

Institution: University of Derby		
Unit of Assessment: 4		
Title of case study: Improving people's connection with nature		
Period when the underpinning research was undertaken: May 2012–December 2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Professor Miles Richardson	Professor	1996–present
Dr Ryan Lumber	Lecturer	2019–present
Professor David Sheffield	Professor	2010–present
Dr Kirsten McEwan (UoA 3)	Researcher	2016–present
Period when the claimed impact occurred: April 2015–31 December 2020		
Is this case study continued from a case study submitted in 2014? No		
1. Summary of the impact (indicative maximum 100 words)		
<p>The climate and biodiversity crisis shows that people's relationships with nature are breaking down. Researchers at the University of Derby (UoD) have transformed the way people interact with nature to improve wellbeing and promote pro-nature behaviour, by developing the 'Pathways to Nature Connectedness', a behaviour change framework that focuses on experiencing rather than mastering nature. The National Trust, Wildlife Trust, European Forest Therapy Institute, and the New Zealand Government Department of Conservation (DOC) have all made improvements to their policy and practice by adopting the framework, which has improved the wellbeing of the public. The creation of the Nature Connection Index (NCI) allowed Natural England to gain a population measure of the UK's relationship with nature. The United Nations (UN) reviewed the framework, and it has influenced the development of the UN's post-2020 Biodiversity Framework.</p>		
2. Underpinning research (indicative maximum 500 words)		
<p>The Nature Connectedness Research Group (NCRG) was established at UoD in 2013 and has produced over 30 peer-reviewed journal articles and received over £300,000 in external research funding [G3.1, G3.2]. In 2018, Universities UK recognised their work as one of the UK's best 100 breakthroughs for research impact. The group is led by M. Richardson, core researchers include D. Sheffield, R. Lumber and K. McEwan. The group conducts behavioural research including:</p> <ul style="list-style-type: none"> • A multi-study project (2013–16) on the development of the 'Pathways to Nature Connectedness', has identified and operationalised five types of activity and relationships that improve people's nature connectedness [3.1]. The foundational idea took Kellert's nine values of biophilia from 1993 and identified those that improve nature connectedness through cross-sectional research and final empirical testing. The pathways provide a unique framework for designing nature connectedness interventions, from visitor programming to green infrastructure design. • Development and evaluations of interventions to improve mental wellbeing and pro-environmental behaviours by increasing nature connectedness. The research group worked with the Wildlife Trust to use the pathways in the design of the annual '30 Days Wild campaign' (2015–20). Yearly evaluations have shown significant improvements in nature connection, health, happiness and conservation behaviours sustained for two months. An evaluation of 273 people who took part in the campaign identified specific groups within the population that benefitted most [3.2]. The clear rationale, theoretical basis, delivery, content and focus on defined outcomes, met criteria for public health interventions. • In 2016, a low-cost intervention to improve nature connectedness was trialled with 92 participants; approximately half had to note three good things in nature every day (intervention) and were compared with the remainder who noted three factual things every day (control) [3.3]. The intervention group showed sustained and significant increases in nature connectedness compared to the control group. Increases in nature connectedness were associated with psychological health improvement in the intervention group. This research provided evidence that 		

paying attention and noting the good things in nature each day can deliver sustained increases in people's connection with nature.

- An RCT (n=582) of a nature connectedness green prescription app [3.4, G3.1] based on noticing the good things in urban nature delivered clinically significant improvements in mental health. Providing everyday opportunities to improve wellbeing through engaging with urban nature using a brief, portable, widely accessible and cost-effective smartphone app intervention is valuable new knowledge.
- A key benefit of nature connectedness is pro-nature behaviours. Although there are several measures of pro-environmental behaviours (broadly carbon/resource use) related to climate warming, there were no psychometric scales to measure pro-nature conservation behaviours (broadly habitat creation or protection) related to the crisis of biodiversity loss. Therefore, the NCRG developed the first scale to measure these behaviours [3.5] which subsequent research showed were increased by improved nature connectedness.
- Psychometric scale development with the Nature Connection Index (NCI): a new population measure of nature connectedness developed for national statistical research [3.6]. To establish the reliability of the new Nature Connection Index (NCI) three factor analyses were conducted. One was based on a large Monitor of Engagement with the Natural Environment (MENE) dataset for adults (n=3568) with replication using datasets collected online (n=553), and a third used MENE data from children (n=351). MENE (now called the People and Nature Survey) was part of the UK's national statistics and uses the robust protocols required when collecting data to inform policy. The results showed that the NCI was a reliable and valid scale for both children and adults, and they gave insights into the links between nature connectedness and pro-nature behaviours.

