

The Wildlife Trusts' *Natural Health Services*

A rapid economic assessment of
The Wildlife Trusts' Natural Health Services



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Contents

1	Executive summary	4
2	Introduction	7
2.1	The benefits of nature for human health, and how this is captured in health economics	7
2.2	The Wildlife Trusts and their role in green prescribing	7
2.3	Health inequalities, and the opportunity of nature	7
2.4	This study and outline of the report	8
3	Review of methods to quantify and monetise health impacts	9
4	Projects and case study selection	10
4.1	Green prescribing projects identified	10
4.2	Data collection	11
4.3	Selection of case studies for analysis and method applied	12
5	Case study results	13
5.1	Green prescribing case study - wild at heart	13
5.2	Loneliness case study - feed the birds	14
5.3	Case studies tackling mental health	15
5.3.1	Early intervention in Bury	15
5.3.2	Nature for health in Greater Manchester	17
5.4	Physical health case study - wild health	19
6	Estimate of the cost of rolling out green prescribing UK-wide, and the size of potential benefits	21
7	Green prescribing and the contribution to overcoming health inequalities	23
8	Summary results, lessons learnt and recommendations	25
	Appendix 1 review of methods to quantify and monetise health impacts	28
	Appendix 2 data request	35
	References	39



1 Executive Summary

1.1 INTRODUCTION

The Wildlife Trusts are playing an important role in reducing the impact of poor public health on NHS services, by delivering a number of projects across the UK, focused on improving human health through engagement with nature. These projects can be classed as green prescribing, the practice of supporting people in engaging in nature-based interventions and activities to improve their mental health¹. Studies increasingly show that nature plays a critical role in our physical and mental wellbeing. For example, the People and Nature Survey data recorded in January 2022 that 90% of adults in England reported they view green and natural spaces as good places for mental health and wellbeing². This shows the importance of green prescribing and the potential for these projects to alleviate the burden on the NHS as well as improving and enhancing our natural environment.

To bring these health benefits to light, Ricardo, in collaboration with the Institute for Occupational Medicine (IOM), conducted a rapid economic assessment of individual Wildlife Trusts' 'Natural Health Services' on behalf of The Wildlife Trusts. The Wildlife Trusts are a federation of 46 independent wildlife conservation charities covering the whole of the UK, with more than 900,000 members, 45,000 volunteers and managing 2,300 nature reserves. The primary objective of this study was to identify and quantify the human health impacts of these services and value them in terms of cost savings to the NHS. Furthermore, the study collected data on the costs associated with delivering these projects and services, enabling a comprehensive comparison with the monetary benefits and subsequent assessment of their value-for-money. Additionally, an important focus of the study was to examine the demographics of participants in different green prescribing projects, with the intention of exploring the potential role these initiatives play in addressing health inequalities.

1.2 METHODOLOGY

We collected data from several Wildlife Trusts to explore the running costs of various green prescribing projects and schemes, and to estimate the benefits to the NHS. For this project, we evaluated five case studies with the most comprehensive data. To calculate the benefits to the NHS, we explored different approaches to capturing aspects of participants' health which if improved would benefit the NHS; these included mental health, loneliness and physical health.

For this analysis we do not measure the wider (not explicitly health-related) benefits, such as the benefit to individual residents, local neighbourhoods and the economy through for example increased productivity. Other natural capital benefits which we do not measure include for example, natural flood defence, climate regulation and the health of pollinator populations.

The research investigated the role green prescribing can play in addressing health inequalities in the UK. Additionally, we also scaled the costs of running an individual local green prescribing project to the UK level. We also presented the potential benefits at the UK level using the results from the case studies.

To refine the methodologies for valuing the impacts achieved with each service type and its associated costs, a targeted literature review was conducted, which included existing studies, reports, data, and evidence sources. The review encompassed studies considering the valuation of green prescribing services, mental health benefits, physical health benefits, and the economic implications related to reduced loneliness. The literature provided insights into the various methods to value the positive contributions of green prescribing to human health.

1.3 FINDINGS

Table 1-1 shows the results for the five case studies. It's clear from our results that **green prescribing has the potential to deliver cost saving benefits to the NHS and 'take weight out of the system'**.

For example, for the Early Intervention scheme in Bury which supports people experiencing psychosis and to promote healthy living, socialisation, and access to services, through social prescribing³ we estimated that from people spending time in nature there would be a reduction in mental health care treatment costs by £7,024 per year.

For the Wild at Heart Clifton Park in Rotherham project⁴, we estimated there would be a reduction in NHS costs in terms of inpatient admissions, A&E attendances and outpatient appointments by £38,646 per year.

The size of savings varies depending on the size of the scheme and the methodology applied to estimate cost savings.

Furthermore, **green prescribing has the potential to deliver healthcare cost savings in a cost-effective way** – i.e., green prescribing can deliver a greater saving in healthcare costs than the cost of running the green prescribing scheme. Even accepting that there may be additional cost-savings and other additional benefits that have not been included in this analysis, the Wild at Heart Clifton Park in Rotherham and Early Intervention project in Bury are both estimated to deliver a return of >£1 per £1 invested, as does the Wild Health project in Wales depending on the methodology applied to estimate the effects.

Project	Method used to calculate benefit	Annual benefit to NHS/ healthcare (2023 prices)	Annual total cost of running project (2023 prices)	Benefit Cost ratio
Wild at Heart Clifton Park in Rotherham	(Dayson & Bashir, 2014) ⁵	£38,646 in reduced NHS healthcare costs ⁶	£32,427	For every £1 spent on the Wild at Heart Clifton Park in Rotherham session, £1.19 in benefit in terms of reduced costs to the NHS.
Feed the Birds	(McDaid, et al., 2016) ⁷	£15,460 in reduced NHS healthcare costs ⁸	£46,092	For every £1 spent on the Feed the Birds project, £0.34 in benefit in terms of reduced costs to the NHS (assuming participants spent only one year each in the scheme). Where participants are assumed to have had a longer participation, the payback is higher at £0.86 per £1 spent.
The Early Intervention project in Bury	(Saraev, et al., 2021) ⁹	£7,024 in reduced NHS mental health treatment costs ¹⁰	£3,250 (£6,500 if we include member of staff provided by NHS)	For every £1 invested into the Bury project, the project provides £2.16 of benefit in terms of reduced costs of treating mental health related conditions. If we include the NHS member of staff and double the costs the BCR would be for every £1 invested there would be a £1.08 benefit in terms of reduced costs of treating mental health related conditions.
Nature for Health Greater Manchester	(Santini, et al., 2021) ¹¹	£8,460 in reduced NHS healthcare costs ¹²	£47,891	For every £1 spent on the Nature for Health project, £0.18–£0.93 in benefit in terms of reduced costs to the NHS.
	(Dayson & Bashir, 2014) ¹³	£44,745 in reduced NHS healthcare costs ¹⁴	£47,891	
Wild Health	(Beale, et al., 2007) ¹⁵	£35,474 in reduced NHS healthcare costs ¹⁶	£60,644	For every £1 spent on the Wild Health project, £0.58–£1.10 in benefit in terms of reduced costs to the NHS
	(Dayson & Bashir, 2014) ¹⁷	£66,882 in reduced NHS healthcare costs ¹⁸	£60,644	

Table 1-1 Summary table of Wildlife Trust green prescribing project costs and benefits

1.4 SCALED UP COSTS AND BENEFITS

For this study, the costs and benefits are scaled to the UK level. Using data on the population for England, Wales, Scotland and Northern Ireland produced by the Office for National Statistics¹⁹ and data on the percentage of the English population suffering from depression, anxiety and common mental health disorders not otherwise specified (CMD-NOS)²⁰, we estimate that 9.3 million adults suffer from these mental health disorders across the UK.

It is noted that spending time in nature may not be a beneficial treatment for everyone – as such, green prescribing at a UK-level would be best targeted to those for which it would be more effective. To estimate UK-wide costs, we therefore have adopted a proxy scaling factor to represent the proportion of the population who would benefit from spending time in nature (and hence who could be targeted by green prescribing). Using data from the People and Nature Survey²¹, 12.8% of the English adult

population spend time in nature more than several times per month, for mental health reasons. We have taken this as a conservative indication of the percentage of people whose mental health is likely to benefit from contact with nature.

If, overall, this pattern is assumed to reflect the situation in Scotland, Wales and Northern Ireland as well as England, and adults who suffer from depression, anxiety and CMD-NOS are no more or less likely to spend time in nature for mental health reasons than anyone else, then around 1.2 million adults in the UK (12.8% of the 9.3 million estimated to suffer from poor mental health) could reasonably be expected to benefit from nature-based health interventions each year.

This figure may represent an underestimate of the actual need for and likely beneficial uptake of nature-based health interventions because firstly it represents people who already access nature as a means of improving mental health and not those that may want to but are not able to. Secondly, it also

excludes those individuals that could benefit from being in nature but for example, are not aware of its potential benefits. Therefore, in practice, the number that could benefit from green prescribing could be much higher.

The average cost of putting a participant through one of the more cost-effective Wildlife Trust projects included in this study was £447.

On this basis, it could reasonably cost a total of around £534.1 million per year to deliver natural health services at the UK level to all those likely to take them up and receive benefit from them. If we break this cost down into individual countries, this will equate to £449.7 million for England, £25.0 million for Wales, £44.6 million for Scotland and £14.8 million for Northern Ireland per year.

If an investment of this amount were to yield the cost savings shown in the Wild at Heart project for example, then it could realistically result in gross annual cost savings of £635.6 million at the UK level.

1.5 IMPACT ON HEALTH INEQUALITY

Evidence gathered through this study suggests that green prescribing can and has provided benefits for various groups who suffer from health inequalities. These include individuals with restricted mobility and communication, those more receptive to soft touch assistance, the most vulnerable people in the community, older people, carers, participants from under-served areas and ethnic minorities. The projects have helped improve physical and mental health and address barriers related to access, engagement, and representation. Several Wildlife Trusts have addressed access and engagement barriers by visiting people's homes in the Feed the Birds project and through a network of outdoor providers in the Nature Wellbeing Prescribing pilot. The Nature Nurtures project also targeted underrepresented communities, making nature more inclusive.

1.6 LESSONS LEARNT AND RECOMMENDATIONS FOR HOW TO DESIGN AND OPERATE A GREEN PRESCRIBING PROJECT

In terms of lessons learnt and recommendations for how to design and operate a green prescribing project, the case studies showed:

- **Working with the NHS or a voluntary organisation that bridges the gap between the NHS and projects was beneficial in terms of value for money.** The Wild at Heart project in Sheffield benefited from working with Voluntary Action Rotherham to specifically engage participants with significant mental health conditions, ensuring that those with the greatest need could benefit from the project. Similarly, the Early Intervention project in Bury benefited from working closely with the Pennine Care NHS Foundation Trust, which helped deliver cost savings by avoiding the need to self-generate referrals.
- **Given there are currently no sustainable funding channels, many successful green prescribing projects are short-lived due to lack of funding.** This increases the long-term cost of sustaining delivery, as service delivery is disrupted and time and effort must be spent on building new partnerships, developing new projects and securing new funding. Some of the projects analysed in this study have only been successful due to long term funding. For example, the Wild at Heart project was selected to partner with the South Yorkshire ICB in the National Green Social Prescribing Pilot and according to their end of year progress report this wouldn't have been successful without the long-term funding they have received from the National Lottery Community Fund.
- **To improve estimates in the future, it is recommended to collect data that tracks participants' use of NHS services before and after engaging in green prescribing, as this would provide more robust results.** As well as tracking individuals, we see a benefit in green prescribing providers linking up with project health evaluation teams to robustly track and assess outcomes. This would further strengthen the evidence base and provide information on what types of NHS services see a reduction in costs due to green prescribing.
- **The evidence from this study highlights that green prescribing initiatives have been successful in providing benefits to different groups facing health inequalities** including those with restricted mobility, individuals receptive to soft touch assistance, vulnerable community members, older people, carers, participants from less-served areas and ethnic minorities. These projects have effectively improved physical and mental health while addressing barriers related to access, engagement, and representation in nature-based interventions. **Payback could be enhanced by more targeted design of the green prescribing project,** for example, targeting groups which more frequently access expensive NHS services will deliver greatest 'real-world' health care cost savings.
- **Barriers to increasing participation in green prescribing projects** – especially for individuals with limited mobility or anxiety – can be overcome by implementing befriending programs where long-term participants support and encourage new members. Green prescribing can be effective in addressing these challenges, presenting an opportunity to reduce health inequalities and improve outcomes for marginalised groups.
- **Increase representation from groups likely to be experiencing health inequalities,** due to access restrictions and other barriers. Outreach may benefit people who are not currently accessing nature-based prescriptions but who may benefit.
- **Some delivery models inherently carry a greater cost and a lower return in terms of healthcare cost savings** – for example, the one-to-one, home visits offered by Feed the Birds. But this investment is what may be required to deliver effective care to some individuals, in particular those that suffer more acutely from health inequalities.
- **The development of better evaluation tools would enable third sector organisations to understand and report on the impact of nature based social prescribing initiatives.**

2 Introduction

2.1 THE BENEFITS OF NATURE FOR HUMAN HEALTH, AND HOW THIS IS CAPTURED IN HEALTH ECONOMICS

There is an increasing body of evidence clearly showing the benefits of nature, and spending time in nature, for human health. The benefits for physical health are more obvious, for example, as being in nature often involves recreation and active pursuits such as walking and cycling. But the mental health benefits of spending time in nature are also being increasingly understood, both through physical activity but also through a connection with nature itself. Spending time in nature has been associated with reduction in anxiety and depression²², with studies showing an improvement in self-reported health with increasing time spent in nature²³.

From an economic analysis perspective, nature delivers several benefits for and through improved human health which can be assessed:

1. Direct benefit to the individual, sometimes called a 'utility' or 'welfare' effect, of being able to live life in good health and the value that the individual places on that.
2. Productivity benefits, where improved health allows people to participate in activities which have a value in an economic (e.g., lower sickness absence from employment will lead to higher output in the workplace) or social context (e.g., lower sickness absence from non-paid roles, such as care or volunteer roles).
3. Health and social care cost savings, where improved health results in lower demands on health care provision such as GP appointments or hospital visits, resulting in lower costs for the NHS and other health and social care providers.

Increasing recognition of the benefits that nature can have for human health is reflected in the growing trend of 'green social prescribing'. Social prescribing is defined by the NHS as: *an approach that connects people to activities, groups, and services in their community to meet the practical, social and emotional needs that affect their health and wellbeing*²⁴. Social prescribing is a key component of the NHS' Universal Personalised Care and the NHS, through its Long-Term Plan, has committed to significantly expanding the number of social prescribing link workers in primary care, which for many will be green social prescribing. Green social prescribing (or 'green prescribing') is where such activities and interventions are nature-based, with the aim to improve either or both mental and physical health. As with the wider body of evidence linking time in nature to health, there is also growing evidence of the benefit that green prescribing can have on human health, in particular mental health²⁵.

