Research Awareness Meeting

The nature of health and well-being: how trees and woods keep us fit and feeling good!

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The link between Nature, Woods and Wellbeing

John Muir
1838-1914

"Climb the mountains and get their good tidings. Nature's peace will flow into you as sunshine flows into trees. The winds will blow their own freshness into you, and the storms their energy, while cares will drop away from you like the leaves of Autumn."

John Muir, *Our National Parks*

River Derwent, Borrowdale
Photo: E.R. Wilson 2012

Policy Drivers in Forestry: Climate Change and Public Health

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Environmental Benefits of Forests: Thirlmere Reservoir

Policy Drivers in Health: Physical activity and health

Be Active, Be Healthy. Department of Health 2009.
The Scottish Health Survey. Scottish Government 2009.

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The evidence base for the link between Nature, Woods and Wellbeing

- **Ulrich 1984**
  - **View from a window may influence recovery from surgery.** Science, 224(4647):420–421
- **Mitchell and Popham 2008**
  - **Effect of exposure to natural environment on health inequalities: an observational population study.** Lancet 372(9650):1655–1660
  - *Green space can dilute the effects of poverty and risk of morbidity and mortality*
- **Donovan et al. 2013**
  - **The Relationship Between Trees and Human Health: Evidence from the Spread of the Emerald Ash Borer.** Am J Prev Med 44(2):139 –145
  - *Loss of trees to the emerald ash borer increased mortality related to cardiovascular and lower-respiratory-tract illness. This adds to the growing evidence that the natural environment provides major public health benefits.*

Strathspey, near Boat of Garten
Photo: E.R. Wilson 2013

What the research demonstrates with certainty

(Townsend and Weerasuriya 2010)

A = Anecdotal T = Theoretical E = Empirical

Assertion	Evidence			Key references
	A	T	E	
There are some known beneficial physiological effects that occur when humans encounter, observe or otherwise positively interact with animals, plants, landscapes or wilderness	✔	✔	✔	Ulrich (1981, Medical Hypothesis 1986), Ulrich and Parsons 1992, Ulrich et al. 1991, Parsons 1991, Pearson et al. 1989a, Friedmann et al. 1980b
Natural environments, such as parks, foster recovery from mental fatigue and are restorative	✔	✔	✔	Kaplan 1995, Hartig et al. 1997, Hartig and Kaplan 1995, Kaplan and Kaplan 1989, Parsons 1973
There are varied clinical methods of nature-based therapy (including wilderness, horticulture and animal-assisted therapy) among others) that have positive healing effects for patients who previously had not responded to treatment	✔	✔	✔	Faccott and Sutcliffe 2011, Diaz and O'Donnell 1995, Lewis 1996, Russell et al 1995, Wade et al. 1998, Katcher and Beck 1983, Levinson 1969
When given a choice people prefer natural environments (particularly those with water features, large old trees, intact vegetation or minimal human influence) to urban ones, regardless of nationality or culture		✔	✔	Hartig et al. 2006, Newell 1997, Parsons 1991

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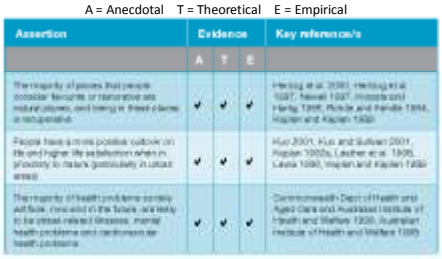

Assertion	Evidence			Key references/s
	A	T	E	
The majority of people that people consider favorite or restorative are natural places, and being in these places is rejuvenating	✔	✔	✔	Herzog et al. 2000, Herzog et al. 1997, Newell 1997, Hodgson and Harty, 1998, Ritchie and Perkins 1996, Kaplan and Kaplan 1989
People have a more positive outlook on life and higher life satisfaction when in proximity to nature (particularly in urban areas)	✔	✔	✔	Hug 2001, Kuo and Sullivan 2001, Kaplan 1992a, Lechner et al. 1995, Lewis 1996, Kaplan and Kaplan 1989
The majority of health problems society will face, now and in the future, are likely to be stress related illnesses, mental health problems and cardiovascular health problems	✔	✔	✔	Commonwealth Dept of Health and Aged Care and Australian Institute of Health and Welfare 1998, Australian Institute of Health and Welfare 1998

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Social capital is decreasing and is likely to continue to decline	✔	✔	✔	Putnam 1995
Exposure to natural environments, such as parks, enhances the ability to cope with and recover from stress, cope with subsequent stress, and recover from illness and injury	✔	✔	✔	Parsons 1991, Ulrich et al. 1991, Ulrich 1984
Greening natural non-work concentration and improve productivity	✔	✔	✔	Tabor et al. 2007, Lechner et al. 1995, Tennessen and Cimprich 1995
Having nature in close proximity (e.g. urban or national parks), or just knowing it exists, is important to people regardless of whether they are regular "users" of it	✔	✔	✔	Driedel et al. 1990, Kaplan and Kaplan 1989

