sweep
Investing in Nature for Health RESOURCE

A Five Capitals Model approach

Building a business case for investment in nature for health

This report was produced in collaboration with our project partners

rspb giving nature a home

WWT Saving wetlands for wildlife & people

Dorset Local Nature Partnership

active CORNWALL

Cornwall Area of Outstanding Natural Beauty

This Resource

The need for a clear and robust business case framework to support investment in nature for health

There is evidence of a growing disconnect between people and nature, and simultaneously an increase in mental health disorders and physical health problems associated with insufficient exercise. There are opportunities to address these issues by capitalising on the *value* of nature for human health and wellbeing.

However, there is an urgent need for research not only to evidence these connections, but to help us understand *how* our natural resources can best be used, improved, and managed to deliver health benefits

Faced with an ever increasingly competitive funding environment, one of the keys to success will be using current evidence to develop more robust business cases that can attract greater investment into this area.

The purpose of this resource

This resource demonstrates how the Five Capitals Model approach, backed by relevant evidence, can provide a convincing and credible framework for strengthening such business cases, placing natural capital and human health benefits at the centre of interest.

Commonly, the emphasis has tended to focus more on financial, manufactured, social and human capital as these are most immediately obvious and intrinsically internal to decision-making processes.

Natural capital has typically been regarded as external to decision-making processes resulting in over exploitation and depletion. The use of the five capitals approach addresses this oversight by bringing all capitals onto an equal footing, clarifying the interdependencies between all five types of capital.

This resource emphasises how natural capital can be included by applying the five capitals approach, the benefits of doing this for human health and wellbeing, and to evidence how natural capital can underpin investment in the other four capitals.

As such, this document has the potential to be a valuable tool for stakeholders delivering nature-based health outcomes across a range of applications from strategic development thinking, resource planning, prioritisation and delivery of projects, monitoring and evaluation activities and outcomes and the development of funding proposals.

> *"SWEEP's evidenced based resources have informed and strengthened the drafting of Cornwall City Council's five year social prescribing strategy. This five capitals model approach resource has enabled me to illustrate how different elements of my work, that deliver health and wellbeing objectives, link together."*
>
> **Rich Sharpe, Public Health Specialist and Lead Mental Health and Suicide Prevention, Cornwall Council**

For your use ...

We've specifically included the following elements in this resource to support your own work

- Descriptors of terms
- Visual diagrams (please always credit as outlined in footnotes)
- Case studies of where the five capitals approach has been applied in natural capital contexts
- Case studies that illustrate how each of the five capitals can be linked to health and wellbeing outcomes

What is the Five Capitals Model?

The Five Capitals Model was developed in 2018 by Jonathan Porritt, Co-Founder of Forum for the Future, to provide a basis for understanding sustainability in terms of the economic concept of wealth creation or 'capital'.

The model is based on five types of capital from which we derive the goods and services we need to improve the quality of our lives

Definitions of the Five Capitals [1]

Natural capital is any stock or flow of energy and matter that yields valuable goods and services. It includes resources, some renewable (timber, grain, fish and water), others not (fossil fuels); sinks which absorb, neutralise or recycle wastes; and processes, such as climate regulation.

Social capital concerns the institutions that help us maintain and develop human capital in partnership with others; e.g. families, communities, businesses, trade unions, schools, and voluntary organisations.

Human capital consists of our health, knowledge, skills and motivation, all of which are required for productive work. Enhancing human capital, for instance through investing in education and training, is vital for a flourishing economy.

Financial capital plays an important role in our economy, enabling the other types of capital to be owned and traded. Unlike the other capitals, it has no real value itself but is representative of natural, human, social or manufactured capital.

Manufactured capital comprises material goods or fixed assets - tools, machines, buildings and other forms of infrastructure - which contribute to the production process, but are not used up in it.

Good to note ...

- 'Capital is an asset that produces future benefits in the form of flow services. The five capital theory states that human wellbeing depends on service flows form five conceptualised stock categories, where financial capital is seen as a liquid asset to facilitate interchange between the other categories'. (Maack & Davidsdottir, 2015)

- The five capitals defined above have the following features:
  - They comprise the productive base of a body's economy and therefore, together, capture the overall wealth of that body
  - They require investment to remain productive over time
  - They are often partial complements and partial substitutes with one another (Davenport et al., 2019)

- All organisations use these capitals to different degrees to deliver their products and/or services. For an organisation to operate sustainably, it will maintain and, where possible, enhance these stocks of capital assets, rather than deplete or degrade them. The model enables businesses to consider a wide range of environmental and social issues that affect their practices, allowing all of these to be integrated in long-term sustainable financial planning.

[1] Adapted from https://www.the-ies.org/sites/default/files/reports/T%26A_Training_Manual.pdf and https://www.forumforthefuture.org/the-five-capitals

The Five Capitals Model

Figure 1 shows the five capitals that comprise the model and how they connect to a core organisational issue or aim.