3. References to the research (indicative maximum of six references)

Researchers employed by UoD on the publication date are indicated by black, underlined text:

3.1 Lumber, R., Richardson, M., and Sheffield, D. (2017) 'Beyond knowing nature: Contact, emotion, compassion, meaning, and beauty are pathways to nature connection', *PLoS One*, 12(5). DOI: <https://doi.org/10.1371/journal.pone.0177186> [Rigorous peer review. Innovative study resulting in the 5 Pathways to Nature Connectedness.]

3.2 Richardson, M., McEwan, K., and Garip, G. (2018) '30 Days Wild: who benefits most?', *Journal of Public Mental Health*, 17(3), 95-104. DOI: <https://doi.org/10.1108/JPMH-02-2018-0018> [Rigorous peer review. Evaluation of 30 Days Wild campaign and identification of sub-sets of the population who would benefit most from the nature connectedness intervention.]

3.3 Richardson, M., and Sheffield, D. (2017) 'Three good things in nature: noticing nearby nature brings sustained increases in connection with nature', *PsyEcology*, 8(1), 1-32. DOI: <https://doi.org/10.1080/21711976.2016.1267136> [Rigorous peer review. Evaluation of a low-cost intervention that improved nature connectedness and led to psychological health improvements.]

3.4 McEwan, K., Richardson, M., Sheffield, D., Ferguson, F. J., and Brindley, P. (2019) 'A smartphone app for improving mental health through connecting with urban nature', *International Journal of Environmental Research and Public Health*, 16(18), 3373. DOI: <https://doi.org/10.3390/ijerph16183373> [Rigorous peer review. RCT of potential new green prescription using urban nature to benefit mental wellbeing.]

3.5 Barbett, L., Stuppel, E. J., Sweet, M., Schofield, M. B., and Richardson, M. (2020) 'Measuring Actions for Nature—Development and Validation of a Pro-Nature Conservation Behaviour Scale', *Sustainability*, 12(12), 4885. DOI: <https://doi.org/10.3390/su12124885> [Peer review. First psychometric scale of its type.]

3.6 Richardson, M., Hunt, A., Hinds, J., Bragg, R., Fido, D., Petronzi, D., Barbett, L., Clitherow, T.J., and White, M. (2019) 'A Measure of Nature Connectedness for Children and Adults:

Validation, Performance and Insights', *Sustainability*, 11(12), 3250. DOI: <https://doi.org/10.3390/su11123250> [Rigorous peer review. Evaluation of a new measure, the Nature Connected Index, (NCI) which is used by the UK government.]

Grants

G3.1 Improving Wellbeing through Urban Nature: NERC, NE/N013565/1. GBP1,300,000 in total. UoD led work package 3, GBP300,388 to M. Richardson, K. McEwan, D. Sheffield.

G3.2 Nature Up Close and Personal: NERC, NE/V009656/1. GBP57,880 (GBP14,204 to M. Richardson and I. Hamlin).

4. Details of the impact (indicative maximum 750 words)

Nature Connectedness is a recent psychological construct that benefits mental wellbeing and pro-environmental behaviours. Researchers at UoD, led by Richardson, have discovered ways to improve nature connectedness that have changed the practices of UK [5.1, 5.2, 5.3] and European organisations [5.4] and the New Zealand government [5.5]. The research has also informed the implementation and evaluation of the Department for Environment, Food and Rural Affairs' (DEFRA's) 25 Year Environment Plan and Natural England's 5-year policy in the UK [5.6, 5.7]. It also influenced approaches to mental wellbeing in the UK and Europe [5.8, 5.9], and has been adopted by the UN [5.10].

Using the pathways framework to engage people, improve wellbeing and increase pro-nature behaviours

Research by Lumber *et al.* [3.1] identified the types of activity that led to improved nature connectedness in the 'Pathways to Nature Connectedness'. The Wildlife Trust used the pathways to design and organise the 'Random Acts of Wildness' activities as part of their innovative '30 Days Wild' national programme [5.1] which has run from 2015 to the present. Evaluations evidenced sustained improvements in happiness, health, nature connectedness and pro-environmental behaviours [5.1] and over one million people have taken part over 5 years [5.1]. The greatest impact was among people who began the programme with lower nature connectedness [5.1]. [text removed for publication]

Following the success of the Wildlife Trust's campaign, in 2018, the National Trust asked Richardson to produce an internal report introducing the evidence base for the benefits of nature connectedness. This resulted in the organisation embedding NCRG pathways into their practice and strategic vision for outdoor experience programming, which was available to the National Trust's 6 million members and 25 million visitors from 2018 [5.2]. The Trust organised a series of workshops with staff who were responsible for the visitor experience, facilitated by videos and guidance on the pathways by UoD. One part of this work was a refresh of the national campaign '50 things to do before you're 11^{3/4}' launched in Spring 2019, which activated the pathways to nature connectedness amongst children. The pathways approach will also form the basis of the new Easter 2021 programming.

