Integrated Health Impact Assessment

The Impact of the Gwent Green Grid Partnership on the health and mental wellbeing of the population of Gwent

Thrive Wellbeing Consultancy
March 2023

Thrive

Table of Contents

Executive Summary

An integrated Health Impact Assessment (iHIA) was undertaken between February 2022 and February 2023 by Thrive, an independent wellbeing consultancy. The purpose was to identify the impact of the Gwent Green Grid Partnership (GGGP), a multi-agency alliance to improve green infrastructure, on the health and mental wellbeing of the residents of Gwent. Key findings have been drawn from an analysis of stakeholder evidence, epidemiological data and a review of the relevant literature.

Key Findings

Consider Health Inequalities: 'The *"hardest to reach" are often the ones we need to reach most.*' Those groups of people experiencing the greatest health inequalities are the ones most likely to benefit from access to the natural environment. Therefore, increasing access for all, but with a focus on how to increase engagement for at risk groups, is an important consideration for the GGGP. These include children and young people, Socio-economic status (SES), older people, BAME communities, people with physical and mental health long-term health conditions, people with disabilities.

Increase access to green space and the natural environment: Access to green space and nature has been strongly linked good physical and mental health. Therefore, increasing opportunities for people to engage with nature and the natural environment is an important health consideration. The ability of the GGGP to work strategically and collaboratively across local authorities to ensure that green space is accessible, well managed and protected is an important feature of the partnership.

Identify the impact of the GGGP on climate change: There was a general consensus that collectively, GGGP and all its workstreams were likely to contribute towards addressing climate change, however currently there is no measurement/acknowledgement of the impact.

Address eco-anxiety: Uncertainty, unpredictability and lack of control are all important factors in eco-anxiety. The GGGP has the potential to increase or decrease the communities 'eco anxiety' depending on how it raises awareness and understanding about climate change and offer opportunity for people to take action.

Increase social connection: Green space can support positive health and wellbeing outcomes through facilitating social interactions which promote social cohesion. The ability of the GGGP to enable people to come together in nature is likely to have a positive impact on social connections.

Support Volunteering: Volunteering is an important element in sustaining the projects and green space improvements made by the GGGP. It is associated with a sense of achievement, social connectedness and improved eudemonic wellbeing and therefore likely to be an important contributor the wellbeing of the volunteer themselves.

Facilitate healthy lifestyles through behavior change: The recent pandemic lockdowns increased awareness about access to green spaces. However, after the lifting of the second lockdown the usage has almost dropped back to pre-pandemic levels. Hence, there's a need to understand sustainable behaviour change and appropriate promotion to encourage continued access and use of green spaces.

Build capacity and sustainability: A key element of working in a sustainable way is supporting and building capacity in existing community-based groups and projects. The Regional Officer roles were considered an important part of this, and consideration should be given to how they can be sustained.

Develop and sustain partnerships: The natural environment is not bound by local authority boundaries and therefore requires a collaborative way of working across the region combining high-level strategy alongside tailored and targeted on-the-ground activity and an ability to share good practice and resources.

Influence strategy and policy: Providing a regional and strategic approach to Green Infrastructure that increases the profile of the natural environment and its impact on health and wellbeing can enable a stronger position in corporate and community plans and strategies.

Suggestions to maximise health and wellbeing.

This iHIA has identified a range of potentially significant impacts of GGGP on the health and wellbeing of the population of Gwent. It has also identified a number of areas that could further strengthen the impact of the GGGP on health inequalities and ensure the sustainability of those impacts once current funding comes to an end.

Influence policy and mainstream

- promote awareness of a positive perception of space through improved green spaces (building on the increased access and positive impacts on mental wellbeing gained through the pandemic), increasing green spaces, and tree and landscape planting
- influence national, regional and local strategies and policies to encourage access to green space and nature and promote this as being beneficial for health and wellbeing using the learning from GI projects to influence policy and strategy to promote and maintain green spaces
- ensure enough time is allocated to natural environment issues in the PSB
- build on the collaborative approach, sharing best practice, lessons learned and encouraging consistency of approaches across the region
- maximise the effective use and sharing of resources
- develop a sustainability strategy preparing for the end of funding and providing support for projects, whilst continuing to collaborate on funding opportunities.
- communicate the i-tree eco study findings in a way that provides the facts and creates hope for the future
- build on the 5 key themes of education, resilience, taking action, social connection and contact with nature to address eco anxiety
- continue to create a strong sense of local identity and heritage, reinforcing a sense of pride on local culture build on the success of the Regional Officer roles and consider how they can be continued
- work with the Council and Housing Associations on existing social and new housing developments to support the retention of trees, appropriate tree planting and their management to ensure improved green infrastructure
- improve air quality through retaining, managing and increasing the tree canopy
- continue to work with Council Land management staff to enable change in working practices
- create links between GI projects and local/regional initiatives e.g., the Regional Access Group
- continue to provide clear and accessible mapping, signage and information to enable people to explore the greenspaces and activities
- continue to minimise vandalism and crime on sites and to increase confidence for people in accessing green spaces particularly for women
- explore how to further links and promote access for some of those groups through social prescribing programmes.

Demonstrate Impact
Build the case for mainstreaming or secure further funding for work to increase access to green space and nature through:
- introduce measures of impact on physical and mental health
- increase the use of demographic data to inform targeting and monitoring or programmes
- highlight the role of trees in addressing pollution and carbon reduction, ways to monitor
- identify the 'cost' of tree loss.

Further target GGGP programmes and policy
Further target programmes to encourage access to green space and related activities for those who are not currently able to access easily and who have the potential to have benefit, namely:
- teenagers – including within Safeguarding requirements
- young adults
- older people
- people with physical or mental health disabilities
- BAME communities building on the recent success of promoting a walk with the national Muslim Walking group.
- refugees and asylum seekers
- people living in both urban and rural deprivation
- continue to work with primary school age children and people in Care Homes
- recognise the benefits of both mixed gender activity as well gender specific activities encourage physical activity and active travel through well treed routes.

Increase knowledge, understanding and skills related to increasing access to green space and nature
- continue to provide flexible and tailored support to build the capacity of community projects and organisations
- train staff and volunteers who are working with key population groups e.g. school staff, volunteer organisations to maximize sustainability
- link with the school curriculum to promote the GI Projects in school
- provide further opportunities for volunteering, training and learning new skills including the Trainee Ranger Scheme
- offer more people an opportunity to learn about and participate in pollination strategies and land management
- considering setting up a tree warden scheme.

About this report

This report presents the key findings, and suggestions for action, from an integrated Health Impact Assessment (iHIA) undertaken between January 2022 and January 2023. The iHIA investigated the impact of The Gwent Green Grid Partnership (GGGP) on the health and mental wellbeing on the population of Gwent.

The Gwent Green Grid Partnership

The Gwent Green Grid Partnership (GGGP) aims to improve and develop "Green Infrastructure" (GI), a term used to describe the network of natural and semi-natural features, green spaces, rivers and lakes that intersperse and connect villages, towns and cities. It also seeks to support job opportunities within an area. The GGGP has 5 workstreams:

- Regional GI Strategy and Partnership – seeking to demonstrate a ground-breaking way of working collaboratively to deliver strategic and local outcomes to provide a regional approach to Green Infrastructure in Gwent.
- Gwent Green Corridors – a Strategic Action Plan (SAP) aiming to improve access to green spaces, promote health and wellbeing and seek economic opportunities; and a Trainee Ranger Project (TRP).
- i-Tree Eco study - providing a detailed and statistically robust insight into the tree population of Chepstow and the surrounding towns and villages of Severnside.
- Gwent GI projects - delivering a range of practical landscape enhancements, development and implementation of GI management plans. Implementation of Nature Isn't Neat (NiN) outcomes, delivery of the pollinator friendly management approach, tree planting and access improvements.
- Pollinator friendly Gwent – a Nature isn't Neat (NIN) project establishing joined-up green space management to create wildflower-rich pollinator habitats across Gwent local authority areas.

The Integrated Health Impact Assessment Process

The Integrated Health Impact Assessment seeks to identify the key impacts a policy, service or programme has on the health and mental wellbeing of targeted population groups. Wider determinants of health and protective factors for mental wellbeing are drawn from literature and used for the assessment. Factors considered included:
- demographic and health characteristics (is it equitable for all people?)
- the impact of the wider structural determinants of health and mental wellbeing
- the impact on the specific protective factors for mental health and wellbeing.

This was achieved through:
- collecting information on the current health and mental wellbeing, and equality profile of Gwent residents
- five screening workshops undertaken on each of the GGGP workstreams
- reviewing the published research on the potential impact of the natural environment and green space on health and wellbeing
- production of a report, with recommendations to ensure that the physical and mental health needs of the community are properly addressed.

Methodology

What is a Health / Mental Health and Wellbeing Impact Assessment?

HIA is a means of assessing the health impacts of policies, plans and projects using quantitative, qualitative and participatory techniques. It aims to produce a set of evidence-based recommendations to inform decision-making to maximise the positive health impacts and minimise the negative health impacts of proposed policies, plans or projects. It assumes that policies, programmes and projects have the potential to change the determinants of health. Changes to health determinants then lead to changes in health outcomes or the health status of individuals and communities

HIA is based on a social model that recognises that factors, such as housing, environment, access to services, levels of income and others can have on physical, mental health and well-being. In addition, these can have differential impacts on population groups such as children, young people and families, older people with disabilities or longer-term conditions and many other population characteristics.