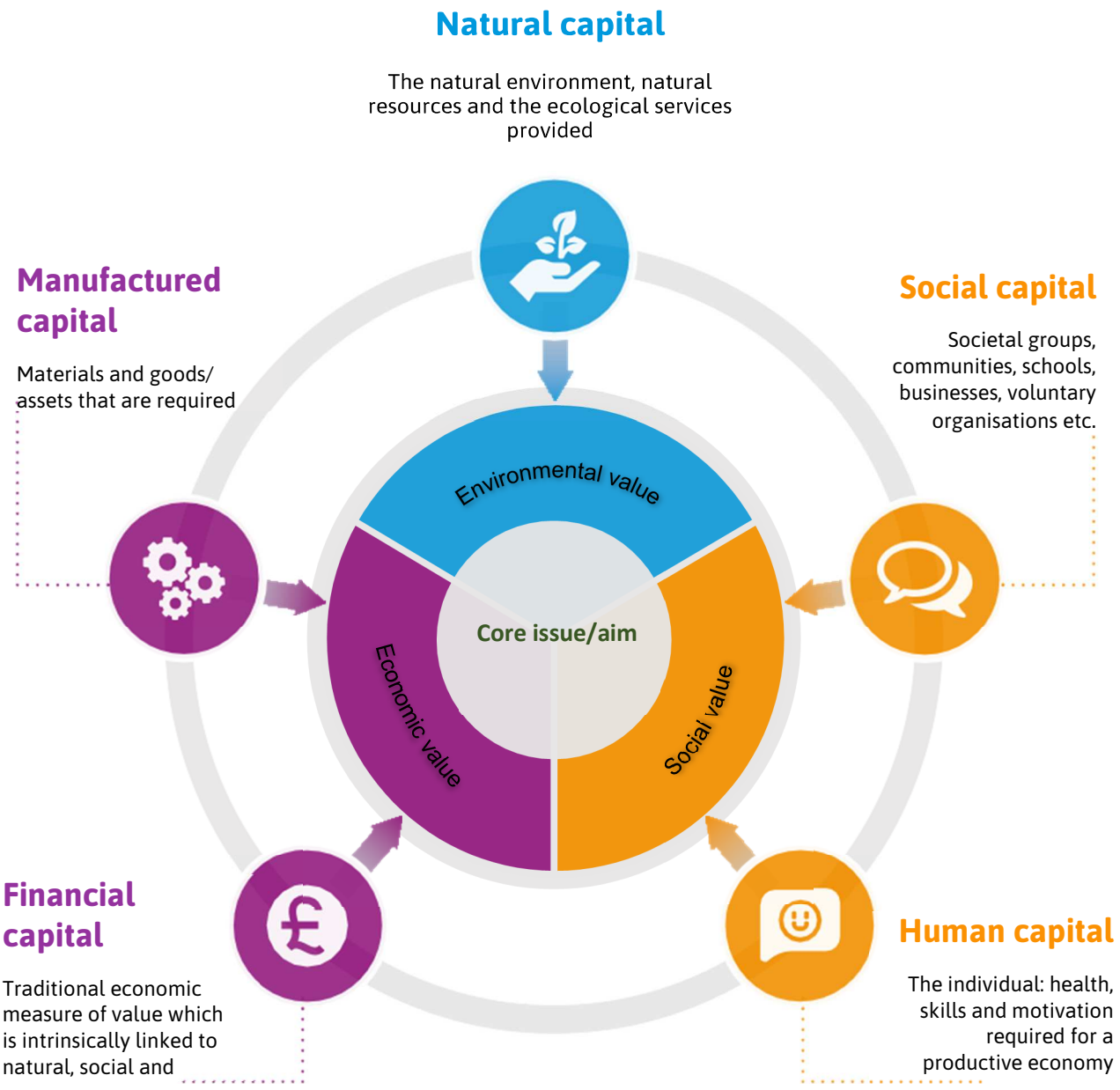

Figure 1: The five capitals model [2]

[2] Reproduced with kind permission from the Association for Consultancy and Engineering (ACE) https://www.acenet.co.uk/media/5151/ace-five-capitals-report-2020.pdf

How can we use the Five Capitals Model to strengthen cases for investment in nature for health?

The Five Capitals Model offers a robust conceptual framework that can be used to help identify and communicate (and potentially quantify) sustainable policies, strategies, plans, programmes and interventions that deliver human health benefits.

It offers a dynamic approach enabling organisations to think about how to achieve a balance between their environmental, social and economic activities. It encourages consideration of what an organisation needs to do to maximise the value of each capital whilst pursuing agreed priorities or objectives, as well as factoring in the impact of its activities on each of the capitals.

As such, we argue that the Five Capitals Model can be successfully applied to the development of business cases for investing in nature for human health outcomes. It provides a means of evidencing the role that health and wellbeing can play in contributing toward organisational priorities, placing natural capital at the centre of interest, while simultaneously adding value to the other capitals.

> *This resource instinctively feels like it has very broad application and relevance to today's climate.*
> **Alison Wills, Strategic Relationship Manager, Active Cornwall**

> *This model has been incredibly useful for our NLHF application and will surely be useful for future bids. Many of our projects explore the connection between nature and wellbeing, therefore I feel this to be a highly useful resource for organisations like ours.*
> **Jacob Parry, Cornwall AONB Unit**

Applying the Five Capitals Model

This approach can be used to support activities both at a strategic and project level, for example;

- Informing strategic organisational thinking about how best to invest across the capitals to achieve health and wellbeing goals
- Demonstrating how investment in different capitals by different organisations, at programme or project level, can be mapped against health and wellbeing outcomes to deliver multiple outcomes and benefits
- Planning more effectively for resource allocation across the different capitals
- Applying appropriate outcome and impact metrics to each capital to assist with monitoring, evaluation and reporting activities
- Communicating more clearly with funders and stakeholders about how a proposed programme of activity will deliver health outcomes, and integrate with existing organisational systems and structures

Figure 2 presents some broad themes that might be considered within each capital

Figure 2: Themes within the five capitals [3]

> *SWEEP's five capitals model resource is a really useful resource and is helping to shape my thinking in relation to my work with Health and Nature Dorset (HAND). HAND aims to strengthen joint collaborative working on nature-based wellbeing between the health, environmental and business sectors to support population health, develop opportunities for prevention at scale and reduce health inequalities across Dorset.*
>
> **Maria Clarke, Dorset Local Nature Partnership Manager**

Building on this, further information is available in our *Supporting Document: A Five Capitals Model approach – Building a business case for investment in nature for health.* Along with further case studies, you will find a series of tables and descriptions of the five capitals highlighting further examples of themes that relate to each capital, as well as the kind of business objectives these could inform. These examples are drawn from academic literature that highlight cases where the Five Capitals Model has been applied within real environmental contexts.

[3] Reproduced with kind permission from the Association for Consultancy and Engineering (ACE) https://www.acenet.co.uk/media/5151/ace-five-capitals-report-2020.pdf

Adapting the Five Capitals Model to health and wellbeing outcomes

There are a number of evidence-based case studies that help us understand how investment in each of five capitals (or combinations of capitals), where underpinned by natural capital (through the provision of natural assets), can result in improved human health and wellbeing. Examples of these are outlined below and help to illustrate how developing activities, interventions or programmes which draw on all the capitals are most likely to be successful, delivering multiple benefits for an organisation.