2.2 THE WILDLIFE TRUSTS AND THEIR ROLE IN GREEN PRESCRIBING

The Wildlife Trusts are a federation of 46 independent wildlife conservation charities covering the whole of the UK, with more than 900,000 members, 45,000 volunteers and managing 2,300 nature reserves. The Wildlife Trusts offer a wide range of services which provide access to and maintain natural spaces for everyone, but also encourage people to come into and spend time in nature.

The Wildlife Trusts are playing a key role (either as project lead, partner, or stakeholder) in a range of green prescribing projects and activities. The Wildlife Trusts' website hosts a [Nature for Wellbeing](#) page which shows some of the services that are on offer from Wildlife Trusts across the UK, and these include:

- a range of wellbeing projects run in each of the 5 regions (North, South, Midlands, Wales and Scotland) to improve physical and mental health²⁶
- delivery and management of some of the pilots under the Green Prescribing for Mental Health demonstration programme²⁷
- delivery and management of schemes and projects that have spun out of the national pilot. For example, the [Wild at Heart](#) project in Sheffield is currently being funded by the Rotherham Social Prescribing Service which is part of the Yorkshire and Bassetlaw Integrated Care System and has received funding through the above programme. Another example is the [Take Root](#) service project in Kent
- school engagement programmes like [Nature Friendly Schools](#)²⁸, and
- youth engagement services as found within the [Our Bright Future](#) partnership²⁹.

In doing so, the various services the Wildlife Trusts provide have a varied and important impact on human health across many different groups in society.

2.3 HEALTH INEQUALITIES, AND THE OPPORTUNITY OF NATURE

Health inequalities refer to the disparities in health outcomes that exist within the UK between various social groups. Research indicates that social determinants, such as education, disability status, employment status, income level, gender, sexuality and ethnicity, play a significant role in shaping an individual's overall health and well-being (Arcaya, et al., 2015).

Like the benefits of nature for health, there is also a growing awareness of health inequalities in the UK. Health inequalities can be defined in different ways, but a helpful, comprehensive definition is provided by the Kings Fund³⁰ as presented in the following Box.

Information Box – definition of health inequalities (Kings Fund)

Health inequalities are ultimately about differences in the status of people's health. But the term is also used to refer to differences in the care that people receive and the opportunities that they have to lead healthy lives – both of which can contribute to their health status. Health inequalities can therefore involve differences in:

- health status, for example, life expectancy
- access to care, for example, availability of given services
- quality and experience of care, for example, levels of patient satisfaction
- behavioural risks to health, for example, smoking rates
- wider determinants of health, for example, quality of housing.

Health inequalities can manifest themselves in different ways for different groups, for example:

- Difference in life expectancy is associated with variance in income or 'index of deprivation' (the so called 'social gradient in health')³¹, or amongst groups with learning disabilities, and different ethnic groups
- Variance in the prevalence of long-term health conditions is also associated with variance in income or 'index of deprivation'³², and ethnic group
- Variation in prevalence of mental health conditions is associated with variance in income or 'index of deprivation', and ethnic group, but also sexuality and gender, and disability status
- Difference in access to healthcare services is associated with variance in income or 'index of deprivation', which can be observed in fewer GP visits per head and/or lower rates of admission to elective care. People living in areas of high deprivation, those from Black, Asian and minority ethnic communities and those from inclusion health group, for example the homeless, are most at risk of experiencing these inequalities³³.

Lack of access to green space in itself is a driver of health inequality: Access to good-quality green space is linked to improvements in physical and mental health, and lower levels of obesity. Levels of access to green space are lower on average for people from ethnic minority communities and people living in areas with lower average incomes³⁴.

Engaging with green spaces offers notable advantages, particularly for vulnerable populations. Individuals with better access to green spaces tend to experience reduced health disparities which would typically be associated with income deprivation (Mitchell & Popham, 2008). Furthermore, research reveals that ensuring fair and equal access to green spaces in England alone could result in annual savings of £3.1 billion (2023 prices) for the NHS (Natural England, 2009).

Green prescribing is hence a potential opportunity to work towards overcoming health inequalities in the UK. This is particularly the case given natural spaces may be more easily accessible to some groups that suffer from health inequality – for example rural communities – and nature could offer a cost-effective, alternative approach to 'mainstream' methods of treatment, or at least offer an alternative to over-stretched core services.

A study conducted by (Plimpton & Ben, 2023) identified four key categories of barriers to addressing health inequalities:

1. Communication: Effective communication between social prescribers and providers of nature-based activities is crucial.
2. Availability and engagement: It is important to enhance accessibility to locations offering nature-based activities and ensure individuals feel welcome in these spaces.
3. Representation: Efforts should be made to increase diversity and inclusion in nature-based activities.
4. Funding: Long-term funding, particularly for activities delivered by Voluntary, Community, and Social Enterprise (VCSE) partners, needs to be secured.

By addressing these barriers and incorporating the lessons learned from the Wildlife Trust's green prescribing services, future initiatives can overcome health inequalities more effectively and promote the well-being of diverse populations.

2.4 THIS STUDY AND OUTLINE OF THE REPORT

Ricardo, in collaboration with the Institute for Occupational Medicine (IOM), was commissioned by The Wildlife Trusts to produce a rapid economic assessment of the benefits of green prescribing. Through the identification and analysis of a selection of Wildlife Trusts green prescribing projects, the aims of the study were to:

- identify, quantify and monetise the healthcare cost savings that these services provide;
- compare the health care cost savings to the investment put into each service to understand the 'value-for-money' of green prescribing, relative to other healthcare pathways;
- scale up the costs of delivering social prescribing to illustrate a total investment at UK level in green prescribing activities;
- explore what contribution green prescribing has made to resolving health inequalities, and/or what opportunities could they offer in the future.

The focus of this study is on direct savings to the NHS and other health and care providers. In doing so, the study does not take into consideration two important additional benefits which would significantly influence the assessment of value-for-money: the utility value that an individual places on their own good health, and 'productivity' benefits where individuals are able to participate in paid (e.g., work) or unpaid (e.g., care for dependents in the home) activities. By not including estimation of these impacts in the analysis, the benefits of green prescribing for human health are significantly underestimated – i.e., the benefit-cost ratios calculated as part of this study would be significantly higher (higher benefit per £ cost) were these included.

The remaining sections of this report are structured as follows:

- **Section 3** – summarises the outcomes of our targeted literature review of studies and approaches to quantify and monetise the NHS cost savings associated with green or social prescribing, and more generally time spent in nature. The detail of the review can be found in Appendix 1.
- **Section 4** – outlines green prescribing projects identified in the course of the project, our data request and ultimate selection of projects as case studies.
- **Section 5** – presents the green prescribing project case studies, including our approach to and outputs of our analysis to monetise the NHS cost savings.
- **Section 6** – illustrates the cost of rolling out green prescribing UK-wide.
- **Section 7** – presents and review evidence collected around the impact of green prescribing on health inequalities.
- **Section 8** – presents the summary results, lessons learnt and recommendations to run a green prescribing project.

3 Review of Methods to Quantify and Monetise Health Impacts

As part of the project, a review of existing studies and methods to quantify and monetise the health impact of green (and social) prescribing was undertaken. Detail on the studies reviewed can be found in Appendix 1. Additionally, the review also captured methods used to evaluate changes in loneliness and wellbeing more generally. This review, alongside a consideration of the data needs, outputs and robustness of the approaches, has then informed the methods and approaches we have selected to apply to the green prescribing case studies in Section 5.

From the targeted literature review we found that green prescribing as a concept has only gained traction in the last few years. Hence although there is a large amount of anecdotal evidence on the benefits of participation, there is relatively limited quantitative, peer reviewed assessment

of the impacts of green prescribing. In particular, in only a limited number of cases have the health outcomes and/or access to health care services of green prescribing participants been tracked quantitatively following a robust approach. That said, some studies which have attempted to quantitatively track health outcomes are beginning to emerge (indeed the forthcoming evaluation of the national pilot is anticipated to add to this evidence base). Furthermore, there is a greater body of evidence that has sought to quantify and monetise the impacts of spending time in nature in general, for example natural capital is becoming more mainstream with the government publishing the Dasgupta Review³⁵ which seeks to incorporate the impacts of economic growth on the natural environment as well as realising the many benefits that the natural environment provides to both people and nature.

4 Projects and Case Study Selection

4.1 GREEN PRESCRIBING PROJECTS IDENTIFIED

The Wildlife Trusts are actively involved as service lead, partner, or stakeholder, in a range of green prescribing projects and activities. As part of this project, we explored the scope of Wildlife Trusts' activities, which also highlighted several other green prescribing projects involving other

interested stakeholders. The following Table 4-1 presents a list and short summary of the different projects identified. We were unable to approach all projects for discussion and to request data under the scope of this project, but what is striking is the level of activity and interest in green prescribing and the opportunities that it provides to deliver NHS cost savings and to 'take weight out of the system'.

Project	Brief description
Green Prescribing for Mental Health Demonstration Sites – Government (England) pilot ³⁶	A £5.77 million pilot with funding from Defra, NHS England and NHS Improvement, Sport England and the National Academy for Social Prescribing (NASP), aimed at preventing and tackling mental ill health through green social prescribing. Funding is shared across 7 sites, all led by the local integrated Care board: <ul style="list-style-type: none"> ● Humber Coast and Vale Health and Care Partnership ● South Yorkshire and Bassetlaw Integrated Care System ● Nottingham and Nottinghamshire Integrated Care System ● Joined Up Care Derbyshire Sustainability and Transformation Partnership ● Greater Manchester Health & Social Care ● Surrey Heartlands Health and Care Partnership ● Bristol, North Somerset and South Gloucestershire Sustainability and Transformation Partnership. The Wildlife Trusts are a delivery partner in all 7 and programme leads in South Yorkshire, Derbyshire and Greater Manchester.
Wild at Heart ³⁷	Wild at Heart is a social group for adults, run by the Sheffield Wildlife Trust, with the aim of exploring local green spaces, and to use the natural world to boost wellbeing, learn new skill, and make new friends in the community. This forms part of a wider social prescribing programme in Rotherham. For further information, see Section 5.1.
MyPlace ³⁸	Myplace is an innovative Nature and Wellbeing project delivered by the Wildlife Trust for Lancashire, Manchester and North Merseyside in partnership with the Lancashire and South Cumbria NHS Foundation Trust. The project was originally part of Our Bright Future originally but has now expanded. Offers participants weekly sessions, led by a trained members of staff, to help improve health and wellbeing.
Nature for Health ³⁹	Greater Manchester is one of seven national test and learn sites delivering NHS England's Green Social Prescribing Programme that aims to use our connection with nature to improve mental health. Nature for Health looks at how people with mental ill health can be supported, by offering connection to the natural environment through referral to nature-based activities, groups and organisations. For information, see Section 5.3.2.
Early intervention in Bury	For information, see Section 5.3.1.
Environment and Me ⁴⁰	With funding from the National Lottery Community Fund, Warwickshire Wildlife Trust in partnership with Coventry and Warwickshire Mind, are delivering The Environment and Me Project (TEaM) which is working with people in Coventry and Warwickshire to improve their mental health by spending time in nature.
Feed the Birds ⁴¹	Feed the Birds is a befriending scheme for lonely or socially isolated people first piloted by Shropshire Wildlife Trust in 2016, run with the involvement of Shropshire Wildlife Trust. For further information see Section 5.2.
Take Root ⁴²	With funding from the National Lottery Community Fund and HM Government, Kent Wildlife Trust operated the Take Root project, a two-year initiative in December 2020. The project is a social prescribing initiative, helping people to improve their health and wellbeing by connecting them to their community and with nature, by taking part in conservation-based programmes, walks and workshops.
Wild Walks ⁴³	Wild Walks is a partnership pilot project between London Wildlife Trust and Black Girls Hike, supported through Natural England seed-corn funding, that delivered nature engagement and wellbeing-centred activities across Walthamstow Wetlands Nature Reserve. The initiative focussed specifically on young women from Black, Asian and minoritised ethnic backgrounds (aged 16-25), who are currently underrepresented in the environmental and outdoors sectors.
Seeding Change ⁴⁴	The report explores barriers to inclusion across three main themes – safety, relevancy, and accessibility – and offers recommendations for organisations aiming to increase engagement with young women and non-binary people of colour. The aim was to enable young women and non-binary people of colour to discover, explore and enjoy the wild spaces on their doorstep.
Nature-in-Mind	A new collaborative project between London Wildlife Trust and Newham CAMHS, starting in June 2023.
Wild Health	For further information, see Section 5.4.

Table 4-1 List of green prescribing projects included in the review

4.2 DATA COLLECTION

A targeted data request was developed to collect relevant data and information from green prescribing projects in which the Wildlife Trusts had a role. The data request is included at Appendix 2. Dissemination of the data request was co-ordinated through initial contact made by the Wildlife Trusts project officer, with data review, gap checking and follow-up completed by the Ricardo project team.

The data request was shared with representatives of the following projects:

- Myplace
- Bury early intervention team
- Nature for health
- Wild at Heart
- Feed the Birds
- Environment and Me
- Wild Health.

Various data and information were returned from different projects using the Data Request form found in Appendix 2.

Each was reviewed to understand its potential for inclusion in subsequent analysis. This review included assessing: whether the sample size was sufficient, what variables were included (to facilitate subsequent analysis) and whether the cost information was sufficiently detailed and specific.

The amount of data received from each project varied, with Table 4-2 showing an overview of the data that was received. As well as data, we received past evaluation reports for Feed the Birds, MyPlace and Nature for Health.

Table 4-2 also maps the data received against the variables required to undertake further analysis of the project and its potential impact on health care costs (as presented in Section 5). The crucial variables were: either having the mental health condition or mental health survey before and after participation, having the information on the number of participants and cost information. For the Environment and Me project, no data was received regarding the number of participants and or the cost information, therefore this was screened out. Also, for the Myplace project, although a large programme, we did not receive the data for the project.

	Participants	referrals through green prescribing	Mental health conditions	Mental health survey before and after	NHS usage before and after	Tracking participants post intervention	Cost information
Environment and Me			■			■	
Feed the Birds	■						■
Bury early intervention team	■	■	■	■		■	■
Nature for Health - Greater Manchester	■	■	■	■		■	■
Wild Health - Wales	■	■	■				■
Wild at Heart	■	■				■	■
Myplace	■						■

Table 4-2: Review of data received as part of selection process (green denotes where sufficient data was received to facilitate analysis)

Emails and calls were made to clarify the data where required, and also to help with the selection of the case studies. For example, a phone conversation was held with a member of Voluntary Action Rotherham, which identified the importance of including the Wild at Heart project in the analysis. He explained that Wild at Heart project is currently part of Voluntary Action Rotherham's 'Nature Pathway' which is one route of referral through their social prescribing model. Other important conversations included calls and emails with the Lancashire Wildlife Trust, which identified that the costs for the Early Intervention project in Bury are different to the Greater Manchester programme due to the Early Intervention project being organised by Pennine Care NHS Foundation Trust, Early Intervention Service, Bury.

