., 2014; Nisbet & Zelenski, 2013); potentially providing a motivation for repeat visitation of natural spaces, while benefits to wellbeing could also lead to further health gains when mediated by nature connection (Richardson, Cormack, McRoberts & Underhill, 2016). This could take the form of green exercise to increase physical activity levels (Pretty et al., 2007; Richardson, Cormack, McRoberts & Underhill, 2016) that may be a cost-effective way to help address health issues within the UK population. Alongside this, chronic ill health and the health inequality gap could also be addressed through improving visitation of areas of greenspace within the local landscape (Logan & Selhub, 2012; Mitchell & Popham, 2008) motivated by nature connection. Utilising greenspace in this way would require planners to provide accessible areas of greenspace, especially within urban populations where opportunities to meaningfully engage with nature are diminished (Pyle, 2003).

## **Pro-Environmentalism**

The benefit of nature connection is not limited solely to aspects of physical and mental wellbeing as it is proposed to be a significant factor of pro-environmental behaviour (Tam, 2013b) and a core motivator for pro-environmentalism in general (Tam, 2013a); being a counter to a nature disconnect which may lead to environmental harm. As such, nature connection, rather than exposure to nature may be important for pro-environmental outcomes. While a direct causal link is yet to be evidenced, nature connection may function as a foundation for accepting the need for behaviour change through a commitment to sacrifice (Davis et al., 2011), while also being part of a larger interaction with other factors, that together lead to the enactment of pro-environmental behaviour.

Nature connection can directly create positive environmental attitudes (Mayer & Frantz, 2004) that are thought to influence behavior, while empathy has been shown to increase environmental concern (Berenguer, 2007; Gulliford et al., 2014) that is itself an outcome of nature connection (Zelenski & Nisbet, 2012). The emotional attachment felt towards local nature is thought to create an interlinked sense of self and place that along with cognitive, social and physical aspects, leads to a desire to protect the natural space from harm (Scannell & Gifford, 2010). Cognitions also play a role as including nature within the self-concept is thought to make nature

connection implicit, subsequently leading to an increase in biospheric concern, biocentrism (Bruni & Schultz, 2010; Schultz, Shriver, Tabanico & Khazian, 2004) and similarity (Tam, Lee & Chao, 2013).

Nature connection has the potential to facilitate pro-environmental behaviour through the creation of pro-environmental attitudes, cognitions and positive emotions, while creating a sense of similarity and empathy with nature. The recent large scale intervention 30 Days Wild run by the Wildlife Trusts that explored contact with nature and nature connection found increases in self-reported pro-environmental behaviour immediately after taking part and at the two-month follow-up (Richardson et al., 2016). The evidence suggests that nature connection helps address the cultural disconnect between humanity and nature (something exposure to nature on its own may not achieve) and so lessens environmental harm that may result from disconnection. This is achieved through the formation of pro-environmental attitudes, intentions, and in some instances, self-reported pro-environmental behaviour.

## **Summary of themes emerging from Nature Connections 2016**

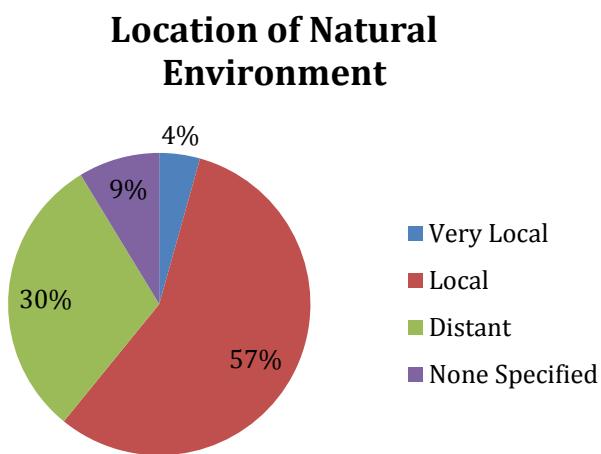
This section of the report provides an overview of the themes emerging from the Nature Connections 2016 conference.

Conference presentations were selected on the basis of their alignment to the two conference themes: the benefits and outcomes of nature connection and ways to facilitate nature connection. Most oral presentations covered both aspects. The benefits mainly focused on mental wellbeing, with three also focusing on learning, three on pro-environmental outcomes, and one also evidencing physical health benefits. In addition, of the poster presentations, one reported physical health and wellbeing benefits, another benefits to learning, with one also evidencing place attachment to the local landscape.

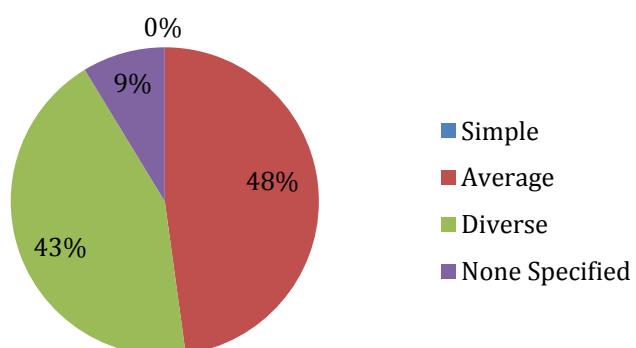
Three keynote addresses, eight posters, and 27 presentations were made. 31 abstracts are given in the appendices, with permission from the authors.

## The scope of nature connection research and practice presented

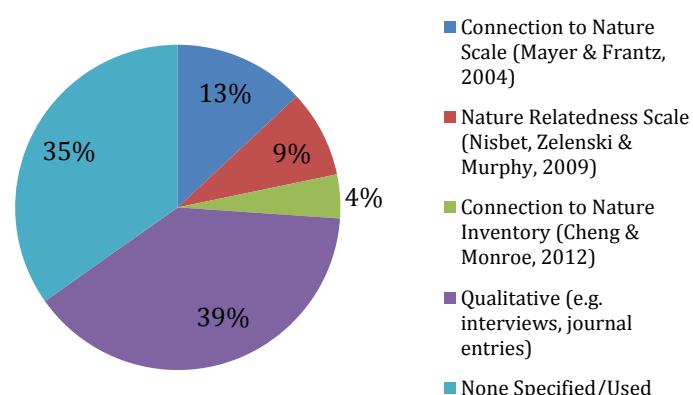
In order to present an assessment of the broad scope and context of current research and practice, an assessment of the quality<sub>2</sub> of natural setting, location of the natural setting, and the measures used to assess nature connection were captured for each of the presentations. The results are presented in the charts below.



### The quality<sub>2</sub> of the natural environments in which the study took place



### Measure of Nature Connection Used



<sup>2</sup>Examples for the categories: Simple- a football pitch; Average – a local park; Diverse – nature reserve

The broad assessment given in figs 1 – 3 are useful as they suggest that much of the current research and practice (as reflected by presentations shared at the conference) are taking place in local natural environments of average quality, and that there are also significant amounts of interest in activities in more distant and biodiverse spaces.

Evidence from the Monitor of Engagement with the Natural Environment survey (MENE) shows that people in England are most likely to visit local natural environments, also that local urban green space that is particularly important to those groups in society who take the least frequent visits to natural spaces, including people from the Black and Minority Ethnic (BAME) and the lower socio-economic groups (C2DE). Exploring the mechanisms by which nature connection can happen in these very local green spaces, which are often of average quality, is important as our interaction with nature will increasingly occur within urban environments (Newman & Dale 2013).

The conference presentations appear to confirm that there is ongoing research and practice interest in understanding how to engage people with nature in local spaces in their everyday lives. However, it was clear that there was no coordination of this activity or mechanisms to enable this work to be collated or to inform or respond to strategic priorities. There was also evidence of considerable overlap and duplication.

There appeared to be a body of evidence supporting links between nature connection and positive mental health/wellbeing benefits, but a clear need to better understand the impact that different types of natural environments, and different types of experiences, have on nature connection and its outcomes in different contexts and at different ages.

At the conference there was, in most cases, a clear distinction between research and practice presentations, with few studies involving both research and practitioner organisations working together. There was a clear opportunity and need to build awareness among practitioners of the difference between contact with nature and the construct of nature connection.

Evaluation methods used were both qualitative and quantitative. Where quantitative methods were used, a variety of different measurement scales were being employed although the Connection to Nature scale (Mayer & Frantz, 2004) was the most frequently used. One presentation updated the conference on a collaborative project to develop a simple indicator scale for nature connection that was being used with both children and adults in a national survey context and being tested for potential use by researchers and practitioners evaluating local projects. Of the presentations made by practitioners, only 1 of the 13 used an established measure of nature connection (the Connection to Nature Inventory (Cheng & Monroe, 2012), with the rest using qualitative measures or no measures at all. While no explicit reason was provided for this, lack of awareness of existing measures and a lack of the confidence and skills required to evaluate interventions using these measures may be responsible, with delivery focus being on enabling contact with nature instead. Linking practitioners (with expertise in engaging people with nature) with researchers (who have expertise on research methodology and evaluation) appears to be an important next step.

*Conclusions:*

- *There is a clear need for a simple, consistent ways to describe, build awareness of, measure and report on nature connection in delivery applications.*
- *Relevant networks in this area, such as the Nature Connection Research Network (NCRN) and Strategic Research Groups (SRGs), should work to lead and establish a shared view of the priorities for research and delivery in nature connection.*

## **Enabling Nature Connection**

- **The potential routes or pathways to nature connection** were explored in a presentation that drew on experimental testing of theory. This suggested that contact, emotion, meaning, compassion, and beauty were potential pathways to nature connection. For this presentation, an experiment utilising focused attention on the surrounding environment and walking in either the built environment or in local urban spaces with nature were used to test the identified pathways. Activities focusing on the pathways were used on the walk in the built environment and on the walk in urban nature, while a third condition used a walk in urban nature without any activities. Only engaging with nature through the pathway activities of contact, emotion, meaning, compassion, and beauty led to an increase in nature connection. The wellbeing outcome of vitality was increased only in the two urban nature conditions. While the results are encouraging and amongst the first of their type, the use of a student sample (mainly young adults) and the need to further refine the activities used necessitates the need for further practical evaluation of the pathways to nature connection.
- A poster presentation outlining walking for three consecutive days in local natural spaces compared to walking in an urban environment led to increased nature connection, as well as cognitive empathy and mindfulness.