The new '50 Things' campaign was implemented in at least 270 properties and led to a 405% increase in web traffic and engagement and has shown a positive impact on visitors' nature connection as well as enrichment of the visitor experience overall [5.2]. A National Trust Project Manager remarked: *"The [UoD] research has really helped the National Trust find ways to encourage visitors to connect to nature and therefore our places in new and more meaningful ways. For the staff it has given a clear framework for how to shape activities to provide richer and more immersive experiences, transforming garden tours, ranger days, dawn chorus events, season long programs, national campaigns (like '50 things') and everything else in-between. For some this has been a considerable shift from a knowledge-based approach to a more personal one, but many have adopted it with enthusiasm and the emerging results have been transformational. For visitors, the change in approach to these activities has helped them to see our places in a new way, develop much deeper appreciation and connection, and ultimately inspiring them to want to care for nature in a better way"* [5.2]. The National Trust Head of Insight remarked: *"The work on Pathways, translated into practical guidance for our teams, has resulted in a transformation in how we design nature experiences, as well as our 'on property*

programming...” It has been, “a positive cultural change”. Furthermore, the approach: “...had a dramatic impact into our wider communications... [We]...have translated the principles of the pathways into operational guidance, as well as a language guide on nature communications.” Additionally, it: “...significantly shifted the focus of our marketing and communications teams ... inspiring creativity for our in-house marketing teams to deliver a more profound and purpose-led approach to engaging people with nature at a time of crisis. We took this further through a high-profile TV advertising campaign, which again, founded on principles and evidence we established through our work with the team at Derby” [5.2].

More organisations across the UK are now using UoD research to inform their work, including: the Royal Society for the Protection of Birds (RSPB), to inform their evaluation and engagement work [5.3] and their ‘nature prescription’ offer in Scotland [5.3]; the Wildfowl and Wetlands Trust are using the Pathways as a guiding principle to establish the Trust as a fore-runner in promoting nature connectedness [5.3]; and the Derby Museum, who experienced a 100% increase in exhibit dwell times after UoD research informed new exhibit design [5.3]. Durrell Wildlife Conservation Trust are using the pathways research to inform organisational guidelines for visitor experience. The Durrell Director of Conservation Science stated: *“In 2017, Durrell Wildlife Conservation Trust launched its new 2018–2025 organisational strategy which put nature connection front and centre of what we do... The Pathways to Nature Connectedness research provides a really useful framework for reframing and designing many of the ways we interact with...people...The Pathways research feeds directly into a set of organisational guidelines”* [5.3].

Internationally, the pathways form a key part of the ‘5x5’ Forest Bathing training provided by the European Forest Therapy Institute to influence the practice of 180 practitioners from 30 countries including Turkey, Ireland, UK, USA, Sweden, Norway, Finland, France, Spain, Portugal, Croatia, Slovenia, Slovakia and Costa Rica [5.4]. The pathways framework changed the practice of the New Zealand Department for Conservation (DOC) who collaborated with the UK National Trust and implemented their own version of the ‘50 things’ campaign [5.5]. In an emergency response to the COVID-19 pandemic, the international charity, SOS Children’s Villages International (SOS CVI), used UoD’s ‘good things in nature’ intervention [3.3, 3.4] as part of the resources provided to improve the psychological health of their staff, children and community during the lockdown in Italy [5.8].

Influencing policy change in the UK and Internationally

Research conducted by the NCRG has influenced a number of national and international policies for nature, environments and wellbeing. The NCRG worked closely with Natural England to inform the development and evaluation of DEFRA’s 25 Year Environment Plan [5.6], published in 2018, which included policy on ‘connecting people with the environment to improve health and wellbeing’. Richardson is an invited member of Natural England’s Strategic Research Committee leading projects such as the validation of the Nature Connections Index (NCI) [3.6], used for population survey work [5.7]. In 2020, nature connectedness was included in Natural England’s new online People and Nature Survey (formerly the MENE Survey), the world’s largest survey of people’s interaction with outdoor green spaces, using the UoD-developed NCI measure [5.7]. The UoD-developed Pro-nature Conservation Behaviours Scale was also included [3.5, 5.7]. The results from this survey provided information on how COVID-19 affected the population’s relationship with nature. The group’s research is also cited in the September 2019 DEFRA review of National Parks and Areas of Outstanding Beauty and is the only research evidence cited in Natural England’s new 5-year plan in relation to the aim to connect people with nature [5.6]. Nature connectedness now forms a key part of Natural England’s 5-year plan and is one of the four strategic areas of focus. Richardson also chairs the expert advisory group on the UK Government 25YEP Nature Friendly Schools programme to create nature-friendly schools.

