

# Methods and glossary for EIN065- EIN068

Natural England Evidence Information Note. EIN069.

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# Foreword

Natural England commission a range of reports from external contractors to provide evidence and advice to assist us in delivering our duties. The views in this report are those of the authors and do not necessarily represent those of Natural England.

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# 1. Aim and scope

The following series of reviews aim to scope both academic and grey literature assessing the relationship between health and natural environments, building on previous work conducted by Lovell<sup>1-6</sup> and Wooley et al.<sup>7</sup> Researchers aimed to map the wider physiological and psychological benefits of outdoor environments and connection to nature for adult, child and adolescent populations (those aged 0 to 25 years).

This work was comprised of four parts, each consisting of a separate rapid review with the aim of exploring the following:

- a) The relationship between natural environments and mental health
- b) The relationship between natural environments and physical health
- c) The evidence around nature connectedness
- d) How the natural environment can support children and young people.

They build on the evidence but are not comprehensive and should be read together with the original notes:

- [EIN015 Connection to Nature](#)
- [EIN018 Links between natural environments and mental health](#)
- [EIN019 Links between natural environments and physical activity](#)
- [EIN020 Links between natural environments and physiological health](#)
- [EIN021 Links between natural environments and obesity](#)

## 2. Methods

### 2.1. Overview

Scoping is defined in this piece of work as, exploring a range of evidence sources to populate an understanding of the concepts, boundaries, outcomes, and critical ingredients to achieve defined and emergent outcomes. This approach provides indicative rather than comprehensive insight. Much of this data may be held in grey literature, although, there has been a growth in published literature in recent years. The methodology was therefore guided by our aim to explore information available as grey literature reports and evidence summaries alongside peer reviewed literature.

### 2.2. Search strategies

We used a range of search strategies and an iterative approach following the WHO Rapid Review methodology<sup>8</sup>. This approach to evidence synthesis involves streamlining the steps of a more in-depth systematic review under an accelerated time frame to produce evidence in a shortened time frame, typically around five weeks. We searched the

Cochrane Library, MEDLINE, PubMed, Google Scholar for peer reviewed literature (note in Google Scholar only the first 10 pages of the search results were used). Rapid Reviews are best designed for new or emerging research topics, updates of previous reviews, critical topics, to assess what is already known about a policy or practice. Grey literature is anything written that is not published in peer reviewed journals. For this work it was identified by handsearching, networking with expert researchers and searching grey literature databases (google, greylit.org and opengrey.eu).

The strategy for each review was to establish a list of keywords based on the PICO (population, intervention, control, outcome) model.<sup>9</sup> Searches included a combination of search terms including: [intervention] + [outcome]; for example: [green spaces] + [mental disorder]. Reports include details of all search terms and combinations of search terms and findings, including the number of returns for each search, synthesis and summaries, plus any inclusion/exclusion criteria and were recorded in excel files with notes denoting exclusion and inclusion reasons.

### **For each review, the following search terms (title and abstract) were used to identify literature relating to the natural environment (Intervention):**

For searches in google scholar: Nature OR Conservation OR natural environment OR regenerat\* OR garden OR wild OR rewild OR environment OR nature OR rural OR countryside OR outdoor OR outside OR wood\* OR park\* OR meadow OR horticultur\* OR floricultur\* OR botanical OR arboretum OR allotment OR forest OR rainforest OR moor OR dale\* OR marsh OR mountain\* OR blue space OR beach OR river\* OR lake\* OR canal\* OR waterway OR wetland\* OR open spaces OR protected areas OR green\* OR footpath\* OR trail\* OR coast\* OR cliff\* OR dune

For Pubmed searches: Nature [MeSH] OR "natural environment" OR rewild OR countryside OR "blue space" OR "green space" (Note, these terms were chosen after many different versions of searches for nature terms were explored – these terms included the MeSH term for nature, and several other key words from the literature. Other searches with wider nature terms delivered less targeted results in the context of the rapid review.)

The terms for the natural environment were generic and used alongside specific search terms used for each review. So, each block below was added to the search terms for the natural environment to yield the different results per rapid review.

### **For review 1 (The relationship between natural environments and mental health):**

For searches in Google Scholar: Mental Health\* OR Anxiety\* OR Depression\* OR Stress\* OR Psychological distress\* OR mental health OR mental illness\* OR mental wellbeing\* OR mental stress\* OR mental distress OR psychology\* health OR psychologist\* illness\* OR psychologist\* wellness\* OR psychologist\* stress\* OR psychologist\* distress\* OR Wellbeing OR Anxious

For Pubmed searches: mental health [MeSH] OR mental disorders [MeSH] (in Pubmed, again, the MeSH terms were used pragmatically to attain a targeted search).