We also engaged authors of the ongoing evaluation of the National Programme for Green Prescribing pilot. It was not possible to access data being put together for the National Programme for Green Prescribing pilot, however, it was helpful to have these conversations as similar analysis is happening at the same time and to compare and contrast early conclusions and outcomes.

4.3 SELECTION OF CASE STUDIES FOR ANALYSIS AND METHOD APPLIED

Within the scope of the present study, it was only possible to include analysis of a selection of projects. As such, 5 case studies were selected for further analysis. The selection of case studies was made on the basis of: the comprehensiveness of the data provided, and the feasibility of applying an approach from the literature to quantify the health impacts that was considered sufficiently robust. As mentioned previously, due to data and a need to prioritise, the Myplace and the Environment and Me schemes were not included in the analysis. The other five projects had enough data to allow different valuation methods to be applied – these are presented in the following Table 4-3, alongside a 'grouping' which summarises the aim of the green prescribing activity.

Primary intended health outcome	Project
Green prescribing services – tackling loneliness and social isolation	Wild at Heart in Sheffield and Rotherham
	Feed the birds project in Shropshire
Services that tackle mental health	The Early Intervention project in Bury
	Nature for Health project in Greater Manchester
Services that provide physical health benefits	Wild Health project in Gwent

Table 4-3: Green prescribing projects taken forward as case studies for detailed analysis

In each case a method has been selected from the literature and applied to calculate the NHS cost savings for comparison to the costs of operating the scheme or project. The method selected varies between the case studies depending on the underlying data available, the nature of the green prescribing project, and the suitability of the methods available. A hierarchy was adopted as follows to guide the selection of an appropriate method:

- where reported impacts on NHS services i.e. the use of the NHS services before and after were available, these were used as priority
- where reported health outcomes (e.g., change in wellbeing score) were available, these were used
- otherwise, where no reported health outcomes were available, it was necessary to select a more general approach from the literature and applied based on time spent in nature.

5 CASE STUDY RESULTS

5.1 GREEN PRESCRIBING CASE STUDY - WILD AT HEART

Project overview: Wild at Heart is a social group for adults, run by the Sheffield and Rotherham Wildlife Trust, with the aim of exploring local green spaces, and to use the natural world to boost wellbeing, learn new skills, and make new friends in the community. Wild at Heart has two face-to-face groups running on a weekly basis, one in Rotherham supported by the Rotherham Social Prescribing Service (RSPS) and the other in Sheffield. The RSPS is run by Voluntary Action Rotherham and forms part of a wider social prescribing programme in Rotherham.

During the financial year April 2022 to March 2023, 40 sessions were delivered in Clifton Park, Rotherham. In addition, 64 sessions were run in Sheffield, resulting in a total 104 sessions across both sites.

Who participated: The 40 Rotherham sessions were attended by 82 participants, of which 42 were referred through RSPS in total, and most of these did attend. On average, 24 participants attended each session, and the Sheffield and Rotherham Wildlife Trusts have totalled 849 attendances overall.

Project costs: The average annual costs of running the Wild at Heart project over two years, across both sites, was £84,310. These costs include both groups running in Clifton Park in Rotherham, and the second group in Sheffield.

Hence across the **104 sessions** run, the average cost of a session would equal around **£811**. Multiplying £811⁴⁵ by 40 this equates to a total annual cost of **£32,427** for the Rotherham sessions alone.

Observed improvements in health: The Wild at Heart project collects lots of anecdotal evidence of improvements in health. Some of these include reported improvements in depression, reduction in self-harm, and reduction in anxiety. Their latest End of Year progress report to the Lottery Community Fund is very comprehensive and details case studies of individuals who have seen improvements in all the improvements mentioned previously.

Estimating NHS cost savings: For this analysis, the focus is on the group that is supported by the RSPS given this was also the focus on the work by (Dayson & Bashir, 2014)⁴⁶. As such, the method and results of (Dayson & Bashir, 2014) are used to estimate the benefits

of the impact on the NHS due to the project being run by Voluntary Action Rotherham. However, it is important to highlight that the analysis of (Dayson & Bashir, 2014) assessed the aggregate effect of all social prescribing in Rotherham, which includes Wild at Heart offered through one of the pathways (the Nature pathway) run by Voluntary Action Rotherham, but the analysis did not focus specifically nor split out the individual effects of Wild at Heart.

For the 42 patients that were referred through RSPS, using the 12-month cohort of patients referred through a grant funded VCS provider cost reduction, the annual benefit **equals £19,794** (using the £378 saving per participant reported by (Dayson & Bashir, 2014), uplifted to 2023 prices and a £471 saving per participant) in terms of reduced NHS costs associated with mental health conditions.

It would not be fair to compare this benefit to the cost of running the Wild at Heart project because 82 people attended throughout the year (so the 42 referred through RSPS, but also a further 40 participants accessing the service through an alternative route). Therefore, one way to provide a fair comparison is to instead multiply the total number (82) of participants by the per-patient cost reduction and this would equate to **£38,646** in terms of reduced NHS costs associated with mental health conditions.

Estimated BCR and other lessons learned: Every £1 spent on the Wild at Heart Clifton Park in Rotherham session is estimated to deliver a £1.19 benefit in terms of reduced costs to the NHS.

In practice, the reduced costs to the NHS are likely to be significantly higher, as this method does not consider the many other benefits that the Wild at Heart programme offers. For example, the Wild at Heart project also shares learning and best practise through the NHS led South Yorkshire Green Prescribing Tests and Learn programme. The NHS South Yorkshire Integrated Care Board have recommissioned the Wild at Heart team to deliver 12 training sessions over the next year introducing more health professionals to the benefits and application of green social prescribing. Over the last year they also provided training to a total of 65 social prescribing link workers and 83 healthcare professionals with 86% of attendees reporting that they felt confident or very confident in applying what they had learnt in their work.

5.2 LONELINESS CASE STUDY – FEED THE BIRDS

Project overview: Feed the Birds is a programme run by Shropshire Wildlife Trust and funded by The National Lottery Community Fund for the period considered in this report. It aims to address the issue of social isolation and loneliness by linking individuals-in-need with a volunteer, who visits them once a week to feed the birds in their garden.

Participants are provided with a bird feeder, which the volunteer fills-up during their visits, and a bird identification guide to track the various types of birds observed between visits. The project helps individuals to feel a sense of purpose by allowing them to observe and document their garden’s wildlife, while also providing them with a crucial social connection to their volunteer.

Volunteers undergo training in safeguarding and bird feeding and are matched with a local participant referred by either: a health professional, social prescriber link worker, adult and social care services, or a voluntary sector organization. The project is managed by a part-time Project Co-ordinator who works three days a week.

The project was first piloted in 2016 and has continued until 2023 thanks to grants from various funders.

Who participated: There were a total of 57 participants over a 31-month period from 1st of April 2019 to 31st of October 2021. Based on a recent sample of participants, 36% were male and 64% were female. According to the same recent sample there were varying numbers of participants across each age group as described in Table 5-1 below.

Age Range	15-19	45-49	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90+
% of people	1%	2%	6%	2%	5%	9%	14%	18%	24%	18%

Table 5-1: Age range of Feed the Birds participants

The most recent participants mainly lived in the north and northeast of Shrewsbury or North Shropshire, including Oswestry, Ellesmere, and Market Drayton. The majority of participants were classified in the 4-7 range of the overall Index of Multiple Deprivation by National deciles⁴⁷. Participants typically had a range of age-related conditions and illnesses such as Alzheimer’s, Parkinson’s, COPD, heart conditions, anxiety, and depression, often exacerbated by social isolation⁴⁸.

Project costs: Data was provided through the request for only 31-months of project operation. The cost of running the Feed the Birds project from 1st of April 2019 to 31st of October 2021 equated to **£99,550**⁴⁹. These costs include: salary, overheads, staff expenses, volunteer training, mileage and DBS, equipment and marketing. To obtain an estimate of the annual cost of the project, the total cost of **£99,550** can be scaled down by multiplying it by the ratio of 12 months to 31 months, resulting in an equivalent **annual cost of £38,535**.

Observed improvements in health: The Feed the Birds project reported a positive impact on the mental health and well-being of beneficiaries, with 90% reporting an improvement in their general mental health (this was provided in response to a general, qualitative question in a survey regarding improvements in general mental health – no quantitative reduction was measured) (Impact Consultancy & Research, 2021). The weekly volunteer visits were noted to have provided beneficiaries with something to look forward to, a sense of purpose, and a feeling of doing something worthwhile. 20% of the beneficiaries surveyed felt they had visited the GP less as a result of the project. No other data was collected that tracked the actual change in access to NHS services by participants as a consequence of participation in the scheme.

The project was also reported to have had a positive impact on the environment, by enhancing the bird population and biodiversity in people’s gardens and increasing care and concern for nature. Volunteers also reported an increase in their sense of well-being and feeling that they were contributing something worthwhile.

A significant unexpected outcome was the positive impact on family members of beneficiaries, particularly those with a direct caring role, by providing an opportunity for respite and an impartial “ear” to talk to.

Estimating NHS cost savings: The ‘Reconnections Evaluation Interim Report’ conducted by LSE (McDaid, Park, & Fernandez, 2016)⁵⁰ investigated the impact of loneliness on healthcare costs, revealing that individuals experiencing chronic loneliness incur an additional £7,732 (2023 prices) in healthcare costs over a 10-year period, equating to an average of £773 per year (2023 prices). The cost saving assumes that the level of loneliness is reduced from ‘severe’ to ‘moderate’.

We apply the (McDaid, et al., 2016)⁵¹ method to the Feed the Birds project because:

- Feed the Birds targets individuals who experience chronic loneliness and social isolation due to factors such as age, poor mental or physical health. Therefore, the participants of this project fall under the definition of chronic loneliness.
- The age profile and age-related conditions and illnesses of the participants in Feed the Birds are similar to those in the UK-based study conducted by McDaid et al. (2016)⁵².
- (McDaid, et al., 2016)⁵³ was conducted based on a UK study cohort, where the Feed the Birds project is also based.

90% of people surveyed as part of the evaluation of the Feed the Birds project said they felt less lonely as a result of the volunteer visits and all of the feedback received from family members and stakeholders referred to the value of companionship for the beneficiary.

When applying these figures to the Feed the Birds project, we can estimate that 20 participants may report a reduction in loneliness per year, based on the assumption that the program runs for 31 months and 90% of participants experience a reduction in loneliness (multiplying the number of participants (57) by the ratio of the duration of the program to the total number of months in a year (12/31)). Assuming a reduction in loneliness from 'severe to moderate' as defined by McDaid et al (2016), the healthcare cost saving of the intervention can be calculated as **£15,460 per year**.

The assumption is made that each participant was only engaged for one year. Assuming all 57 participants were fully engaged over the full 31-month duration, the estimated benefits over this period are much higher at around **£102,440**. However, it is important to note that we did not have the information regarding the duration of individuals' engagement in these projects for this analysis.

Estimated BCR and other lessons learned: The value-for-money of Feed the Birds depends on the assumption around the length of participation of each participant. **Assuming participants spent only one year each in the scheme, every £1 spent on the Feed the Birds project is estimated to deliver a £0.34 benefit in terms of reduced costs to the NHS. Where participants are assumed to have participated over a longer period, the payback is higher at £0.86 per £1 spent.**

5.3 CASE STUDIES TACKLING MENTAL HEALTH

5.3.1 Early intervention in Bury

Project overview: People using mental health services in Bury and Rochdale have been utilising their areas' natural green spaces to improve their mental and physical health. The Pennine Care NHS Foundation Trust's early intervention teams in Bury and Rochdale, have been working with Lancashire Wildlife Trust in Bury and Petrus in Rochdale, to support people experiencing psychosis and to promote healthy living, socialisation, and access to services, through social prescribing. The social prescribing of green activities provides both physical and mental health benefits. For the mind, it lifts mood, increases focus and social engagement, and boosts confidence. All the activities organised bring a physical element too, keeping bodies active and promoting continuous exercise. The groups have been visiting The Strand in Rochdale and Philips Park in Bury, taking part in group outdoor activities such as pond dipping, willow weaving, gardening, bird box building and more.

Who participated: For this analysis, the benefits are calculated for 23 participants, attending weekly two-hour session for eight weeks (8 sessions, 16 hours of contact time).

All the participants access the project through NHS referrals via Pennine Care NHS Foundation, Early Intervention Service, Bury. Each of the participants have been diagnosed with a mental health condition, which includes anxiety, depression, psychosis, schizophrenia and Bipolar.

Project costs: According to the Lancashire Wildlife Trusts, the day rate of running the sessions in Bury equated to the cost of one full time officer for two-hours, which equated to £250 per session. For eight two-hour sessions used in this analysis, this would total £2,000.

The costs are relatively low because this project is for a specific closed referral group with Pennine Care for their Early Intervention team. This essentially has a couple of differences to the Greater Manchester Programme (see Section 5.3.2) standard nature and wellbeing sessions, namely:

- They do not need to put time into recruitment- all referrals come via Pennine Care and they fill the places
- Pennine Care also support the session, so the Wildlife Trust do not need a 2nd member of staff or lead volunteer to support.

To reflect the costs of this second member of staff provided by Pennine Care we will double the costs and include this as another way to look at the costs in the analysis.

Once costs are scaled up to align with the assumption that visits to outdoor greenspace of 30 minutes or more per week could reduce the prevalence of mental health conditions (so 26 hours of time in nature per year, relative to the 16 hours delivered through participation in the early intervention project – see below section describing method to estimate NHS cost savings), this would equate to a cost of the programme of £3250 (one Wildlife Trust staff member) or £6500 (includes NHS member of staff).

Observed improvements in health: The project tracked the participant after they were part of the Early Intervention project in Bury. The majority of participants (16 out of 23) were unemployed when they started in the project, however many of these participants reported that they were employed post intervention, volunteering with The Wildlife Trusts and also working with the local community.

The project also recorded the participants' mental health score before and after using the ONS4. Out of all the participants, 10 recorded scores before and after. The ONS4 questions for Life Satisfaction, Worthwhile, Happiness and Anxiety⁵⁴ on average all saw an improvement, with all scores improving on average by 2 points from 4-5 to 6-7 where 0 is "not at all and 10 is "completely"

Estimating NHS cost savings: For this analysis, the focus was on the first pathway 'visits to nature' due to the data that was being received by projects run by the Wildlife Trusts. To estimate the benefits, the method used is adapted from the method used by Saraev, et al (2021)⁵⁵ as described in Appendix 1. Saraev, et al (2021) assumed that visits to outdoor greenspace of 30 minutes or more per week could reduce the prevalence of depression

in the population by 7% using (Shanahan, et al., 2016). This percentage was applied to the annual estimates of depression-related costs, to estimate avoided costs. Saraev, et al (2021) extrapolate the findings of this research by assuming this benefit would also apply to anxiety-related costs as well as Common Mental Health disorders not otherwise specified (CMD-NOS)-related costs.