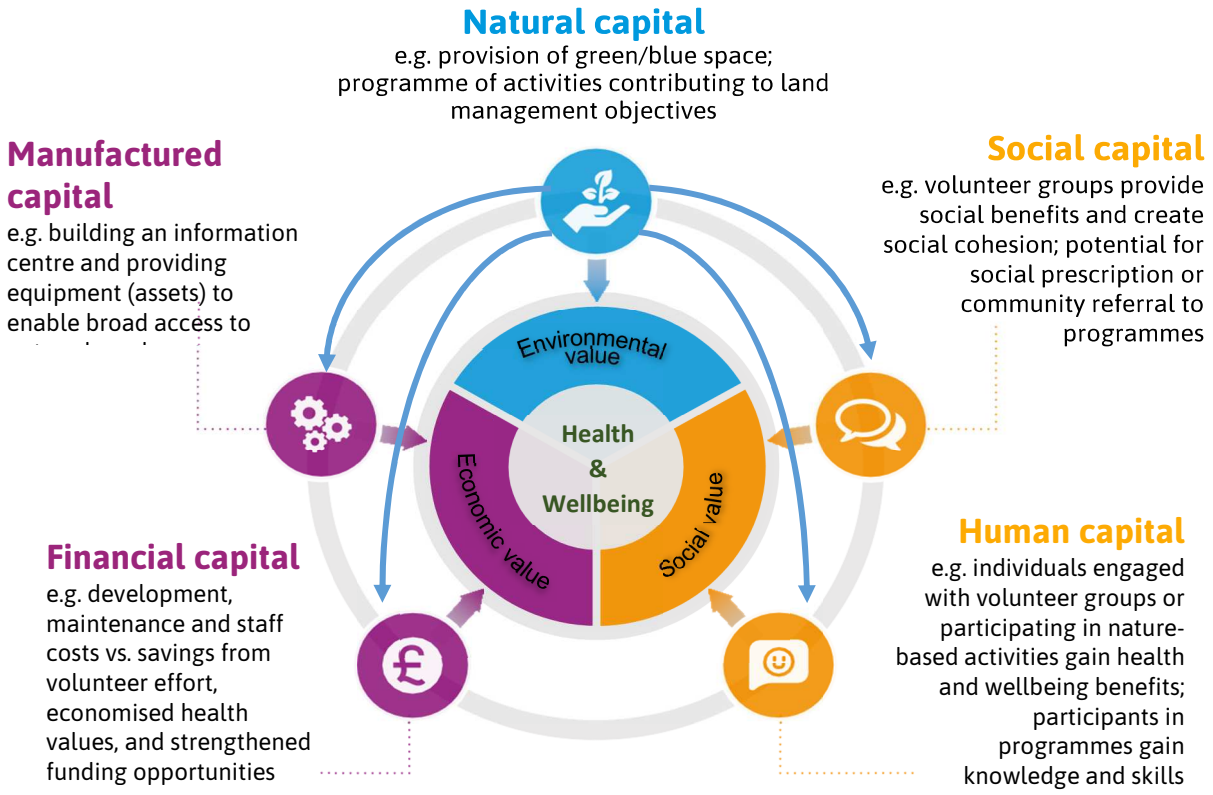

Figure 3:
Adaptation of the Five Capitals Model to illustrate a conceptual holistic application to health and wellbeing outcomes [4]

Figure 3 above represents a conceptual illustration of this, demonstrating how the Five Capitals Model could be used as a visual tool to communicate with key stakeholders. This example is based on a nature reserve's objective to enhance both natural capital and health and wellbeing outcomes both through the development of an information centre that acts as a hub to attract visitors, and the provision of a programme of nature-based activities and land management operations that enrich the local natural capital.

The diagram helps to communicate the connection between each capital, with improved human health and wellbeing sitting as the central aim. It also illustrates how natural capital should be viewed as central to sustainable decision making, underpinning the other capitals through its provision of valuable goods and services on which they depend. While each of the capitals should be enhanced over time to ensure a successful and sustainable operation, an emphasis on investment in natural capital can provide the critical foundation to support the other capitals, and deliver human health benefits.

This is not an exhaustive diagram, and could be further annotated to suit individual needs. For example, specific health and wellbeing outcomes could be added in the centre in relation to planned interventions, along with appropriate measures to monitor and evaluate the success of health and wellbeing outcomes and impact.

[4] Adapted from original diagram with kind permission from the Association for Consultancy and Engineering (ACE) https://www.acenet.co.uk/media/5151/ace-five-capitals-report-2020.pdf

Case Studies

Evidence-based case studies demonstrate the value of health and wellbeing outcomes for each of the five capitals and can be used, alongside the Five Capitals Model, to strengthen cases for investment in nature for health. Further case studies are available on the SWEEP website, *Supporting Document: A Five Capitals Model approach – Building a business case for investment in nature for health.*

Case Studies A

This first set of case studies (A) illustrates how the five capitals model approach has been **applied** to natural capital focused projects enabling better planning, communication and delivery of both overall, and specific health and wellbeing objectives.

A1 | Sustainability appraisals

A SWEEP project team (Hooper & Austen, 2020) developed a natural capital framework that can be applied to sustainability appraisals. A scoping phase starts the process using a broader five capitals model. With stakeholder input, and following identification and review of relevant programmes, policies and plans, the overarching aims and related objectives, indicators and targets can be broken down into constituent parts that encompass the environment, infrastructure, individuals, and wider society.

The natural capital framework proposed by the authors draws from the environmental inputs to the wider Five Capitals Model (natural capital and some elements of manufactured capital). For the natural capital element, baseline information consists of four core elements: an asset register (in which information on the status of natural capital is compiled), an ecosystem services inventory (to list services, benefits and values); an asset-service matrix (to connect services to the assets from which they are derived); and a risk register (which summarises threats to continued system functioning).

This scoping process provides a comprehensive and systematic baseline of the current status and trends in assets, services and benefits, and the degree to which they are at risk, allowing for the selection of detailed and meaningful sustainability objectives and indicators. The authors argue that this approach supports better outcomes than using high-level objectives and indicators such as the number and condition of protected sites.

The Five Capitals model is already widely used in sustainable development contexts, including in local planning; for example, by Powys County Council (2017), and Calne Town Council (2012).

A2 | Environmental investment assessment options

Yorkshire Water (YW) conducted a Five Capitals Assessment of its Little Don Recreation Plan which aimed to promote health, fitness, and wellbeing through inclusive and accessible outdoor recreation opportunities (reaching out to groups not commonly represented by visitor surveys) (Yorkshire Water, 2018). The Little Don Recreation Plan attempted to develop opportunities for innovative ideas and solutions that would benefit the natural environment and the local and wider community.

With consultants, YW developed a replicable approach via a quantitative tool that could be used to compare a wide range of project design options, based on the five capitals, providing a shortlist of five scenarios for site development.

The process started with a baseline assessment of the study area (three reservoirs and associated habitats), including assessments of natural capital assets, ecosystem service provision, socio-economic data, and qualitative descriptions of the activities that contribute to the human and social capital (i.e. employment, skills, health & safety, wellbeing, quality of place, and trust).

The second stage was to conduct an option prioritisation exercise which compared a longlist of potential options for the Little Don site against a range of qualitative scoring criteria, the scores being determined by the impacts of each activity on the five capitals. Five broad options resulted - woodland creation, moorland restoration, artificial beach with play area, dark skies observation centre, and water sports activities.

However, YW found limitations with this exercise and opted instead to develop a quantitative tool that could be used on the full range of options to support robust comparisons of each option's strengths and weaknesses, with a focus on health and wellbeing and economic impacts. The 'Capitals Valuation Tool v1.0' aimed to allow users to compare a wide range of land management options across the capitals at the Little Don site as well as at other sites owned by Yorkshire Water. A pilot exercise applied the tool to five possible scenarios for development: Inclusive Environment; Active Recreation; Active Biodiversity; Sustainable Farming; and Sustainable Forestry.