Mental Wellbeing Impact Assessment (MWIA)[i] is similar with a particular focus on Mental Health and Wellbeing and draws its methodology from IHIA. It is proposed to draw on the evidence based mental health and wellbeing framework to strengthen this aspect in the IHIA.
In summary, the determinants and protective factors the health and mental well-being are presented in the diagram below.
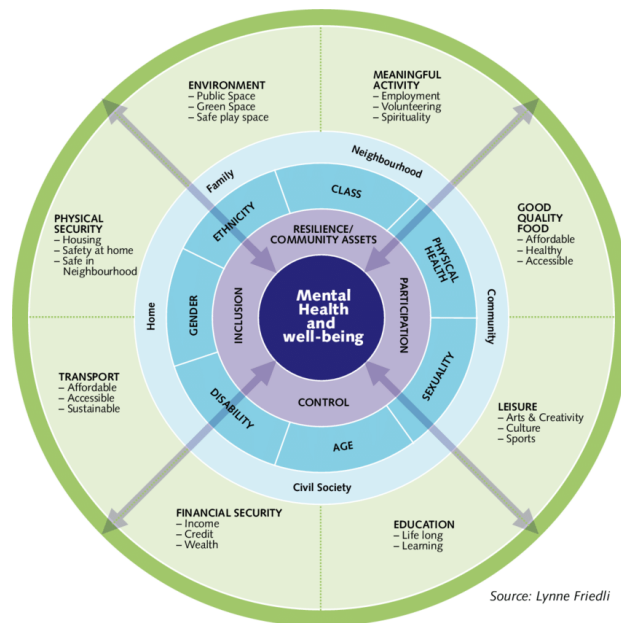
Source: Lynne Friedli

Integrated Health Impact Assessment (IHIA)

An integrated assessment framework and checklist was developed based on recent best IHIA and Mental Wellbeing Impact Assessment (MWIA) guidance and practice:

- MWIA: A toolkit for assessing impact on mental wellbeing (Cooke et al., 2011)
- Welsh Health Impact Assessment Support Unit Health Impact Assessment. A practical guide. (WIHIASU, 2020)

Stakeholder views

IHIA screenings were undertaken with stakeholders on all five workstreams. Stakeholders included representatives from all project partners (five LAs, Forest Research, SWEA and NRW), GGGP workstream

leads and those involved in project delivery. A thematic review was then conducted from which six themes emerged.

1. Developing Partnerships
2. Access
3. Health and wellbeing
4. Sustainability
5. Communication
6. Health inequalities

The themes were used to inform a review of the relevant literature.

Literature review

Across all themes, it is noted that there is lack of definitive high quality quantitative studies on each area. Furthermore, most literature available concentrates on green spaces in the context of the urban environment. Therefore, conclusions from available published research, for example: impacts on health disparities and green space in urban environments may be difficult to apply to rural communities, whereby there is considerable green space which often intersects with disadvantaged populations. However, a synthesis of available quantitative and numerous qualitative studies indicates the general benefits of green spaces on health and well-being. Differences in the extent of impact varies across differing populations, for example with gender, age, ethnicity and socio-economic status.

Community profile

A brief profile of the Gwent population was undertaken. The Gwent Well-being Assessment (GWA) Executive Summary produced by the Gwent Public Services Board Executive presents an overview of all aspects of wellbeing across Gwent that relate to the aims of the GGGP and was the main source of information. Due to the lack of data on Black Asian Minority Ethnic Communities (which arose as a key group in relation to health inequalities in the iHIA) the 2021 Census was used.

Data Analysis
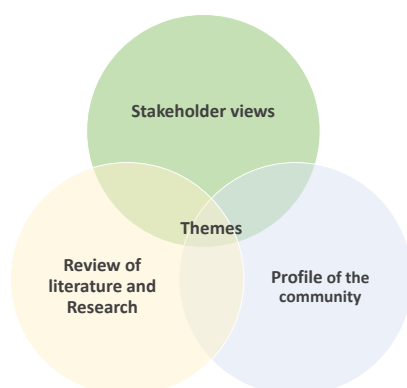
The views of stakeholder, the literature review and the profile of the Gwent population were triangulated to identify key areas for the GGGP to focus on to maximise the impact on the health and mental wellbeing of Gwent residents.

Report Findings: key areas of focus to maximise the impact of the GGGP on wellbeing of Gwent residents

This report is broken down into four sections; population groups, the wider determinants of heath, the protective factors for mental health and a section on partnership and policy. Each section provides a summary of key health and mental wellbeing issues identified by stakeholders, the available data and a review of the relevant literature. The findings have been used to generate suggestion for actions to maximise the impact of the GGGP on the health and mental wellbeing of the population of Gwent.

Section One : Population Groups

Levels of vulnerability to poor health vary among different population groups with characteristics such as age, gender, class, race/culture, disability, sexuality and physical health, influencing risk and protective factors. Understanding demographics and how each group may be affected by the GGGP is therefore a key well-being consideration.

Health Inequalities

Health inequalities are the differences in health across the population, and between different groups in society, that are systematic, unfair and avoidable. They are caused by the conditions in which we are born, live, work and grow. These conditions influence our opportunities for good mental and physical health.[1]

Significant health inequalities exist in Gwent and there are pockets of communities across Gwent where health deprivation is in the top 10% most deprived. These clusters are mainly in Newport, Torfaen, Caerphilly and Blaenau Gwent. Healthy life expectancy data shows a level of health inequality throughout all communities. On a Gwent wide basis, this ranges from the lowest in Blaenau Gwent, being 55.9 years for males and 57.0 years for females, to the highest in Monmouthshire, being 66.4 years for males and 66.1 years for females. This is a gap of 10.5 years for males and 9.1 years for females – again showing the inequality that exists across Gwent.[2]

Stakeholder Views

Stakeholders thought that the whole community potentially benefits from the GGGP however they felt some communities and population groups have the potential for greater health benefits. Priority areas are informed by the Public Service Board (PSB), the Integrated Wellbeing Network and the Health and Wellbeing board. Much of the targeting is based on geographic location, and areas experiencing higher levels of deprivation and poverty are therefore likely to impact on population groups facing health inequalities and low levels of wellbeing. However, population data for the projects is not readily available, making it hard to track who benefits from the project and therefore demonstrate its contribution to addressing health inequalities.

The literature

That there is a social gradient in health has prompted considerable interest in public health circles. In particular, the notion that '*The "hardest to reach" are often the ones we need to reach most*' has attracted speculation regarding how to deliver health equity. The Strategic Review of Health Inequalities

---

[1] NICE and Health Inequalities. (2023) https://www.nice.org.uk/about/what-we-do/nice-and-health-inequalities).
[2] Inequalities in life expectancy in Wales. Ref: Inequalities in life expectancy in Wales. (2022) Public Health Wales https://phw.nhs.wales/news/inequalities-in-life-expectancy-on-the-increase-in-wales/

in England[3] introduced the concept of 'proportionate universalism' to this debate suggesting that health actions must be universal, not targeted, but with a scale and intensity that is proportionate to the level of disadvantage.

Suggestions for action:

- collect demographic data on both who is being targeted and subsequently engaging with projects.
- target groups more likely to be affected by health inequalities and least able to access the natural environment
- increasing access to green space through leisure activities and programmes specifically promoted to and adapted for 'at risk' groups

- provide programmes in areas of greatest health inequality identified by PSB/IWN
- create partnerships with organisations working with key 'at risk' groups e.g. health/rehabilitation services
- follow up on opportunities to create larger networks across areas such as Newport to then be able to apply for other grants.

Socio-economic status

Socio-economic status shapes access to material resources and influences every aspect of experience in the home, neighbourhood and workplace and is a major determinant of health inequalities.

Across Gwent there is a marked contrast in the ratio and spread of overall deprivation. Significant deprivation exists in the valley communities and surrounding town and city centres. Alongside these are areas of significantly less deprivation, notably Monmouthshire, which make differences starker. These differences are also mirrored in employment rates with Blaenau Gwent having the highest proportion of Lower Super Output Areas (LSOA) in the top 20% for employment deprivation (49%) with Monmouthshire has the lowest (2%). Most housing deprivation is clustered around Newport city centre which has 12 LSOAs in the top 10% deprived in Wales. Elsewhere the pattern of housing deprivation across Gwent looks quite spread out, but noticeably lower in much of Monmouthshire where other categories of deprivation are also generally low.[4]

Stakeholder views

In Gwent, stakeholders noted that much of the housing in areas with higher levels of deprivation was built post war and had many green spaces, such as grass verges. It was felt that therefore there is significant potential to reach more deprived areas by changing land management due to the amount of of the green spaces that have been built into those communities. However, newer social housing estates were often 'very sterile' in composition due to the pressure to maximise space for homes. As a result, there tends to be more units, flats and higher density properties, with increased requirements for parking spaces, potentially compounding existing health inequalities. To address this the GGGP is working with Housing Associations to provide community nature spaces, tree planting and the creation of green space linked to social housing. People thought that the i-Tree Eco Study could be used to support the case for better management of the wider green infrastructure including planting and management of street trees. However, on the ground GGGP projects such as Nature isn't Neat (NiN) have found challenges in engaging some of the more deprived communities in project activities.

---

[3] Marmot.M. (2010) Fair society, Fair Lives. Institute of Health Equity https://www.instituteofhealthequity.org/resources-reports/fair-society-healthy-lives-the-marmot-review
[4] Gov. Wales Lower Super Output Area (LSOA) Maps https://www.gov.wales

"In the lower income areas the priorities are completely different. They are more worried about how they are going to buy their food that week, or how they are going to get to the food bank or how they are going to clothe their kids to get to school."

The literature

There is support in the literature that increasing access to green space is an effective intervention to address health disparities in disadvantaged communities. For example, good access to green/recreational areas can reduce inequalities in mental wellbeing between people of different socioeconomic statuses (Mitchell et al., 2015). Lower socio-economic status communities have access to fewer and lower quality green spaces and parks, these same communities also have a higher incidence of disease. Higher quality parks and green spaces can mitigate socioeconomic health related inequalities and green space accessible within a 15-30 minute walking distance is related to positive health outcomes within communities (Wang and Lan., 2019). Improved respiratory health and resulting reduced mortality rates for circulatory disease is correlated with greater access to green spaces in low-income populations (Mitchell et al 2008). This finding is consistent with other studies which have linked cardiovascular, respiratory diseases and strokes with access to green space. Jennings and Gaither (2015) make several recommendations for urban green spaces. These include improving safety in disadvantaged communities and increasing support for municipal projects to strategically plant and maintain urban green space projects. They also recommend including urban ecologist/landscape architects and arborists in the planning process, promote programming and social events on green spaces, and audit the coverage and condition of green spaces to support climate adaptation goals.

Suggestions for action:

- continue to influence social housing to ensure beneficial green infrastructure through working with the Council and Housing Associations to support appropriate tree planting and management
- influencing new developments to ensure the retention of trees and the tree canopy
- further target areas / people facing greater levels of deprivation

Children and young people

The foundation for good mental health lies in pregnancy, infancy and early childhood. Parenting style and attachment are the key factors. The quality of the home learning environment, the quality of pre-school and the amount of time spent in pre-school are all associated with greater self-regulation, an attribute strongly linked to improved educational outcomes. In adolescence, protective factors for mental health include attachment to school, family and community. Social capital indicators (e.g. friends, support networks, valued social roles and positive views on neighbourhood) are closely related to risk and the severity of emotional disorders.