*Conclusion:*

- *More research is needed to understand the routes or pathways to support nature connection.*

Several presentations reflected on the impact of **different types of natural environment**, but very few presentations compared the impact of different types of environment on nature connection or outcomes. Similarly, most presentations tended to look at the impact of exposure to or contact with nature but did not assess nature connection.

- One presentation referred to an analysis of data from MENE alongside health and wellbeing data. This illustrated that visits to some types of environment are linked with delivery of more positive impact than others.

- One study explored preferences for coastal areas and areas of bluespace. This suggested that coastal areas that provided openness and fresh air were preferred for relaxation, possibly as the result of positive childhood experiences with nature in similar spaces. Respondents reported that water that was not part of the coast was less important for wellbeing benefits than coastal areas.
- The role of woodland within communities and its value both economically and for its health and wellbeing benefits was explored with 50 groups around the UK. Results supported future focus on management of woodland as a commercial enterprise for skill development and job creation, and for its role in enabling sense of place and community cohesion, along with possible physical, and mental wellbeing benefits.
- Natural history museums were cited as another point of contact with nature that are often over looked for their potential to facilitate nature connection in urban environments. The large reach and location of natural history exhibitions suggested the need to create and formally evaluate interventions that utilise museum spaces to facilitate nature connection.
- The preferences for wildflower meadows in urban green spaces was outlined in a poster presentation, which highlighted individual preferences for species richness and natural aesthetics.
- In response to an unpublished literature review highlighting the need to understand the priorities and values of policy makers and planners when creating natural spaces in urban environments, a study in Eire interviewed different types of policy officers including local planners, local authority engineers, biodiversity officers, conservationists, and health promotion officers. Q Sort methodology was used to explore with participants to what extent they agreed or disagreed with a set of statements. All those interviewed felt that nature benefitted wellbeing and they all agreed that access should be for everyone in society, they also all agreed that there is a need for green exercise and that nature connection leads to personal pro-environmental motivations. However, there were some notable differences in opinion between the professions involved: all but the local planners felt they were restored by nature but felt there were insufficient green spaces, while engineers felt greenspace was sufficient. Engineers were also found to be more interested in play than biodiversity and to hold the view that that most adults appreciated nature. This highlighted how important it is to understand the complexity of different perspectives involved in decision making.
- There was a call to ‘leave more trace’ when in nature (that is ethical and proportional) with the intention of facilitating nature connection (although this was not evidenced) and to replace ‘leave no trace’ messages that can act as barriers. Removing such barriers through actively engaging with nature (e.g. through touch/direct contact) supports the ethos behind campaigns such as Project Wild Thing (The Wild Network, 2016.) While it was noted that this approach is becoming more widespread, there is a need for more evidence of the impact ‘leaving more trace’ may have.

- A poster presentation outlined barriers to engagement with the natural environment from MENE data. It was highlighted that a unique opportunity exists to work to better understand those who report 'no particular reason' as preventing them from accessing nature.

*Conclusions:*

- *Build awareness of nature connection as a construct that can be measured.*
- *Build evidence to understand the impact of different types of natural environments and different types of experiences on nature connection and its outcomes.*
- *Recognise and better understand the different perspectives involved in planning decisions and build awareness of inequalities in access to natural spaces.*

Conference presentations highlighted the many **different contexts and types of contact with nature** being used, and some indicated how these may affect nature connection. Several presentations referred to **education contexts** and highlighted an opportunity for adapting the wealth of existing outdoor learning practice to both investigate and evaluate nature connection as a desired outcome.

- One research study had investigated the differences in nature connection between students on a countryside management course and those studying adventure sports. Students on the countryside management course who worked in and with nature were found to have significantly higher nature connection scores than students on the adventure sports course who tended to use and experience nature as simply the location for their studies and practice. While the design prohibits any conclusions of cause and effect, the importance of experiential or situational learning was suggested as a possible explanation for the higher nature connection scores in countryside management students.
- A study of a forest school programme drew links between attachment to place and nature connection. These were explored through interviews with practitioners. This study did not use measures of connection to nature, however it did record perceived barriers to nature connection which included negative cultural views such as possible dangers, and reluctance to allow children to get dirty. It was also reported that subjective accounts of increases in nature connection (although it is unclear whether this meant nature contact or connection), knowledge, and self-esteem, along with further, independent visitation to the forest by children and their families; indicating a sense of place. This was attributed to experiencing nature through the senses in the forest school approach.
- Another forest school study was reported in a poster presentation, with children showing increased physical activity and increased self-reported wellbeing during days spent in forest school lessons when compared to a traditional classroom learning.

- One presentation focussed on the pedagogy of attention, incorporating noticing nature, imaginative play and creativity into initial teacher training. Although no direct measurement of nature connection was used in this study, it was suggested that this approach, rather than just cognitive approaches, would connect learners to nature and find meaning within their local spaces and landscapes by becoming immersed within the natural world. The implication was to design approaches to fieldwork with activities to direct attention and encourage enquiry and playfulness.
- The potential role of therapeutic horticulture for physical health and wellbeing was also outlined in a poster presentation.
- A programme in Australia engaged students in workshops and a six-day wilderness camping trip. Personal journals and interviews highlighted how a personal, non-directed exploration of nature led to a greater desire to spend more time in the natural environment and to engage in active roaming in the wilderness.
- A project in Devon that aimed to deepen children's' and teachers' understanding and appreciation for nature was the subject of a poster presentation. After six weeks of an educational project, an increased ability to categorise landscapes and the use of words to describe the natural landscape including 'home' and 'beautiful' were reported.

#### *Conclusions:*

- *Develop partnerships and links between research and practice communities already working in nature connection and outdoor learning to:*
  - *Address a lack of awareness of the construct and role of nature connection among practitioner communities who support outdoor learning.*
  - *Develop ways to help practitioners facilitate and report on nature connection in learning contexts, for example by developing simple, consistent tools that can be used to measure nature connection.*
  - *Gather evidence on how to facilitate nature connection in learning contexts and how this relates to delivery of outcomes.*

Three presentations touched on **the use of technology** in engaging people with nature and nature connection, directly addressing concerns over inactivity and screen time.

- One study explored the relationship between problematic smartphone use, nature connection, anxiety, and self-esteem. Results indicated those with higher nature connection had less problematic smartphone use, used their phones half as much, were significantly less anxious, had higher self-esteem, and took less 'selfies' but more pictures of nature. In contrast, those with lower nature connection were also more likely to be problematic phone users, have lower self-esteem, and have higher levels of anxiety while taking more selfies. It was noted that the cross-sectional design of the research meant causality

could not be determined but the results suggest evidence that would support limiting screen time and the benefits of being more connected to nature.

- A qualitative study interviewed older adults who engaged with nature via walks and who were encouraged to take photos via smartphones. The results suggested that noticing nature was a key component for nature connection. Technology has the potential to both help facilitate nature connection through picture taking, while also being a potential barrier through interruption.
- A conceptual piece from Canada presented the potential for technology to facilitate nature connection, particularly to encourage pro-environmentalism, focussing on Attention Economy, and to captivate attention to facilitate nature connection. It was proposed that this was especially important for children in learning environments, where the wondrous and hidden aspects of nature, such as how trees breathe, could be visualised through technology. The potential for technological approaches to reflect indigenous knowledge about the natural world was also noted.
- All three presentations acknowledged the need to engage with nature more and technology less, however, all three presentations also highlighted how nature connection could potentially be facilitated through applying technology where appropriate and that this might be especially relevant when targeting young people.

#### *Conclusion:*

- *More research is needed to build an understanding of the potential role that technology could play in enhancing interaction with nature and nature connection.*

### **Outcomes of contact with nature and nature connection**

Of all the possible outcomes of contact with nature and nature connection, **mental wellbeing and mental health** received the most coverage at NCx2016.

The following summarises the presentations that focused primarily on evaluating outcomes – for ease these are grouped under outcomes for children and outcomes for adults.

Several of the presentations in this section reflect the benefits of research and practice working together to deliver new insight.

### **Outcomes for children**

- A ‘three good things’ intervention studied two groups of children. One group were asked to take a note every day for a week of 3 good things they had noticed in nature, while the other group recorded any three things they had noticed. Nature connection was measured and showed increases similar in

both conditions. There was a positive relationship between nature connection and two outcomes; satisfaction with life and self-reported pro-environmental behaviour, however this was not evident in the more general context. The need to engage children with nature in order to facilitate nature connection and wellbeing, rather than just writing about nature was highlighted.

- To address a widespread lack of empirical evidence, the effect on nature connection and wellbeing was studied during a 5-week forest schooling programme with children. Children were engaged with nature through woodland activities including games, storytelling, and camp cooking. Compared to the non-forest school classes, the children's resilience (or sense of mastery) and individual wellbeing increased after engaging with the activities. Initial analysis of results suggested some small changes in children's nature connection scores over the 5-week programme, further work will explore and publish the results. This result reflects a need to better understand the pathways to nature connection in educational approaches.
- Engaging young people with nature through conservation skills in outdoor natural spaces was outlined in a poster presentation made by the YMCA in conjunction with Derbyshire Wildlife Trust. Increases in nature connection and wellbeing were reported after engaging with the project.
- Two studies explored outcomes of engagement with nature but did not measure nature connection. The first was a double-blind, placebo controlled trial using nature as a treatment for Attention Deficit Hyperactivity Disorder (ADHD) although final results were not available. In the second study, primary school children engaged with nature through working farms. Qualitative accounts from teacher assessments expressed increases in confidence, self-esteem, resilience, and self-agency for children.
- Several of the presentations referred to the likely role of childhood experiences in nature determining later life outcomes and predisposition to nature connection in adulthood.