The impacts of the scenarios were calculated over a 40 year assessment period, with the results compared against the baselines for each option. Facilitating active recreation on site was shown to have the greatest potential positive impact of the five scenarios, despite the highest costs. The pros and cons of each of the options for the Little Don site were demonstrated, and it was suggested that there can be important trade-offs between goals of encouraging visitor diversity, protecting biodiversity, and creating employment opportunities.

The health and wellbeing elements are reflected by the outdoor recreation and exercise values within Social Capital (presumably emphasising physical health).

YW concluded that there were many potential uses for this tool, including high level optioneering for informing land management decisions, communicating results, complementing broader organisational decision-making frameworks, and for 'Net Gain' (informing the approach to biodiversity offsetting and design of capital delivery schemes).

Note
A detailed methodology showing all the five capital elements factored in by the tool are shown as an appendix to the final project report.
https://www.yorkshirewater.com/media/dgcbfpdl/report.pdf

A3 | Managing Resilience

Resilience has become a priority consideration for water companies, with significant challenges arising from, for example, increasing customer demand for better services, and the need to demonstrate stability to investors. OFWAT made resilience one of its four key themes in its 2019 Price Review, putting water companies' approaches to managing resilience under the spotlight, and making it clear that investment returns should be generated from the provision of good customer and wider society services (rather than from spend on built assets alone). Sustainable financing and long-term resilience could be achieved by tapping into natural, social and human capital, as well as financial and built capital.

AECOM (Rowcroft, 2020) describe how the five capitals model can be applied to tackle the risks of a) too much water and b) too little water. For example, they suggest how investment in sustainable drainage measures, such as creation of wetlands and green verges in urban areas (utilising natural capital) provides wider benefits than flood prevention i.e. improved air and water quality, and enhanced local wellbeing and amenity through the creation of green spaces (human and social capital). Water companies such as United Utilities and South West Water, rather than imposing water use restrictions during times of drought and high water demand, have instead allocated land in upper catchment areas to act as natural reservoirs, soaking up and storing rainwater naturally and allowing gradual release downstream, so avoiding peaks and troughs in water supplies. This approach leads to wider natural, social and human capital benefits such as increased biodiversity and the creation of space for recreation and learning, as well as improving the quality of water provided to customers, saving company money, and reducing carbon footprints. Water companies can also use education campaigns — a good example of social capital— to encourage customers to use water more responsibly.

AECOM purports that holistically embedding all five capital values in business decision making and investment planning will enable water companies to give greater assurance to investors and regulators that their service delivery and financial performance is resilient and sustainable, so attracting further investment.

Case Studies B

This second set of case studies illustrates how each of the five capitals can be **linked** to health and wellbeing outcomes.

Further case studies are available on the SWEEP website in our *Supporting Document: A Five Capitals Model approach – Building a business case for investment in nature for health*.

Natural Capital Case Studies

Green space quality enhancements, improving wellbeing

B1 | Visits to natural spaces and psychological restoration

Summary: White et al. (2013) analysed Monitor of Engagement with the Natural Environment (MENE) 2009-11 survey data, which categorized England visit destinations into types of natural environments, in broad themes including: a) parks and open spaces in towns and cities, b) the countryside, c) seaside resorts and towns and d) open coastline, including beaches and cliffs, and sub-categories (e.g., playing fields, allotments, farmland, woodland, country parks, rivers). The authors were able to compare feelings of restoration associated with visits of 4255 participants to different natural environments.

Metric: They created a variable, "recalled restoration" by collapsing two survey items in which respondents agreed that their visit "made me feel calm and relaxed" and "made me feel refreshed and revitalised". Multiple regressions were used to investigate the relationship between the type of environment visited and recalled restoration.

Results: Feelings of restoration following visits to any natural space were found to be high overall, reflecting the restorative effects of natural environments in general. However, restoration was found to be significantly higher for visits to hills/moors/mountains, woodlands/forests, beaches and 'other coast habitats' than, for example, urban green spaces (such as playing fields).

Application of findings: These findings help improve understanding of which environments people find most restorative and, therefore, which natural capital assets could benefit from investment to, for example, improve access or increase protection and condition.

B2 | Different types of well-being experience associated with nature engagement

Summary: Bell et al. (2018) adopted a three-stage, qualitative, interpretive study which sought to understand and situate people's natural environment well-being experiences within their everyday lives. Thirty-three participants carried an accelerometer (measuring physical activity) and a Global Positioning System (GPS), (measuring location) receiver for one week while spending time in various green/blue spaces, the resulting data being used to produce a set of personalised activity maps showing where the participants went each day of that week and how long they stayed in different places. The maps were used as visual prompts to guide an in-depth geo-narrative interview exploring how and why they engaged with different local environments for well-being, and how they felt this had changed over time. In-situ interviews were also held with a subset to further capture place experiences.

Metric: A narrative thematic analysis was used to identify patterns and themes recurring across participant accounts to understand variations in well-being experiences.

Results: Four types of routine natural environment encounters emerged, 1. Social - for example, shared wildlife encounters by family units, and intergenerational interactions; 2. Immersive - restorative power of wildlife engagement, sense of awe-and-wonder, and escape from the everyday; 3. Symbolic - feelings of freedom and a sense of perspective through consciously connecting with wildlife, sense of comfort during periods of depression, and importance of observing and connecting to wildlife life cycles; and 4. Achievement – for example, fishing, wildlife spotting and species identification.

Application of findings: Recognition by green space and health professionals of mutual environmental and well-being benefits could enable informed investment in green space design and management approaches that create socially inclusive opportunities for diverse well-being experiences whilst also promoting the ecological value of such spaces.

B3 | The relationship between nature connectedness and environmental quality

Summary: Wyles et al. (2019) used data from a large England MENE survey to determine the roles that type and quality of natural environments have on an individual's sense of connectedness to nature, and psychological restoration. Using a sub-sample of 4,515 people who described and evaluated a visit within seven days of completing the survey.

Metric: Three main environmental types were generated from survey questions: Urban green, rural green, and coastal. Environmental quality of the visit location was based upon official designated status including: National Parks, Sites of Special Scientific Interest, National or Local Nature Reserves and Areas of Outstanding Natural Beauty. A set of visit characteristics was established i.e. duration of visit, nature of activity, distance travelled to site, and size of group. 'Recalled connectedness to nature' and 'recalled restoration' were operationalised measures derived from specific survey questions.