### **For review 2 (The relationship between natural environments and physical health – spanning obesity, physical health conditions, and physical exercise):**

For both searches in Google Scholar and Pubmed: Obesity [MeSH] OR overweight [MeSH] OR Exercise [MeSH] OR Hypersensitivity [MeSH] OR Diabetes Mellitus, Type 2 [MeSH] OR Neoplasms [MeSH] OR Respiratory Tract Diseases [MeSH] OR Cardiovascular disease [MeSH] OR Musculoskeletal [MeSH] OR Maternal health [MeSH] OR physical activity OR exercise OR aerobic OR physical exercise OR leisure-time OR sport OR leisure activit\* OR physical fitness OR gym OR training OR physical performance or physical therapy

### **For review 3 (Nature connectedness, policy and evidence brief) – note search terms were developed from looking at other published searches on connection to nature:**

For both searches in Google Scholar and Pubmed: "biophilia" OR "nature connection" OR "Nature Connection Index" "outdoor education" OR "eco-psychology" OR "30 days wild" OR "connectedness to nature" OR "nature relatedness" OR "Connectedness to nature scale" OR "connecting with nature" OR "connectivity with nature" OR "conservation behaviour" or "Nature relatedness scale" OR "Nature lovers" OR "Children's connection to nature" OR "therapeutic landscape" OR "play in nature"

### **For review 4 (How the natural environment can support children and young people):**

Child\* OR Adolescen\* OR Young\* OR Student\* OR youth\* OR teen\* OR pupil\*

Plus FILTER for age 0 to 18 for children, and 0 to 25 for children and young people

The results for the pragmatic natural environment search and outcomes were combined to provide a manageable range of sources of information to work with within the rapid review.

## **2.3. Selection criteria**

Studies were included if they met the following criteria:

- Studies were referenced in the original evidence notes EIN015-EIN021
- Studies from January 2016 (when last review work was written) to present (February 2022). Note – for the rapid review “How the natural environment can support children and young people” studies were taken from 2011 onwards (as that

was the date for those included in the 2016 reviews of the other areas i.e., physical health, mental health and connection to nature),

- Studies were reviews, including scoping reviews, Cochrane reviews, meta-analyses and narrative reviews; pre/post interventions; secondary data analyses; cohort studies; longitudinal; cross sectional; survey data or grey literature.
- Studies explicitly assessed the relationship between outdoor environments and one of the identified outcomes (e.g., physiological and psychological benefits of outdoor environments for adult, child and adolescent populations and evidence for connection to nature).
- Studies were not limited to English.

All other literature was excluded.

## **2.4 Data extraction and analysis**

For the purposes of this rapid review, search results were sorted by 'most relevant' and the first 150 results included from each database, and the first 10 pages of Google Scholar search results. The first broad search and screening of abstracts was conducted by authors (see author list on each evidence briefing) to make a preliminary selection of studies for consideration. This ensured a realistic amount of data to review within the time frame allocated. Rayyan.ai software was used to organise all sources of information, for screening and for independent review of each paper. Final selections for inclusion were then made by all authors when reading the studies in full. Results of the review process between two authors were compared in excel files, and any discrepancies discussed and resolved.

### 3. References

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## 4. Glossary

Association(s)	See Correlation
Blue space	Outdoor environments—either natural or manmade—that prominently feature water and are accessible to people, e.g., the collective term for rivers, lakes or the sea.
Brownfield	A brownfield investment is when a company or government entity purchases or leases existing production facilities to launch a new production activity.
Causal, causality, causation	When something has an actual effect on something else- and is not simply correlated with it.
Cohort	Cohort studies are a type of longitudinal study—an approach that follows research participants over a period of time (often many years).
Confounding factors	There are other factors that may affect the primary result of a study.
Connection to nature	The term 'connection to nature' is frequently used to describe our enduring relationship with nature, including emotions, attitudes and behaviour. Research shows that people with a greater connection to nature are more likely to behave positively towards the environment, wildlife and habitats.
Correlation	A correlation reflects the strength and/or direction of the relationship between two (or more) variables. The direction of a correlation can be either positive or negative. This is also sometimes referred to as an association.
Cortisol	A stress hormone
Cross-sectional	A cross-sectional study involves looking at data from a population at one specific point in time.
Direction of effect	This refers to whether there is a positive or negative association between two variables
Empirical evidence	Empirical evidence is information that is acquired by observation or experimentation.