Prevailing Theories Linking Contact with Nature and Wellbeing

- Biophilia Hypothesis
- Attention Restoration Theory
- Stress Reduction Theory
- Environmental Self-regulation Hypothesis
- Bio-ecological Model
- Relaxation Response

- Each theoretical framework is a function (to varying degrees) of evolutionary, genetics, psychology theory and research
- "Additionality" – multiple benefits physical exercise + psychological restoration

Current Research:

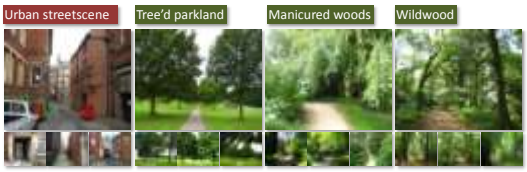
Woodlands and wellbeing projects at
Silviculture Research International

1. Public forests, public health – a review
2. Iconic wildlife species and human wellbeing
3. Psychological restoration - value of urban woodlands of varying structural attributes
4. Lyme disease – best practice for minimising the risk of infection

- **Project Partners** – University of Sheffield, University of Cumbria, Wageningen University, Lyme Disease Action, Forestry Commission, Forest Research, ...

Psychological restoration in urban woodlands
(Jorgensen et al. in review)

- **Locations**: variation in naturalness, biodiversity and structural complexity
- **Filming**: 50 images (each 5 m, 2 secs. each); 5 video clips with sound (60 secs. each).
- **Total time**: 6 mins, 40 secs to cover 250 m transect through each environment



Sheffield City Centre
- Offices
- Georgian/Victorian architecture
- Mix open and narrow streets, lanes, square

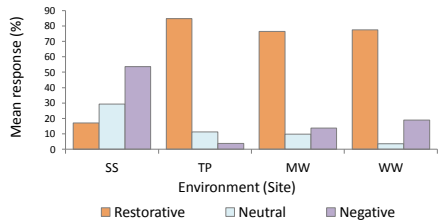
Graves Park
- Simple vegetation structure
- Mown grass, avenue trees, limited shrubs
- Paved paths, benches

Botanic Garden
- Carefully tended arboretum
- Complex structure
- Structural and species diversity
- Paved/gravel paths

Greno Woods
- Semi-natural woods
- Complex structure
- Open areas, dense thickets, seedlings to mature trees
- Gravel paths

Psychological restoration in urban woodlands
(Jorgensen et al. in review)

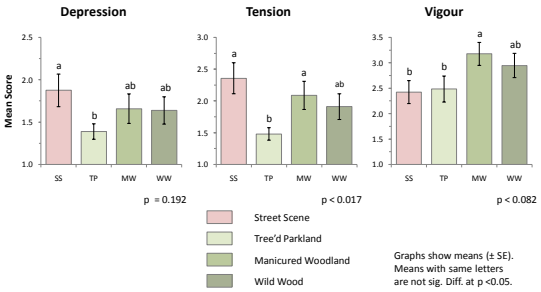
Keyword analysis for each environment



- Pronounced restorative experience in all three green spaces.
- Highest proportion of negative impressions/feelings in Street Scene.
- Moderate distinction among green spaces with distinct structural attributes in terms of negative impressions, most obvious in the Wild Wood setting.

Psychological restoration in urban woodlands
(Jorgensen et al. in review)

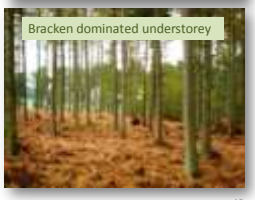
- Profile of Mood States (POMS)
- Significant differences between groups after environmental exposure



Ticks and their habitat

Tick "questing"

Image: BADA-UK



Photos: E.R. Wilson 2013

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Erythema migrans (EM) – the target rash

Image: LDA

Image: 2007 J Gathany PHIL/CDC

- The rash is an early and common symptom of infection
- The rash present in 74 % of cases (LBU, HPA Study) (Marcu et al 2013)
- The rash can be a wide variety of shapes depending on the location of the bite
- Left untreated, Lyme disease can develop into a serious medical condition

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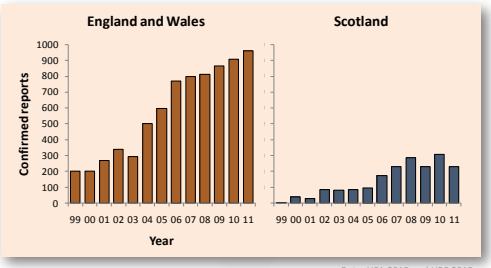
Epidemiology of Lyme disease in the UK 1999-2011