The most recent report from the School Health Research Network Student Health and Wellbeing survey comparing mental wellbeing findings from before to during the pandemic (2019 to 2021) found a fall in mental wellbeing for 11 to 16 years olds. Children are the population group most likely to be in relative income poverty, with the latest data showing that 31% were living in income poverty. Blaenau Gwent has the highest proportion of LSOAs that are in the top 20% most deprived for education (38%) and Monmouthshire has the lowest (2%). The Wellbeing of Wales, 2022: children and young people's wellbeing report found that in 2019 the percentage of children with two or more healthy lifestyle behaviours declined with age in secondary school and to a lesser degree lower family affluence. However, there were no large differences between girls and boys. Reported physical activity levels

declined with age in secondary school. Boys and children from a high family affluence background are more active every day.[5]

Stakeholder views

Stakeholders indicated that they have had an excellent response from preschool staff who were interested to learn and improve how they can use their outdoor spaces to support wellbeing activities and biodiversity. Where projects have worked with parents, schools and primary school age children they have been very well received.

"The feedback we've had from the school workshops has been overwhelmingly positive both from the teachers and the children."

Feedback suggested that the children enjoy a sense of freedom in being in the outdoors exploring nature and learning about wildlife. An added benefit was that the learning from their experience was then often shared with families and communities, thus contributing to a wider positive impact.

Whilst there was good engagement at primary school level stakeholders said that projects have struggled to engage 11 – 18 year olds and some young adults on the green agenda. It is this generation who may be most affected, at this time, by 'eco-anxiety' There were some exceptions. For example, exhibitions of artwork and an initiative linking a community gardens project with a secondary school that had an 'alternative curriculum' for young people.

One stakeholder reflected that young people often have increased anxieties due to concerns about the impacts of Climate Change.

"It's such a big issue regarding their future that it can become a mental health issue."

The literature

Teenagers and young adults appear to be less connected with nature. Connection with nature starts to dip as early as 10 years old and may not recover until people are in their early 30s (Richardson et al., 2019). A 2016 study by Metcalf et al found that youth engagement in urban greening efforts had beneficial effects in emotional and social wellbeing. The study suggests that benefits are gained through mechanisms such as: increased exposure to green spaces, increased social interaction and connectedness. Eudemonic (conducive to happiness) wellbeing is associated with a sense of purpose as well as providing opportunities for education, and mentorship. Adolescents who perceive connection with nature as important have been found to have better psychological wellbeing than adolescents who do not (Capaldi A. et al., 2014; Martin et al., 2020). Nature-based education can also stimulate the use of greenspace and promote pro-environmental behaviours. Kruize et al., (2019) suggest that activities such as guided group walks and school gardens could bring children closer with nature. Access to high quality green space can influence behavioural development in the context of pro-social behaviours in young children (Putra et al., 2021).

Suggestions for action:

- continue to work with school age children and young people – note: the new curriculum has given an opportunity to further engage
- continue to consider how to increase engagement work with adolescents and
- people of working age – in particular – 18-30years
- further identify how best to promote access to green spaces and activities for children and young people within the constraints of Safeguarding requirements

---

[5] School Health Research Network 2021 Primary School Student Health and Wellbeing Survey – 2021
https://www.shrn.org.uk/national-data/

- continue to work with pre-school and school staff to build knowledge and

understanding of the importance of access to nature

Later Life

Five key areas influence health and mental wellbeing in later life: age discrimination, participation, relationships, physical health and poverty. Fear of crime and lack of transport are also consistent themes. The estimated population of Gwent is 594,164, approximately 19% of the total population for Wales. The overall population in Gwent is projected to increase by 6.2 % between 2019 and 2043, roughly similar to the Welsh average (5.2%). There is a slight projected increase of 0.7% for those between 16 & 64 years. By far the largest increase in projected age of people living in Gwent is in older people:

- aged 65 and over to increase by 31.2%
- aged 85 and over by 74%.[6]

This will have implications in the longer term for the support required to enable aging populations to continue to access green spaces.

Stakeholder views

Stakeholders thought that NiN activities delivered in Care Homes have been particularly well received. The carers supported residents to use their green spaces in different ways and had also enjoyed the project themselves.

"Really happy with the changes for those living in sheltered accommodation, having that space to go out and access nature has been quite a significant change to their lifestyles."

Participants thought that many retired people enjoyed the NiN workshops and accessing the countryside. There has been some sharing of information including the reasoning behind rewilding of previously neatly mown grass verges in more urban settings. However, some older people were finding it harder to accept and appreciate the changes.

"They're used to looking out of their windows and seeing grass and things like that. Then they see things looking messy and they don't always access social media so perhaps they're not as linked to what's going on."

The literature

Research finds that ample greenery in outdoor spaces appears to promote more frequent visitation and better health in older people (Dahlkvist et al. 2016) with higher frequency of urban green space visits being associated with lower mortality in older people (Sulander et al. 2016). Physical and social characteristics of the neighbourhood environment, such as neighbourhood social cohesion, walkability, pleasant surroundings, parks and safety from crime and traffic are deemed to significantly influence different forms and levels of physical activity engagement and psychological well-being among older people (Cramm et al. 2013; Carrapatoso et al. 2018; Choi and Matz-Costa 2018; Bonaccorsi et al. 2020). Importantly, the health of older people may be more influenced by their local neighbourhood environments compared to other age groups as a result of decreased mobility due to ageing-related declines in functional capacity (Choi and Matz-Costa 2018). Providing additional greenspace in deprived areas may make it easier for elderly people to manage the process of ageing (Douglas et al., 2017). A scoping review of 16 studies into the benefits of sensory gardens and horticultural activities for people with dementia suggests positive impacts of these activities, particularly for wellbeing, affect and behaviour. There also appeared to be improvements in sleep and functional level and reductions in

---

[6] ONS 2021 Census 2021 rounded population and household estimates for local authorities in Wales, by sex and five-year age group. https://www.ons.gov.uk/peoplepopulationandcommunity

serious falls and use of psychotropic drugs (Gonzalez and Kirkevold, 2013). Similarly, a systematic review of quantitative and qualitative evidence suggested that people with dementia living in care homes experienced lower levels of agitation if they spent time in the gardens or outdoor spaces (Whear et al., 2014).

Suggestions for action:
- Continue to work with older adults and older people (both men and women), in a range of settings in a way engages their imagination and raises their awareness at the same time.
- Continue to support care staff to encourage access to nature and green spaces with and for residents
- Continue to provide practical resources for staff working with both young and older people e.g. pollinator packs

Black, Asian and Minority Ethnic groups (BAME)

Mental health and mental distress are often presented and perceived differently in different cultures. This may lead to people developing alternative responses for coping with psychological stressors.

The HIA identified a lack of data on population groups more likely to be experiencing higher rates of health inequalities, including BAME people. In addition, the literature is suggesting that BAME communities are not accessing green space opportunities in representative numbers and that these groups have the potential for significant positive impacts on health and wellbeing. Data from the 2021 Census is used for the HIA to give an indication of the BAME communities living in Wales, and where possible, an indication of where the highest concentrations of BAME people live in the Gwent area. See table below.

Apart from Newport, which is the most multi-cultural of the local authority areas, the region has little ethnic diversity. This lack of ethnic diversity could make it more difficult for people to understand each other's cultures and beliefs, as there are far fewer opportunities to interact with people from diverse backgrounds.

Self-identified ethnicity[7]	2011	2021	Percentage change
White – includes 90.6% White: Welsh, English, Scottish, Northern Irish or British	95.6 %	93.8% %	1.8 ↓
Asian, Asian Welsh or Asian British	2.3 %	2.9 %	0.6 ↑
Mixed or multiple ethnic groups	1 %	1.6 %	0.6 % ↑
Black, Black Welsh, Black British, Caribbean or African	0.6 %	0.9 %	0.3 ↑
Other ethnic group	0.5 %	0.9 %	0.4% ↑
• 5.3% of households in Wales were multiple ethnic group households, up from 4.2% in 2011			
• The local authorities with the highest proportions of high-level ethnic groups other than "White" were mainly urban areas such as Cardiff, Newport and Swansea.			

---

[7] ONS 2021 Census 2021 rounded population and household estimates for local authorities in Wales, by sex and five-year age group. https://www.ons.gov.uk/peoplepopulationandcommunity

The above suggests that although the percentages of BAME people is relatively low, (6.2 %) in Wales in comparison to 18.1% across both England and Wales, there is nevertheless a growing percentage of people self-identifying as other than White in Wales. In addition, the highest concentrations of BAME communities appear to be within the Gwent area.

Finding accurate and current data on the numbers of Refugees and Asylum seekers in the Gwent area is challenging. However, the Wales Strategic Migration Partnership reports on the numbers of Asylum Seekers supported by Section 95 in 2022 by Local Authority area. In the Gwent area Newport has the highest numbers – 1,166 with 19 in Caerphilly [8] - it is assumed that this includes refugees from Ukraine. Please note: An asylum seeker is an individual who is seeking international protection. In countries with individualised procedures, an asylum seeker is someone whose claim has not yet been finally decided on by the country in which he or she has submitted it. Not every asylum seeker will ultimately be recognised as a refugee, but every refugee is initially an asylum seeker.[9]

Stakeholder views
Stakeholders said that none of the GGGP projects were targeted at specific ethnic or cultural groups. However, much of the work was focused in areas of greater deprivation where there were likely to be more ethnically diverse communities.

The literature
A study by (Roe et al., 2016) found that access to and use of green space was a significant predictor of health for BAME communities. Therefore, improvements in local greenspace and accessibility may be important in reducing health disparities in this community.

Suggestions for action:
- explore how best to communicate and raise awareness of the benefits of accessing nature and green space with BAME communities
- further develop links with BAME community organisations to build on the recent success of promoting a walk with the national Muslim Walking group
- explore making contact with organisations working with Refugees and asylum seekers to offer them an opportunity to benefit from some of the GGGP projects.

Gender
Gender has a significant impact on risk and protective factors for mental health and on the way in which the experience of mental distress is expressed. Depression, anxiety, attempted suicide and self-harm are more prevalent in women, whilst death by suicide, drug and alcohol abuse and crime and violence are much more prevalent among men.