## Outcomes for adults

Two presentations directly addressed the pro-environmental benefits of nature connection.

- The 30 Day Wild campaign (Richardson et al., 2016) drew upon previous research about the good things in nature (Richardson et al., 2015) and aimed to encourage people of all ages to spend a small amount of time in nature for 30 consecutive days and for those taking part to use social media and online blogs to recount their experiences. In addition to increases in nature connection scores, physical and mental wellbeing, and self-reported pro-environmental behaviour were also increased, both immediately after taking part and at a two-month follow-up evaluation. An important finding was that nature connection mediated the relationship between mental and physical wellbeing.

- A new research project was introduced that aims to investigate the role of nature connection through attachment to local and global spaces and how this might affect the uptake of pro-environmental behaviours. An unpublished literature review performed for the project identified the dominance of psychological papers in the field of nature connection, the need for more input from practitioners and policy makers, and the prevalence of theoretical rather than practical papers on nature connection.

Many of the studies on adult outcomes explored outcomes from contact with nature in general rather than nature connection.

- Research was presented that demonstrated the link between time in nature, emotions, physiology, and wellbeing. Many of the mental well-being benefits of nature relate to positive affect, yet research into nature and positive affect tends not to consider affect regulation and the neurophysiology of emotion. In a review of 14 published papers (Richardson, McEwan, Maratos & Sheffield, 2016), the role of the parasympathetic and sympathetic nervous system on the wellbeing benefits of nature were outlined based on heart rate responses. The analysis supported the use of an existing evolutionary functional model of affect regulation, the three-circle model of emotion that provides a framework in which to consider the mental well-being benefits of nature. The three-circle model is easily understood in the context of our everyday lives, providing an accessible physiological-based narrative to convince others of the benefits of nature.
- Audience specific presentations included a horticulture programme for female prisoners which reported improvements in mental health and wellbeing and support for reintegration. Qualitative interviews revealed a sense of vitalisation and a reduction in self harming that was linked to the horticulture programme. Another presentation shared results of working with vulnerable adults with, for example, mental health issues or housing problems. Qualitative reflective accounts suggested that direct experiences of nature via guided walks in nature reserves, combining the physical activity of walking with sensory experiences through nature, led to improvements in confidence and the ability to take ownership over personal health issues as a result of walking in nature, supporting previous literature on the benefits of green exercise (Pretty et al., 2007).

### *Conclusions*

- *There is a clear need for more evidence to support a better understanding of how nature connection and contact with nature support outcome delivery, and what conditions might support nature connection. This is particularly important to inform strategic interventions around delivery of wellbeing outcomes and for pro-environmental behaviours.*
- *There is a need for research and practice to work together on nature connection, with input from a wide range of disciplines beyond psychology - including health, environment, conservation, and education.*

- *There is a need to understand nature connection across the life-course and whether and how childhood experiences influence nature connection in later life.*

## Priorities for action

The evidence presented in this report confirms that nature connection is a well-established construct with the potential to help address physical and mental health inequalities, and to support pro-environmental outcomes. The conference was very useful in highlighting several clear challenges and opportunities for research and practice in this area, not least the need to work better together to support policy and planning to support positive outcome delivery for health and environment. A follow-up survey after the conference was also used to help the authors identify the themes and priorities for action that emerged from NCx2016.

Priorities for research and practice that emerged from the conference include the need to:

- Address the disconnect between academic research and practice in this area and between different disciplines/sectors. For example, interest and understanding of nature connection (rather than contact with nature) exists largely within the psychology research community, whereas ongoing practice to support contact with nature rests with practitioner communities in environment and health.
- Agree a strategic framework and priorities for nature connection research, to allow prioritisation and coordination of research and practice, to enable collation of data and to reduce fragmentation.
- Develop simple, consistent ways to articulate what nature connection is, why it is important, and how to measure it; so that this can be clearly communicated to practitioners, policy makers, and others with an interest in delivering outcomes for people.
- Research needs to develop understanding of:
  - The ways in which nature connection supports delivery of outcomes, and specifically its role in supporting wellbeing and pro-environmental attitudes and actions.
  - The role nature connection might play in facilitating positive outcomes over and above contact with nature.
  - The routes to enable nature connection, including technological ones, so that this can inform both strategic interventions and support outcome delivery in local contexts.
  - Whether or not those groups least likely to have contact with nature are also those least likely to be connected to nature.
  - The role of the quality and type of natural environment in supporting nature connection
  - The role of nature connection in supporting outcome delivery in learning environments.
  - Whether and how nature connection develops and changes across the life course, and the possible role of childhood experiences in determining nature connection in later life.

- The aspects and complexities of nature connection that are likely to be related to culture and sense of place, as these will be relevant to the development of nature connection within individual population groups in the UK and in different countries.
- Enable collaboration between research and practice in outdoor learning and ecotherapy practice settings as these offer immediate gateways for gathering evidence and research.

## Opportunities

The UK Government's emerging 25 year plan for the environment sets out an ambition to optimise benefits for both people and the environment, and has a specific ambition around reconnecting people with nature.

The NCRN, working with the SRGs and their associated Working Groups, are well placed to respond to the findings of this conference to continue to show leadership in this area, offering an immediate forum for informed advice, for progressing a more strategic approach to nature connection research and practice, and for addressing the priorities for nature connection research and practice.

In the short term, these networks can respond by leading the development of more coherent narratives about nature connection and why it is important. They can also respond to the findings of other recent studies including the pilot to develop a national indicator measure for nature connection amongst adults and children in England (report due for publication in early 2017.) The University of Derby's annual Nature Connections Conference can continue to offer a forum to share and inform UK priorities in nature connection research and practice in an international context.

If you are interested in attending the Nature Connections Conference 2017 please visit <http://www.derby.ac.uk/enterprisecentre/events/nature-connections/>

## Conference poem

During the conference, Jo Bell listened, inspired and worked with delegates to create a poem based on their most enduring memories of being truly connected to nature.

### Only connect: three good things

A kid from the estate sees trees,  
amazed that they really exist.  
Weeks of sighs of pain and anguish  
dissolved by a mountain, covered in mist.  
Three good things: A Pyrenees col. An open sky. The whistle of overhead swifts.

Swimming in Mull - the dark sky above,  
kelp forests below and me in the middle.  
Roly polying down a Dorset beach  
to throw moon shadows between the pebbles.  
Three good things: woodland. A chiff chaff. The goldcrest's zippy fiddle.

Making love in the sun, half a mile from our clothes –  
her hair was the colour of corn.  
A red deer's breath misting the air  
as we see each other at dawn.  
Three good things – a seven year old. A grandparent. A rock pool, containing one prawn.

In the form of a heron, a dead friend appears  
as I wake on a beach in Brittany.  
Taking the kids to the edge (but not over)  
at the Half Dome in Yosemite.  
Three good things in Pembrokeshire: the power of a wave. Barnacles. Anenomes.

Collecting the delicate lace-like leaves  
crafted by snails on the march, on the munch.  
Shouting BITTERN BITTERN BITTERN  
so the old men in the hide leap off their bench.  
Three good things: Epping Forest. Wellingtons. Egg mayonnaise sarnies for lunch.

Love amongst Irish wildflowers;  
sunburn in bulrushes on Lough Earne;  
walking without the iPod for once, and hearing  
the powerful swoosh of a swan.  
Three good things: A hot tub. A forest in Suffolk at night. Rain.

Sitting on Giggleswick Scar at fifteen,  
immortal, and smoking Marlboro Lites.  
The almost vibrational rasping of limpets  
grazing Lettergesh rocks at night.  
Three good things: A pram beneath an apple tree. A baby watching sun in the leaves. Delight.

The sound of dawn chorus at Glastonbury  
before all the other tents have stirred;  
walking in local woodland,  
rejoicing at noises the deaf dog hasn't heard.  
Three good things reported by all: The birds, the birds, the birds.

Trying to stop a turtle on its way to the sea –  
it was very big. I am very small.  
The underside of a glacier –  
blue glass in a Norwegian wall.  
Three good things: three skylark eggs, three hopes, three bright songs in the shell.

The wind in the palm leaves, so different to home  
that I helplessly burst into song.  
Swimming in a water hole and hoping  
the DANGER OF CROCODILES sign is wrong.  
Three good things: is not enough. Don't ask me to pick just one.

Using a Coke can to gather up tadpoles,  
as I lay on a rock on my belly;  
in the absence of anything better,  
bringing home frogspawn in a welly!  
Three good things: The sudden desire to undress. My heart. This ragged-breath reality.

Swimming with seals in Loch Sunart  
or the crystal clear waters of Shetland;  
nursing a pigeon from illness to flight;  
a tree as old as a village, recognised as a friend.  
Three good things: A blackberry bush and two purple hands.

Waiting in hope of otters,  
till they swim into the corner of your eye;  
butterflies seen in the Burren  
and a score of rockpool holidays.  
Three good things: a learning-disabled child. A seed pushed in with her finger. Joy.

An afternoon snooze in the orchard;  
my summer-sweating parents, forking out hay.  
Me lying flat on my back on the earth  
like one more little star, reflected in the sky.  
Three bad things: Falling off the zip wire. Walking in the rain so no one can see me cry.  
Spiders in the shed WATCHING ME.  
A study of slug eating behaviour;  
a waterfall shower that sluiced away gloom.  
You know the score. The sky. The trees.  
The sun. The birds. The moon.  
It matters. Three good things: Nature. Connection. The people in this room.

.....