For our analysis, we extrapolate this 7% reduction to other mental health conditions including psychosis, schizophrenia and Bipolar. Although an assumption, psychosis (according to the NHS⁵⁶) does include severe depression as one of its causes, and in terms of the sample only 2 participants had schizophrenia and 1 had Bipolar disorder, hence this assumption would not significantly impact the results.

Firstly the 7% reduction was applied to the number of cases of mental health conditions (see count information in Table 5-2). The healthcare cost savings as defined in the Saraev, et al (2021) paper⁵⁷ were then multiplied by the latest GDP deflator⁵⁸ to convert prices from 2007 to 2023 prices (see Table 5-2). These were then applied to the reduction in mental health cases.

For psychosis, cost information was taken from the Unit Costs of Health and Social Care 2021 paper⁵⁹ which defined costs of running a programme looking at early intervention for psychosis. They estimated that annual direct cost per patient of this type of service, plus other community psychiatric services and inpatient care, was £13,332. The

first year of the early intervention team's input is estimated to cost £4,043 per patient. For the Early Intervention project in Bury, we have used the £4,043 cost per patient (£4,385 when converted into 2023 prices) as this could be seen as an equivalent project run by the NHS which is in its first year. However, this is a lower bound cost estimate therefore the costs for treating psychosis are likely to be sufficiently higher - if the Early Intervention project can also reduce community psychiatric and inpatient care after the first year of diagnosis, then the benefits would be a lot higher.

The mental health costs used are defined on an annual basis, and the participation studied by Shanahan et al. was also observed over the course of a year. However, participation in the Early Intervention project was over a shorter timeframe - eight two-hour sessions over two months. That said, qualitative evidence provided from the implementation team alongside participation data suggests that the majority of the participants went on to continue visiting outdoor greenspace following completion of the sessions (responses included: engaging in other Wildlife Trusts services, continuing to walk in greenspace, volunteering with other Wildlife Trust services). Therefore, based on this anecdotal evidence from the reports, the assumption is that participants continued to take part in some sort of outdoor activity outside of the sessions for the remainder of the year.

As shown in Table 5-2, the total estimated benefits in terms of reduced mental health treatment costs equated to **£7,024**.

	Count	Calculated equivalent reduction in number of cases as a result of participation (applying 7% reduction assumption)	Annual per person cost for treatment (2023 prices)	Reduction in annual costs for treatment (2023 prices)
Depression	4	0.28	2,978	£834
Anxiety	5	0.35	1,577	£552
Bipolar disorder	1	0.07	2,034	£142
Schizophrenia	2	0.14	15,145	£2,120
Psychosis	11	0.77	£4,385	£3,376
Total	23			£7,024

Table 5-2: Reductions in annual costs for treatment of mental health conditions

As well as the reductions in mental health costs, as explained in more detail in Appendix 1, (Saraev, et al 2021) also looked at the costs associated with employment losses for different mental health conditions. Similar to the mental health costs, these were adjusted to 2023 prices using the latest GDP deflators⁶⁰. The reduction in

the number of mental health cases were multiplied by the annual per person cost for economic inactivity to calculate the reduction in average annual employment-related cost. As shown in Table 5-3 benefits in terms of reduced treatment employment costs equated to **£28,442**.

	Count	Assumption 7% reduction	Annual per person employment-related cost (2023 prices)	Reduction in annual costs for employment related costs (2023 prices)
Depression	4	0.28	£10,319	£2,889
Anxiety	5	0.35	£9,782	£3,424
Bipolar disorder	1	0.07	£35,051	£2,454
Schizophrenia	2	0.14	£27,245	£3,814
Psychosis	11	0.77	£20,599	£15,861
Total				£28,442

Table 5-3: Reductions in annual costs for employment related costs

Estimated BCR and other lessons learned: Every £1 invested into the Bury project is estimated to produce £2.16 of benefit in terms of reduced costs of treating mental health related conditions. If we include the NHS member of staff and double the costs, the payback in health care cost savings would be £1.08 in terms of reduced costs of treating mental health related conditions for every £1 invested.

Where employment benefits are also considered, the benefit-cost ratio would be significantly greater. Furthermore, this assumes that all benefits are gained in year, and participation has no lasting effects on access to health care and associated costs – where the impacts last more than one year, the benefits would be even greater. As mentioned previously, we have also used the lower bound estimate for the cost of treating psychosis – where the cost of treating psychosis are much higher, the healthcare cost savings of participation would be higher as would the payback per £1 invested.

It is also observed that costs can be minimised where a referral link is made with a local NHS Trust or health care provider. This significantly reduces the costs of advertising the project and seeking referrals.

5.3.2 Nature for Health in Greater Manchester

Project overview: Nature for Health is a programme part-run by Lancashire, Manchester & North Merseyside Wildlife Trust, and managed overall by the Greater Manchester Health and Social Care Partnership. Greater Manchester and its Nature for Health project is one of seven national test and learn sites delivering the NHS England's Green Social Prescribing Pilot Programme that aims to use the human connection with nature to improve mental health⁶¹.

Greater Manchester Health and Social Care Partnership have commissioned five voluntary sector organisations deliver green social prescribing activities across the city-region: Sow the City, Petrus, Lancashire Wildlife Trust, Salford Community and Voluntary Service (CVS), and City of Trees.

The project (as the overall Pilot Programme) is funded by NHS England, Department for Environment, Food and Rural Affairs, Department of Health and Social Care, Natural England, Office for Health Improvement and Disparities, Department for Levelling Up, Housing and Communities, National Association of Social Prescribing and Sport England.

Lancashire, Manchester & North Merseyside Wildlife Trust's aim is to support people with mental health needs in Prestwich. The groups have been taking part in group outdoor activities such as bushcraft, practical

conservation, group walks and practicing mindfulness. The project was started in 2021 and is scheduled to conclude in 2023.

Age Range	18-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	Unknown
# of people	12	15	11	28	18	21	24	13	14	9	7	8	3	4	3

Table 5-4: Age range of nature for health (wildlife trust) participants

All participants were referred through either: social prescribers, the NHS, local voluntary services, education, and self-referrals. The attendees are mostly White British or Asian/Asian British - Pakistani. The participants mainly lived in Manchester and Bolton with the most common regions M25, M26, BL9, and BL8. Some participants were homeless or rough sleepers.

The majority of attendees have varying degrees of mental health needs, ranging from early/pre-determinants to severe. However, there are a few attendees who do not have any mental health needs.

The typical group size is approximately eight active participants, and the program runs for three months per person at half a day per week.

Project costs: To manage three nature and wellbeing sessions per week, the Wildlife Trust would expect to employ one full-time equivalent (FTE) Nature and Wellbeing Officer. If we assume that the sessions for the 190 participants are evenly distributed over the two-year period, then we can estimate the annual cost of the Nature for Health project to be equal to the salary of one FTE Nature and Wellbeing Officer, which is **approximately £47,891 per year.**

Observed improvements in health: The Nature for Health project reportedly had a positive overall impact on the mental wellbeing of participants. Data was collected from participants before and after participation, including an assessment against the SWEMWS scale. The data reports a +104 total SWEMWS point change for the 42 participants that responded to the survey.

Estimated NHS cost savings: The benefits of the scheme have been calculated drawing on the reported SWEMWS scores. The Nature and Wellbeing Senior Officer involved in the project believed that the 42 individuals who completed the SWEMWS survey provided a good representation of the diverse range of individuals accessing the service. As a result, it can be assumed that their responses are indicative of the remaining 148 individuals who did not complete the survey. Extrapolating the average point change per participant (around +2.5 point improvement per participant)

to the remaining 148 participants that did not complete the SWEMWS survey, this results in a total +470-point change across all 190 participants.

To monetise the reported benefits, the methods from (Santini, et al., 2021)⁶² and (Dayson & Bashir, 2014)⁶³ have been adopted. The Santini approach that allows us to directly monetise SWEMBS changes, but it is not specifically tailored to green prescribing. Therefore, as a sensitivity, we also apply the Drayson method to assess the potential outcomes of an alternative approach.

(Santini, et al., 2021) findings showed that each point increase in mental wellbeing is associated with a £36 (2023 prices) decrease in healthcare costs (95% CI=£-57, £-2). For our analysis, we calculated the total annual point change in wellbeing as +470 divided by 2 which equates to +235. The £36 decrease in healthcare costs was applied to the total point change resulting in **£8,460** healthcare cost savings per annum. This benefit only captures the impact in one year and does not consider any potential ongoing or lasting effects. However, it is noted that this methodology is not specific to green prescribing and its potential benefits, and also that the healthcare cost saving per point change would likely vary significantly depending on a variety of parameters, including for example, underlying healthcare conditions.

Applying an alternative method to monetising the benefits produces a very different result. (Dayson & Bashir, 2014) findings based on similar types of activities to the Nature for Health project shows that social prescribing can result in healthcare cost savings associated with inpatient admissions, accident and emergency attendances, and outpatient appointments. For 95 participants, using the 12-month cohort of patients referred through a grant funded VCS provider cost reduction, the annual benefit **equals £44,475** (£471 saving per participant) in terms of reduced NHS costs associated with mental health conditions.

Estimated BCR and other lessons learned: Every £1 spent on the Nature for Health project is estimated to deliver a £0.18-£0.93 in benefit in terms of reduced costs to the NHS.

5.4 PHYSICAL HEALTH CASE STUDY – WILD HEALTH

Project overview: The Wild Health initiative is a programme run by Gwent Wildlife Trust and funded by The National Lottery Community Fund. It provides opportunities for recreational, social, and work-based outdoor activities that leverage the potential benefits of nature-based interventions for physical and emotional well-being. The project primarily focuses on the enhancements in health and well-being outcomes derived from connecting with the natural world, along with the therapeutic and environmental benefits. Furthermore, it also provides support for other issues that people may face, such as social isolation, confidence, self-esteem, and employability.

The project was first piloted in 2017 and is scheduled to conclude at the end of 2025.

This project collaborates with various mental health and local delivery groups, such as: Adferiad and Platfform, Mind Monmouthshire, Goldtops, Early Intervention Service, Girls Aloud, Newport People First, Blaenau Gwent/RCT People

First, Coleg Gwent, Integrated Autism Service, Aderyn, Bridges Monmouth, and GP referral groups.

Since April 2022, this project has been managed by two Wild Health Officers working full time. Wild Health is presently being financially supported by £359,592 from the National Lottery Community Fund to the end of 2025. Prior to this, its funding was sourced from the Integrated Care Fund through the Welsh Government, which lasted until March 22.

Who participated: In 2022, there were a total of 142 participants with the majority coming from deprived areas as described in Table 5-5. A significant number of participants in the Wild Health project are from local authorities with a high representation amongst the most deprived Lower-layer Super Output Areas (LSOAs) in Wales, as indicated by the 2019 Welsh Index of Multiple Deprivation (WIMD). The WIMD assesses deprivation levels based on factors such as income, employment, health, education, access to services, community safety, living environment, and housing.

Residence	Newport	Monmouthshire	Torfaen	Blaenau Gwent	Caerphilly	Pan Gwent
% of people	24%	20%	11%	14%	5%	26%
% LSOAs in most deprived 20%	34.7%	1.8%	31.7%	44.7%	23.6%	-

Table 5-5: Age range of nature for health (wildlife trust) participants

Data on the age of participants has only been collected up until the end of 2022, so the percentage of across each age group are described in Table 5-6 below instead.

Age Group	18 and under	19-29	30-39	40-49	50-59	60-69	70 and over
% of people	4%	19%	30%	21%	11%	11%	4%

Table 5-6: Age range of nature for health (wildlife trust) participants

Project costs: The cost of running the Wild Health project from January 2022 – December 2022 was reported as **£60,644**. These costs include salary, overheads, staff expenses, volunteer travel and training, PPE, equipment and marketing.

Observed improvements in health: The activities organised by Gwent Wildlife Trust were mostly physical in nature and included: litter picking, coppicing/ground clearance, hedge laying, geocaching, habitat creation/tree planting/wildflower seeding, and guided walks.

In addition to physical health benefits, the Wild Health Programme reported positive qualitative impacts on participants’ mental health and wellbeing, through helping them connect with nature, learn about the environment,

and interact with people from different backgrounds. The program has helped them gain new skills, build their confidence, and develop a more positive outlook on life. Participants have found it enjoyable, relaxing, and uplifting, and have benefited from socializing and learning new skills.

Estimating NHS cost savings: The relationship between physical activities and QALY scores was examined by (Beale, et al., 2007), who estimated that 30 minutes of moderate to intense physical activity per week, undertaken 52 weeks a year (equivalent to 26 hours over the course of the year), would be associated with a QALY gain of 0.011 per individual per year.

The social value of a QALY in England, based on the NICE cost-effectiveness threshold, was £20,000 (National

Institute of Health & Care Excellence, 2013)⁶⁴ implying that enhancing health by a single QALY is equivalent to a saving of up to £26,161 (2023 prices) in health care costs (Claxton, et al., 2015; Barnsley, et al., 2013)^{65,66}.

These findings can be applied to the Wild Health project by calculating the equivalent number of individuals engaged in 30 minutes of moderate to intense physical activity per week, for 52 weeks a year, based on the total number of physical recreation hours. In 2022, the total number of recreational hours of all participants was 3,204 hours, which is equivalent to 123 individuals (spending 30 minutes per week in nature). Using the findings of (Beale, et al., 2007), this equates to a total QALY gain of 1.356 per year, which equates to a monetary value of **£35,474 per year**.

It is noted that the (Beale, et al., 2007) approach does not capture the benefits specific to green prescribing, which may be arguably different and higher, in particular where activities are undertaken as a group (and hence

carry additional benefit through greater interaction with others)⁶⁷. As a sensitivity, we therefore apply an alternative method to estimating the healthcare cost savings for illustration. (Dayson & Bashir, 2014) findings based on similar types of activities to the Wild Health project shows that social prescribing can result in healthcare cost savings associated with inpatient admissions, accident and emergency attendances, and outpatient appointments. For 142 participants, using the 12-month cohort of patients referred through a grant funded VCS provider cost reduction, the annual benefit **equals £66,882** (£471 saving per participant) in terms of reduced NHS costs associated with mental health conditions.

Estimated BCR and other lessons learned: Every £1 spent on the Wild Health project is estimated to deliver £0.58-£1.10 in benefit in terms of reduced costs to the NHS. The lower bound of this assessment is based on the general health benefits of regular physical activity and not on specific outcomes reported by this project.

6 ESTIMATE OF THE COST OF ROLLING OUT GREEN PRESCRIBING UK-WIDE, AND THE SIZE OF POTENTIAL BENEFITS

In this section, we estimate an illustrative cost to scaling-up green prescribing activities to the UK level. Our approach is to apply the cost to take a percentage of the total UK population that suffer from a mental health condition and also spend time in nature frequently to improve their mental health.