Stakeholder views
Screening participants felt that generally the projects were more likely to be accessed by women. Also, many of the partner settings for the work e.g., Care homes and schools have a larger proportion of female staff.   As a result, people felt that women were more likely to benefit from increased engagement with nature. However, it was noted that attention needs to be given to measures to help women feel safe when accessing green spaces, particularly in parks and wilder green space. There were some projects targeted specifically at men, for example, working in partnership with a hospital

---

[8] Partneriaeth Mewnfudo Strategol Cymru | Wales Strategic Migration Partnership (wsmp.wales)
[9] Amnesty International https://www.amnesty.org/en/what-we-do/refugees-asylum-seekers-and-migrants/

rehabilitation service to improve hospital green spaces and increase outdoor activities for men experiencing PTSD. **No women came forward for the Trainee Ranger Scheme.**

The literature

Roe et al., (2013) found that lower levels of green space were associated with high levels of stress in women. However, significant improvement in measured stress were not seen in the men in this study when higher levels of green space were evident. Interacting with green spaces has multiple health and wellbeing benefits on adults living in deprived areas. Authors found differences in levels of engagement and motivation for volunteering between men and women. For example, involvement by women tended to relate to the pursuit of conservation experience, whilst men tended to get involved for "something to do". Perhaps, in relation to this the men were more likely to value the social connection made within the group. Participation also appeared to be related to increased self-esteem and problem-solving skills for the male participants. The male participants were also more likely to value green space for being a 'neutral space' that made them feel at ease (Currie et al., 2016).

Suggestions for action:

- recognise the benefits of a mix between mixed gender activity as well gender specific activities

Physical and mental health and long-term health conditions

Poor physical health is a significant risk factor for poor mental health; conversely, mental well-being is protective of physical health and improves health outcomes.

Drawing from the 2021 Census, it is clear that some of the Local Authority areas in Gwent have communities that are experiencing poor health. The lowest proportion of people in Wales reporting good health was in Blaenau Gwent (41.5%). The local authorities with the next highest proportions of people describing their health as very bad were Blaenau Gwent (2.3%) and Neath, Port Talbot (2.1%). The lowest proportion of people reporting very bad health was for Gwynedd (1.0%).[10]

Stakeholder views

Stakeholders felt that the GGGP can potentially have a significant impact on both the physical and mental wellbeing of people with a variety of long-term health conditions by supporting projects and activities that enable people to be more physically active and engage with nature. For example, walking groups encourage people to move, but also support social connection, both of which in turn, support good mental health.

"The joy of participating in those walking groups has had a really profound impact on his wellbeing and really stabilised the situation."

A number of GGGP projects such as NIN , Pollinator Friendly Gwent and the Health and Wellbeing Officer have created partnerships with health and social care organisations to help increase engagement with the natural environment for people with long-term health conditions.

"We do a lot with cardiac rehabilitation, social prescribing and gentle walks to get them back on track."

---

[10] ONS 2021 Census 2021 rounded population and household estimates for local authorities in Wales, by sex and five-year age group. https://www.ons.gov.uk/peoplepopulationandcommunity

Stakeholders highlighted that tree cover has been correlated with both physical and mental health. They thought that the ability of the partnership to influence policy strategy to retain and or increase tree cover was likely to have a positive impact, particularly for people with asthma and respiratory conditions due to the air cleaning qualities of trees. The i-Tree Eco Study areas have been chosen due to of concerns relating to air quality, particularly in the Chepstow area.

"If the i-Tree project delivers more trees in the ground then by rights you should end up with more air purification across that locality."

Well treed routes also encourage active travel such as walking and cycling, potentially increasing levels of activity and physical health. Participants highlighted that street and urban trees also have a positive impact on people's perception of the areas within which they live, work and play, and help to create a sense of place. This, in turn, contributes towards a general sense of mental wellbeing.

The literature
Disparities in psychological health related to green space were identified in a review undertaken by Jennings and Gaither., (2015). Across their review a theme emerged whereby low-quality green space and green infrastructure correlated with depressive symptoms, whilst higher quality green infrastructure was linked to lower stress, increased positive emotion and greater cognitive capacity.   Green spaces and social environment have also been linked to reduced levels of stress (Ward Thompson et al., 2016). Authors suggest that decreased stress is attributable to green spaces contributing to encouraging a sense of belonging and minimising social isolation through promoting social cohesion. Biodiversity through bird-species richness, plant-species richness, habitat diversity and butterfly richness are all related to improved wellbeing (Aerts et al., 2018), increased positive affect (mood) and lower levels of anxiety (Wolf et al., 2017). Exposure to nature can generate positive emotions and balance our moods, resulting in improved resilience (M. Richardson, K. McEwan, Maratos, 2016).

Suggestions for action:
- continue to encourage physical activity and active travel through well treed routes
- explore how to further links and promote access for some of those groups through social prescribing programmes

- partner with, and build the capacity of, those who work with people with physical or mental health challenges or concerns
- introduce measures of impact on physical and mental health

People with disabilities
Life chances (notably education, employment and housing), social inclusion, support, choice, control and opportunities to be independent are key factors influencing the mental health of people with disabilities.

Stakeholder views
Some GGGP projects support initiatives specifically for people with disabilities. For example, Able Radio is a station that is run by people with learning difficulties which also grows local produce to sell in their community shop on a 'pay what you can basis.'   Other examples include increasing accessibility for people with limited mobility by introducing raised beds into allotments and improving access to nature reserves.

However, stakeholders said it was challenging to achieve a balance between opening up access for people with mobility scooters, wheelchairs and families with prams e.g., by removing physical barriers such as gates or stiles and stopping illegal access and use of the land e.g. fly-tipping. It was felt that policies are generally supporting increasing access whilst restricting opportunities for illegal use and a stick (enforcing penalties) and carrot (supplying resources to open up access) approach worked best.

"Sometimes we try and do the right thing to stop illegal access so we put in barriers which then put off legitimate users."

The literature

Groulx et al., (2022) conducted a scoping study looking at accessibility of green spaces to individuals with disabilities. Their findings indicate that there are considerable gaps in the 'provision of services and information that enable self-determination in the use and enjoyment of nature'. People with disability have a higher risk of physical inactivity and associated long-term health conditions (Rimmer et al. 2007; Rimmer and Marques 2012). In their 2016 study Jakubec, Carruthers Den Hoed et al identified a positive trend towards improved depression markers, greater health satisfaction, improved social relationships (in particular, love and friendship), as well as satisfaction with a sense of community and experiences of helping among adults with disabilities and their caregivers as a result of direct exposure to nature and green space. Park-based activity environments have been shown to positively impact on disability-specific impairments and functional limitations (Saitta et al. 2019).

Suggestions for action:

- engage with the 'Active Travel and Rights of Way Improvement Plans' to further promote transport access for people with disabilities to enable them to access green space and activities.

- continue to improve access to green space through removing physical barriers in the countryside.

Section Two: The Wider Determinants of Health

The wider determinants of health are the social, economic and environmental factors that affect our health and well-being. These factors drive differences, or inequalities, in health and wellbeing between groups of people. They include:

- money and resources
- our level of education and skills
- availability of fair work
- the quality and security of our housing
- our surroundings.

Influencing the wider determinants of health is one of seven strategic priorities of Public Health Wales. The long-term strategy states that by 2030 the people of Wales will have a more equal chance of living a fulfilling life, free from preventable ill health (Public Health Wales). The IHIA identified two determinants of health that the GGGP has the potential to address, access to green space/natural environment and climate change.

Increase access to green space and the natural environment

The Gwent region offers plenty of green space and access to nature ranging from hills to mountains and access to safe beaches.   The GGGP aims to support access to the natural environment through the development of strategies and plans such as the GI and the Strategic Access Plan (SAP). The GI projects support access through practical locally based initiatives to encourage usage. For example, projects that support increased planting on roadsides, access to woodlands (in the form of walks) and increasing habitat and access to natural play areas. The SAP aims to identify missing links and areas where improvements are needed in the Countryside access network both regionally and locally to enable people to lead active healthy lifestyles, provide economic opportunities and expand, where possible, the network available to cyclists and horse riders.

The Gwent Well-being Assessment (GWA) concludes that the health of the natural world in Gwent is under threat. Stocks of natural resources are being used unsustainably and resilience is declining, in line with global trends. These include the conditions of native woodlands, grasslands, mountains, moors and heathland being less than favorable. The majority of local rivers are of poor or moderate status, and the health of the best rivers towards the East of the county, are registering significant failure rates for phosphorus levels, with salmon stocks in decline.

There is a major challenge to reduce agriculture's negative impact on the environment whilst simultaneously maintaining food production for a growing population.

The WIMD data shows that 39% of Monmouthshire LSOAs are in the top 20% for access to services in Wales, compared with only 5% for Torfaen and Caerphilly. This means that it takes much longer for people living in rural areas in Monmouthshire to travel to services such as doctors, shops or leisure centres when using public transport.

Gwent is close to urban several centres such as Cardiff, Swansea and Bristol, as well as Hereford, Gloucester and the Midlands. Hence, there are large numbers of people who commute outside the

county where they live. More people commute into Newport, whereas more people commute out of Blaenau Gwent, Caerphilly and Torfaen.[11]

Stakeholder views

A key focus for the GGGP is connecting to nature. Access is an important part of this and the GGGP is developing a Regional Access Strategy and has set up a Regional Access Forum with representatives from local forums. These provide an opportunity at a local and regional level for the GGGP to influence and increase accessibility to nature. The partnership is concerned with the creation and management of green spaces and collectively providing opportunities for people to engage with nature and the natural environment.

"They're critical elements of what we're looking at – the management of both people and land. Creating links to those locations – not just to green space but also the wider countryside."

Stakeholders thought that through providing joined up networks, reducing physical and other barriers such as transport and reducing crime could help increase people's ability to access green space and nature and engage in physical activity all of which are good for mental and physical health

"We are working hard to create cycle tracks, natural links, village to village, rail to rail, the canal for Torfean, the Garn lakes, Newport."

The NiN project aims to increase access to more natural spaces and improve the management of grasslands, parks, green spaces and roadside verges, by changing management regimes and expanding 'cut and collect' techniques embedding these into best practice. Approaches varied according to the local situation and needs. For example, some are focusing on local, smaller green spaces with greater biodiversity close to where people live (day to day access), whilst others are working on a much larger scale to increase pollinator opportunities such as a flower rich meadows. Stakeholders believed that creating more areas like these is positive for mental wellbeing.