By Jo Bell for the Nature Connections conference, Derby University June 2016  
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## **Abstracts**

### **Forest Schools**

**Clare Austin- PhD Student, Liverpool John Moores University and The Mersey Forest**

“Forest School is an inspirational process that offers all ages regular opportunities to achieve and develop confidence through hands-on learning in a woodland environment” (Murray and O’Brien, 2005). Originating in Scandinavia, and adopted in schools in the UK. Forest Schools aim to promote academic, creative and physical development, while teaching personal and communication skills and providing children with a greater understanding of the world. This study primarily focuses on the physical benefits of Forest School and investigates whether Forest School sessions increase physical activity in primary school children. The study also explored the mental wellbeing benefits associated with taking part in Forest School sessions. Participants were aged 7-9 years old and were recruited from 4 primary schools throughout Merseyside, each participating in 12 weeks of Forest School sessions. Measures were both quantitative and qualitative. Accelerometers were used to measure physical activity objectively, worn mid-intervention (at week 6 of Forest School sessions) for 7 days. Qualitative measures included a write and draw technique and semi-structured focus groups to gain more in-depth and subjective information about the children’s Forest School experience. Accelerometer data demonstrated that children were significantly more physically active on Forest School days than on regular school days. Write and draw findings revealed interesting gender differences in terms of activity preferences during Forest School sessions and focus group data showed improvements to mental wellbeing as a result of taking part in Forest School sessions.

**The impact of walking environment on connectedness to nature, mindfulness and empathy: a comparison of natural and urban locations**

**Kerry Birdsall and Caroline Harvey, University of Derby**

Immersion in nature has been demonstrated to improve health and well-being, and has also been found to increase measures of trait nature connectedness. However, the effect of such an environment on other personality traits remains in question. An experiment was conducted to examine the effect of urban and natural walking environments and time on measures of nature connectedness, mindfulness, cognitive empathy and affective empathy. Participants (N=44) conducted a thirty-minute walk on three consecutive days and measures of the dependent variables were taken pre and post intervention. A series of factorial mixed design ANOVAs were used to assess the impact of walking in urban and rural environments on the dependent variables. The results indicated that walking in a natural environment significantly increased nature connectedness, mindfulness and cognitive empathy over time but did not have a significant main effect on affective empathy. Walking in an urban environment did not have an impact on the dependent variables at either time point. This research highlights the potential of interventions involving walking in natural environments for positive

psychological outcomes in terms of the enhancement of desirable personality traits.

## **Not Going Out: Barriers to Engagement with the Natural Environment.**

**Francesca Boyd, University of Exeter**

### **Introduction**

There is evidence that time spent in natural environments supports both mental and physical health, e.g. by encouraging stress reduction and physical activity. However, there is also evidence that sixty percent of the adult population of England had not engaged with the natural environment in the past 7 days (Natural England, 2015). Using data from the nationally representative Monitoring Engagement with the Natural Environment (MENE) survey, the current work explores the stated barriers to engagement with natural environments among this cohort. The aim is to better understand why people don't currently use these environments and try to identify ways in which some of these barriers could be overcome. A particular focus is on whether certain groups of society face certain barriers and how these could be addressed.

### **Objective**

To identify the most commonly reported barriers to engagement with natural environments in England among different sub-groups of the population, including changes to barriers during the life course.

### **Method**

Participants were 16,812 individuals drawn from the first six waves of the MENE survey (2009/10-2014/15) and the variable of interest was the reasons why participants said they had not visited nature in the last week.

### **Results**

The sociodemographic analysis showed a disproportionate percent of females experienced barriers to engagement (55.9%). The most common barriers, depending on the participant's life stage, were 'too busy at work' (27.7%, mid-aged adults) and 'too old' (37%, 65+ years). Surprisingly for young people, a relatively large number answered that they had 'no particular reason' (24.2%).

### **Conclusion**

While some factors that reduce the likelihood of visiting nature are already well documented and being acted upon (e.g. disability and organisations such as the Sensory Trust), others such as 'no particular reason', suggest there is an opportunity to better engage certain sectors of society with the potential benefits of visiting natural environments to enhance health and well-being.

## **Perceptions of benefits from getting connected to nature: engaging decision-makers and practitioners.**

**Caitriona Carlin<sup>1,4</sup>, Martin Cormican<sup>2,3,4</sup> Mike Gormally<sup>1,4</sup>**

<sup>1</sup>Applied Ecology Unit, Environmental Science, School of Natural Sciences, NUI Galway, <sup>2</sup>Department of Bacteriology, School of Medicine, College of Medicine, Nursing and Health Sciences, NUI Galway, <sup>3</sup>The Centre for Health from Environment, Ryan Institute, NUI Galway, <sup>4</sup>Ryan Institute, NUI Galway, Galway, Ireland.

*Importance of the work:* This is the first time that Irish decision-makers' perceptions are assessed in relation to health and wellbeing benefits from getting connected to nature. Here, as elsewhere, trends of aging populations and socio-economic inequality increase the burden of illness, as restricted public funding limits capacity to deliver health care services. A particular challenge is exploring the kind of environments that may appeal to those sectors of the community that are at present most sedentary and isolated. Engaging people's interest in nature-based activities can help overcome inertia and lack of confidence and provide motivation to pursue a more active outdoors lifestyle. A critical aspect of this engagement is to provide multiple stepped points of departure relevant to different needs.

The *objective* is to examine evidence of health benefits from connecting with biodiversity in relation to green space decision-makers' values, and make recommendations for policymakers and practitioners.

*Methodologies:* We appraise emerging themes and challenges presented by the current literature. We ascertain perceptions of key stakeholders involved in the planning, design, management and use of Ireland's green spaces, using Q methodology. We assess stakeholder values in relation to the evidence base.

*Main results:* We categorise evidence of health related benefits from connecting with the natural environment according to life stage. We show that stakeholder values are complex, differing within and across stakeholder groups.

*Conclusion:* Biodiversity is essential to a health-sustaining environment but quantifying the evidence is a major challenge. Perceptions of health benefits cannot be categorised solely on the basis of stakeholder role. In seeking to influence policy in this area, we must demonstrate the need to employ multifaceted arguments to engage planners, landscape architects, engineers, health practitioners, conservationists and communities to determine how biodiverse spaces can be created to suit individual preferences and life stages.

## **Using technology in nature**

**Aiden Clark & Lizzie Freeman, Sheffield Hallam University**

The benefits of contact with nature are diverse, with a wealth of literature arguing for its role in human health and well-being, as well as spiritual health, all of which advocate its healing or restorative properties (Pretty et al., 2007). Natural environments have also been found to provoke involuntary attention due to their "rich and inherently fascinating stimuli," (Berman et al. 2008, p. 1207) without demanding directed attention and to counteract attentional fatigue in healthy adults.

To understand how to support nature connection, a mobile and its recording, camera and note taking facilities was used to facilitate mindful practice and data collection with 10 participants of mixed age and gender. Participants went to a local park (for up to an hour) and recorded their experiences and then a week after looked at the data they collected on the computer. Wellbeing and nature connectedness scales and interviews were completed and were analysed by using thematic analysis and repeated measures. Although technology could allow participants to document their mindfulness experience and may assist in the reflection of that event, it may also distract and detract from the effect of being with nature and demand directed attention that would induce attentional fatigue. It is therefore essential that the use of technology nature experiences is adequately evaluated in order to assess efficacy and appropriateness of use.

The preliminary findings of this research will be discussed in relation to the extent it increases our understanding of how contact with nature can be beneficial for people and how technology may/or may not assist the process of connecting with nature.

### **Attending to place: connecting with the natural world**

**Dr Helen Clarke and Sharon Witt, University of Winchester**

*'When people connect with nature, it happens somewhere' (Pyle, 1993: xv). From a local back garden to remote wilderness, from a familiar patch to the edges of experience, from micro-place to macro-space; we propose that attention to place fosters meaningful connections with the world. Outdoor places are 'rich in significance and meaning' and a 'powerful pedagogic phenomenon' (Watichow and Brown, 2011). We advocate an education model where embodied, sensory encounters foster different ways of seeing to nurture more nuanced understanding of the natural world. Our work draws on the Deweyan notion of learning as acquaintance that encourages humans to engage in transactional relationships with the world (Dewey, 1938). These transactions unfold within 'place events' which foreground experience as temporary, dynamic, open and multiple (Massey, 2005:141). We explore embodied learning in context as a 'model for professional action' (Biesta 2007: 7).*

This presentation reports on a pedagogic enquiry with student primary teachers as they engage in fieldwork and interact with children in their school grounds. It lies within the traditional curriculum disciplines of geography and science and also crosses boundaries to promote attentiveness, build confidence, re-imagine relationships, engage in eco-playful experiences and foster spaces of acquaintance. In our case study, provocations lead to attention to detail, experiences imbue spaces with personal meaning, and reflection disentangles an instrumental school curriculum. We illustrate that heightened sensory awareness of our surroundings is a step towards connection (Watichow and Brown, 2011). Everyone should have a place of initiation to nature, a local patch, where 'we learn to respond to the earth, to see that it really matters' (Pyle, 1993). Place connection seeks to foster engagement through nurturing relationships between people and their world in order to develop a sense of stewardship for the future. We suggest implications for educators at every level.

## **30 Days Wild: Development and Evaluation of a Large-Scale Nature Engagement Campaign to Improve Well-Being**

**Miles Richardson<sup>1</sup> Adam Cormack<sup>2</sup> Lucy McRobert<sup>2</sup> Ralph Underhill<sup>3</sup>**

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There is a need to increase people's engagement with and connection to nature, both for human well-being and the conservation of nature itself. In order to suggest ways for people to engage with nature and create a wider social context to normalise nature engagement, The Wildlife Trusts developed a mass engagement campaign, 30 Days Wild. The campaign asked people to engage with nature every day for a month. 12,400 people signed up for 30 Days Wild via an online sign-up with an estimated 18,500 taking part overall, resulting in an estimated 300,000 engagements with nature by participants. Samples of those taking part were found to have sustained increases in happiness, health, connection to nature and pro-nature behaviours. With the improvement in health being predicted by the improvement in happiness, this relationship was mediated by the change in connection to nature.