Data: HPA 2013 and HPS 2013

- Approximately **10 000 confirmed cases in past 10 years**.
- Confirmed reports thought to **significantly underestimate** true incidence **(3:1?)**
- Up to **20 percent** of cases in any year are thought to be acquired abroad

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Case study: Understanding risk during a woodland visit in SE England (O'Brien et al 2012)

- **Outcomes**
  - Woodland visitors recognise many personal benefits from contact with nature
    - Physical exercise, Psychological restoration, Social contact
  - Focusing too much on risk can detract from the nature experience
    - *"distancing from risk"* (Marcu et al 2011)
  - Advice at odds with behaviour preference unlikely to be adopted
  - Focus on post-visit action likely to be most effective (see also Marcu et al 2013)

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Health Information about ticks and Lyme disease for Outdoor Users: Key Points

1. **Enjoy the outdoors**
   - it's great for physical and emotional well-being!
2. **Before going outdoors**
   - be aware of ticks and tick ecology
3. **While outdoors**
   - minimise risk of being bitten: dress appropriately; apply acaricide; avoid dense vegetation (questing)
4. **After being outdoors**
   - check for ticks on skin and clothes; check children; check the dog too!
5. **If bitten by a tick**
   - remove promptly using a **safe technique**
6. **Medical treatment**
   - seek early diagnosis and treatment if symptoms of infection develop after being bitten or after visiting tick habitat
   - early diagnosis is easier to treat with ABx
7. **If in any doubt, speak with your GP**



Images: Forestry Commission

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Case study: Understanding risk during a woodland visit in SE England (O'Brien et al 2012)

- **Managing woodland visits:**
  - Providing information that does not seem to impede or reduce recreational use of woodlands
  - Short, clear, concise warning messages most appropriate and effective
  - *"Naturalness of setting"* is important, sensitive placement of signs is essential
  - Responsible management does not equate with a lot of visible warnings

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A high risk area: forest clearing with broadleaf regeneration and a large mat of bracken
Photo: Sharon Rodhouse 2011


Making use of vegetation dynamics – maintain moderate shade in high access areas
Whinlatter Forest
Photo: E.R. Wilson 2011


Lower risk habitat with paths carefully prepared and vegetation cut back
Center Parc Forest Village, Whinfell Forest

What research is required

(Townsend and Weerasuriya 2010)

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Assertion	Evidence			Key reference/s
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Theoretical and/or empirical evidence on whether human health is affected by lack of opportunities to experience nature	✔			Frumkin 2001, Sidgis 2007, Hebert 1987, Ascher and Beck 1987
Theoretical and/or empirical evidence on whether the destruction of the natural environment directly affects human health and well-being and is linked to the prevalence of mental disorders in modern society	✔			Rosser et al. 1997
Anecdotal and/or empirical evidence on the importance of parks to the community in terms of health and the actual health benefits people derive from parks		✔		Hollowath 1998
Theoretical and/or empirical evidence on the role that natural environments (natural capital) play in facilitating social and human capital, and the outcomes in terms of health	✔			Frumkin 2001, Putnam 1995

What research is required

(Townsend and Weerasuriya 2010)

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Empirical evidence on the role of nature in wilderness and adventure therapy	✔	✔		Crisp and O'Connell 1998, Crisp and Runger 1999
Evidence on whether the health and life satisfaction of some population groups (e.g. Friends of Parks groups, park volunteers, wildlife readers and users, or outdoor sports) is greater than others, where those groups have regular contact with nature/wilderness i.e. parks	✔			Townsend and Weller 2003, Townsend 2006, Moore et al. 2007
Evidence on the extent, nature and process of the impact of nature and parks in maintaining psychological health	✔			Wakefield 2005, Wood et al. 2008
Evidence on the extent, nature and process of the impact of nature and parks on quality of life (and happiness)	✔	✔		Wood et al. 2008, Hood et al. 2005, Louv 2005
Evidence on whether exercise carried out in natural settings (parks) has greater health benefits than indoor exercise	✔	✔	✔	Pretty et al. 2007

Joined up thinking!
Team forestry, health service and railway

Photo: E.R. Wilson 2010

Conclusions

- We have deep cultural connections with nature and woodlands that need to be nurtured and renewed
- There is now a strong evidence base for the physical and psychological benefits of green space and woodlands
- More work is required to develop specific interventions and therapies, but generally promoting access and use of woodlands is a key ecosystem service of the public forest estate
- Health benefits must be balanced with health risks – the key is engagement, education and positive communication
- Work is required to minimise health inequalities and to promote opportunities for positive childhood experiences in woodland and other natural settings.

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