Results: Respondents recalled greater connectedness to nature and restoration following visits to rural and coastal locations compared with urban green space, and to sites of higher environmental quality (for example, nature reserves).

Application of findings: These findings are potentially relevant for the management of natural environments. The combination of different effects of particular types of nature with designated areas being associated with greater psychological benefits (RCN and RR), reinforces the need for land managers to avoid oversimplifying natural environments. The findings evidence an association between psychological benefits and visits to different types of natural settings, irrespective of socioeconomic status. This highlights the importance of prioritizing access to and protection of different environments.

Manufactured Capital Case Studies

Green space and infrastructure co-developments plus other added benefits for integrating investment in natural and material assets

B4 | Investment in physical assets contributes ultimately to nature-based health benefits

Summary: Hampshire County Council commissioned a community engagement strategy to develop a new visitor hub at Lepe Country Park, a coastal site within the New Forest National Park. The enhancements included construction of a new visitor centre, restaurant, sensory cottage garden, play park, improved paths, security measures, parking and toilet facilities, with a particular focus on improving access for people with disabilities. The driver for this transformation programme was to attract more visitors, and for visitors to stay longer at the park, by providing new modern facilities that enhance visitor enjoyment. Proceeds from the facilities are ploughed back into maintenance of the wider park environment, so moving it toward becoming financially self-sustaining, and providing benefits to people in the long term (Green Halo Partnership, 2021).

Metric: Number of park visitors; compliance with parking requirements and honesty boxes (financial measure).

Results: This project used external funding to create new, and improve existing, assets. These changes will draw in more visitors to enjoy the country park's green and blue features (natural capital), so providing health and wellbeing being benefits for more people over a sustained period of time.

Application of findings: This initiative demonstrates how a multi-capital approach can be used for problem-solving (in this case, how to improve Lepe County Park's long-term sustainability).

B5 | Integrated grey and green regeneration for multiple health gains

Summary: Dallat et al. (2013) estimated the potential health impacts and cost-effectiveness of an urban regeneration project in Northern Ireland, the Connswater Community Greenway, offering new cycle- and walk-ways and providing accessible and safe green space. Before and after surveys of the Greenway community included the Global Physical Activity Questionnaire, used to determine the number of minutes of physical activity performed per week per interviewee. From this, the proportion of those meeting the current physical activity recommendations of 150 minutes per week of moderate physical activity were calculated. Other data sources included population data derived from NISRA, population disability weights using UK EQ-5D data, disease data from NICR, and NI Health & social wellbeing survey, GP and research database. Also disease weight data from Global Burden of Disease study. The PREVENT model was used to compare projected future disease with and without the intervention and calculated the gains in life expectancy (LE) and disability-adjusted life expectancy (DALE) expected for intervention beneficiaries and the years lived with disability (YLD) saved by the Greenway population.

Metric: Macro-simulation PREVENT model used to model the project's potential impact on the burden from cardiovascular disease, type2 diabetes mellitus and stroke, and colon and breast cancer, by the year 2050.

Results: The aim was to present the incremental cost-effectiveness ratios (ICERs) of the Greenway intervention. The authors calculated costs saved through diseases averted and summed all diseases to get total disease cost savings; health outcomes were derived in DALYs. If 10% of 'inactive' people became 'active', 886 incident cases (1.2%) and 75 deaths (0.9%) could be prevented with an incremental cost-effectiveness ratio of £4469/DALY (below the UK cost-effectiveness threshold of £20 000–£30 000/QALY or DALY). At 2% effectiveness, the intervention would remain cost-effective (£18411/DALY). Small gains in average life expectancy and disability-adjusted life expectancy could be achieved, and the Greenway population would benefit from 46 less years lived with disability.

Application of findings: Demonstrates the potential economic benefits (financial capital) of combining investment in enhancements to manufactured capital (cycle tracks and pathways), and natural capital (green spaces), and generating human capital outcomes (individual health gains). Of interest to urban regeneration project planners; and funders of such projects. Public health professional may be interested in potential scaling up of health benefits derived from such projects.

B6 | Urban Green Blue Infrastructure design can benefit users' mental health

Summary: Andreucci et al (2019) examine the current status of 'mental health-sensitive' open space design in the built environment. Urban Green Blue Infrastructure (UGBI) can contribute to urban dwellers' mental health and wellbeing as well as healthy aging, while providing co-benefits balancing the negative impacts of climate change, through the provision of integrated ecosystem services. The authors argue that there is a paucity of evidence of the actual benefits achieved by exposure to, and affiliation with, nature, as well as the key performance indicators and metrics to monitor and adapt open spaces to key urban challenges. Concepts of increasing degenerative mental disorders in urban environments are described, as is the emerging green blue infrastructure design approach. UGBI is normally a hybrid infrastructure of green or blue spaces, and built systems. Examples are urban forests, parks, domestic gardens, green roofs and walls, and community orchards, while blue components might feature wetlands, rivers, canals, ponds, and streams.

Metric: Comparative critical analysis

Results: International case studies describe how evidence-based design and Nature-based Solutions have been found to be beneficial for supporting healthy aging through exposure to, and affiliation with, biodiversity, and especially to those diagnosed with mental disorders and dementia; for example, landscape architects designing therapeutic or healing gardens, promotion of edible cities, and dementia-friendly communities such as The Village in Canada, and Hogeweyk in the Netherlands which strongly emphasise integration of green/blue spaces into urban design.

Application of findings: The multiple benefits evidenced by these UGBI case studies for people's health, particularly mental health and dementia, should interest and influence landscape planners and designers. The actual benefits of designed garden spaces for people with dementia are still not fully supported by meta-analyses and should be the subject of further research.

B7 | Engaging with diverse natures can provide opportunities for shared sociality

Summary: Bell et al. (2019) draw from post humanist theories of social practice to identify or prescribe a standardised healthy nature interaction. Relational understandings of interactions with nature move beyond static notions of bounded spaces (i.e. a park, a woodland etc) where a person simply has to visit to gain health or well-being benefits. Rather, social practice encourages engagement with the "transformative potential of the entire field of relations with which beings of all kinds interact". Two social practices - beach-going and citizen science— demonstrate how a focus on social practices can better cater for the diverse and dynamic ways in which people come to conceptualise, embody, and interpret nature in their everyday lives.

Metric: Critical analysis based on author experience of several research projects

Results: Engaging with diverse natures can provide opportunities for 'shared sociality', which may be between friends, family, fellow wildlife enthusiasts or professionals. Such experiences can build strength, skill, and confidence to engage with one another and to nature.