### **Investigating which characteristics of the natural environment are most effective in promoting mental health and well-being**

**Lynn Crowe and Nick Heath, Sheffield Hallam University**

Investigating which characteristics of the natural environment are most effective in promoting mental health and well-being

A recent report commissioned by Natural England on nature based therapies for mental health and well-being (Bragg and Atkins, 2016) highlighted how the prevalence of mental ill-health is on the rise in the UK. At the same time there is increasing recognition of the importance of connections with nature as a determinant of individuals' mental health (Bragg and Atkins, 2016). Nature-based interventions could be part of a new and cost-effective solution for mental health care (IHE, 2014). However, there remain many unanswered questions (Burls & Caan, 2005). A recent Research Council funding call, led by the Valuing Nature Programme (2015), challenged researchers to establish a better understanding of the different values associated with the natural environment. They hoped this would lead to a better understanding of the aesthetic, cultural and recreational benefits derived from different habitats and landscapes.

This small scale research study investigated which different qualities of the natural environment - both the tangible and intangible - are most effective in promoting mental health and well-being. Using two investigative methods - a questionnaire survey distributed on line (with 200 responses), and six qualitative interviews - the study aimed to explore whether certain habitats or landscapes were preferred over others to relieve stress.

Preliminary analysis of the results (a more complete picture will be available before June) suggests that most people do regard engaging with the natural environment as important for their mental health, with the simplest forms of recreation such as walking, being the most valued. There also appear to be significant differences in landscape preferences, such as coastal areas rather than inland areas. But equally

interesting is the suggestion that a link with earlier experiences (including childhood memories) reinforces the ability of many landscapes to perform this restorative function.

This research suggests there may be particular features worth protecting and enhancing when considering natural environments with public health benefits in mind, but also reinforces concerns about an increasing lack of engagement in the natural environment in young people.

### **Making Local Woods Connect: Social enterprise as a mechanism for reconnecting people with woodlands**

**Norman Dandy, *The Plunkett Foundation***

**Mike Perry, *The Plunkett Foundation***

Woodland-based social enterprises (WSE) provide alternative models for establishing links between local communities and the natural environment that surrounds them. There are many explanations put forward to explain the supposed lack of engagement of communities (and others) in local woodlands, however, underpinning many's assumptions about this is the rhetoric of woodlands as "uneconomic". The arguments, although only rarely directly expressed, are that because woods are "uneconomic" people are, amongst other things, unfamiliar with woodlands and their products, few have jobs or skills focused on woods, and many don't enter foreboding, dense "under-managed" forests.

The MLWW project recognises that an enterprise or trading dimension to woodland management can be important for generating and sustaining connections (and for providing a link to the mainstream forestry sector), however WSEs arguably also provide 'space' for non-economic connections to develop simultaneously and foster deeper, more resilient links between people and woods. WSEs can facilitate alternative (i.e. non-economic) forms of exchange which can build social capital and maintain reconnecting activities.

Through the provision of expert advice, training and networking events, the Making Local Woods Work (MLWW) project will be supporting fifty community-led groups to form and develop WSEs over the next three years. Their many proposed activities include timber production, woodfuel, education provision, skills training, coppicing, ecotherapy, recreation, and events, along with others. Each of these has the potential to bring people together with nature, in many different ways.

This paper will describe WSE and introduce the MLWW project, providing examples of the groups involved. It will discuss the varied ways in which WSEs can provide a mechanism to (re)connect people and forests, the forms these reconnections may take, and consider how best to evaluate the impacts of WSE.

### **Understanding the benefits of a prisons horticulture programme on mental health and wellbeing**

**Dr Alan Farrier, University of Central Lancashire**

The Healthy and Sustainable Settings Unit, based at the University of Central Lancashire, England, carried out a two-year impact evaluation concerning the effects of a prisons-based horticulture and environmental programme on the health and

wellbeing of participants. The purpose of the evaluation was to increase understanding of and strengthen evidence relating to the benefits of the programme for prisoners taking part in three main outcome areas: mental health and wellbeing, physical activity and healthier eating. Additionally the aim was to understand participant experiences by developing individual case studies to show the programme had affected the participants in more depth, including how skills and experiences gained on the programme may be taken 'through the gate' and into the outside community.

It was determined that the most appropriate way to explore this area was to conduct an in-depth qualitative evaluation. Specifically, the biographic-narrative interpretive method (BNIM) was used. Purposive sampling was used to select 12 prisoners from four UK prisons for one-to-one interviews, which were conducted on site.

This presentation explores some of the specific themes that emerged from the analysis of these interviews regarding the participants' perceptions of their connection with nature and how this relates to their understanding of their own health and wellbeing. Examples are drawn from the case studies that were developed from the evaluation. Emergent findings suggest that allowing prisoners access to nature can have a beneficial effect on their health and wellbeing in a more holistic sense, extending beyond the outcome indicators by which the programme was initially measured.

## **Health and Wellbeing: The Role for Social and Therapeutic Horticulture as Nature Based Practice**

**Imogen Gordon, Sharon Heeney, Mike Morgan, Coventry University**

There is a long and established history of the use of nature-based environments for their healing effects and therapeutic activities carried out within them. Nature based interventions are current and contemporary and there is a growing movement for the development and recognition of sustainable therapeutic practice. A number of approaches are now encompassed under the umbrella term Greencare (Sempik et al 2010) of which Social and Therapeutic Horticulture (STH) is embedded, closely allying with professions such as occupational therapy.

Health and social care continues to undergo unprecedented change. Challenges faced by STH and their service users also create potential opportunities particularly where sustainable practice and environments are key considerations in health and wellbeing.

The potential for STH is tangible yet out with some short training courses; occupational therapy within Coventry University provides the only current suite of courses to develop this profession further. 22 years ago, the department designed its first professional development diploma in social and therapeutic horticulture, deliberately selecting the title in recognition of and to ensure a broad spectrum of application. With input from both Pershore College and Thrive, this course provides a recognised real site approach for practitioners in and wishing to join the field. The recent addition of MSc adds a clear focus on developing expertise and research skills.

Both routes attract a diverse range of students from across a wide range of backgrounds open to sharing their unique experience within an innovative community of practice. However the target driven higher education system remains a major threat to the development of this profession.

### **All Play and no Work Makes for Meaningless Nature Connections**

#### **Geoffrey Guy, Bushcraft Education Limited**

One of the earliest champions of experiential education was John Dewey, who cited his experiences as a child in a rural community and watching children in rural settings learning from their chores on farms as an influence in his later theories on experiential learning. Along with Dewey other 18<sup>th</sup> and 19<sup>th</sup> Century thinkers, such as Rousseau and Montessori, advocated 'chores' as part of the learning process. Why is it then that so much of the learning we try to use to encourage a 'connection' with nature revolves around play?

This study shows using the connectedness to nature scale (CNS) that those who 'work' with nature are more 'connected' to it than those who 'play' with it. This study compares students preparing to enter the countryside management and land-based industry who have been working in nature and environment based roles, and compares their scores on the CNS scale to students who have been studying adventure sports and whose primary relationship with nature is as an arena for recreation. This comparison of CNS scores indicates that those students who work with nature develop a greater connection than those who do not. This study does not draw conclusions as to whether the initial motivation for people to engage in 'work' or 'play' in nature has an impact on an individual's CNS score but does demonstrate that those who work with nature tend to have a higher score than those who don't but who still have a vested interest in nature. This may suggest that the inclusion of 'chores' in education for nature connection and involving young people in real nature based work as well as play may have real impacts on nature connectedness.

### **The potential for connecting to nature through forest school.**

#### **Frances Harris, University of Hertfordshire.**

Assessments of the time children spend outdoors in natural environments show that significant groups of the population spend little time outdoors (MENE, 2015). Amid increasing concerns about children's disconnection from nature, the role of schools in providing opportunities for children to learn about nature and the outdoors is increasingly important. Forest school stands out as a school activity which enables children to visit natural sites and engage with nature on a regular basis within the school timetable. An increasing body of research indicates that the impacts of forest school may be wide-ranging, from increasing exercise through learning about nature, developing social skills, and improving self-esteem. This paper reports on research which draws on the experiences of the community of forest school practitioners. Interviews assessed their perceptions of the impact of forest school on the many children for whom they have lead sessions. This paper focusses on practitioners' perceptions of how children engage with nature while attending forest school. It focusses specifically on whether children return to forest school sites outside of

sessions, whether they developed an attachment to the place where forest school occurs, and the potential implications of this.

### **Children's well-being and nature connectedness: Exploring the impact of a '3-good-things' writing task on nature connectedness and well-being.**

**Caroline Harvey, David Sheffield and Miles Richardson, University of Derby**

The health benefits of being connected to nature are well documented amongst both adults and children therefore simple interventions that lead to greater connectedness are valuable. The '3-good-things' writing task is a positive psychology intervention which has been shown to increase happiness and decrease depression. Focusing the 3-good-things writing tasks on nature related good things has been found to increase nature connection in a sample of adults and the present research extends this to explore the impact of the intervention on nature connectedness in children. Children ( $n= 167$ ) aged 9-11 completed measures of nature connection, mindfulness and life satisfaction at three time points, before and after the intervention, and again approximately eight weeks later. The intervention consisted of writing 3 good things about nature that they noticed every day for 5 days, whilst the control group wrote about 3 things they had noticed. Data will be analysed using factorial mixed design analysis. Relationships between the dependent variables will be explored using multiple regression.