As demonstrated by the case studies, many green prescribing schemes have targeted those suffering from mental health conditions to date. As such, we have based our estimate on the UK costs of green prescribing on rolling out such schemes to those that suffer from mental health conditions – although it is important to note that green prescribing can target and deliver benefits for people suffering from other health conditions too. To estimate the number of people in the UK who suffer from the three mental health conditions, firstly the total number of adults across the UK are taken from the estimates of the population for the UK, England, Wales, Scotland and Northern Ireland produced by the Office for National Statistics⁶⁸. Information concerning adults living with depression (3.3%), anxiety (5.9%) or CMD-NOS (7.8%) are taken from (Saraev, et al 2021)⁶⁹ which take the proportions from the Adult Psychiatric Morbidity: Survey of Mental Health and Wellbeing, England, 2014⁷⁰.

These percentages for the three mental health conditions are applied to the adult population (aged 16 onwards) for England, Wales, Scotland and Wales. Table 6-1 shows the estimates of the number of the adult population that suffers from one of the three mental health conditions. Although, these percentages for mental health conditions are for England it is assumed in the (Saraev, et al 2021) method a similar prevalence is found in the other countries of the UK. This then gives the estimate of the number of people who are suffering from the three mental health conditions in the UK broken down by country.

It is noted that spending time in nature may not be a beneficial treatment for everyone – as such, green prescribing at a UK-level would be best targeted to those for which it would be more effective. To estimate UK-wide costs, we therefore have adopted a proxy scaling factor

to represent the proportion of the population who would benefit from spending time in nature (and hence who could be targeted by green prescribing). We do so based on existing numbers of people who suffer from mental health conditions and who spend time in nature. To calculate the percentage of the population that visit the natural environment several times a month, we used the latest data from The People and Nature Survey⁷¹. Only those respondents that had visited the natural environment 'several or more times a month' were included in the analysis. As well as this, only those respondents who had answered that the main reason for their visit was 'for mental health and wellbeing reasons' was included in the analysis. These survey responses were then scaled up to the English population (given the survey covers England only) level by using the weights published by The People and Nature Survey. From this, it was calculated that 13% of the English adult population visited a place that is considered a natural environment 'more than several times a month' and also 'went for mental health and wellbeing'. We use this percentage as our proxy for the proportion of those with mental health conditions who could benefit from green prescribing.

A couple of drawbacks of using this figure are that it represents people who already access nature as a means of improving mental health, but not all those that may want to (but cannot) and/or that could benefit from being in nature (but for example, are not aware of its potential benefits). Therefore, in practice, the number that could benefit from green prescribing could be much higher.

Although, this is an English survey, it was assumed (similar to Saraev, et al 2021) that this 12.8% would be similar in Scotland, Northern Ireland and Wales.

The estimates of the number of people who suffer from mental health conditions in each country are then multiplied by 12.8% to get the number of people who regularly spend time in nature with a mental health condition (see Table 6-1). We estimate around 1.2m adults suffering from mental health conditions, could benefit from green prescribing if scaled up to UK level.

UK	Adult population who suffer from the mental health condition	Applied to % of adults who spend time in nature several times a month & for mental health and wellbeing
Depression	1,805,486	231,938
Anxiety	3,227,991	414,677
CMD-NOS	4,267,513	548,216
Total	9,300,990	1,194,831

Table 6-1: UK estimates used in the calculations

In terms of scaling up the **costs**, we took an average of the Wild at Heart, Nature for Health in Greater Manchester and Wild Health which equated to £447 in terms of putting a participant through a green prescribing project. This number aligns with conversations had with other researchers.

If we apply this to the number to number of people who suffer from mental health conditions at the UK level, assuming 12.8% would benefit from regularly spending time in nature, this equates to a funding requirement of **£534.1 million per year** to deliver green prescribing to this representative cohort who could benefit. If we break this cost down into individual countries, this will equate to £449.7 million for England, £25.0 million for Wales, £44.6 million for Scotland and £14.8 million for Northern Ireland per year.

As an illustration of the benefits achieved from this level of investment, we can apply the estimated payback from those case study projects that delivered targeted green prescribing; in particular the Early Intervention project in Bury and the Wild at Heart project in Rotherham:

- For the Wild at Heart project for every £1 invested there would be a £1.19 in terms of reduced costs to the NHS. Using this ratio the healthcare cost savings of UK-wide funding would be around £635.6 million.
- For the Early Intervention project in Bury (for every £1 spent there was a £2.16 saving in terms of reduced mental health costs) this would equate to around £1.2 billion in terms of reduced mental health costs.

7 GREEN PRESCRIBING AND ITS CONTRIBUTION TO OVERCOMING HEALTH INEQUALITIES

Health inequalities refer to the disparities in health outcomes that exist within the UK between various social groups. Research indicates that social determinants, such as education, disability status, employment status, income level, gender, sexuality and ethnicity, play a significant role in shaping an individual's overall health and well-being (Arcaya, et al., 2015). Engaging with green spaces offers notable advantages, particularly for vulnerable populations. Individuals with better access to green spaces tend to experience reduced health disparities which would typically be associated with income deprivation (Mitchell & Popham, 2008). Furthermore, research reveals that ensuring fair and equal access to green spaces in England alone could result in annual savings of £3.1 billion (2023 prices) for the NHS (Natural England, 2009).

A detailed and structured evaluation of whether the Wildlife Trust projects have/have not had an impact on improving/removing health inequalities has not been possible within the scope of this study. However, based on the evidence collected, the green prescribing projects may have provided some benefit for some groups to overcome barriers in accessing care needs.

7.1 EVIDENCE OF IMPACTS FOR SPECIFIC GROUPS

Restricted mobility and communication (Feed the Birds and Wild Health project): The Feed the Birds project sought to address the access and engagement barrier by implementing a home visitation approach. In this project, dedicated volunteers visit the beneficiaries in their own homes, ensuring that those with limited mobility can still access the benefits of nature-based interventions. In several cases, the project has been acknowledged as a vital factor in enabling beneficiaries to remain in their own homes and maintain a sense of independence. These outcomes have had a positive influence on the overall health and well-being of the individuals involved. The project's home visitation aspect has also served as a "soft entry" for beneficiaries to open their homes to outsiders. This gentle introduction has increased their receptiveness to receiving more formal care services. Additionally, volunteers have played a crucial role in guiding beneficiaries towards other sources of help and support that they were previously unaware of, effectively expanding their access to essential resources.

Evidence from a volunteer involved in the Feed the Birds project highlights the impact of the project on individuals' lives. For instance, Brenda's story sheds light on her unique circumstances: *"Brenda, who is deaf and grew up in a large family of hearing siblings in Barmouth, faced significant challenges. She attended a special boarding school at the age of five where she learned sign language but never acquired spoken language skills. After marrying and moving to Shrewsbury, Brenda's husband, who was also deaf, passed away, leaving her feeling increasingly lonely and isolated. Recognizing her mother's situation,*

Brenda's hearing daughter contacted Diane, the Feed the Birds Project Officer at Shropshire Wildlife Trust, seeking support for her mum's well-being, which was compounded by her hearing impairments. Diane got in touch with volunteer Karen who enthusiastically agreed to attend a sign language course so she could communicate better with Brenda. With a bit of sign language under her belt, Karen arrived at Brenda's and set up a birdfeeder. No birds came so Karen moved the feeder various times but always to no avail! Despite this their friendship has developed and they both look forward to weekly visits. Brenda has taught Karen more sign language and they often find amusing ways of communicating." An evaluation of the Feed the Birds Project found it evident from feedback that the volunteer visits brought fun and laughter and colour back into many people's lives which helped to improve wellbeing.

Another participant of the Feed the Birds project shared the importance of the project for a family where the husband had a life-limiting illness, severely restricting mobility and communication. During lockdown as a consequence of the COVID pandemic, the project provided respite for the wife, who was the main caregiver, and offered valuable social interaction.

In another example from the Wild Health project, several wheelchair users engaged with the project through Monmouthshire Mind. These individuals took initiative and downloaded the geocaching app, creating a free profile and independently participating in the activities, showcasing their determination and enthusiasm for the program.

The Nature Wellbeing Prescribing pilot in Caerphilly also worked to overcome the access and engagement barrier by bringing together a nascent network of outdoor activity providers and nature-based organisations working in the Caerphilly County Borough area. These providers offered a diverse range of geographically spread activities, ensuring that patients had access to a wide array of options. This comprehensive system made it easier for GPs and other healthcare professionals to understand and refer patients to appropriate nature-based interventions.

Individuals more receptive to soft touch assistance (Feed the Birds project): Through the Feed the Birds project, volunteers found that for some this was a 'soft entry into opening up their home to outsiders' and that this had made people more receptive to more formal care services being brought in. Other people referenced that volunteers had been able to signpost people to other sources of help or support that they were not aware of previously. A volunteer emphasised the positive impact of the project by stating, *"Thanks to this project, individual X now has a care package in place, which wouldn't have been possible before because they were reluctant to allow anyone into their house."* Another volunteer expressed, *"We have successfully connected with individuals who may have been overlooked by other organizations, opening doors for them to access additional services and support."*

Most vulnerable people in the community (Feeds the Birds): Volunteers found that the Feed the Birds project engaged people who may not have identified as being 'lonely' or acknowledged that they would benefit from regular company. As such it has provided some of the most vulnerable people in the community who may fall outside of other types of formal social care with regular human contact.

Older people (Feed the Birds project): A significant focus of the green prescribing services has been on older people, who are less likely to seek help for mental health issues. 90% of the beneficiaries of the Feed the Birds project were aged 65 or above. Research shows that more than six in 10 people aged 65 or over in the UK have experienced depression and anxiety. Of these, more than half did not seek help as they thought 'they should just get on with it' and nearly a quarter relied on support from friends or family (NHS England, 2020). The Wildlife Trust's interventions have provided a valuable avenue for support, allowing older individuals to engage with nature and improve their mental wellbeing.

Participants from under-served areas and ethnic minorities (Nature for Health, Early Intervention Project in Bury, Nature Nurtures: Wild Walks Pilot⁷²): Among the participants of the Wild Health project, a significant proportion reside in areas with high levels of deprivation (Welsh Government, 2019). Furthermore, in the Nature for Health project, the majority of participants are from areas characterized by higher levels of deprivation, with 56% residing in postcodes classified within Index of Multiple Deprivation Deciles 1 to 3 (Ministries of Housing, Communities & Local Government, 2019).

Ethnic minorities constitute around 18% of people in England and Wales (ONS, 2021). Even without specific emphasis of engaging ethnic minorities, participation of ethnic minorities ranged from 13% in the Nature for Health project to 30% in the Early Intervention Bury project.

These figures demonstrate the positive impact of the Wildlife Trust's efforts can have in creating an inclusive environment where individuals from diverse backgrounds feel welcome and empowered to engage with nature-based activities.

The Nature Nurtures project, led by London Wildlife Trust in collaboration with partners Spread the Word, Black Girls Hike CIC, and London Youth, has tackled the representation barrier in expanding green social prescribing to address mental health inequalities. This project aims to inspire and engage young people from underrepresented communities in the nature conservation sector, making nature more inclusive, accessible, and relevant to them.

Specifically, the Nature Nurtures project focuses on young people from Black, Asian, and Minoritised Ethnic (BAME) backgrounds, young people with special educational needs and disabilities, and individuals residing in socio-economically disadvantaged areas of London. By targeting these specific groups, the project aims to address the lack of diversity and representation in nature-based activities. The Nature Nurtures project has achieved significant participation, with a total of 46 young women aged 16-25 involved. The majority of participants (57%) identified as Black, Black British, Caribbean, or African, highlighting the impact of Black Girls Hike in attracting and engaging individuals from these backgrounds. Additionally, 11% of participants identified as having mixed or multiple ethnic heritage, while 2% identified as Latino and 2% identified with other ethnic backgrounds.

Whilst anecdotes from beneficiaries further demonstrate the value and impact of the projects, they also shed light on the lack of support for carers and the frequent oversight of their needs. This suggests that there would be a benefit in broadening the scope of the project to include carers as beneficiaries, recognising the crucial role they play in supporting others.

8 SUMMARY RESULTS, LESSONS LEARNT AND RECOMMENDATIONS

Project	Method used to calculate benefit	Annual benefit to NHS/ healthcare (2023 prices)	Annual total cost of running project (2023 prices)	Benefit Cost ratio
Wild at Heart Clifton Park in Rotherham	(Dayson & Bashir, 2014) ⁷⁴	£38,646 in reduced NHS healthcare costs ⁷⁵	£32,427	For every £1 spent on the Wild at Heart Clifton Park in Rotherham session, £1.19 in benefit in terms of reduced costs to the NHS.
Feed the Birds	(McDaid, et al., 2016) ⁷⁶	£15,460 in reduced NHS healthcare costs ⁷⁷	£46,092	For every £1 spent on the Feed the Birds project, £0.34 in benefit in terms of reduced costs to the NHS (assuming participants spent only one year each in the scheme). Where participants are assumed to have had a longer participation, the payback is higher at £0.86 per £1 spent.
The Early Intervention project in Bury	(Saraev, et al 2021) ⁷⁸	£7,024 in reduced NHS mental health treatment costs ⁷⁹	£3,250 (£6,500 if we include member of staff provided by NHS)	For every £1 invested into the Bury project, the project provides £2.16 of benefit in terms of reduced costs of treating mental health related conditions. If we include the NHS member of staff and double the costs the BCR would be for every £1 invested there would be a £1.08 benefit in terms of reduced costs of treating mental health related conditions.
Nature for Health Greater Manchester	(Santini, et al., 2021) ⁸⁰	£8,460 in reduced NHS healthcare costs ⁸¹	£47,891	For every £1 spent on the Nature for Health project, £0.18-£0.93 in benefit in terms of reduced costs to the NHS.
	(Dayson & Bashir, 2014) ⁸²	£44,745 in reduced NHS healthcare costs ⁸³	£47,891	
Wild Health	(Beale, et al., 2007) ⁸⁴	£35,474 in reduced NHS healthcare costs ⁸⁵	£60,644	or every £1 spent on the Wild Health project, £0.58-£1.10 in benefit in terms of reduced costs to the NHS.
	(Dayson & Bashir, 2014) ⁸⁶	£66,882 in reduced NHS healthcare costs ⁸⁷	£60,644	

Table 8-1: UK estimates used in the calculations

Table 8-1 shows a summary of the operating costs and healthcare cost saving benefits that were calculated for each of the case studies. It should be highlighted that this only captures one benefit (reductions in healthcare costs) associated with green prescribing, and omits the wider health and wellbeing benefits generated from the activity for the public in terms of increased access to natural places and more wildlife.

It's clear from our results that green prescribing has the potential to deliver cost saving benefits to the NHS and 'take weight out of the system'.

For example, for the Early Intervention scheme in Bury which supports people experiencing psychosis and to promote healthy living, socialisation, and access to services, through social prescribing we estimated that from people spending time in nature there would be a reduction in mental health care treatment costs by £7,024 per year.