Stakeholders thought that at an individual level, the projects have increased people's positive perception of their natural environment, and the benefits to their mental wellbeing. Rephrased as suggested

The literature

Studies have found that wellbeing can be linked in both urban and rural settings. It is influenced by how close we live to nature spaces, street trees or private gardens (Jiricka-Pürrer et al., 2019; Kruize et al., 2020). Access to green space has been linked to reductions in obesity and thus improved health outcomes as it promotes physical activity. For example, McCormack et al., (2014) and Ding et al., (2011) found that residents of walkable neighbourhoods (i.e. with infrastructure which supports pedestrian mobility) tend to have better and greater access to green space. Residents tend to be more active and obesity rates are lower. In line with such findings, improved accessibility to pedestrian friendly parks has been noted to reduce obesity related health issues. The greening of areas in and around schools in disadvantaged areas, particularly with trees, could promote optimal socio-emotional and behavioural functioning for children from homes with both low and high levels of exposure to nature (Scott et al., 2018).

It should be noted that access to green space alone is not necessarily sufficient to encourage physical activity in inactive individuals, particularly in those that do not regularly include outdoor activity in their

---

[11] Welsh Govt. 2019 Welsh Index of Multiple Deprivation https://statswales.gov.wales/Catalogue/Community-Safety-and-Social-Inclusion/Welsh-Index-of-Multiple-Deprivation

lives and have little access to community-based programmes which encourage outdoors activity (Jennings and Gaither., 2015). Barriers to accessing outdoor space and participating in physical activity particularly in low-income communities, include public safety, proximity to pollution sources, and lack of proximity to others (Molnar et al., 2004; Kaczynski et al., 2014; Weiss et al., 2011).

There are a number of key features which promote increased usage of green spaces. For example, the presence of walking paths, shade, water features, lawns, birdlife, lighting, sporting facilities, and other amenities, such as playgrounds (Jenning and Bamkole 2019:Gardsjord et al 2014). Spaces also need to be suitable for the variety of activities that different types of people want to undertake there. Safe, accessible and attractive green space may be linked to improved utilisation (Kruize et al., 2019). The quality of our relationship with nature contributes to its positive impact on our wellbeing (Dobson et al., 2020)

Suggestions for action:
- continue to create a positive perception of space through improved green spaces
- continue to provide clear and accessible mapping, signage and information to enable people to explore the greenspaces and activities with confidence
- continue to minimise vandalism and crime on sites and to increase confidence for people in accessing green spaces particularly for women

Identify the impact of the GGGP on climate change

The GWA states that 'Climate change, lack of management, over-use, invasive species, pollution, landscape crime and antisocial behaviour are also threatening Gwent's natural resources.' The Severn Estuary's special status is also under threat with predicted extreme impacts of climate change likely for coastal habitats. Gwent, like many other places in Wales is likely to experience an increase in rainfall, river flow and intensity of extreme weather events. This is projected to lead to an increase in the likelihood of flooding of infrastructure, businesses, and homes. It will not be possible to prevent all flooding; there is, therefore, a need to use a range of approaches to not only reduce risk where possible, but to adapt local communities and infrastructure to be prepared for severe weather events and rising sea levels.

Stakeholder views
There was a general consensus that collectively, GGGP and all its workstreams were likely to contribute towards addressing climate change. For example, the i-Tree Eco Study offers a robust account of the extent to which the existing tree stock is providing drainage, shade, improving air quality and encouraging biodiversity. Stakeholders said that nature conservation principles and allocation of tree planting can also help reduce the flow of phosphates into rivers by managing the land alongside sustainable farming practices. Trees planted around buildings can reduce the need for air conditioning when the weather is warm and heating for when it is colder, thus, helping to minimise carbon emissions. It provides the evidence to make the case for increasing and managing the tree canopy and its distribution.

"We are heading towards higher temperatures, so we need to plan for that in our towns and villages … but also for drainage, trying to absorb surface water. Climate factors are significant in this."

The GGGP supported changes to land management that could contribute towards addressing climate change, for example leaving the grass to grow allows the root system to spread and deepen, making the land more resilient and able to withstand flooding. The grass needs less cutting reducing the need for

use of fossil fuels for land management machinery.   The SAP and TRP were thought to have a positive impact on climate change through increasing cycling and walking, and through behaviour change. The GI projects deliver land management plans for Monmouthshire, which include flood mitigation and planting projects to reduce pollution. Likewise, green corridors have the potential to have a positive impact on climate change through increasing cycling and walking opportunities.

"If you can get people out enjoying walking or cycling they are more likely to think about using these where possible as a normal everyday thing. It changes people's social perception of what's happening... and a lot of the barriers fall way...if we make these choices easier people are more likely to do the right thing."

However, participants noted that currently there is no measurement of the impact of the projects on climate change.

"We have had less fires deliberately set off than in previous years despite this being a drought year. Whether that is related in any way to this project is hard to tell."

Participants felt that measuring the impact of GI projects on carbon reduction and adaptation was something that could be included as part of monitoring and evaluation going forward, and as part of any future bids and proposals.

Suggestions for action:
- improve air quality through increasing the tree canopy
- identify the 'cost' of tree loss
- highlight the importance of retaining, managing and increasing tree stock to improve air quality
- highlight the role of trees in addressing pollution and climate change
- further promote awareness of wildfire risks through careless or deliberate actions

- continue policies of 'rewetting' land
- increase green spaces, and tree and landscape planting
- introduce measures of impacts on climate change e.g., carbon reduction
- develop a woodland management and action plan
- link with the promotion to schools of 'Eco-awards', including links with the Princes Trust 'Learning Pathway' awards.

Section 3: The Protective Factors for Mental Health

Enhancing control, increasing resilience, facilitating participation and promoting inclusion have a significant influence on the mental well-being of individuals and communities. These protective factors are important pathways through which wider and social determinants influence health outcomes (Cooke et al., 2010).   The IHIA identified a number of ways that the GGGP can influence the protective factors for mental health.

Address eco-anxiety

Eco-anxiety is described as the chronic fear of environmental cataclysm that comes from observing the seemingly irrevocable impact of climate change and the associated concern for one's future and that of future generations

Stakeholder views

Participants recognised that anxiety levels for some people are already running high due to the Covid-19 pandemic and the current cost of living 'crisis.' They thought that the NiN project had the potential to increase or decrease the communities' 'eco anxiety' depending on how it raises awareness and understanding about climate change.

"I think it (climate anxiety) is something that we need to be really careful of when we are promoting the project and we try and get a balance between this and why we are doing it.
We are in the middle of a nature and climate emergency and this is a key part of how we are going to tackle it for each generation."

Participants felt that through building capacity and knowledge by training communities / people in small actions that they can make in their own homes and gardens can make people feel more empowered and help reduce anxiety and e.g. pollinator patches.   Likewise, linking the NiN projects to larger national initiatives could help people feel more empowered at a local level, providing a sense that they are making a difference by doing something that is science based. For example, giving people the skills to run 'citizen science monitoring schemes' which feeds into wider pollination data sets.

The literature

Uncertainty, unpredictability and lack of control are all important factors in eco-anxiety. Studies from across the western world identify eco-anxiety across all levels of the population (Panu., 2020). Girls were more likely to feel both worried and hopeful regarding climate change. However, this may be attributed to increased emotional awareness in girls (Eastabrook et al., 2014). Increased levels of climate change worries in girls is, however, consistent with research that finds increased climate related worries in women (Heeren et al., 2021). A 2020 study by Ballman, identified that the greatest predictor of eco-anxiety is nature connectedness. The greater one's connection to the natural world as part of their identity and perspective, the more one may be negatively affected by its destruction.   Eco-anxiety is associated with depression, stress, anxiety, lower self-reported mental well-being, functional impairment and a reluctancy to have children. Pro-environmental behaviours were also linked to eco-anxiety, such as climate activism and it is suggested this may buffer major depressive symptoms. However, some stress behaviours may not improve an individuals' feelings as they may perceive their efforts as not actually impacting the climate crisis. (Boluda-Verdú et al., 2022).

A thematic analysis of individual and group treatments for eco-anxiety found five key themes: education, fostering people's inner resilience, encouraging action, helping people find social connection and emotional support by joining groups, and connecting with nature (Baudon and Jachens., 2021). Although some studies highlight the potential for improving anxiety through teaching about constructive pro-

environmental behaviours, other studies suggest that 'excessively using action as an antidote to eco-anxiety' could cause burnout in children or lead to disproportionate feelings of the importance of individual action (Pihkala, 2020). It should be noted that there is a lack of rigorous empirically based studies on eco-anxiety and its antidotes (Léger-Goodes et al.,2022).

Suggestions for action:
- communicate the i-tree eco study findings in a way that provides the facts and creates hope for the future
- build on the 5 key themes of education, resilience, taking action, social connection and contact with nature to address eco anxiety.

Increase social connection

Stakeholder views
Stakeholders thought that the GGGP is potentially having a positive impact on social connection by enabling people to come together and feel part of a local project that they can have a sense of pride in.

"There are areas of grassland and verges that would have been of no interest before, whereas if we can turn them into a natural habitat that provide a focus point for the community to interact with and provide a talking point with neighbours."

Projects such as the big butterfly count offer an easy and natural way for people to connect with each other. Likewise walking groups provide an opportunity for people to talk and learn about each other and to challenge stigma surrounding mental health.

The literature
Green space is linked to positive health and wellbeing outcomes through facilitating positive social interactions which promote social cohesion. In urban environments, social cohesion and a sense of community are positively influenced by the presence and quality of green spaces (Jennings and Bamkole., 2019). Green space has also been linked to reduced levels of stress by encouraging a sense of belong and minimising social isolation through promoting social cohesion. (Ward Thompson et al., 2016). People involved in 'Green Prescribing' have an increased level of social contact and inclusion, as well as a sense of belonging (Bragg, R., Atkins, 2016).

Suggestions for action:
- continue to create opportunities for social connection.

Support volunteering

An aging population in Gwent may mean that there are more people able to support their communities through volunteering. The highest levels of volunteering in Gwent are in Monmouthshire and the lowest in Blaenau Gwent. Volunteering rates may be linked to available time and financial freedom to volunteer.

Stakeholder views
Volunteering, at a local level, was seen as an important element in maintaining some of the Green Space improvements and projects such as the NiN.

"It's about creating volunteer groups who are going to talk with each other and exist long into the future so we need to have these things running on their own two feet."

Participants noted that where it's related to having confidence and getting outdoors it's generally women that are less comfortable going out on their own. Within the SAP there may be funding for groups who want to work in a specific way with support.

"So, it's about getting groups together with female volunteers who can help women get out there and feel safe."