### **Experiences of explicit connection with nature pedagogy from a student and educator perspective: An Australian case study**

**David Hayward, Heidi Smith and David Moltow, The University of Tasmania**

Across the globe, the many cultural forms of 'outdoor education' including outdoor education, outdoor recreation, environmental education, friluftsliv, adventure education and wilderness schools have, to varying degrees, identified the importance of 'nature connection' as a core goal for outdoor learning. In recent times, a call for a stronger focus on human nature relationships, developing connection to place and nature, and place based pedagogy in outdoor education has been consistent across the outdoor education literature (e.g., Beringer, 2003; Higgins 2009; Nicholls & Gray, 2007; Martin, 2005; Wattchow & Brown, 2011). This presentation shares the early findings of two research projects. The first used a synthesis of Martin's (2005) human to nature relationships signposts and the Affective Domain Taxonomy (Krathwohl, Bloom & Masia, 1964) to create a conceptual framework through which to understand and elucidate the emotional experience of Initial Teacher Educator's (tertiary students studying to be teachers) nature connection through a unit of study which included a six-day wilderness expedition. The second shares reflections from one educator's personal experience of combining the key elements of extraordinary outdoor leadership with deep nature connection models and activities, to explicitly teach nature connection to Initial Teacher Educators in the same unit of study. The views and experiences of the educator and the participant observer will be given to form a coherent picture of the teaching of, and experiences of, tertiary students during the explicit teaching of deep nature connection.

## **A national indicator for connection to nature?**

**Anne Hunt, Natural England**

Connection to nature - and gaining a better understanding of it - will underpin work to improve policy, practice and research across a wide range of sectors including health, education and environment. Various scales and methods are currently used to measure connection to nature, however the Strategic Research Group for Learning in Natural Environments highlighted that there was a strategic research need for a simple indicator that can be used to provide representative data at a national scale. Over the last year a collaboration of partners, representing research and service delivery in this area, have supported the development and piloting of a new scale - one that is aimed to be suitable for use with both adults and children and one that will capture data on those aspects of connection to nature which evidence suggests act as mediators of wellbeing and pro-environmental behaviour outcomes.

Having had the opportunity to test the idea for the pilot at Nature Connections 2015, we would now like to return to share some of the emerging findings with delegates at Nature Connections 2016. This will include robust estimates of the total number of adults and children in England who are at certain levels of connection to nature, plus results of analysis of this against key demographic factors captured, such as region of residence, age of adults, age of children, socio-economic status and ethnicity. We would also like to seek feedback on any emerging recommendations and next steps.

The final report from the pilot will be published in Autumn 2016 once it has been possible to also analyse the data against published measures from the Monitor of Engagement with the Natural Environment Survey, including behavioural measures (such as frequency of visits to the natural environment) and attitudinal measures (such as motivations for visits, perceived outcomes of visits and intention to adopt more pro-environmental activities.)

## **Enhancing Nature Connectedness Through Digital Technologies, Not Despite Them: An Urgent Conservation Mindset Shift**

**Alan Keeso, University of Oxford**

The relationship between the digital age and nature connectedness is often labeled an inverse one; Increasing amounts of time spent on digital platforms translate to less time spent connecting with nature. Studies continue to surface that signal the reduced amount of time children spend outdoors, and digital technologies are commonly listed as a major driver of this generational trend. I proposed at TEDxOxbridge 2015 that we stand a better chance of reconnecting humans with nature through tech mediums rather than through our resistance of them. I called this talk “The Rescue Mission” to highlight how a reconnection effort through digital means – tailored for children and youth – could serve as our best chance to ensure the longevity of humanity and the planet. Now, one year on, I revisit and reaffirm our

need to view the digital age as a platform that can propel us upright toward meaningful connections with nature. I tailor this message for conservationists and those most interested in nature connections to introduce and emphasise the need for an urgent mindset shift. I discuss the spectrum of feedback I received following my talk, and in keeping with the TEDxOxbridge 2015 theme, “Ideas to Action”, I discuss how I, and I hope we, can mobilise technological mediums to enhance humanity’s vital connection with the natural world.

### **Integrating Scale into Measures of Human-Nature Connectedness**

**Kathleen Klaniecki, Leuphana Universität Lüneburg, Germany**

The degree to which individuals see themselves as part of the natural world is a determinant of pro-environmental behavior. Yet, current measurements of nature connectedness do not consider at what spatial scale people build connections. Thus, there is a need to further understand where individuals experience connectedness and how such connections influence behavior. If connecting people to nature has desirable sustainability outcomes, we must build an understanding not only of how to connect people but where to connect people to nature. We argue that integrating elements of scale into current measurement tools is crucial for making nature connection an effective leverage point for sustainability. We present preliminary findings from a systematic review [660 papers] on human-nature connections. Findings reveal that the concept resonates with a number of disciplines and has been conceptualized in a variety of ways. Across scholarships, the majority of papers study non-specific nature or connections to a specific place. This suggests that, while there are many useful approaches to connection to nature, there is an overarching level of vagueness when referring to the scale at which connections occur. If we accept that a range of pro-environmental behaviors benefit the natural environment, then research should attempt to understand the range of nature connections that may influence behaviors at similar or differing scales. This presentation, drawing on literature from environmental psychology, human geography, education and tourism, will address the methodological question of how to conceptualize and operationalize nature connectedness across different scales. We suggest that measuring where nature connections form will be useful in explaining or predicting pro-environmental behaviors. These findings contribute to our understanding of nature connections and their measurement, and have important implications for future research. Next steps should focus on developing methods for measuring scales of connectedness and the relationship to pro-environmental behaviors.

### **Country Trust Food Discovery as a way of connecting young people to nature**

**Vicki Leng, The Country Trust**

Many children are unfamiliar with what ‘nature’ is, how their lives depend on it for basic needs, like food, and how influential their own attitudes towards food and nature can be. Engaging children with nature should be easy, but there are often many barriers to overcome, for example adults’ fear and own lack of understanding

of the natural world as well as many children's lack of access to 'natural' outside space.

Food Discovery is a holistic programme run by the Country Trust which aims to connect children, their parents and their teachers with food, including where it comes from, and how to feel confident to enjoy food and the environments in which it is grown and produced. Children know that food is vital to life, but through Food Discovery teachers and children learn at first hand the value of fresh food, produced sustainably. In using food as a vehicle to engage learners with nature we are discovering huge benefits: through visits to real working farms and gardening in their own school grounds children can see the importance of acting environmentally responsibly and start to understand the implications of this; they begin to explore their connection with the natural world as a result of the food they grow to eat – there is nothing as immediate as eating peas which they have sown and tended to create a sense of agency.

In addition, children's experiences of patience, wonder, and success help them develop positive learning behaviours, vital for classroom learning. Teachers are telling us, and children are demonstrating, that a better understanding of and connection with nature brings greater food confidence, self-confidence, respect for self and others and engagement with learning.

## **Devon Landscape Characterisation Project**

### **Jo Lewis, Healthy Devon Schools Project**

Forming part of Naturally Healthy Devon Schools project, the Landscape Characterisation project aimed to develop and deepen childrens' and teachers' understanding and appreciation of their local landscapes through outdoor learning.

The project contracted outdoor education specialist Chris Holland to develop and deliver a 6 week cross curricular outdoor learning enrichment programme with a focus on the local landscape in 4 schools in Devon.

The project aims were:

- to connect teachers with their local landscape as an area in which outdoor learning can be focused;
- to develop and deepen children and teachers' understanding of how landscapes have been and continue to be shaped by both natural and cultural influences, what people value in the landscape we see today, forces for future landscape change and how we can guide and manage these through the democratic process of decision-making;
- to increase children's sense of belonging to a place through establishing a strong and continued connection to a distinct landscape that is local to them;
- to support the mental and spiritual health of children by allowing them to experience beauty, tranquility, sense of wonder and contact with nature and history that the landscape provides; and
- to instill a sense of custodianship and stewardship of that place in future,.

At the end of the six weeks the children were able to describe what a landscape is, how landscapes might differ and the different elements that come together to create a particular landscape. They used words such 'home', 'beautiful', 'a home for nature'

and ‘lucky’ to describe their relationship with their local area and felt a greater sense of belonging.

The opportunity to take the time to stand back and appreciate the landscape in which they live was also valued by teachers, who felt doing so had the ability to inspire greater custodianship and stewardship.

### **Leave more Trace**

#### **Chris Loynes, University of Cumbria**

The North American approach of ‘leave no trace’ has crossed the Atlantic to the UK. In the USA the organisation sets out to promote the ethic that will minimise human impact on public lands (<https://lnt.org>). The seven principles of the organisation focus on human behaviour during a visit to public land. It can be argued that this intention, whilst well meaning, ignores the many impacts that are the result of human behaviour when not visiting public lands, the ecological and, especially, the carbon footprint (Chambers et al., 2000) of everyday life and of travel to public land. Arguably these impacts are far more significant on the health of the ecosystems of public lands and elsewhere. This opens the ‘leave no trace’ concept to criticism (Alagona & Simon, 2012).

Of course the ‘leave no trace’ approach has value in fragile ‘wilderness’ settings. However, in Europe the areas that can truly be called wild land are few and far between (Agnoletti, 2006). Despite this the ‘leave no trace’ ethic is becoming widespread and sometimes, I would suggest, an unhelpful approach. An appropriate response might be ‘leave more trace’ in order to protect and sustain the habitats and the wildlife we have come to value as part of our culture.

I suggest that ‘leave no trace’ has another more pervasive consequence in that it strengthens the modern view of humans as separate from nature (Rawles, 2010). This is reinforced by the objective ‘leave no trace’ which is necessarily predicated on the idea that humans are apart from nature and not a part of nature (Beery, 2014). So, to open this up to debate, I offer the maxim of ‘leave more trace’ i.e. that humans are a part of nature and that we inevitably leave a trace. What matters is what this trace is. This acknowledges that traces are inevitable and encourages a debate about what traces are reasonable, proportional and ethical; and what are not.