For the Wild at Heart Clifton Park in Rotherham project, we estimated there would be a reduction in NHS costs in terms of inpatient admissions, A&E attendances and outpatient appointments by £38,646 per year.

The size of savings varies depending on the size of the scheme and the methodology applied to estimate cost savings.

Furthermore, green prescribing has the potential to deliver healthcare cost savings in a cost-effective way – i.e., green prescribing can deliver a greater saving in healthcare costs than the cost of running the green prescribing scheme. Even accepting that there may be additional cost-savings and other additional benefits that have not been included in this analysis, the Wild at Heart Clifton Park in Rotherham and Early Intervention project in Bury are both estimated to deliver a return of >£1 per £1 invested, as does the Wild Health project in Wales depending on the methodology applied to estimate the effects.

It is true that some of the projects, in some cases when applying particular approaches to quantifying the benefits, appear to show a payback of <£1 healthcare cost savings per £1 invested. In these cases, it is worth keeping in mind:

- These monetary estimates do not capture the feasibility or practicalities of offering healthcare provision through different routes – i.e., green prescribing can offer an alternative means of health and social support that can be established relatively quickly where there is no or very limited capacity through existing traditional healthcare pathways, nor where can this be expanded in the short term
- Green prescribing as a concept is still relatively new. As such it is expected that some of these projects might be designed in a way that might not necessarily maximise value-for-money in the first instance (this relates to our lessons learned as defined below)
- Methods and data to assess the impacts of green prescribing is nascent. Tracking of health outcomes of participants, in a comprehensive and quantitative

way is not commonplace. In many instances we have therefore had to apply more general approaches to capturing the benefits of spending time in nature or of improvements in health, which may underestimate the benefits achieved through green prescribing specifically and/or for its cohort of participants

- In addition, some of the benefits that we were not able to quantify are listed below:
 - There is some evidence that caregiver burden and stress can be relieved through natural environment interventions, but there is need for more research in this area⁷³. These indirect benefits are not considered in our analysis
 - Potential long-term benefits are not estimated here. For example, from the anecdotal evidence, many of the participants of these projects continue to spend time in nature after the project has finished which will have longer term benefits for the NHS. As well as this, some participants have seen an improvement in confidence which will impact positively on the economy. Our analysis of the case studies typically only includes benefits in the year of participation
 - We have not included values for improving cost effectiveness of treating mental health conditions through learning. For example, the Wild at Heart project shares learning and best practise through the NHS led South Yorkshire Green Prescribing Tests and Learn programme. The NHS South Yorkshire Integrated Care Board have recommissioned the Wild at Heart team to deliver 12 training sessions over the next year introducing more health professionals to the benefits and application of green social prescribing. Over the last year they also provided training to a total of 65 social prescribing link workers and 83 healthcare professionals with 86% of attendees reporting that they felt confident or very confident in applying what they had learnt in their work.

Therefore, the benefits in practice, and the healthcare cost savings per £1 invested could be significantly higher. In terms of lessons learnt and recommendations for how to design and operate a green prescribing project, the case studies showed:

- Working with the NHS or Voluntary organisation that bridges the gap between the NHS and projects was beneficial in terms of value for money. The Wild at Heart project in Sheffield benefited from working with Voluntary Action Rotherham by getting participants with the greatest need in terms of mental health conditions. Meanwhile, as mentioned in section 5.3.1 the Early Intervention project in Bury also benefited from working closely with the Pennine Care NHS Foundation Trust, which helped deliver cost savings through avoiding the need to self-generate referrals.
- To improve estimates in future, data on tracked individuals through the NHS and how they used the NHS before and after green prescribing would make the results more robust. As well as tracking individuals, we see a benefit in green prescribing providers linking up with project health evaluation teams to robustly track and assess outcomes. This would further strengthen

the evidence base and provide information on what types of NHS services see a reduction in costs due to green prescribing.

- If we apply the cost of putting a participant through green prescribing to number of people who suffer from mental health conditions, assuming 12.8% would benefit from regularly spending time in nature, this equates to a funding requirement of **£534 million per year at the UK level** to deliver green prescribing to this representative cohort who could benefit. If an investment of this amount were to yield the cost savings shown in the Wild at Heart project for example, then it could realistically result in gross annual cost savings of £635.6 million.
- The evidence from this study highlights that green prescribing initiatives have been successful in providing benefits to different groups facing health inequalities, including those with restricted mobility, individuals receptive to soft touch assistance, vulnerable community members, older people, carers, and participants from under-served areas and ethnic minorities. These projects have effectively improved physical and mental health while addressing barriers related to access, engagement, and representation in nature-based interventions.
- Payback could be enhanced by more targeted design of the green prescribing project, for example, targeting groups which more frequently access NHS services will deliver greatest 'real-world' health care cost savings.
- Overcoming participation challenges, especially for individuals with limited mobility or anxiety, can be facilitated by implementing befriending programs where long-term participants support and encourage new members. Green prescribing proves to be effective in addressing these challenges, presenting an opportunity to reduce health inequalities and improve outcomes for marginalised groups.
- Increase representation from groups likely to be experiencing health inequalities, due to access restrictions and other barriers. Outreach may benefit people who are not currently accessing nature-based prescriptions but who may benefit.
- Some delivery models inherently carry a greater cost and a lower return in terms of healthcare cost savings – for example, the one-to-one, home visits offered by Feed the Birds. But this investment is what may be required to deliver effective care to particular individuals, in particular those that suffer more acutely from health inequalities.
- The development of better evaluation tools would enable third sector organisations to understand and report on the impact of nature based social prescribing initiatives.

APPENDIX 1 REVIEW OF METHODS TO QUANTIFY AND MONETISE HEALTH IMPACTS

STUDIES ASSESSING IMPACTS OF GREEN (AND SOCIAL) PRESCRIBING

The social and economic impact of the Rotherham Social Prescribing Pilot⁸⁸ (impact on the demand for hospital care) – Dayson and Bashir (2014)

The paper explored the impact of the Rotherham Social Prescribing Pilot on demand for hospital-based health interventions. The Rotherham Social Prescribing Pilot was delivered by Voluntary Action Rotherham (VAR) on behalf of NHS Rotherham Clinical Commissioning Group (CCG). The Pilot covered the whole borough of Rotherham.

The paper used patient-level Hospital Episode Statistics (HES) provided by the NHS to map over time the use of hospital resources by patients referred to the Social Prescribing Service since the Pilot's inception. Three types of hospital episode were considered: inpatient admissions, accident and emergency attendances, and outpatient appointments between April 2011 and December 2013.

Analysis was undertaken on both 12- and six-month cohorts:

- The 12-month cohort included all patients for whom 12 months post-referral data was available - i.e., all patients referred between September 2012 and June 2013 (n = 108)
- The six-month cohort included all patients for whom six months post-referral data was available - i.e., all patients referred between September 2012 and December 2012 (n = 451).

The analysis was undertaken on both samples to measure changes in the use of hospital resources by Social Prescribing patients.

As part of this analysis the changes experienced by a sub-group of patients who had been referred specifically to funded voluntary and community sector (VCS) Social Prescribing services were also considered.

A1-1 shows the change in per-patient utilisation of hospital resources for the 12-month cohort. This is also presented for the six-month cohort in the paper.

Average rate per-person	All patients referred to Social Prescribing			Patients referred to a grant funded VCS provider		
	12m before	12m after	Change	12m before	12m after	Change
No of inpatient admissions	1.46	1.17	-0.3	1.45	1.1	-0.36
No of A&E attendances	1.94	1.56	-0.39	2.19	1.67	-0.52
No of outpatient appointments	1.7	1.3	-0.36	1.9	1.36	-0.55

A1-1: Patient-level hospital episode data for Social Prescribing patients provided by the NHS Data Management and Integration Centre (DMIC)

The activities listed in A1-1 (for example, inpatient admissions) were then costed using the 2013/14 Payment by Results (PbR) national tariff⁸⁹. In cases where the activity did not have a tariff, costs were estimated from the NHS reference costs⁹⁰. A1-2 shows the change in costs per-patient for each of the activities for the 12-month cohort.

For example, in the 12-month cohort there was an overall cost reduction of £265 per average participant, whereas the per participant cost reduction for those referred to a funded VCS service was £378. Similar trends were seen in the six-month cohort although, as expected, the changes over 6 months were smaller than the 12-month changes.

Average rate per-person	All patients referred to Social Prescribing			Patients referred to a grant funded VCS provider		
	12m before	12m after	Change	12m before	12m after	Change
Cost of inpatient admissions	£2,633	£2,434	£199	£2,282	£2,001	£281
Cost of A&E attendances	£201	£174	£27	£221	£183	£38
Cost of outpatient appointments	£184	£145	£39	£206	£147	£59
Total cost	£3,018	£2,753	£265	£2,708	£2,330	£378

A1-2: Per-patient utilisation of hospital resources: cost comparison - 12-month cohort

Using the numbers in A1-2, annual benefits were calculated by multiplying the per-patient cost reduction by the total number of referrals to social prescribing. For example, £378 was multiplied by the total number of referrals to grant funded providers across each year of the pilot.

Reflections on the source

The outcome measures used in the study are appropriate for the economic assessment and can be replicated if the relevant data are available, such as hospital/GP appointment details and self-reported wellbeing. However, there are three main issues to consider regarding the conclusions.

Firstly, some of the reported differences are not statistically significant due to the small sample size and short follow-up times, as stated in the report.

Secondly, the lack of a control group makes it impossible to determine how much of the observed change was due to the intervention (social prescribing) and how much would have happened anyway. This limitation is acknowledged in the report, but the translation of the results into monetary values assumes that all of the change came from the intervention.

Finally, the study covers a wide range of activities and support, and the findings do not distinguish between different types of intervention, so there is no information on whether the impacts differed between them. Importantly for the present study there is no differentiation of the green prescribing effects, from the other social prescribing activities.

Regarding the assigned monetary values, it is difficult to assess their reasonableness without further information, particularly in relation to how “wellbeing” is valued in relation to mental health costs.

It is also noted that the study only captures the cost savings for hospital admissions, and not for other health and care provision (e.g. GP appointments).

Use in the present analysis: this study methodology is applied in the Wild at Heart (green prescribing) case study with limitations noted. This is also applied to the Greater Manchester and the Wild Health as an upper bound estimate.

Nature-Based Interventions and Mind-Body Interventions: Saving Public Health Costs Whilst Increasing Life Satisfaction and Happiness⁷¹ (Pretty & Barton, 2020)

The paper presents a literature review of evaluations of social prescribing programmes that record outcomes on service use, drawing on sources such as the NASP 2017 and 2018 annual reports, (Bragg & Leck, 2017) (Leeds Beckett University, 2019) and (New Economics Foundation, 2013). The ranges found for improvements after one year are 15-25% reductions in GP appointments, 20-25% reductions in A&E appointments, and 35-50% reductions in secondary treatments in hospitals. The analysis conducted in the paper went on to support the validity of these ranges.

The paper assessed the impact of four nature-based and mind-body interventions (NBIs and MBIs) programmes (woodland therapy, therapeutic horticulture, ecotherapy/green care, and tai chi) on life satisfaction/happiness and costs of use of public services. The paper calculates the economic benefits of these programmes using three measures: (a) reduced costs on public health and other services, (b) reduced health costs arising from reduced loneliness, and (c) economic benefits created from Life Satisfaction/Happiness LS/H improvements in income equivalents.

To estimate the reduced costs on public health and other services, the paper uses data on the changes in the use of public services, the methods set out by the government’s Treasury Green Book (HM Treasury, 2019), and the unit costs saved for public services drawn from the New Economy Manchester cost-benefit analysis spreadsheets and unit costs database (v 2.0 updated April 2019). The paper also assumes that the NBI programmes reduced loneliness and social isolation, as there are explicit aims to increase both nature and social connectedness. Loneliness increases annual GP visits by 1.8-fold and annual A&E visits by 1.6-fold (CMO (Chief Medical Officer), 2018). The study assumed that these are reduced to the levels found in the programme cohort.

According to evaluations of Improving Access to Psychological Therapies (IAPT) programs, complete recoveries are achieved by 40-50% of individuals, while some 63-67% experience reliable long-term improvement, implying that roughly 30% of individuals do not derive any benefit from the intended interventions (IAPT, 2019; Gyani, et al., 2013). Consequently, the paper distinguished between participants who have achieved “reliable improvement” in their well-being and those who have received no benefit, where possible based on available data.

Reflections on the source

This paper covers similar intervention programs as the Wildlife Trust, with the exception of the Tai Chi MBI program. The sample sizes are sufficient, and the methods used are robust and appropriate. The separation of the analysis into positive and negative responders highlights the individual variability in the impact of programme participation.

The key limitations are:

- uncertainty regarding how the data were collected within each program, as the data were provided by the programs themselves, which may introduce bias
- the lack of a control group, which limits the ability to determine what changes might have occurred anyway, without program intervention.

Use in the present analysis: This methodology was not utilised in the case studies because the data provided by the Wildlife Trust was better suited to the method proposed by (Dayson & Bashir, 2014) as it covered a similar geographical area and demographic of respondents.

OTHER STUDIES CONSIDERING THE IMPACT ON CARE COSTS OF TIME SPENT IN NATURE

Loneliness

Reconnections impact evaluation (loneliness)⁹² – McDaid et al. (2016)

Green prescribing, which involves connecting individuals to nature-based interventions and activities such as a befriending scheme for bird enthusiasts, has been shown to effectively reduce loneliness and social isolation (Razani, et al., 2018; de Vries, et al., 2013; Mughal, et al., 2022). This is because these interventions have explicit goals of increasing both nature and social connectedness.

A methodology for assessing health benefits via combating loneliness was explored in the 'Reconnections Evaluation Interim Report' from the Personal Social Services Research Unit (PSSRU) at London School of Economics (LSE) (McDaid, et al., 2016). The report is part of an ongoing evaluation of Reconnections, a multi-component multi-activity programme run by Age UK Hereford and Worcestershire and a number of other local voluntary and community sector organisations, intended to reduce loneliness in people over the age of 50 in Worcestershire.

LSE's methodology first constructs a decision analytical model. Insights through interviews with Reconnections clients, volunteers and delivery partners, as well as observed changes in levels of loneliness helped to inform some future assumptions about the level of uptake and engagement with loneliness alleviating interventions.

The model utilised survey data from the UK Office for National Statistics (ONS) to determine the initial probability of individuals with an average age of 65 experiencing high levels of loneliness, occasional loneliness, or no loneliness at all (Thomas, 2015).

Over the course of ten years, the model tracks changes in loneliness levels, as well as the incidence of dementia and mortality, for each individual in the cohort. At the end of each one-year period, individuals may transition between three different levels of loneliness. The model employs an incidence-based approach to costing, which involves identifying all new cases of loneliness in a specific geographic population during a particular period (usually one year). The model then estimates the expenses associated with treating these new cases, as well as other indirect financial and non-financial costs, such as impacts on families and quality of life, over a more extended period of time (in this instance, ten years).