Application of findings: The authors advise caution against universal prescriptions of nature doses across populations without engaging with people's unique and relational embodied priorities. Those with responsibility for enabling people to connect with nature, such as environmental land managers, conservation charities, urban planners, and landscape architects, should make the effort to understand how best to accommodate diverse sensory, physical, and psychological needs within site management, visitor experiences, and community engagement.

B8 | Community gardens foster social cohesion and improve wellbeing

Summary: The Women's Environmental Network (WEN) was commissioned by London Borough of Tower Hamlets' (LBTH) Public Health department to help set up 15 community gardens across the Borough. This 15 month project (April 2014 – July 2015) was designed to help improve residents' wellbeing by providing increased access to healthier food and creating community cohesion by working together, with support from WEN's community garden coordinators, to develop the growing spaces. Fifteen community gardens were successfully set up using two gardening coordinators who engaged 4,485 Tower Hamlets residents. 178 residents actively participated in gardening, largely growing food, and were supported by training sessions covering practical and theoretical topics of site planning, garden design, organic food growing, healthy eating and cooking, tailoring each workshop to the needs of the group. Within this programme, the Tower Hamlet Food Growing Network provided access to a community seed library, to which users 'borrowed' seeds at the start of the growing season and 'returned' seed from their crops in the autumn. This project was designed to help improve residents' wellbeing by providing increased access to healthier food and creating community cohesion by working together (Pinto, 2017).

Metric: Measure of wellbeing; qualitative feedback from participants and volunteers.

Results: The Gardens for Life project showed an improvement in wellbeing for over half (59%) of participants for whom data were available (12.5%); new opportunities were provided for people to meet their neighbours and build a sense of community around the garden itself; the project successfully promoted all of the 5 ways to Wellbeing ; including Connect, Be Active, Take Notice, Keep Learning and Give, through the acts of learning new skills, sharing their produce with friends and family and increasing their levels of physical activity; the project provides access to local food and encourages healthy eating; individual feedback highlighted a host of community benefits and how the gardens helped build social capital.

Application of findings: This project demonstrates the health and social benefits of a community garden programme. There are added sustainability benefits of linking activity-based programmes with existing networks, which can provide support, advice, networking opportunities with other communities, access to related schemes and facilities.

B9 | People in connector roles are key actors for developing social capital

Summary: Tierney et al (2020) examined connector schemes (e.g. delivered by care navigators or link workers) that have become a key component to the successful delivery of social prescribing services. People in these connector roles support patients by either (a) signposting them to relevant local assets (e.g. groups, organisations, charities, activities, events) or (b) taking time to assist them in identifying and prioritising their 'non-medical' needs and connecting them to relevant local assets. A review was undertaken to better understand how such connector schemes work, for whom, why and in what circumstances.

Metric: Realist review

Results: Context- mechanism-outcome configurations (CMOCs) reinforced the authors' developing theory that centred on the essential role of 'buy-in' (of stakeholders e.g. patients, GPs, commissioners, primary care staff) and connections (strong, ongoing interrelations). This was refined further by turning to existing theories on (a) social capital i.e. bonding between link worker and patient, and bridging between patient and services, and (b) patient activation i.e. matching interventions to patient's ability to manage their health.

Application of findings: Connector roles, especially link workers, represent a vehicle for accruing social capital (e.g. trust, sense of belonging, practical support). This affords patients with the confidence, motivation, connections, knowledge and skills to manage their own well-being (patient activation), hence reducing reliance on GPs. Patient activation is identified by NHS England as a key measure for assessing link worker services within primary care networks.

B10 | Walking in quality green/blue spaces improves self-esteem and mood

Summary: Barton, Hine & Pretty (2009) evaluated changes in self- esteem and mood of participants walking in four different National Trust sites of natural and heritage value in the East of England, including forests, fens, lowland heaths and coastal areas. The self-esteem and mood of a proportion of the visitors at the four sites was measured pre- and post-activity. The study assessed changes in psychological health parameters, using standardised internationally recognised scales, following a single visit to a greenspace of natural and heritage value.

Metrics: The Rosenberg Self-Esteem Scale (RSE) a tool widely used in health psychology, was used to assess visitors' self-esteem. The authors also measured mood change pre- and post-activity using the Profile of Mood States test (POMS) which has previously been used to determine mood change post-exercise. A Total Mood Disturbance (TMD) Score was calculated to assess overall emotional state and the relationship between the duration of the visitors stay and the reported TMD scores when leaving the sites was investigated using statistical parametric tests.

Results: Self- esteem scores for visitors leaving the sites were significantly higher than those just arriving and overall mood also significantly improved. Feelings of anger, depression, tension and confusion were all significantly reduced and vigour increased.

Application of findings: The environment plays an important role in facilitating physical activities and helping to address sedentary behaviours. Walking, in particular, can serve many purposes including exercise, recreation, travel, companionship, relaxation and restoration. Walking in greenspaces may offer a more sustainable behaviour-change option, as it can enhance emotional wellbeing through both exposure to nature and participation in exercise.

B11 | Animal care increases self-efficacy and quality of life

Summary: In a Norwegian study, Berget et al. (2008) analysed video recordings to study the interactions between severely ill psychiatric patients and farm animals. Using a three-month intervention, mainly with dairy cattle, the authors examined the intensity and exactness of the patients' work with the animals. They investigated whether the working abilities were correlated with better self-esteem, coping ability, quality of life, or less depression or anxiety. The patients visited the farm for three hours twice a week for 12 weeks to participate in routine work with farm animals.

Metric: Several metrics were used, including the Spielberger State Anxiety Inventory (STAI) and the Beck Depression Inventory. Self-esteem was measured with the Generalized Self-Efficacy Scale (GSE); Coping was measured using the Coping Strategies Scale of the Pressure Management Indicator and a Norwegian version of Quality of Life Scale (QOLS-N) was used comprising 16 items and reflecting relations to other humans, work, and leisure.

Results: Psychiatric patients working with farm animals during the intervention increased both the intensity and the exactness in their work with the animals. Patients also showed increased self-efficacy and quality of life compared with the control groups, when measured six months after end of intervention.

Application of findings: Skills can be enhanced though working with farm animals which may be related to improved mental health exemplified by decreased anxiety or increased self-efficacy.

B12 | Therapeutic gardening improves mental wellbeing and confidence

Summary: Howarth et al (2020) examined a case study based on research with the RHS Wellbeing Garden Bridgewater (https://www.rhs.org.uk/gardens/bridgewater/Articles/helping-people-to-better-health). In a pilot study, people were referred to the Wellbeing garden through 'social prescribing' by health workers to reduce anxiety, develop confidence and/or mental wellbeing. The wellbeing programme is now looking at ways therapeutic gardening, gardens and green spaces can transform people's lives.