Epidemic	An epidemic is the rapid spread of disease to a large number of hosts in a given population within a short period of time.
Eudemonia/ Eudemonic	Eudemonic wellbeing refers to the type of happiness or contentment that is achieved through self-actualisation and having meaningful purpose in one's life.
Green space	Green space refers to land that is partly or completely covered with grass, trees, shrubs, or other vegetation. Green space includes parks, community gardens, and cemeteries.
Grey literature	Literature, such as a report, which is not peer reviewed
Hedonic wellbeing	Hedonic wellbeing is based on the notion that increased pleasure and decreased pain leads to happiness. Hedonic concepts are based on the notion of subjective wellbeing. Subjective well-being is a scientific term that is commonly used to denote the 'happy or good life'.
Interconnectedness	See Connection to nature*
Internal biome	Refers to all the microbes - bacteria, fungi, protozoa and viruses - that live on and inside the human body.
Intervention	An external variable that comes between someone and an outcome, that changes someone's eventual outcome as a result.
Limbic responses	The limbic system is the part of the brain involved in our behavioural and emotional responses, especially when it comes to behaviours we need for survival: feeding, reproduction and caring for our young, and fight or flight responses.
Longitudinal	A long-term study in which as Cohort is visited at different time points to get a long-term understanding of an effect.
Mental health	Mental health includes our emotional, psychological, and social well-being. It affects how we think, feel, and act. It also helps determine how we handle stress, relate to others, and make choices. Mental health is important at every stage of life, from childhood and adolescence through adulthood.
Meta-analysis	Meta-analysis is a research process used to systematically synthesise or merge the findings of single, independent studies, using statistical methods to calculate an overall or 'absolute' effect.

Neuropsychology modelling	A neuropsychological model is a computerised or mathematical representation of an individuals or group of individuals brain or thought patterns.
Non communicable disease	A non-communicable disease (NCD) is a disease that is not transmissible directly from one person to another. NCDs include Parkinson's disease, autoimmune diseases, strokes, most heart diseases, most cancers, diabetes, chronic kidney disease, osteoarthritis, osteoporosis, Alzheimer's disease, cataracts, and others.
Parasympathetic nervous activity	The parasympathetic nervous system predominates in quiet “rest and digest” conditions while the sympathetic nervous system drives the “fight or flight” response in stressful situations. The main purpose of the PNS is to conserve energy to be used later and to regulate bodily functions like digestion and urination.
Peer reviewed	A study which goes through a process of fact checking by several experts in the field.
Perinatal health	Perinatal refers to the time before and after the birth of a child.
Pilot study	A pilot study, also called a 'feasibility' study, is a small-scale preliminary study conducted before any large-scale quantitative research in order to evaluate the potential for a future, full-scale project.
Pro-conservation	Pro-conservation behaviour refers to behaviours in which individuals engage in environmental, animal, marine or human conservation - including natural resources, forests, wildlife, plants and biodiversity.
Pro-environmental	Pro-environmental behaviour, also known as green-, sustainable-, or environmentally friendly (eco-friendly) behaviour, is defined as behaviours in which individuals take protective actions toward the environment.
QALY	The quality-adjusted life year or quality-adjusted life-year (QALY) is a generic measure of disease burden, including both the quality and the quantity of life lived. It is used in economic evaluation to assess the value of medical interventions. One QALY equates to one year in perfect health.
Qualitative	Qualitative data describes qualities or characteristics. It is collected using questionnaires, interviews, or observation, and frequently appears in narrative form. For example, it could be notes taken

during a focus group, or responses from an open-ended questionnaire.

Quantitative	Quantitative data is data that includes numbers and figures. These can include scores on tests, number of hours of study, or weight of a subject. These data can be open to statistical interpretation. Qualitative data is not expressed as a number.
Reliability	Data reliability means that data is complete and accurate.
Scoping review	A review that is less rigorous than a Systematic review or Meta-analysis.
Strength of association	The extent to which two variables are closely or loosely aligned or correlated with each other
Sympathetic nervous activity	The sympathetic nervous system directs the body's rapid involuntary response to dangerous or stressful situations. A flash flood of hormones boosts the body's alertness and heart rate, sending extra blood to the muscles.
Systematic review	A systematic review is a summary of all the literature on a particular topic, that meets pre-defined eligibility criteria.
Validity	Data validity means that data is complete and accurate.
Wellbeing	The extent to which a person is in a state of being comfortable, healthy or happy.

# About Natural England

Natural England is here to secure a healthy natural environment for people to enjoy, where wildlife is protected and England's traditional landscapes are safeguarded for future generations.

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