Links between loneliness and the following NHS cost pathways were considered in the model:

- GP consultations - the Campaign to End Loneliness (CTEL) survey of more than 1,000 GP practices conducted in 2013 suggested that as much as 10% of all consultations per day could be attributed to loneliness (Cooper, 2013). It should be noted that older people in England who experience depression use GP services at a low rate, with less than one in six discussing their depression with a GP and less than half receiving treatment (Rodda, J., Z. Walker, et al., 2011).
- A&E visits - a US study reported an annual A&E contact rate of 1.6 compared to 0.4 for non-lonely individuals (Geller, J., P. Janson, et al., 1999). Another study from Sweden found that lonely individuals over the age of 65 had significantly higher rates of A&E department visits over a year, with contact rates doubling from one visit to two per annum (Taube, E., J. Kristensson, et al., 2015).
- Self-harm - A recent study from England examined the impact of loneliness on suicidal behaviour (Stickley & Koyanagi, 2016). The risk of serious deliberate self-harm in a year was found to be 17.37 times greater for highly lonely individuals and 3.6 times greater for those who are sometimes lonely.
- CHD and Stroke - Loneliness is also a risk factor for coronary heart disease (CHD) and stroke (Heffner, K. L., M. E. Waring, et al., 2011; Cene, C. W., L. Loehr, et al., 2012; Valtorta, N. K., M. Kanaan, et al., 2016).
- Mortality - the Dutch AMSTEL study, which monitored individuals aged 65 to 84 over a decade and found that lonely men had a 1.3 times higher likelihood of mortality compared to their non-lonely counterparts (Holwerda, T. J., A. T. Beekman, et al., 2012).
- Dementia - (Holwerda, T. J., D. J. Deeg, et al., 2014) found that older adults who felt lonely had a 64% higher risk of developing dementia compared to those who did not. Another Dutch team conducted a recent meta-analysis of 19 studies that suggests a 1.58-fold increase in the risk of developing dementia with high levels of loneliness (Kuiper, J. S., M. Zuidersma, et al., 2015).

The total costs reflect the net present value of the current and future expenses incurred due to new cases of loneliness during the specified year.

The model incorporated the impacts on GP and hospital contacts, self-harm, depression, coronary heart disease, stroke, dementia and mortality. An incidence-based costing approach was used to estimate the long-term costs of each "case" of loneliness. The model suggests that taking effective measures to avoid loneliness in a general population cohort, including those who are already lonely, could lead to net present value savings of more than £1,700 (2015 values) per person over ten years. The avoidance of unplanned hospital admissions accounts for the majority of these savings (59%), with further substantial savings (16%) from the reduction of excess GP consultations. The delay in the use of dementia services accounts for most (20%) of the remaining averted costs. If interventions can be specifically targeted at those who are chronically lonely, these avoidable costs increase to £6,000 over ten years. This value can be applied to a sample of older people who are afflicted by loneliness most of the time.

However, it is important to note that the actual level of potential economic benefits will depend on various factors. These include the costs associated with implementing a green prescribing program on a large scale to address loneliness, the effectiveness of the program in addressing loneliness, and the ability of targeted programmes to identify individuals who would benefit the most from such measures.

Reflections on the source

While the Reconnections programme is multi-faceted and not solely focused on nature, it is possible to estimate the cost savings of the 'Feed the Birds' project as data is available on the reduction in loneliness among its participants.

Use in the present analysis: This method is applied to The 'Feed the Birds' project. The 'Feed the Birds' project is assumed to be an effective measure for alleviating loneliness, as 90% of surveyed participants reported feeling less lonely after participating. The project's explicit goal was to connect socially isolated and lonely individuals with both volunteers and nature.

Improvements in mental health and impact on NHS

Valuing the mental health benefits of woodlands - Saraev, et al 2021 (2021)⁹³

(Saraev, et al 2021) investigated the mental health benefits of UK woodlands; their headline figure was that annual mental health benefits of visiting UK woodlands were estimated at £185 million. They had five 'pathways' which looked at the benefits associated with: visits to nature, physical exercise, antidepressants and street trees, proportion of greenspace, and forest bathing/therapy.

(Saraev, et al 2021's) analysis drew strongly on an underlying paper by Shanahan et al. (2016)⁹⁴, which reported that visits to outdoor greenspace of 30 minutes or more per week could reduce the prevalence of depression in the population by 7%. (Saraev, et al 2021) extrapolated the findings of Shanahan et al. by assuming that visits also lead to a 7% reduction in anxiety-related costs, as well as costs related to 'Common Mental Health disorder that is Not Otherwise Specified' (or CMD-NOS).

The assumptions made by the paper included: (i) visits made at least several times a month are equivalent to visits of at least 30 minutes per week; and (ii) people visiting woodlands are representative of the general population in terms of susceptibility and (other factors being equal) incidence of mental health conditions (MHCs).

(Saraev, et al 2021) then estimated the numbers of adults that regularly visit woodlands across each country with either depression, anxiety, or CMD-NOS, assuming an even representation of mental health conditions across each country. These estimates were multiplied by 0.07 to give the reductions in prevalence of the three MHCs as a result of regular visits. These are then multiplied by the associated avoided treatment and working day losses.

In the study by (Saraev, et al 2021), annual depression and anxiety-related cost estimates were derived as follows. Treatment costs are taken from McCrone et al. (2008)⁹⁵ and adjusted to 2020 prices using the UK Government's gross domestic product deflator (GDP) series (see A1-3).

Reference	Methodology summary	Costed element	Cost (£)
McCrone et al (2008) ⁹⁶	Estimates service costs based on direct health and social care costs (2007 costs)	Per person for treatment of depression	£2,085
		Per person cost for treatment of anxiety	£1,104
		Per person cost for treatment of schizophrenia	£10,605
		Per person cost for treatment of bipolar disorder	£1,424

Prices are also adjusted based on the percentage of individuals with depression and anxiety that actually seek and receive treatment for their MHCs. According to the latest APMS (McManus et al., 2016), only 48.2% of individuals receive treatment for anxiety and 59.4% for depression. On this basis, average annual costs for treatment per person are estimated at £1,640 for depression and £705 for anxiety (at 2020 prices).

To account for co-occurrence of the three MHCs, the resulting estimate is multiplied by 0.744.

(Saraev, et al 2021) provided a very approximate indicative estimate of the costs associated with CMD-NOS based upon the average annual treatment costs of depression and anxiety, weighted by the percentage of individuals that seek treatment (27.2%). This gave an annual per person estimate for the cost of treatment of CMD-NOS of £574 (at 2020 prices).

Alongside health care cost savings, the study also assessed the 'productivity' impacts. To estimate costs associated with excess working days lost, the national living wage for an adult in 2020 was used (£8.72 per hour). (Saraev, et al 2021) multiply the national living wage per hour by 7.6 for an estimate of the value of a lost day (£66.27). They then multiplied this by excess working days lost for depression and anxiety estimated from Viavattene and Priest (2020)⁹⁷, this gave an estimate for the average annual employment-related costs of £1,140 for depression or anxiety (at 2020 prices). To estimate employment costs utilising findings from Clinical Interview Schedule-Revised (CIS-R) and treatment-seeking data, (Saraev, et al 2021) assume excess working days lost from CMD-NOS as 50% of the average number of working days lost from individuals with anxiety and depression. The value of annual excess working days lost due to CMD-NOS is therefore estimated at £570 (at 2020 prices). As well as the above, (Saraev, et al 2021) also found employment related costs from other papers (see A1-4)

Reference	Methodology summary	Costed element	Cost (£)
McCrone et al (2008) ⁹⁸	Estimates lost employment costs due to unemployment and economic inactivity from those with a mental health condition (2007 prices)	Per person cost for economic inactivity due to depression	£7,226
		Per person cost for economic inactivity due to anxiety	£6,850
		Per person cost for economic inactivity due to schizophrenia	£19,078
		Per person cost for economic inactivity due to bipolar disorder	£24,544

A1-4: Employment losses costs

The final figure, representing the annual mental health value of the UK's woodlands via avoided anxiety-, depression- and CMD-NOS-related costs, was **£185 million** (at 2020 prices). At country level and rounded to the nearest million, this is distributed as **£141 million** for England, **£26 million** for Scotland, **£13 million** for Wales and **£6 million** for Northern Ireland.

Reflections on the source

The study by (Shanahan, et al., 2016) adopted by (Forest Research, 2021) provided compelling evidence that regular visits to outdoor greenspace for 30 minutes or more per week can reduce the prevalence of depression and high blood pressure in the general population by 7% and 9%, respectively. The paper employs appropriate methods, and the sample size is reasonable. The health outcomes are well-defined, specifically mild or worse depression and being treated for high blood pressure. While the study does not focus on social prescribing or specific programmes for interaction with nature, it is relevant to the assessment. However, it should be noted that the study has limitations, such as the possibility of self-selection among respondents.

There are limitations in the (Forest Research, 2021) evidence regarding the costs associated with mental health conditions, due to a lack of recent and comprehensive data on treatment costs and lost working days, and the cultural stigma around disclosing mental health issues as a reason for missing work. The study also identifies limitations and areas for improvement in the use of visits to nature pathways to measure the mental health value of woodlands, such as the small sample size of the People and Nature Survey and the lack of data on visitor behaviour in relation to engagement with woodlands.

Use in the present analysis: This method is applied in the early intervention in Bury project.

Valuing the mental health benefits of woodlands (physical health)⁹⁹ – Saraev et al. (2021)

This study explores the advantages of increased exercise on mental health. While there is considerable research in this area, there is a notable gap in understanding the dose-response relationship. This refers to how exercise can quantitatively affect the likelihood of developing mental health conditions. However, the MOVES tool provides an example of how this quantitative relationship has been attempted. Developed by (Sport England, 2016), the tool explores how physical exercise at different levels reduces the incidence of disease rates (Woodcock, et al., 2009). It also includes estimates for risk reduction in depression. Using the tool to simulate physical exercise performed during outdoor visits, a reduction in the incidence of depression can be observed.

The physical activity representative of all visits to woodlands assumed in the study is walking. The average reduction in depression is simulated across all age groups (≥ 16 years) taking walking exercise each week. The typical walking speed is modelled at the average value. According to this methodology, the average reduction in the incidence of depression for UK adults who walk two hours a week is 0.67%.

Reflections on the source

The relationship between walking and physical activity in woodlands is not well established, as there is a lack of available data on the types of activities performed during visits. Therefore, this paper only estimates the mental health benefits of walking as a form of physical exercise. It should be noted that while the reduced risk of depression from exercise is widely accepted, there is still ongoing research in this area.

The paper references a dose-response function for exercise and depression from a longitudinal research study on male Harvard graduates from 1962 to 1988 (Paffenbarger Jr, et al., 1994) which may not be representative of the UK population. Additionally, the study took place at a time when mild to moderate cases of depression were not as well recognized as they are now. Despite these limitations, the study still provides valuable insights into the potential mental health benefits of exercise.

Use in the present analysis: This methodology was not utilised in the case studies because the incidence of depression pathway is already covered by the Saraev, et al (2021) method which provides a more robust method.

Economics of mental well-being: a prospective study estimating associated health care costs and sickness benefit transfers in Denmark (wellbeing)¹⁰⁰

Existing literature has explored the societal costs of mental illness, but few studies have investigated the costs associated with mental wellbeing. This study conducted a prospective analysis on Danish data to examine the association between mental well-being (measured in 2016) and government expenditure in 2017, specifically healthcare costs and sickness benefit transfers (Santini, et al., 2021). The study utilised a Danish population-based survey of 3,508 adults (aged 16+ years) in 2016, which was linked to Danish registry data. Mental well-being was assessed using the WEMWS (see following Information Box), and costs were expressed in USD Purchasing Power Parity (PPP).

Information Box - Warwick-Edinburgh Mental Wellbeing Scale

NHS Health Scotland commissioned the development of the Warwick-Edinburgh Mental Well-being Scale (WEMWBS) as part of the Mental Health Indicators Programme. This initiative aimed to address two key issues in mental illness measurement. Firstly, traditional measures tend to have ceiling effects in general population samples, meaning that even those with only moderately good mental health can achieve the highest possible score, making it difficult to detect improvements in the healthier portion of the population distribution. Secondly, participants involved in evaluating interventions designed to promote mental health may mistakenly assume that these interventions are intended solely for individuals with mental health problems, potentially influencing the impact of interventions (Stewart-Brown, et al., 2008).

The WEMWBS is a widely used measure of wellbeing that defines mental wellbeing as the positive aspect of mental health. It comprises 14 positively worded questions relating to an individual's mood, interpersonal relationships, and functioning over the past two weeks. To make the scale more accessible, a shorter 7-item version, the SWEMWBS, was also developed, focusing on function-related questions. The seven statements include 'I've been feeling useful', 'I've been feeling relaxed' and 'I've been thinking clearly' have five response categories ranging from 'none of the time' to 'all of the time'. The SWEMWBS is scored by summing the scores for each of the seven items, which are scored from 1 to 5. The total raw scores are then transformed into metric scores using the SWEMWBS conversion table, which ranges from 7 to 35, with higher scores indicating higher positive mental wellbeing (Warwick Medical School, 2007).

The analysis employed a two-part model to predict costs in 2017, adjusting for socio-demographics, health status (including psychiatric morbidity and health behaviour), as well as costs in the previous year (2016).

The estimated reductions in costs related to mental wellbeing build on the existing knowledge of potential savings related to the prevention of mental illness. They illustrate the savings that could be achieved by transitioning from lower to higher levels of mental wellbeing both within and beyond the clinical range. The estimates cover immediate cost projections generated in the year following mental well-being measurement, not those that could emerge from improved mental wellbeing over the longer term. As a result, they may be deemed conservative from a societal standpoint.

Costs were divided into healthcare costs (general practitioners/specialists, hospitalisations, outpatient services, prescription medicines) and costs in terms of sickness benefit transfers (including partial sickness benefit transfers). The unit costs for general practitioners and specialists were based on the current national health insurance rate (Kronborg, et al., 2009). Sociodemographic variables were included as covariates, such as age, sex, migration background, marital status, education, employment status, and income.

The results showed that higher mental well-being (measured on a continuous scale) in 2016 was associated with lower healthcare costs and sickness benefit transfers in 2017. This relationship remained after adjusting for a wide range of covariates, including mental/chronic illnesses, physical activity, and costs in the previous year. Specifically, each point increase in mental well-being according to the WEMWBS was associated with a £31 decrease in healthcare costs (95% CI=£-57, £-2).

Reflections on the source

The study covers immediate cost estimates (costs generated the year following mental well-being measurement) and not those that could follow improved mental well-being over the longer term. Major strengths include the prospective design, the use of a validated scale for measuring mental well-being, and the use of a population-based survey linked with national registers. This approach made it possible to make direct links between mental well-being in one year and cost outcomes expressed in monetary terms in the subsequent year, as well as a range of register-based covariates. However, there are some limitations, such as the low response rate, the unavailability of certain relevant variables, and the overlap between the survey and data on costs.