Metric: The Warwick-Edinburgh Mental Well-being Scale (SWEMWBS) was used to monitor mental well-being and focus groups were used to provide qualitative feedback.

Results: Participants who carried out gardening activities had improved mental wellbeing scores, improved confidence and reduced social isolation, and they highlighted an overall positive impact of the experience.

Application of findings: The findings from the SWEMWBS data provided evidence for continuation of a nature-based social prescription programme at RHS Bridgewater and represents an example of how nature-based interventions can be used by health workers to combat anxiety and support resilience.

B13 | Method of calculating values of woodland sites and associated activities

Summary: Moseley et al. (2018) developed an indicator for woodland recreation that can help woodland managers to quantify the health benefits of recreational activities undertaken in their woodlands to inform local scale planning. They developed a quantitative physical recreation indicator using a step process. Firstly, they determined a non-financial estimate of annual calorific expenditure (ACE) based on a quality of experience survey that consisted of a standard set of questions for participants, accompanied by a measure of intensity of activities in calories and METs (Metabolic Equivalence of Task), where one MET is the energy equivalent to an individual seated at rest. Secondly, they placed a financial estimate on the annual physical health benefits. Quantification of benefits focussed on the physical energy expenditure of woodland recreationists through the calculation of the calories and METs used, followed by a calculation of Quality Adjusted Life Years (QALYs) from the METs and a monetary estimate of these values

Metrics: Annual calorific expenditure (ACE); Metabolic Equivalence of Task (MET); QALY

Results:

- QALY calculation = 30 min of moderate-intensity physical activity undertaken each week over one year would result in an additional 0.010677 QALYs per individual, per year for the general adult population. For each individual the QALY calculation is 0.010677 x M (duration)/30x F(frequency)/52. Median values for QALYS ranged from 0.001 to 0.015 across all the sites, with a maximum of 0.427. Total QALYs ranged from 0.129 to 3.542 depending on site. To calculate economic value, the authors used 1 QALY = £20,000 after White et al. (2016).

- The QALY monetary estimates for individuals that undertook a single activity for at least 30 minutes during their visit ranged from £6 to £8542. Median values ranged from £21 to £296, whilst total estimated values for the surveyed respondents per site ranged from £2581 to £70,832 (total no. of respondents = 2659). The authors were then able to scale these figures up to give a value for each woodland site, and for all sites combined**.**

Application of findings: The authors believe this method provides woodland (and therefore other habitat) programme managers, finance managers, and funders, a good alternative to, for example, the travel-cost method, particularly for small sites that offer informal recreation opportunities that can be particularly important for members of the public who may dislike or cannot afford formal exercise classes.

B14 | A health and wellbeing valuation of the South West Coast Path

Summary: Petersen (2020) provides a health and wellbeing valuation of the South West Coast Path (SWCP) based on available visitor and population data on visits to the trail. The author drew from a range of data sources - visitor data; online survey; data from the England Coast Path baseline assessment; selected data from an earlier SWCP coastal visits survey; data held by the SWCPA and Active Devon on their Connecting Actively to Nature (CAN) programme; and weighted MENE data.

Metrics: WHO HEAT tool, QALYs, UEA MOVES tool

- HEAT – calculates the reduced death rate using the statistical value of a life;
- QALYs – calculates the value of the additional years lived, as a result of improvements in health and reduced incidence of disease, adjusting this value for the quality of life;
- MOVES – calculates the savings in health care costs based on the reduced incidence of disease among walkers compared to non-walkers, converting this into savings to the NHS as a result of reduced treatment costs (and also reports results using QALYs).

Results: The valuation measures the estimated economic value of the physical health benefits from walking on the South West Coast Path. HEAT - Value of reduced death rate = £5.5M directly attributable, £69.1M in total; MOVES - savings in health care costs = 7.4M per year (value of QALYs gained). The MOVES valuation is in addition to the HEAT valuation, because it is based on the reduced occurrence of disease. .

Application of findings: Potential users of metric: SWCP and other site-based land managers and trustees; Social Prescription scheme coordinators and link workers for potential prescription options; public health authorities.

B15 | Social Return on Investment value of a nature-based volunteering programme

Summary: Bagnall et al. (2019) undertook a Social Return on Investment (SROI) analysis of the findings of a report in 2017 that investigated the changes in the attitudes, perceptions and mental wellbeing of Wildlife Trust volunteers taking part in nature conservation volunteering activities over a 12-week period. Six steps for an evaluation SROI were used – i/ establish scope; ii/ map outcomes; iii/ evidence and monetise outcomes; iv/ establish impact, v/ calculate SROI; vi/ and report use and embed results. Financial proxies for social values (WEMWBS, good overall health, nature relatedness, level of physical activity, volunteer time) were found using the global value exchange tool, the social value calculator, and a spreadsheet resource from the Greenspace Scotland SROI review

Metrics: Social Return on Investment value

Results: A SROI value of £6.88 for every £1 invested, for people with low wellbeing at baseline, who were part of a targeted programme; a SROI value of £8.50 for every £1 invested, for people with average to high wellbeing at baseline, who were part of a nature conservation volunteering programme. The SROI ratios calculated for this report were in line with calculations from a number of other programmes. For example, Greenspace Scotland applied an SROI analysis to the outcomes of a number of health-related interventions, including the value of conservation volunteers in delivering the Greenlink project, which was estimated to have resulted in a social return of £7.63 for every £1 invested.

Application of findings: NHS leaders will be interested in a mechanism that helps to identify reductions to the current burden on the National Health Service; GPs, mental health providers and Social Prescription service coordinators will be interested in a mechanism that helps to strengthen the argument for targeted green interventions to become standard practice.

Further case studies are available on the SWEEP website in our *Supporting Document: A Five Capitals Model approach – Building a business case for investment in nature for health.*

References

ACE (2020). Measures for successful outcomes: the Five Capitals approach – a discussion paper. Association for Consultancy and Engineering (ACE). London, UK. Available at: https://www.acenet.co.uk/media/5151/ace-five-capitals-report-2020.pdf

Andreucci, M., Russo, A., & Olszewska-Guizzo, A. (2019). Designing Urban Green Blue Infrastructure for Mental Health and Elderly Wellbeing. Sustainability, 11, 6425. https://doi:10.3390/su11226425

Bagnall, A-M., Freeman, C., Southby, K. & Brymer, E. (2019). Social Return on Investment analysis of the health and wellbeing impacts of Wildlife Trust programmes. Report for The Wildlife Trusts. Leeds Beckett University.