Natural England’s Principal Adviser stated: *“The insight provided through research led by Derby University into the relationship between nature connection and wellbeing and a range of pro-environmental and pro-nature behaviours has made a profound impact on Natural England’s approach to public engagement and the means of evaluating the impact of that engagement work”* [5.7]. The impact is further illustrated by the fact that applicants to the Connecting People with

Nature stream of the Government's GBP40,000,000 Green Recovery Challenge Fund (GRCF) were directed to work on the pathways to nature connectedness framework in a key part of the funding guidance administered by the National Heritage Lottery Fund [5.7].

The charity, Student Minds, used NCRG research [3.3, 3.4] to develop the 'University Mental Health Charter', launched in 2019 with the support of the Universities Minister, and is currently using the University of Derby as a pilot site to implement the Charter Award Scheme [5.9]. A consumer version of the mental health smartphone intervention developed during G3.1 and found to be effective [3.4], was released as part of the Go Jauntly App in May 2020. Between launch and 14 August 2020, the app had 30,701 downloads; a 300% increase compared with the 3 months pre-launch [5.9]. Internationally, the DOC implemented NCRG research into their national teacher training course to improve nature connectedness among New Zealand children [5.5]. The Outreach and Education Coordinator commented: *"Since the introduction of the Pathways to Nature Connectedness research into the team, there has been a shift in focus on how we develop and promote nature-based learning. The research has been a key factor in shaping the strategic direction of DOC's education engagement from development of resources to promotion campaigns. The marketing and social media teams have identified the pathways as a key tool for engaging new and old audiences in national conservation campaigns"* [5.5].

Richardson was invited to co-author the 'Connecting People with Nature' [5.10] report by the Children & Nature Network, a US non-profit organisation aimed at improving children's access and interaction with nature globally. The report was presented at the November 2018 UN Convention on Biological Diversity. This led to a call for the pathways model to be included in the post-2020 Biodiversity Framework [5.10] in order to achieve the UN's Strategic Plan and Aichi Biodiversity Targets to promote pro-nature behaviours and improve mental wellbeing.

5. Sources to corroborate the impact (indicative maximum of 10 references)

5.1 Wildlife Trust evidence group: a) Richardson, M. *et al.* (2016) '30 Days Wild', *PLoS ONE*, 11(2): e0149777. DOI:10.1371/journal.pone.0149777; b) [30 Days Wild: Five year summary](#) (accessed: 06-10-2020); c) Factual statement (FS) from Communications Officer (01-07-2019).

5.2 National Trust evidence group: a) FS from National Trust '50 things' Project Manager (12-03-2020); b) FS from National Trust Head of Insight (17-12-2020); and c) National Trust [#EveryoneNeedsNature campaign](#), published 09-09-2020.

5.3 UK organisations evidence group: a) FS from Principal Conservation Scientist, RSPB (31-03-2020); b) RSPB Nature Prescriptions in Scotland Leaflet; c) Wildfowl and Wetlands Trust Generation Wild Brief; d) FS from Executive Director of Derby Museum (05-03-2020); e) FS from Director of Conservation Science, Durrell Wildlife Trust (09-03-2020).

5.4 FS from Consultant from European Forest Therapy Institute (28-02-2020).

5.5 DOC evidence group: a) Website for DOC ["50 things to do"](#) campaign (accessed: 03-02-2021); b) FS from Outreach and Education Coordinator, DOC (28-02-2020).

5.6 DEFRA/Natural England evidence group: a) DEFRA's 25 Year Environment Plan (2018); b) [DEFRA's Landscapes Review](#) (2019) (accessed: 06-10-2020); c) Natural England's 5 year plan 'Building Partnerships for Nature's Recovery' (published: 07-10-2020).

5.7 NCI evidence group: a) Natural England, [A summary report on nature connectedness among adults and children in England](#), March 2020; b) [The People and Nature Survey For England - Questionnaire](#) (PANS001, Q49 and Q61, accessed: 06-10-2020); c) [Nature Connection Index](#) (accessed: 06-10-2020); d) FS from Principal Adviser, Natural England (25-08-2020); e) [The National Lottery Heritage Fund GRCF Guidance](#).

5.8 SOS CVI evidence group: a) FS from SOS CVI (25-08-2020); b) SOS CVI resources (in Italian with English translation).

5.9 Mental health interventions evidence group: a) [University Mental Health Charter](#) (accessed: 06-10-2020); b) FS from CEO of Go Jauntly App (13-08-2020).

5.10 UN evidence group: a) Publication by Children & Nature Network (10-2018); b) [UN report "Conference of the parties to the Convention on Biological Diversity"](#) (05-11-2018).