Use in the present study: This methodology was applied to value NHS cost savings as a result of improvements in wellbeing in the Nature for Health project in Greater Manchester.

Physical health effects

A study to scope and develop urban natural capital accounts for the UK (physical health)¹⁰¹ – Eftec (2017)

This report outlines methods to calculate the physical health benefits of outdoor recreation in urban environments, building on the work of (White, et al., 2016) in "Recreational physical activity in natural environments and implications for health: A population-based cross-sectional study in England".

The relationship between physical activities and QALY (Quality Adjusted Life Year) scores follows the analysis of health survey data by (Beale, et al., 2007), who estimated that 30 minutes of moderate to intense physical activity per week, undertaken 52 weeks a year, would be associated with 0.011 QALYs per individual per year. Visits to nature is considered to be moderate to intense physical activity. The additional QALYs gained are assumed to be linear over time – i.e., were an individual to undertake double the amount of activity (or 1 hour per week), this would result in a QALY increase of 0.022. If a person reported visiting nature once in the last week, they would be assigned a QALY score of 0.011. The QALY score would increase linearly for each subsequent visit, up to five visits per week.

The implicit social value of a QALY in England, based on the NICE cost-effectiveness threshold, was £20,000. Specifically, NICE states that: "generally we consider that interventions costing the NHS less than £20,000 per QALY gained are cost-effective", (National Institute of Health & Care Excellence, 2013) implying that enhancing health by a single QALY is saving up to £20,000 in health care costs (for further discussion of the NICE threshold see (Claxton, et al., 2015; Barnsley, et al., 2013).

Reflections on the source

The paper provides cautious estimates that have limitations in terms of directly assessing the benefits of the outdoors and capturing a small range of benefits. The estimates are based on comparing current baseline levels of physical activity in natural environments with a counterfactual of no physical activity occurring in these environments, but they do not examine the substitutability of physical activity across natural and urban/indoor locations. Additionally, the use of self-reported data assumes that respondents were accurately reporting the duration, intensity, and frequency of physical activity, which may not always be the case. The conversion from physical activity in nature to QALYs is based on a previous study by (Beale, et al., 2007), but there are uncertainties over how best to model the benefit of accrued exercise over time or account for accidents and injuries, which would need to be explored in future work.

Use in the present analysis: Despite these limitations, the methodology was still applied to value the NHS cost savings from exercising in nature for the Wild Health project in Gwent.

APPENDIX 2 DATA REQUEST

INTRODUCTION

Study overview and this request

Ricardo, working in partnership with the Institute for Occupational Medicine (IOM), have been commissioned by the Wildlife Trusts to undertake a study to assess the benefits that its projects and services have on human health. Specifically, the study will aim to identify and quantify human health impacts, and express these in terms of impacts (both monetary and in terms of care pathways) to the NHS to illustrate the benefit these projects and services can have in 'taking the weight out of the NHS and care system'. The study will also collect information on costs of delivering projects and services, such that these can be compared to the monetary benefits to understand value-for-money. The study will also seek to understand the demographics of participants in different services, to explore the parallel benefit that they can have in tackling health inequalities.

The Ricardo study commenced in late March 2023, and will run to early May, and as such will be conducted as a rapid economic assessment.

As part of the study, Ricardo will seek to engage project and service leads to understand what data and information can be provided to support the assessment. This engagement will commence with an initial data request (this document) and may be followed up by a request for targeted, time-limited interviews with project or service leads to explore further data and information provided or gaps. For those projects and services where data is requested, we would be keen to understand willingness and availability to participate in follow-up engagement activities.

Detail of the request

The purpose of this initial data request is to gather as much information that is possible to quantify the costs and the benefits of running The Wildlife Trusts projects/services. When looking at the benefits, the focus is particularly on the benefits to the NHS in terms of reducing the burden on health care services - both in terms of monetary cost savings, but also the direct impact on care pathways and provision (e.g., change in GP appointments).

As well as the benefits in terms of reduced NHS costs, the research will also try to quantify any mental health and physical health benefits as well as look into how the Wildlife Trusts services/projects help to tackle health inequalities in the UK.

The first part of this data request asks for any general data variables for example age, socioeconomic status, sex.

The second part is targeted at data that would help to quantify the benefits through improvements in mental health, green prescribing or physical health.

Finally, the third part asks for any cost information on running the project/service.

The Wildlife Trusts offer a wide range of services which provide access to and maintain natural spaces for everyone, but also encourage people to come into and spend time in nature. Given the timeline for the project, we have necessarily limited the scope to focus on a sample of Wildlife Trust project and services, comprising: projects under the Green Prescribing for Mental Health pilot; social prescribing projects; Our Bright Future (feed the Birds), and a Nature Park (Gloucester).

Each different service operates in a different way, with different participants, and hence has the potential to affect human health in different ways. Also, there are various methodologies we could adopt to appraise impacts, depending on the data available. As such, we do not expect to receive a complete response to all questions from all projects. We have structured this data request as a 'best case' shopping list but are keen to explore with project and service leads what may or may not be available, or could be accessed in the timeframe of this study.

In some cases, we are aware that projects / services are ongoing. To facilitate the assessment, we would like to assess operation over a discrete time period, matching outcomes and costs over that period. This period can be flexible, depending what data is available.

Timetable/format for response

As noted above, the timeline for our study is short. As such we'd very much appreciate a response to this request as soon as possible ideally we would need data by deadline Friday 21st April.

Key contact details for the study team are: Amy Leake (Amy.Leake@ricardo.com).

We are happy to receive responses to the data request in whatever format it is easiest to provide them. For example, whether this is responses embedded within an edited version of this document, existing reports, underlying excel files or data sets, etc.

Where access to data and information may require consideration of data security and access permissions, we are happy to discuss how to address such issues. In the majority of cases, we expect that we would only require aggregated or summary data, and not data for individual participants. As such, depending on the form in which current data exists, we are happy to discuss how to work towards something that can be shared.

GENERAL DATA VARIABLES

Existing evaluation

Has there been any monitoring or evaluation project/study/report already undertaken around the existing project/service? In particular focusing on the profile of participants, and the impacts on human health (either self-reported, or monitored)? If so could this be shared?

Demography variables

Please can you provide a split of the number of project/service participants by the following categories. We have provided some examples of the variables but these do not need to be followed they are just illustrative examples.

Age

Can either just state the age or provide age in bands for example:

00-01, 01-04, 05-09, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85-89, 90+, All ages

Household deprivation

For example, the Household deprivation variable¹⁰²

Sex

For example, Female or Male used in the Census 2021¹⁰³

Gender Identity

For example, Gender Identity variable used in the Census 2021¹⁰⁴

Where the attendees live and housing status

For example, aggregated number of participants, from different first 3/4 digit postcodes

And/or distance travelled to participate in project/service, and mode of travel (e.g. walking, cycling, by car).

Is there a reliable means of public transport which can be used to access the project/service? If so please provide details?

Also are any participants statutory homeless/rough sleepers¹⁰⁵?

Ethnicity

For example, from the ONS Census¹⁰⁶

Definition

The ethnic group that the person completing the census feels they belong to. This could be based on their culture, family background, identity or physical appearance.

Respondents could choose one out of 19 tick-box response categories, including write-in response options.

Education variables

Highest level of qualification

For example, from the ONS Census¹⁰⁷

Definition

The highest level of qualification is derived from the question asking people to indicate all qualifications held, or their nearest equivalent.

This may include foreign qualifications where they were matched to the closest UK equivalent.

Health and disability variables

Mental health conditions

For example;

Proportion of participants diagnosed as suffering from;

1. Depression
2. Anxiety
3. Treatment of schizophrenia
4. Treatment of bipolar disorder

Or for a more detailed breakdown using the 2019 Global Burden of Disease (GBD)¹⁰⁸ database and the 11 categories used in the Mental Health Foundation paper;

1. Schizophrenia
2. Major Depressive Disorder
3. Dysthymia
4. Bipolar Affective Disorder
5. Anxiety Disorders
6. Anorexia Nervosa
7. Bulimia Nervosa
8. Autism spectrum disorders
9. ADHD
10. Conduct disorder
11. Other mental disorders

Disability

For example, from the Office for National Statistics Census (ONS)¹⁰⁹

Definition

People who assessed their day-to-day activities as limited by long-term physical or mental health conditions or illnesses are considered disabled. This definition of a disabled person meets the harmonised standard for measuring disability and is in line with the Equality Act (2010).

General health variable

For example, from the ONS Census¹¹⁰

Definition

A person's assessment of the general state of their health from very good to very bad. This assessment is not based on a person's health over any specified period of time.

Labour market variables

Economic activity status variable

For example, from the ONS Census¹¹¹

Definition

People aged 16 years and over are economically active if, between 15 March and 21 March 2021, they were:

- in employment (an employee or self-employed)
- unemployed, but looking for work and could start within two weeks
- unemployed, but waiting to start a job that had been offered and accepted

It is a measure of whether or not a person was an active participant in the labour market during this period. Economically inactive are those aged 16 years and over who did not have a job between 15 March to 21 March 2021 and had not looked for work between 22 February to 21 March 2021 or could not start work within two weeks.

The census definition differs from International Labour Organization definition used on the Labour Force Survey, so estimates are not directly comparable.

This classification splits out full-time students from those who are not full-time students when they are employed or unemployed. It is recommended to sum these together to look at all of those in employment or unemployed, or to use the four category labour market classification, if you want to look at all those with a particular labour market status.

Here we are looking for the proportional spilt of participants by referral route. One example is the proportion of participants that have come through a green/social prescribing route.

Other potential routes are through a charity, social services, social housing provider, etc.

Reason for Referral

Description of the project/service and the activities participants are involved in

- What type of activities do participants get involved in?
- How often were these run? How long did each session last?

Average time spent on project/service

- Average time spent participating in sessions?
- Did some demographic groups participate in more/less sessions?
- Reasons/barriers for participating in more/less sessions?
- What proportion of participants completed a course of engagement?
- Were some demographic groups more/less likely to complete?
- Reasons/barriers for groups being more/less likely to complete?

Tracking participant use of NHS services before/after participation

Here we want to know if there is any data tracking participant's use of NHS services in the year before / after participation, covering GP, hospital admissions, A&E visits, outpatient visits.

For example, the table below shows the variables that would be useful for calculating the change in admissions, A&E attendance and outpatient appointments.

PROJECT/SERVICE-RELATED DATA REQUIREMENTS

Location of the project/service

For example, the postcode.

Referral route – e.g. self-referred or an organisation has referred the individual

General variables	Admissions Variables	A and E Variables	Outpatient Variables
GP practice code	Destination at Discharge	A&E diagnosis before	Outcome
Admission or attendance type	Primary diagnosis on admission	Hospital Reference Group code	Emergency assessment flag
Month of admission or attendance	Primary procedure on admission	No of A&E attendances before	No of outpatient appointments before
Year of admission or attendance	Length of stay in days from admission to discharge	No of A&E attendances after referral to social/green prescribing	No of outpatient appointments after referral to social/green prescribing
Age group at admission or attendance	Hospital Reference Group code		
Patient gender	No of admissions before		
Treatment	No of admissions after referral to social prescribing		

If possible, split the before and after variables by demographic categories.

The above information can be provided for before/after picture for participants, or for participants and a control group.

We are also happy to receive any other information or analysis undertaken on the impacts on NHS or care services, in particular quantified impacts on health and care services provided, and/or monetised health and care cost savings.

Tracking change in Personal well-being

We are interested to work out the before and after change in mental health. Below we have provided a couple of surveys that could be used to capture this but as above if other methods have been used then we can still use the information. If possible, the data will also be spilt by the demographic categories.

*ONS4 questions*¹¹²

Overview

The ONS assess personal well-being by using four measures (often referred to as the ONS4), which capture three types of well-being: evaluative, eudemonic and affective experience. These measures ask people to evaluate how satisfied they are with their life overall, asking whether they feel they have meaning and purpose in their

life, and asks about their emotions during a particular period. The measures of personal well-being ask people to assess each of these aspects of their lives.

*Warwick Edinburgh Mental Wellbeing Scale (WEMWBS)*¹¹³

Overview

The Warwick-Edinburgh Mental Wellbeing Scale was developed to enable the measuring of mental wellbeing in the general population and the evaluation of projects, programmes and policies which aim to improve mental wellbeing.

The 14-item scale WEMWBS has 5 response categories, summed to provide a single score. The items are all worded positively and cover both feeling and functioning aspects of mental wellbeing, thereby making the concept more accessible. The scale has been widely used nationally and internationally for monitoring, evaluating projects and programmes and investigating the determinants of mental wellbeing.

Physical health benefits

Here we are interested to find out if there are any physical health benefits so to capture this we have included some potential variables.

Number of "active" visitors / visits to nature – individuals who take part in 30 minutes of moderate to intense physical activity

Summary activity level classification

Vigorous activity	Reported 150 minutes per week of moderate physical activity, 75 minutes per week of vigorous physical activity or an equivalent combination of the two
Some Activity	Reported 60-149 minutes per week of moderate physical activity, 30-74 minutes per week of vigorous physical activity or an equivalent combination of these
Low Activity	Reported 30-59 minutes per week of moderate physical activity, 15-29 minutes per week of vigorous physical activity or an equivalent combination of these
Inactive	Reported less than 30 minutes per week of moderate physical activity, less than 15 minutes per week of vigorous physical activity or an equivalent combination of these

A2-2: HSE 2012; Activity level classification (Table 2A, p8)

Types of physical activity

For example, walking, cycling, running.

Replication of health effects

To what extent do you think any health benefits observed associated with the project/service can be replicated by other projects elsewhere in the UK?

What are the drivers that would influence the ability to replicate health benefits, and their significance?

COSTS OF RUNNING THE WILDLIFE PROJECTS/ SERVICES

Please could we have all the data that relates to the costs of running the project/service some examples include:

- Start up funding streams
- Annual funding streams
- Cost of trained members of staff
- Travel expenses paid for attendants
- Cost of venue
- Cost of guest speaker
- Volunteer time
- Profit and loss accounts.

As noted above, we wish to compare project outcomes to costs, hence we only require cost information for the period matching that for which outcome data is available.

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We are facing climate and ecological emergencies, and the two are inextricably linked — we cannot solve one crisis without tackling the other. The Wildlife Trusts is on a mission to restore a **third of the UK's land and seas** for nature by 2030 — not only in celebration of the value of nature, but also because people are part of, and entirely dependent on, nature.



We believe **everyone, everywhere, should have access to nature** and the joy and health benefits it brings. No matter where you are in the UK, there is a Wildlife Trust **empowering people to take action for nature** and standing up for wildlife and wild places. Each Wildlife Trust is an independent, grassroots, community-powered charity formed by people getting together to make a positive difference for wildlife, climate and future generations. Together we care for 2,300 diverse and beautiful nature reserves and work with others to manage their land for nature, too.

The Wildlife Trusts

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