#### **The Pathways of Contact, Emotion, Meaning, Compassion and Beauty as Activities to Engage with, and Connect People to Nature**

#### **Ryan Lumber, De Montfort University**

The formation of a connected relationship with nature may be important for wellbeing and pro-environmentalism which has in turn led to an increased interest by researchers into the benefits a connection to nature provides. While the benefits of connecting to nature have received considerable research attention, the routes or pathways that can be taken to become connected to nature have received little systematic enquiry. Recent research has identified five pathways to nature connectedness of contact, emotion, meaning, compassion and beauty, with participation in each pathway linked to a connection to nature. While the pathways to

nature connectedness have been identified through theoretical research, their ability to facilitate a connection to nature has not yet been tested. An intervention study utilising the identified pathways was conducted ( $n=72$ ) that consisted of three conditions; an urban activity walk, a pathway activity walk and a nature control walk. Participants in the pathway condition were taken on a walk within outdoor urban spaces that contained elements of nature, with participants engaging with nature through set activities that utilised the five pathways. Participants in the nature control condition went on the same walk but did not engage with nature via the pathways, while those in the urban condition engaged with the urban environment via the pathways while walking within a university building. Pre and post measures of nature connectedness and vitality, a facet of wellbeing, were taken in each condition. Engaging with nature via the pathways led to a significant increase in nature connectedness and vitality, with no significant increase in nature connectedness found in the urban walk or nature control conditions. The identified pathways could be utilised as frames when conducting any activity to increase nature connectedness, with the implications for groups working with people in an effort to reconnect them with nature being discussed.

### **Opening Doors to Nature.**

**Angela Mason, Cheryle Rawson and Liz Richardson YMCA Derbyshire**

Young and vulnerable people who have experienced a combination of homelessness, neglect, abuse, mental health, substance misuse or exploitation can benefit from positive activities related to nature conservation. A joint pilot project between YMCA Derbyshire and Derbyshire Wildlife Trust delivered a 9 week programme teaching nature conservation skills in a range of outdoor environments. The group learned new skills, had improved wellbeing and developed a connection to nature. This group would not typically access the type of environment offered by the Wildlife Trust. A structured programme was delivered offering a range of conservation and wildlife activities such as conservation food production and grazing, path creation, making bird feeders and bug hotels, fence building and regular walks in the woods to take time out and explore.

Pre and post Wellbeing and Nature connectedness Indicator measures were used, along with a weekly blog, observation and semi structured interviews.

The group reported that they loved being outdoors, in the fresh air and getting out of the City. They all were keen to learn new skills and learn more about the wildlife they would see. The group worked really well together as a team, away from any daily challenges and seeing the difference their work had made. As a result of the project the group are now involved in the YMCA allotment project and have applied to complete the Discovery Level of the John Muir Award with Derbyshire Wildlife Trust. Accessing structured activities in a nature based environment has encouraged positive behaviour within the group and support for each other. Regular attendance and a willingness to engage can be a real challenge for this group and due to the pilot's success we now hope to continue this programme as part of our structured programme of support.

### **Nature in museums: not so many answers, but lots of questions**

## **Henry McGhie, Manchester Museum**

Natural history has been a key characteristic of museums established c.1850–1900. Natural history continues to be among the most popular topics in museums, yet these museums have been slow to respond to developments in environmental messaging and the social sciences. These museums have significant reach and, as many are located in city centres, could play a key role in promoting nature connectedness in areas where everyday experience of nature is limited. This presentation would cover: founding principles of key natural history museums, highlighting contrasts with contemporary concerns and emphasising the anthropocentric viewpoint taken. Kellert's attitudes to nature and work on biophilia would be covered, as an alternative lens for exploring nature in museums (ie. alternative to taxonomic or geographical considerations). The relative disconnection between the presentation of nature in museums and the presentation of environmental topics in mass media would be explored (e.g.. DDT and birds of prey, ozone depletion, climate change), before exploring a different model for interpreting nature. In this new model, the emphasis would be on the individual and exploring what they value, what they do, and what they would want to do if they knew how or felt motivated to do so, alongside the presentation of more traditional factual information. How can knowledge of pathways to nature connectedness be incorporated into how we interpret and engage people with the world around them in museums? What are we doing that supports nature connectedness, and what are we doing that gets in the way? These topics would be explored with reference to work undertaken at Manchester Museum (Living Worlds, 7 Million Wonders), and which is currently under development as part of an Esmee Fairbairn funded project focused on older people and their everyday environment.

## **Sowing the seeds of change: Educating for nature-assisted practice.**

**Mike F G Morgan; Sharon Heeney; Murray Hayden; M Rachel Freeman; and Imogen Gordon, Coventry University and Coombe Abbey Country Park**

There is a small but promising and rapidly-developing evidence base, supporting the planned use of natural settings, media and activities to achieve a wide range of health-promoting, social and educational objectives (Annerstedt & Währborg, 2011; Pretty, 2011; Keniger et al., 2013; Allen & Balfour, 2014; Fiennes et al., 2015). However, although such approaches are strongly encouraged by recent governmental policy (HM Government, 2010, 2011; Scottish Government, 2008), uptake of nature-assisted practice as a mainstream intervention strategy has been slow and cautious. Barriers to implementation include difficulties in knowledge translation (Hansen-Ketchum; & Halpenny, 2011); the perseverance of positivistic hierarchies of evidence in healthcare; and practical difficulties experienced by practitioners and service-providers alike with regard to integrating services and partnership working (Taylor-Robinson et al, 2012; Allen & Balfour, 2014).

In this presentation, the authors reflect on their experiences of the development and piloting of an innovative postgraduate module – a partnership between academics at Coventry University and fieldwork education staff at Coombe Abbey Country Park – which aims to provide students with the opportunity to experience, apply and evaluate the use of nature-assisted approaches themselves, whilst using a practical

assignment strategy as a means of promoting the value of such approaches to local service-providers.

### **Natural Triggers Project**

#### **Susan Mulroy, The Farming Life Centre**

*"I observe the landscape, I listen to the birds singing, notice the different colours in the trees and marvel at the texture of the rocks and their formations. I observe definition in clouds. I love to watch and listen to running water flowing. I enjoy the rain, wind and sun in equal measure, the feeling of warm or cold means I am alive. Without Natural Triggers I would never have done these things."*

*Beneficiary, Natural Triggers Project 2015*

Targeting vulnerable people, we take out small groups of beneficiaries to sites in the Derbyshire Dales National Nature Reserve (NNR). After assessing the group's capacity, we provide a walk which is challenging whilst still within the walkers' "window of tolerance" (Ogden et al 2006). Activities led by the Environmental Educator provide participants with a sensory exploration of the natural environment. We use symbols and metaphor to encourage connection between how nature thrives and individuals' own health and wellbeing. We encourage mindful attention, or psychological "flow" (Csikszentmihaly 1996), which harnesses the emotions to maximise the learning potential for each individual.

We return to the indoor environment of The Farming Life Centre where we reflect on and process the group's outdoor experiences through making art. Working with art materials encourages the same mindful attention, and the external experiences of the morning's activities can be processed and internalised, making the learning more sustainable. This means discoveries and insights made during the Natural Triggers day can be carried forward into people's lives and be re-stimulated by future interaction with green spaces.

We finish the day with an open discussion evaluation which allows experiences to be shared, learning consolidated, and insights to be recorded.

*Natural Triggers:* funded by Natural England, administered by the Farming Life Centre and delivered by Susan Mulroy, Environmental Art Therapist and Christine Wilson, Environmental Educator.

#### **Creating a buzz in the city: an experimental cross-city comparison of the public's preferences and values for conserving urban pollinators**

#### **Tristan J. Pett, University of Kent**

Increasingly research is demonstrating that urban greenspaces (UGS), if suitably managed, have the potential to provide important habitats and resources for biodiversity, as well as improving the health and well-being of people living and working locally. However, the role that biodiversity plays in delivering such ecosystem services within UGS is poorly understood. Wildflower meadows can be implemented as a management initiative to support and augment pollinating insect

populations. Such interventions could also provide co-benefits to park users in terms of increasing the opportunity and quality of interactions with nearby nature. This study used experimental meadow plots planted in UGS across three UK cities (Bristol, Leeds and Edinburgh), as part of a wider urban pollinators research project. Areas of UGS were assigned to one of three treatment groups: control sites constituting amenity grass, native perennial meadows and non-native annual meadows. Biodiversity surveys established the diversity and abundance of flowering plants and pollinators within meadows and control sites, and responses to questionnaires were collected in situ across 17 sites during the peak flowering period of summer 2014. We used a suite of methods to assess public preferences and values including psychological scales of connection to the natural world, choice modelling and items to establish perceptions of species diversity and function. These results indicate that the public are generally positive about the creation of flower meadows but that individuals value and prefer meadows for different aesthetic and functional characteristics, depending on the social profile of individuals, their perceptions of species richness and the ecological traits of the flower meadows (such as diversity, colour and nativeness). Our findings suggest that provisioning of wildflower meadows in UGS, as well as providing key resources for pollinators, enhance the value of UGS to park users.

## The Nature of Smartphones Users

### Miles Richardson, University of Derby

Technology is often cited as a reason for our disconnection from the natural world, but there's limited research in this area. Recently smartphone technology has become common and in a study with 236 responses to the survey which included a modified diagnostic scale to identify problem phone use, a measure of connection with nature (NR6), an anxiety inventory, personality scale, self-esteem scale and some general questions about phone usage.