The literature

A 2019 study (Coventry et al.,) found that group guided walks, practical conservation and citizen science were associated with improved mood and reduced stress, whilst conservation and citizen science activities were associated with self-reported co-benefits both for the environment and individual health and wellbeing. Improved well-being associated with these two activities may be linked to increased social interaction and the shared sense of belonging attributed to shared aspirations to learn more about local green spaces. Reduction in stress was more associated with the type of environment rather than the activity being undertaken. Taking part in conservation activities was associated with improved eudemonic well-being i.e., improved well-being associated with the sense of living a purposeful life. This finding mirrors that of a literature review undertaken by Husk et al., (2016). Husk and colleagues found that people who took part in environmental enhancement activities reported higher levels of health related to eudemonic well-being and had a perceived sense of achievement. However, Husk also notes that such conclusions are based on little quantitative evidence and the qualitative evidence used lacked detailed reporting.

Frequent volunteers feel more personally attached to their local environment, believe that their efforts help to solve environmental problems, and enjoy being part of community efforts which may result in more resilience in communities (Dresner et al., 2015).

Suggestions for action:
- support and promote sustainability of volunteer groups
- provide further opportunities for volunteering, training and learning new skills
- consider setting up a Tree Warden and Junior Warden scheme to work across the GGGP region
- link with the Communities of Practice to share learning.
- Link with Schools to promote the benefits of Volunteering – potentially also with Duke of Edinburgh scheme.

Facilitate healthy lifestyles through behavior change

Stakeholder views

The recent pandemic lockdowns increased awareness about access to green spaces. For example, access to rights- of-way increased by 600%.

"I have never seen our parks so full; our parks were overflowing. We have never ever experienced that volume before."

Stakeholders suggested that people appreciated the benefits to their mental wellbeing at a time of stress through accessing green spaces and changes to land management. However, after the lifting of the

second lockdown the usage has almost dropped back to pre-pandemic levels. Hence, there's a need to understand sustainable behaviour change and appropriate promotion to encourage continued access and use of green spaces.

Despite there being much media coverage regarding the need to protect and increase access to natural green space some people are still not aware, or are reluctant to understand, that lifestyles and some traditional ways of managing land need to change e.g. trimming of grass verges. Efforts to address this should continue to be made. As a result, stakeholders felt that there remains a need to help some people view green space differently.

The ability of NiN projects to use creativity and arts to raise awareness of the need for land management for pollinators has proven successful in a variety of settings including schools, which has also enabled parents and carers to get involved.

"We have done loads and loads of events … raising awareness and creating a sense of fun for children to get involved, but at the same time chat to parents and carers about NiN and what we are doing."

Stakeholders said that members of the public were engaging with the NiN creative and public art works and that they were not only enjoyable, but also raised awareness and understanding of the need for pollinator friendly land management. This need for behaviour change applies not only to members of the public but also to the staff being asked to change how they have worked for many years.

"The biggest changes that we probably see is with our staff. Some of them have to go on quite a journey – they're to used coming to work over the last three decades and doing the same job, in the same way, every day. So, we're working with them to see the difference they can make – that's probably where we're working to make the biggest behaviour change."

Stakeholders felt that changes to land management can also provide challenges for Elected Members who receive complaints from members of the public.   To address this NiN projects had provided both council staff and members with examples of how other councils had successfully changed land management practices to encourage wildlife and improve access to nature.

"To be honest this NiN project has really helped to break down those barriers and it's made a really big difference to the managers in charge of the boys on the ground."

This behaviour change was likened to introducing recycling - people initially not understanding and reluctant to recycle and now it has become the norm.

The literature
Lockdown restrictions had negative consequences on many people's mental health, but contact with nature has helped people to cope (Soga et al, 2020). Studies showed that these changes in people's relationship with nature contributed to improvements in their wellbeing; particularly in feelings of life being worthwhile (Richardson & Hamlin, 2021).

The provision of quality green spaces, coupled with education and organised activity, can result in improved capacity and motivation for people to engage with these spaces.   This in turn has been shown to have positive impacts on levels of physical activity, participation in other health promoting behaviours, and life quality, (Kruize et al., 2019). The success of outdoor organised activities depends on a number of factors including good staffing, clearly defined programmes of events with clear location and date specification, and the personality of group leaders. When successful such activities can encourage

people to become more aware of health-related behaviours and their broader environment. Furthermore, these activities may motivate people to adopt more healthy and pro-environmental behaviour in many aspects of their lives. For example, involvement in volunteering events related to green space has been shown to encourage pro-environmental behaviour and promote community resilience (Dresener et al., 2015). The quality of the environment also effects how communities interact with green spaces. Improved green spaces can act as a catalyst for change in community participation (Tester and Baker., 2009).

Suggestions for action:
- build on the increased post pandemic understanding of the importance of access to nature for health and wellbeing
- explore why the significant increase in accessing green spaces and nature that was seen in the first two pandemic lockdowns has not been sustained Respond to these findings
- offer more people an opportunity to learn about and participate in pollination strategies and land management

- continue to work with Council Land management staff to enable change in working practices
- share and showcase best practice regionally
- create a sense of pride by offering opportunities for people and communities to be part of local projects
- continue to create a strong sense of local identity and heritage, reinforcing a sense of pride on local culture.

Build capacity and sustainability

Stakeholder views
Stakeholders thought that the GI projects could potentially have a negative impact by developing exciting projects and momentum, but not creating sustainability.

"There is a great head of steam to get them over the line to start with, but they peter out if the momentum goes - and the authorities are left 'holding the baby".

With this in mind the SAP has an emphasis on the sustainability of interventions.

"We're going to improve a route that then gets looked after ideally by local volunteers. We are trying to create something that is going to last well into the future."

It was noted that it takes time to establish community groups that are able to take on the management and maintenance of spaces. Condensed timelines have made this particularly difficult. A key element of working in a sustainable way was supporting and building the capacity in existing community-based groups and projects. The type of support provided by the GGGP to partners and organisations that they have funded was flexible.

"It differs from project to project, some projects …have somebody driving that project who is very switched on and knows what they are doing. We have several of those projects. Then you have other projects that we are funding where we must have a much more interventionist role within those organisations because they don't have the volunteer network or the know how … so it varies considerably depending on the type of organisation we are dealing with."

Concern was expressed about the impact on community groups and volunteers once funding for officer support ends.

27

The literature

There are a number of barriers to community groups managing green spaces independently of local authorities.   Mathers et al (2015) suggest that as the move towards greater community responsibility continues and underpinned by limited resources, the role played by the public sector may change, potentially from one of implementer to one of facilitator. The research findings suggest that the role of facilitator may involve more support for groups to develop their capacity to operate independently from local authorities. Part of this could be an initial role for local authorities to facilitate cross-city community group networks to improve capacity.

Suggestions for action:

- build on the success of the Regional Officer roles and consider how they can be continued
- communicate the i-Tree eco report in a way that is accessible and usable for individuals and groups

- provide flexible and tailored support to build the capacity of community projects and organisations.

Section four: Partnership and policy

The IHIA identified 2 additional key areas that the GGGP impacts on health and wellbeing of the population of Gwent. These were through developing partnerships and influencing policy and strategy.

Develop and sustain partnerships

Stakeholder views

Stakeholders highlighted that the natural environment is not bound by local authority boundaries and therefore required a collective approach. A key aim of the GGGP is to demonstrate a way of working collaboratively to deliver strategic and local outcomes by providing a regional approach to Green Infrastructure in Gwent. Through this collaborative working, it focuses on establishing a Regional GI strategy and a wider partnership group to work on strategic outcomes and the delivery of the Gwent PSB (Public Services Board) and the South-East Wales Area Statement.

Developing the SAP was offered as a good example of the GGGP working together, to share good practice, develop networks and generally enhance a more cohesive and sustainable approach in establishing Green Corridors and other projects across Gwent. However, stakeholders acknowledged that there are challenges in working with a large number of authorities, partners and wider regions.

"Having to work with five authorities who all have views on things … can be tricky … but not insurmountable."

Stakeholders thought that the GGGP supported and facilitated partnership at a range of different levels. At a strategic level it is enabling local authorities across the region to work across boundaries, create regional strategies, bid collaboratively for funds and share learning and resources.   New local delivery partnerships were also developed as the GGGP sought to target particular 'at risk' population groups, for example, working with Mental Health providers to increase access to nature for veterans or with schools and residential homes to share resources, knowledge and information.

Providing resources such as biodiversity towers and pollinator packs to staff in different settings supported their capacity to engage others in nature both at work and with their own families.

"People were blown away' because it was very simple. It was an exploration of what's around … showing them things to look for such as butterflies and bees, enabled them to show their children, grandchildren, partners."

The literature

There is limited literature on how regional partnerships increase access to green space. However, Mather et al 2015, suggests that the capacity of green partnerships are based on multiple inter-related factors. These include capital, commitment, skill base, motivation, communication and political influence, which supports stakeholder views about the importance of working at a range of different levels.

Suggestions for action:
- build on and 'formalise' the collaborative approach, sharing best practice, lessons learned and encouraging consistency of approaches across the region
- maximise the effective use and sharing of resources
- continue to collaborate on funding opportunities.

- further extend the co-production approach with communities in their settings e.g., Schools or Care Homes
- create links between GI projects and local/regional initiatives e.g., the Regional Access Group
- develop a sustainability strategy preparing for the end of funding and providing support for projects
- maximise collective positive impacts of collaborative working and continue to take mitigation measures where not working so well.

Influence strategy and policy

Stakeholder views

Stakeholders felt that the GGGP is potentially having and will potentially have significant positive impacts on the physical and mental health of the people of Gwent through maintaining and developing the natural environment and supporting access.   The GGGP aims to achieve this through collaboratively developing regional strategies and approaches, collecting information and evidence, and supporting and sustaining the delivery of local projects and groups. This combination of high-level strategy alongside tailored and targeted on-the-ground activity, was considered to be a strength of the partnership.

"This is the complexity of the GGGP … we are looking at trying to do things at a very large scale as well on a more micro level."

A key component of the GGGP has been the development of two strategies; a regional Green Infrastructure strategy and the Regional Access strategy.   The intention is to provide an overarching structure that will inform not only the area statement approach and the Gwent Public Service Boards (PSB) but also the Local Development Plans (LDP) process. In this way it can influence and inform planning both in terms of management and strategic policy at a local and regional level.
People thought that the ability to influence, is in part, dependent on lines of reporting. The current process is through Natural Resources Wales (NRW) to the Gwent Strategic Wellbeing Assessment Group (GSWAG). However, participants thought that more direct reporting may need to be considered.