Barton, J., Hine, R. & Pretty, J. (2009). The health benefits of walking in greenspaces of high natural and heritage value. Journal of Integrative Environmental Sciences, 6(4), 261-278, https://doi: 10.1080/19438150903378425

Bell, S., Westley, M., Lovell, R. & Wheeler, B. (2018) Everyday green space and experienced well-being: the significance of wildlife encounters, Landscape Research, 43:1, 8-19, https://doi: 10.1080/01426397.2016.1267721

Berget, B., Ekeberg, Ø. & Braastad, B.O. (2008). Attitudes to animal-assisted therapy with farm animals among health staff and farmers. Journal of Psychiatric and Mental Health Nursing, 15, 576–581.

Calne Town Council et al. (2012). Calne Vision and Scoping Study. https://moderngov.microshadeapplications.co.uk/calnetc/documents/s4720/CalneTownCentreMasterplanVisionandScopingStudy.pdf Accessed 20 September 2019.

Dallat, M., Soerjomataram, I., Hunter, R., Tully, M., Cairns, K. & Kee, F. (2013). Urban greenways have the potential to increase physical activity levels cost-effectively. European Journal of Public Health, 24(2), 190–195.

Davenport, M., Delport, M., Nelson Blignaut, J., Hichert, T. & van der Burgh, G. (2019). Combining theory and wisdom in pragmatic, scenario-based decision support for sustainable development. Journal of Environmental Planning and Management, 62(4), 692-716, https://doi: 10.1080/09640568.2018.1428185

Digital Catapult (n.d.). Growing VR/AR companies in the UK | A business and legal handbook. Report in association with PwC. Funded by Innovate UK. Available at: https://www.pwc.co.uk/intelligent-digital/vr/growing-vr-ar-companies-in-the-uk.pdf

Forum for the Future (2018). The Five Capitals. https://www.forumforthefuture.org/the-five-capitals

Green Halo Partnership (2021). Lepe Country Park case study. Webpage. Available at: https://www.greenhalo.org.uk/case-study/lepe-country-park/

Hooper, T., and Austen, M. (2020). Application of the natural capital approach to Sustainability Appraisal. Final Report. Report prepared as part of the South West Partnership for the Environment and Economic Prosperity (SWEEP) and the Marine Pioneer programme.

Hooper, T., Ashley, M., Mullier, T. and Rees, S. (2020). North Devon Marine Natural Capital Plan. Sustainability Assessment. Report prepared for the North Devon Biosphere Reserve as part of the South West Partnership for the Environment and Economic Prosperity (SWEEP) and the Marine Pioneer programme.

Howarth, M., Griffiths, A., Da Silva, A. & Green, R. (2020). Social prescribing: A 'natural' community-based solution. British Journal of Community Nursing, 25(6), 294-298.

Maack, M. & Davidsdottir, B. (2015). Five capital impact assessment: Appraisal framework based on theory of sustainable well-being. Renewable and Sustainable Energy Reviews, 50, 1338-1351.

Makino, T., Noda, K., Keokhamphui, K., Hamada, H., Oki, K. & Oki, T. (2016). The Effects of Five Forms of Capital on Thought Processes Underlying Water Consumption Behaviour in Suburban Vientiane. Sustainability, 8, 538. https://doi.org/10.3390/su8060538

Maxwell, S. & Lovell, R. (2017). Evidence Statement on the links between natural environments and human health. Report for Defra's Biodiversity and Ecosystems Evidence Programme. Available at: http://randd.defra.gov.uk

Morrison, R. & Hartley, S. (2020). IGNITION Nature-based Solutions Evidence Base. Greater Manchester Combined Authority.

Moseley, D., Connolly, T., Sing, L. & Watts, K. (2018). Developing an indicator for the physical health benefits of recreation in woodlands. Ecosystem Services, 31, Part C, 420-432. https://doi.org/10.1016/j.ecoser.2017.12.008

Nguyen, H.T. (2018). Unpacking local impacts of climate change: learning with a coastal community in Central Vietnam. Natural Hazards, 93, 125–146. https://link.springer.com/article/10.1007/s11069-018-3292-1

Petersen, C. (2020). The South West Coast Path Health and Wellbeing Assessment 2020. Report for the South West Coast Path Association, Plymouth.

Pinto, A. (2017). Spatial Planning for Health: An evidence resource for planning and designing healthier places. Report to Public Health England, London. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/729727/spatial_planning_for_health.pdf

Powys Council (2017). Powys Local Development Plan 2011-2026. Sustainability Appraisal Report. Composite Version Incorporating Matters Arising Changes. September 2017. https://en.powys.gov.uk/article/4906/Sustainability-Appraisal-SA

Rowcroft, P. (2020). Resilience and a capitals approach. Article on AECOM website. Available at: https://aecom.com/without-limits/article/resilience-capitals-approach/

Subramanian, K., Chopra, S., Cakin, E., Liu, J. & Xu, Z. (2021). Advancing neighbourhood sustainability assessment by accounting for sustainable development goals: A case study of Sha Tin neighbourhood in Hong Kong. Sustainable Cities and Society, 66, 102649. https://doi.org/10.1016/j.scs.2020.102649

Tierney, S., Wong, G., Roberts, N., Boylan, A-M. et al. (2020). Supporting social prescribing in primary care by linking people to local assets: a realist review. BMC Medicine, 18: 49.

Weisz, H., Suh, S. & Graedel, T. (2015). Industrial Ecology: The role of manufactured capital in sustainability. Proceedings of the National Academy of Sciences, 112(20), 6260-6264. https://doi.org/10.1073/pnas.1506532112

White, M., Pahl, S., Ashbullby, K., Herbert, S. & Depledge, M. (2013). Feelings of restoration from recent nature visits. Journal of Environmental Psychology, 35, 40-51. https://doi.org/10.1016/j.jenvp.2013.04.002.

White, M., Pahl, S., Ashbullby, K., Herbert, S. & Depledge, M. (2013). Feelings of restoration from recent nature visits. Journal of Environmental Psychology, 35, 40-51. https://doi.org/10.1016/j.jenvp.2013.04.002

White, M. P., Elliott, L. R., Taylor, T., Wheeler, B. W., Spencer, A., Bone, A., Depledge, M. H., & Fleming, L. E. (2016). Recreational physical activity in natural environments and implications for health: A population based cross-sectional study in England. Preventive medicine, 91, 383–388. https://doi.org/10.1016/j.ypmed.2016.08.023.b

Wyles, K., White, M., Hattam, C., Pahl, S., King, H. & Austen, M. (2017). Are Some Natural Environments More Psychologically Beneficial Than Others? The Importance of Type and Quality on Connectedness to Nature and Psychological Restoration. Environment and Behavior, 51(2), 111-143.

Yorkshire Water (2018). A Multi- Capitals Assessment at Little Don: Final Report. Available at: https://www.yorkshirewater.com/media/dgcbfpdl/report.pdf

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