People with higher scores (top 25%) for a connection with nature, with those scoring higher (top 25%) for problem phone use (e.g. I have lost interest in previous hobbies and entertainment as a result of smartphone use) were compared. The analysis can be used to draw a pen-pic of those people who were more connected with nature, they:

- Use their phone significantly less each day (2hr 10min v 4hr 25min,)
- Were significantly less anxious (10.3 v 13.1).
- Had significantly higher self-esteem (19.9 v 15.0).
- Took significantly fewer selfies (1 v 7 per week).
- Took significantly more nature photos (8 versus 3 per week).
- Were significantly more conscientious, emotionally stable and open to experience.

This is a cross-sectional snapshot so conclusions on causality cannot be made. However, having a greater connection with nature is a broadly positive place to be in comparison – whether that came first or developed.

People with higher scores (top 25%) for a connection with nature, with those scoring lowest (bottom 25%) were compared. Those who were more connected with nature:

- Had significantly lower problem phone use scores (19.7 v 23.2), using their phones half as much each day (2hr 15min v 4hr 8min).
- Took 87% fewer selfies – 1 a week compared to 8.5.
- Took 320% more pictures of nature – 8 a week compared to 2.
- Were significantly more agreeable, conscientious and open to experience.

People with higher scores (top 25%) for problem phone use, with those scoring lowest (bottom 25%) were compared. Those who used their phones more:

- Were 33% and significantly more anxious (13.3 v 10.0).
- Had significantly lower self-esteem (15.2 v 20.1).
- Took 16 times more selfies (5.9 a week compared to 0.3).
- Had a significantly lower connection with nature (3.3 v 3.8).
- Were significantly less agreeable, conscientious, open to experience and emotional stable.

The results show that further research is needed, for example, using measures such as anxiety and nature connection before phone use became problematic and how those measures changed in people who become more dependent on their phones. In summary, technology is here to stay, nature connectedness isn't about abandoning technology, it is about realising our place in a wider ecology here and now. Technology must play a role in that and smartphones are clearly powerful and engaging tools. The study showed that those more connected to their phones had a latent interest in nature through taking photos. Smartphones can foster that latent interest as we showed with our three good things in nature work. Technology needs to be used to help deliver nature into people's everyday lives, helping them realise their place in the wider natural world.

## **Joy and Calm: Affect Regulation and Positive Emotions in Nature**

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There is plenty of evidence that nature is good for us, but how does being in nature impact on our emotions, body and wellbeing? A model and supporting evidence is presented to show that nature brings balance to our emotions and the nervous system that influences the function of our internal organs. And this balance brings wellbeing. A simple way to understand our emotions and their underlying physiology is to consider three dimensions of our emotion regulation system. We can experience threat, drive and contentment:

- Drive – positive feelings required to seek out resources, and nowadays achieve success at work or in leisure. It's about a wanting that can bring joy and pleasure as we pursue things.

- Contentment has an affiliative focus bringing different positive feelings, for example safety, soothing, affection, kindness and a positive calm with the way things are.

- Anxiety – feelings and alerts generated by the threat and self-protection system. Located in the fast-acting amygdala this system can be both activating and inhibiting.

Each dimension brings different feelings (such as anxiety, joy, and calm), motivations (avoid, pursue and rest) – releasing various hormones in the body. For wellbeing we need a balance between the three dimensions - happiness and satisfaction comes through balancing threat, drive and contentment. For example, when our threat response is overactive, an unbalance caused by being constantly driven for example, our positive emotions are reduced and we can become anxious or depressed. The model has been used successfully as a foundation for Compassion Focused Therapy and this research shows that it can also explain how exposure to nature effects our body, our emotions and our well-being.

A meta-analysis was conducted on previous research (mostly Japanese Shinrin-yoku or forest-bathing studies) that had compared how the body reacts to being immersed in nature (woodland), to being in an urban environment. These studies measured heart-rate variability - an indicator of activity in the branches of the nervous system that controls the heart. Although these studies found differences in the responses to both environments they didn't consider them in the context of emotional regulation – how nature links to emotion, physiology and well-being. Nor did they have compelling explanations for some variety in the results. The results of the analysis supported the '3 Circles model'. Finding that being in the woods was calming - soothing the nervous system. Whereas the urban environment stimulated the nervous system associated with drive and threat. We can see how exposure to nature can bring balance, calming us after a busy day in the city, for example.

However, some people weren't soothed by the woodland, others were stimulated by it. Again, the 3 circles can explain this. Some people could experience threat in the woodland, feeling anxious about what lies in the undergrowth. Whereas those more in tune with nature could feel joy (rather than calm) at being asked to spend time in the woods.

This work can be considered when connecting people with everyday nature. Forest-bathing is not a daily option for most, but the soft-fascination of nature is there in towns, it just needs us to pause for a moment and make a little effort to notice it – to connect, rest and feel calm. Understanding how exposure to nature impacts our bodies and how this links through to mental well-being helps establish the types of activities in nature that are most beneficial. Exposure to nature is emotional - emotion is the constant companion of sensation with feelings. And these emotions have a physiological basis – which nature and well-being research often overlooks. Such knowledge and models can guide us, for example in the types of natural spaces we provide for people - moving from green spaces, to green places where a soothing contentment in nature can be found. Realising we can move beyond identifying nature to finding joy and calm – and balance in nature. In sum, research evidence supports the use of the three circle model to explain how the body reacts to exposure to nature. The model is also easily understood in the context of our everyday lives, providing an accessible physiological based narrative to help explain the benefits of nature - the neurophysiological and evolutionary basis provides a

compelling argument to convince others of the role of, and need for, nature in our everyday lives.

### **Investigating the effects of 'forest school' on the mental wellbeing and environmental connectedness of young people.**

**Anna Roberts, Dr Joe Hinds, Professor Paul Camic, Canterbury Christchurch University**

Recent years have seen the rise of 'forest school' in the UK. There seems to be an accepted truth that forest school impacts positively on areas such as resilience and self-esteem, despite a lack of any real empirical evidence. A large proportion of the literature on forest schools tends to take the form of evaluations of existing programmes, seldom employing more rigorous methods of research design, and focusing more on behavioural change and the impact for educational settings rather than mental well-being. Due to the potential forest school has to impact positively on mental well-being, it could arguably be of use to people experiencing mental health difficulties and there is a need for research focusing more on this potential link between forest school and well-being.

This study aimed to investigate this link and was conducted at a secondary school in Sussex with 150 students in year 7. A mixed method crossover design was conducted with questionnaires administered at three time points, to measure early environmental experiences, mental well-being, resilience, and connectedness to nature. A qualitative experience questionnaire was also completed after students had taken part in forest school.

The following hypotheses were proposed:

- 1) Attending forest school (as compared to school classes as usual) will positively impact on mental well-being; 2) Attending forest school (as compared to school classes as usual) will increase resilience; 3) Attending forest school (as compared to school classes as usual) will lead to a greater increase in reported levels of connectedness to nature.

The study is still in the data collection phase and we hope that the results will provide new information on the relationship between forest school and mental well-being, which could be of potential use for informing clinical interventions in the future.

### **Mini-solo experiences: Meaning, nature connectedness and wellbeing**

**Emma Robinson and Elizabeth Freeman, Sheffield Hallam University**

Solitude has been shown to be a fundamental element of wilderness experiences (Hall, 2001; Patterson & Hammit, 1990; White & Hendee, 2000) and is often a prevalent theme in nature visitor and client narrative, along with related feelings of remoteness and freedom (Glaspey et al., 2003). Regarded as an opportunity for personal transformation in outdoor programmes, solo experiences have risen in popularity, with a number of authors documenting that they are a beneficial

component to programmes (Knapp & Smith, 2005; Angell, 1994; McKenzie, 2003) and 'surviving' extended time frame solos can mark life transitions for people (Davis, 2003).

A shift has been made towards solo experiences that centre on the natural environment rather than survival, like the reflective solo (Talbot & Kaplan, 1986). Shorter experiences of solitude in wilderness e.g. quiet time (Nicholls, 1998) or mini-solos (Potter, 1992), offer time for reflection and can be prescribed or self-initiated. These kind of 'shorter' solos have not been extensively researched and neither have they been investigated in local green or semi-natural areas.

18 participants aged from 55 - 75 years undertook a mini-solo experience in a local park, lasting up to one hour. Pre- and post-experience interviews and journals were analysed using thematic analysis (TA; see Braun & Clarke, 2006) and four themes were created: 'Receptivity', 'Distractions', 'Time and control' and 'Noticing nature'. Findings will be discussed in relation to literature and policy and may have implications for 'green prescriptions'.

### **Replacing a dose of medication with a dose of nature: a randomised, double-blinded, placebo-controlled treatment comparison study on attention performance in ADHD.**

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In 2009, Taylor and Kuo noted their effect size for increased working memory performance in children with ADHD after a walk in an urban park was comparable to effect sizes reported in other studies using pharmacological treatment. Here, we compare the effect of walking in a natural environment with a regular dose of medication on executive attention performance in children with ADHD within the same protocol. Thus, we test directly the suggestion that brief exposure to nature can produce cognitive improvements comparable to a dose of common pharmacological treatment. We present a double-blind, repeated-measures, crossover design where participants aged 7-15, who are currently receiving stimulant medication for symptoms of inattention, perform the Attention Network Task under four treatment combinations: 1) medication + walk in natural environment; 2) medication + walk built environment; 3) placebo + walk in natural environment; and 4) placebo + walk in built environment. Based on previous research, we expect to see improved pre-test to post-test executive attention performance in combinations 1), 2), and 3); but not 4). Further, we expect the greatest gains in attention performance to be observed for combination 1). We believe this is the first study to directly compare a natural environment intervention with traditional treatment for attention deficits. We see this as a first step for developing larger scale studies to assess the true efficacy of exposure to nature as a management strategy for attention deficits. We present and discuss the process of obtaining ethical approval, registering as a recognised clinical trial, the research design, the methods, and any available preliminary results.