"We've started to look at how GGGP is working as perhaps a better mechanism for drawing in the work that's being delivered on the natural environment."

Stakeholders thought that GGGP had been able to increase the profile of the natural environment, as well as health and wellbeing, enabling a much stronger position in corporate and community plans.   For example, green spaces and trees were under significant pressure from new developments.

"A lot of our developments are very much surrounded by green space …. and they interface with the countryside … but they are threatened by development on the edges of our settlements….how do we calculate the loss involved in a development in order to ask the developer to replace that loss?"

The i-Tree eco study aimed to support better decision making in the local and strategic management of trees ensuring the resilience of these ecosystems. The study provided the GGGP with a detailed and statistically robust insight into the tree population of Chepstow and the surrounding towns and villages. Stakeholders felt that the study could play a crucial role in highlighting the importance of retaining, managing and increasing the tree stock in the locality, to address air quality and the health and wellbeing of local people.

"It enables me to justify why those trees should be retained or increased."

However, ultimately the potential of the i-Tree Eco study to impact positively on health would be determined by how effectively the report was used to communicate the value of retaining existing street tree stock and planting new trees in the wider environment and green spaces as part of new developments going forward.

Suggestions for action:

- Influence national, regional and local strategies and policies to encourage access to green space and nature and promote this as being beneficial for health and wellbeing
- Consider how to ensure enough time is allocated to natural environment issues in the PSB

- Identify key individuals, groups, policies and developments to influence the i-Tree Eco Study findings
- Use the learning from GI projects to influence policy and strategy to promote and maintain green spaces.

Conclusion and Next Steps

This iHIA has identified a range of potentially significant impacts of the GGGP on the health and wellbeing of the population of Gwent. Key elements include promoting physical and mental health through increasing access to green space and building awareness of the health benefits of the natural environment. The ability of the GGGP to work in partnership at a strategic level to influence regional policy and strategy, to share resources and best practice as well as supporting and building the capacity of local groups is a real strength.

The IHIA also identified a number of areas that could further strengthen the impact of the GGGP on health and wellbeing. These include considering how to better target people and communities more likely to be affected by health inequalities, improving monitoring of the participation of these groups and consequent health impacts. Finally, the GGGP is very likely to be having a positive impact on carbon reduction targets and consideration should be given to how this impact could be captured.

The five individual screening reports completed as part of the iHIA have already been used to inform each of the separate workstreams. The next step will be for this report and accompanying action plan to be considered by the GGGP delivery team to inform the future work of the partnership.

REFERENCES:

1. Aerts, R., Honnay, O., & Van Nieuwenhuyse, A. (2018). Biodiversity and human health: Mechanisms and evidence of the positive health effects of diversity in nature and green spaces. British Medical Bulletin, 127(1), 5–22. https://doi.org/10.1093/ bmb/ldy021

2. Ballman, Carla J. Metadata. (2020). Emotions and actions: eco-anxiety and pro-environmental behaviors. PsychThesis. https://ourspace.uregina.ca/handle/10294/10016

3. Baudon P, Jachens L. A Scoping Review of Interventions for the Treatment of Eco-Anxiety. International Journal of Environmental Research and Public Health. 2021; 18(18):9636. https://doi.org/10.3390/ijerph18189636

4. Boluda-Verdú, I; Senent-Valero M; Casas-Escolano M; Matijasevich A; Pastor-Valero M, Fear for the future: Eco-anxiety and health implications, a systematic review,Journal of Environmental Psychology, Volume 84, 2022,101904, ISSN 0272-4944, https://doi.org/10.1016/j.jenvp.2022.101904. (https://www.sciencedirect.com/science/article/pii/S0272494422001499)

5. Bragg, R., Atkins, G. (2016). A review of nature-based interventions for mental health care. Natural England Commissioned Report NECR204.

6. Bonaccorsi G, Manzi F, Del Riccio M, Setola N, Naldi E, Milani C, Giorgetti D, Dellisanti C, Lorini C. 2020. Impact of the built environment and the neighborhood in promoting the physical activity and the healthy aging in older people: an Umbrella review. Int J Environ Res Public Health. 17(17):6127. doi:https://doi.org/10.3390/ijerph17176127

7. Capaldi A., C. A., Dopko L., R. L., & Zelenski, J. M. (2014). The relationship between nature connectedness and happiness: A meta-analysis. Frontiers in Psychology, 5(AUG). https://doi.org/10.3389/fpsyg.2014.00976

8. Carrapatoso S, Silva P, Colaço P, Carvalho J. 2018. Perceptions of the neighborhood environment associated with walking at recommended intensity and volume levels in recreational senior walkers. J Hous Elderly. 32(1):26–38. doi:https://doi.org/10.1080/02763893.2017.1393485.

9. Source: Census 2021 https://www.ons.gov.uk/peoplepopulationandcommunity/

10. Choi YJ, Matz-Costa C. 2018. Perceived neighborhood safety, social cohesion, and psychological health of older adults. Gerontologist. 58(1):196–206. doi:https://doi.org/10.1093/geront/gnw187.

11. Cooke, A., Friedli, L., Coggins, T., Edmonds, N., O'Hara, K., Snowden, L., Stansfield, J., Steuer, N. and Scott-Samuel, A. (2010) (2nd Ed.) *The mental well-being impact assessment toolkit*. 2nd ed., London: National Mental Health Development Unit https://q.health.org.uk/document/mental-wellbeing-impact-assessment-a-toolkit-for-wellbeing/

12. Coventry, P.A.; Neale, C.; Dyke, A.; Pateman, R.; Cinderby, S. The Mental Health Benefits of Purposeful Activities in Public Green Spaces in Urban and Semi-Urban Neighbourhoods: A Mixed-Methods Pilot and Proof of Concept Study. Int. J. Environ. Res. Public Health 2019, 16, 2712. https://doi.org/10.3390/ijerph16152712

13. Cramm JM, Van Dijk HM, Nieboer AP. 2013. The importance of neighborhood social cohesion and social capital for the well being of older adults in the community. Gerontologist. 53(1):142–152. doi:https://doi.org/10.1093/geront/gns052.

14. Currie, M J. B; Lackova, P; Dinnie ; E (2016) Greenspace matters: exploring links between greenspace, gender and well-being with conservation volunteers, Landscape Research, 41:6, 641-651, DOI: 10.1080/01426397.2016.1208813

15. Dahlkvist E, Hartig T, Nilsson A, Hogberg H, Skovdahl K, Engstrom M. 2016. Garden greenery and the health of older people in residential care facilities: a multi-level cross-sectional study. J Adv Nurs. 72(9):2065–2076. doi:https://doi.org/10.1111/jan.12968.

16. Ding, D.; Sallis, J.F.; Kerr, J.; Lee, S.; Rosenberg, D.E. Neighborhood environment and physical activity among youth. *Am. J. Prev. Med.* 2011, *41*, 442–455. [Google Scholar] [CrossRef] [PubMed]

17. Dobson, A. P., Pimm, S. L., Hannah, L., Kaufman, L., Ahumada, J. A., Ando, A. W., Bernstein, A., Busch, J., Daszak, P., Engelmann, J., Kinnaird, M. F., Li, B. V, Loch-Temzelides, T., Lovejoy, T., Nowak, K., Roehrdanz, P. R., & Vale, M. M. (2020). Ecology and economics for pandemic prevention. Science, 369(6502), 379 LP – 381. https://doi.org/10.1126/science.abc3189

18. Douglas, O., Lennon, M., and Scott, M. (2017) Green space benefits for health and well-being: A life-course approach for urban planning, design and management. Cities, 66, 53–62.

19. Dresner, M.; Handelman, C.; Braun, S.; Rollwagen-Bollens, G. Environmental identity, pro-environmental behaviors, and civic engagement of volunteer stewards in portland area parks. *Environ. Educ. Res.* 2015, *21*, 991–1010.

20. Eastabrook, J. M., Flynn, J. J., and Hollenstein, T. (2014). Internalizing symptoms in female adolescents: associations with emotional awareness and emotion regulation. *J. Child Fam. Stud.* 23, 487–496. doi: 10.1007/s10826-012-9705-yDavenport, L. A new path: The role of systemic therapists in an era of environmental crisis. *Fam. Ther. Mag. July-August* 2019, 13–16.

21. Gardsjord, H.S.; Tveit, M.S.; Nordh, H. Promoting youth's physical activity through park design: Linking theory and practice in a public health perspective. *Landsc. Res.* 2014, *39*, 70–81.

22. Gonzalez, M. T. and Kirkevold, M. (2013). Benefits of sensory garden and horticultural activities in dementia care: a modified scoping review. Journal of Clinical Nursing, 23(19-20), 2698-2715.

23. Mark Groulx, Shannon Freeman, Christopher Lemieux, Accessible nature beyond city limits – A scoping review, Journal of Outdoor Recreation and Tourism, Volume 37, 2022, 100490, ISSN 2213-0780, https://doi.org/10.1016/j.jort.2022.100490.

24. Husk, K.; Lovell, R.; Cooper, C.; Stahl-Timmins, W.; Garside, R. Participation in environmental enhancement and conservation activities for health and well-being in adults: A review of quantitative and qualitative evidence. *Cochrane Database Syst. Rev.* 2016.

25. Heeren, A., Daouda, C. M., and Contreras, A. (2021). On climate change anxiety and the threat it may pose to adaptation: an international study across European and African French-speaking territories. doi: 10.31234/osf.io/a69wp

26. Sonya L. Jakubec, Don Carruthers Den Hoed, Heather Ray & Ashok Krishnamurthy (2016) Mental well-being and quality-of-life benefits of inclusion in nature for adults with disabilities and their caregivers, Landscape Research, 41:6, 616-627, DOI: 10.1080/01426397.2016.1197190

27. Jennings V, Gaither CJ. Approaching environmental health disparities and green spaces: an ecosystem services perspective. Int J Environ Res Public Health. 2015 Feb 10;12(2):1952-68. doi: 10.3390/ijerph120201952. PMID: 25674782; PMCID: PMC4344703

28. Jennings, V.; Bamkole, O. The Relationship between Social Cohesion and Urban Green Space: An Avenue for Health Promotion. Int. J. Environ. Res. Public Health 2019, 16, 452.

29. Jennings, V.; Gaither, C.J. Approaching Environmental Health Disparities and Green Spaces: An Ecosystem Services Perspective. Int. J. Environ. Res. Public Health 2015, 12, 1952-1968. https://doi.org/10.3390/ijerph120201952

30. Jiricka-Pürrer, A., Tadini, V., Salak, B., Taczanowska, K., Tucki, A., & Senes, G. (2019). Do protected areas contribute to health and well-being? A cross-cultural comparison. International Journal of Environmental Research and Public Health, 16(7). https://doi. org/10.3390/ijerph16071172

31. Kaczynski, A.T.; Koohsari, M.J.; Stanis, S.A.W.; Bergstrom, R.; Sugiyama, T. Association of street connectivity and road traffic speed with park usage and park-based physical activity. *Am. J. Health Promot.* 2014, *28*, 197–203.

32. Kruize, H.; van der Vliet, N.; Staatsen, B.; Bell, R.; Chiabai, A.; Muiños, G.; Higgins, S.; Quiroga, S.; Martinez-Juarez, P.; Aberg Yngwe, M.; Tsichlas, F.; Karnaki, P.; Lima, M.L.; García de Jalón, S.; Khan, M.; Morris, G.; Stegeman, I. Urban Green Space: Creating a Triple Win for Environmental Sustainability, Health, and Health Equity through Behavior Change. Int. J. Environ. Res. Public Health 2019, 16, 4403. https://doi.org/10.3390/ijerph16224403

33. Léger-Goodes Terra, Malboeuf-Hurtubise Catherine, Mastine Trinity, Généreux Mélissa, Paradis Pier-Olivier, Camden Chantal, Eco-anxiety in children: A scoping review of the mental health impacts of the awareness of climate change. Frontiers in Psychology ,13, (2022) https://www.frontiersin.org/articles/10.3389/fpsyg.2022.872544 DOI=10.3389/fpsyg.2022.872544   ISSN=1664-1078

34. Alice Mathers, Nicola Dempsey, Julie Frøik Molin, Place-keeping in action: Evaluating the capacity of green space partnerships in England, Landscape and Urban Planning, Volume 139, 2015, Pages 126-136, ISSN 0169-2046,https://doi.org/10.1016/j.landurbplan.2015.03.004.

35. McCormack, G.R.; Shiell, A.; Doyle-Baker, P.K.; Friedenreich, C.M.; Sandalack, B.A. Subpopulation differences in the association between neighborhood urban form and neighborhood-based physical activity. *Health Place* 2014, *28*, 109–115

36. Metcalf, S.; Svendsen, E.; Knigge, L.; Wang, H.; Palmer, H.; Northridge, M. Urban greening as a social movement. In *Urban Sustainability: Policy and Praxised*; Springer International Publishing: Basel, Switzerland, 2016; pp. 233–248. [Google Scholar]

37. Mitchell, R.; Popham, F. Effect of exposure to natural environment on health inequalities: An observational population study. *Lancet* 2008, *372*, 1655–1660.

38. Molnar, B.E.; Gortmaker, S.L.; Bull, F.C.; Buka, S.L. Unsafe to play? Neighborhood disorder and lack of safety predict reduced physical activity among urban children and adolescents. *Am. J. Health Promot.* 2004, *18*, 378–386.

39. Marmot M. Fair Society, Healthy Lives: The Marmot Review. London: Strategic Review of Health Equalitites in England post-2010; 2010.

40. Mitchell, R. and Popham, F. (2008) Effect of exposure to natural environment on health inequalities: an observational population study. The Lancet 372(9650):pp. 1655-1660.

41. Mitchell, R. J., Richardson, E. A., Shortt, N. K., & Pearce, J. R. (2015). Neighborhood Environments and Socioeconomic Inequalities in Mental Well-Being. American Journal of Preventive Medicine, 49(1), 80–84. https://doi.org/10.1016/j. amepre.2015.01.017

42. Source: https://www.nice.org.uk/about/what-we-do/nice-and-health-inequalities

43. Panu, P. Anxiety and the Ecological Crisis: An Analysis of Eco-Anxiety and Climate Anxiety. Sustainability 2020, 12, 7836. https://doi.org/10.3390/su12197836

44. Pihkala, P. (2020). Anxiety and the ecological crisis: an analysis of eco-anxiety and climate anxiety. *Sustainability* 12, 7836. doi: 10.3390/su12197836

45. Public Health Wales. Source: https://phw.nhs.wales/services-and-teams/wider-determinants-of-health-unit/

46. I Gusti Ngurah Edi Putra, Thomas Astell-Burt, Dylan P. Cliff, Stewart A. Vella, Xiaoqi Feng,

47. Association between green space quality and prosocial behaviour: A 10-year multilevel longitudinal analysis of Australian children, Environmental Research, Volume 196, 2021, 110334, ISSN 0013-9351, https://doi.org/10.1016/j.envres.2020.110334. (https://www.sciencedirect.com/science/article/pii/S0013935120312317)

48. Richardson M, Hunt A, Hinds J, Bragg R, Fido D, Petronzi D, Barbett L, Clitherow T, White M. A Measure of Nature Connectedness for Children and Adults: Validation, Performance, and Insights. Sustainability. 2019; 11(12):3250. https://doi.org/10.3390/su11123250

49. Richardson, M., McEwan, K., Maratos, F. *et al.* Joy and Calm: How an Evolutionary Functional Model of Affect Regulation Informs Positive Emotions in Nature. *Evolutionary Psychological Science* 2, 308–320 (2016). https://doi.org/10.1007/s40806-016-0065-5

50. Richardson, M, & Hamlin, I. (2021). Noticing nature, nature connectedness and time in nature: Associations with Human and Nature's Wellbeing during the Corona Pandemic. https://doi.org/10.31234/osf.io/kd7bz

51. Rimmer JH, Marques AC. 2012. Physical activity for people with disabilities. Lancet. 380(9838):193–195. doi:https://doi.org/10.1016/S0140-6736(12)61028-9.

52. Rimmer JH, Rowland JL, Yamaki K. 2007. Obesity and secondary conditions in adolescents with disabilities: addressing the needs of an underserved population. J Adolesc Health. 41(3):224–229. doi:https://doi.org/10.1016/j.jadohealth.2007.05.005.

53. Roe, J. J., Ward Thompson, C., Aspinall, P. A., Brewer, M. J., Duff, E. I., Miller, D., & Mitchell, R. (2013). Green space and stress: Evidence from cortisol measures in deprived urban communities. *International Journal of Environmental Research and Public Health,* 10, 4086–4103. 10.3390/ijerph10094086

54. Roe, J.; Aspinall, P.A.; Ward Thompson, C. Understanding Relationships between Health, Ethnicity, Place and the Role of Urban Green Space in Deprived Urban Communities. Int. J. Environ. Res. Public Health 2016, 13, 681. https://doi.org/10.3390/ijerph13070681

55. Scott, J. T., Kilmer, R. P., Wang, C., Cook, J. R., & Haber, M. G. (2018). Natural Environments Near Schools: Potential Benefits for Socio-Emotional and Behavioral Development in Early Childhood. American Journal of Community Psychology, 62(3–4), 419–432. https://doi.org/10.1002/ajcp.12272

56. Saitta M, Devan H, Boland P, Perry MA. 2019. Park-based physical activity interventions for persons with disabilities: a mixed-methods systematic review. Disabil Health J. 12(1):11–23. doi:https://doi.org/10.1016/j.dhjo.2018.07.006.

57. Soga, M., Evans, M. J., Tsuchiya, K., & Fukano, Y. (2020). A room with a green view: the importance of nearby nature for mental health during the COVID-19 pandemic. Ecological Applications, 0(0), 1–10. https://doi.org/10.1002/eap.2248

58. Student Health and Wellbeing In Wales: Report of the 2019/20 School Health Research Network Student Health and Wellbeing Survey   https://www.shrn.org.uk/national-data/

59. Sulander T, Karvinen E, Holopainen M. 2016. Urban green space visits and mortality among older adults. Epidemiology. 27(5):e34–35. doi:https://doi.org/10.1097/EDE.0000000000000511.

60. Tester, J.; Baker, R. Making the playfields even: Evaluating the impact of an environmental intervention on park use and physical activity. *Prev. Med.* 2009, *48*, 316–320.

61. Qian Wang, Zili Lan, Park green spaces, public health and social inequalities: Understanding the interrelationships for policy implications, Land Use Policy, Volume 83, 2019, Pages 66-74, ISSN 0264-8377,https://doi.org/10.1016/j.landusepol.2019.01.026.

62. Ward Thompson, C.; Roe, J.; Aspinall, P.; Mitchell, R.; Clow, A.; Miller, D. More green space is linked to less stress in deprived communities: Evidence from salivary cortisol patterns. *Landsc. Urban Plan.* 2012, *105*, 221–229.

63. Welsh Health Impact Assessment Support Unit (WIHIASU) Health Impact Assessment. A practical guide. (check date) https://phwwhocc.co.uk/wiHIAsu/wp-content/uploads/sites/3/2021/05/IHIA_Tool_Kit_V2_WEB-1.pdf

64. Ward Thompson, C.; Aspinall, P.; Roe, J.; Robertson, L.; Miller, D. Mitigating Stress and Supporting Health in Deprived Urban Communities: The Importance of Green Space and the Social Environment. *Int. J. Environ. Res. Public Health* 2016, *13*, 440.

65. Weiss, C.; Purciel, M.; Bader, M.; Quinn, J.; Lovasi, G.; Neckerman, K.; Rundle, A. Reconsidering access: Park facilities and neighborhood disamenities in New York City. *J. Urban Health* 2011, *88*, 297–310

66. Whear, R., Thompson Coon, J., Bethel, A., Abbott, R., Stein, K. and Garside, R. (2014). What is the impact of using outdoor spaces such as gardens on the physical and mental wellbeing of those

with dementia? A systematic review of quantitative and qualitative evidence. The Journal of Post-Acute and Long-Term Care Medicine, 15(10), 697-705.

67. Wellbeing of Wales, 2022: children and young people's wellbeing. Welsh Government. https://gov.wales/wellbeing-wales-2022-children-and-young-peoples-wellbeing

68. Wolf, L. J., Zu Ermgassen, S., Balmford, A., White, M., & Weinstein, N. (2017). Is variety the spice of life? An experimental investigation into the effects of species richness on self-reported mental well-being. PLoS ONE, 12(1). https://doi.org/10.1371/ journal.pone.0170225