



Nottingham Trent
University

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Nature Connectivity and Accessibility

Report for the National Trust

Authors:

Dr Duncan Guest – Nottingham Trent University – Lead Author

Natasha Chapman – NTU/National Trust Graduate Placement

Gordon Guest – Mobility Scooter Access and Use Consultant

Dr Ryan Lumber – Nottingham Trent University

Lisa Wardle – Nottingham Trent University

Karen Winfield – Nottingham Trent University

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1. Introduction

Our relationship with the natural world is increasingly being recognised as a vital conservation concern as those who feel more connected to nature are more likely to behave in pro-environmental ways. At the same time, engagement with nature has been shown to have a positive impact on both mental and physical health. As such, providing more opportunities for people to connect with nature can be advantageous for people and the environment.

Recently, the National Trust acquired [Sandilands](#), a new site on the Lincolnshire coast. This site was previously a golf course, but as the area is an important site for wildlife, particularly migrating birds, the National Trust will be turning this into a nature reserve to give people in the region an opportunity to connect with nature at this important coastal site.

When considering how to promote nature connectedness it is important to also consider accessibility, in order to enable and facilitate access to the site for a diverse set of people. It also means thinking beyond mere access, to thinking through how different users with different accessibility needs connect with nature and designing spaces that provide opportunities for all users to connect with nature.

The aim of this report is to bring together practical information about accessibility (Section 2) with academic literature about connectedness to nature (Section 3) in order to draw out key insights about how different groups of people connect with nature. Based on several visits to the Sandilands site, the report provides some general recommendations (Section 4) for the National Trust to consider at Sandilands, but also for other sites in which connectedness to nature is a key consideration.

2. Practical Considerations

This report considers accessibility and connectedness to nature in relation to age (children, adolescents, older adults), ethnic minorities, socioeconomic status and disability. This section identifies a range of practical design considerations that primarily impact accessibility for those that are disabled or mobility impaired. Design considerations for other groups are addressed in the review of academic literature in Section 3.

In England there are currently 2.35 million blue badge holders (Department for Transport, 2022) and by 2030, one in five people in the UK (21.6%) will be aged 65 or over (Office for National Statistics, 2022), with the average number of disability-free life years from age 65 years being 10 years (Office of National Statistics, 2022). As such, many users of the National Trust will have mobility impairments as well as other disabilities and it is important that this is considered in site design. It is important to get accessibility right from the outset to encourage access from a range of potential users, including those with disabilities, the elderly, those who are less mobile and parents with children.

Under the Equality Act 2010, providers of services to the public must ensure people are not unlawfully discriminated against and that reasonable adjustments are anticipated and made for disabled people as well as other groups.

There are a range of considerations to take into consideration when thinking about accessibility. This report focuses mostly on the accessibility of external spaces, because the overall focus is about access to nature. There are of course a range of regulations and guidance about making indoor facilities accessible, but that is out of the scope of this report.

2.1 Website

Accessibility information should be easy to find on the website to refer to before visiting. The National Trust provide access statements that do provide details of facilities. However, more extensive information could be provided, such as information about pre-defined trails that are suitable for different types of users, with information about where facilities are and the extent of resting places as well as other appropriate information.

2.2 Welcome

Whilst the National Trust has a strong brand and reputation, many groups within the population may be unfamiliar with the National Trust. As such any welcome to the site needs to give a welcoming and friendly impression for all visitors, to make them feel that this is a place for them. This includes information being made visible for different users (e.g., disabled car parking, access routes) as well as consideration of who is portrayed in any imaging and the activities they are engaged in (see Section 3).

2.3 Lighting

Good lighting is essential, particularly in areas around key facilities and the car park, where poor weather might affect visibility or when evenings become dark earlier. Solar powered outdoor lighting can be an eco-friendly way of creating more lighting across a site, particularly by important signage.

2.4 Parking and Transport

The Department for Transport (2021) recommends that for car parks for recreational facilities there is a minimum of one space for each employee who is a disabled motorist, plus 6% of the total capacity for visiting disabled motorists. They provide clear guidance on the design of disabled bays, which should be well marked out and well lit, with a well-maintained route to the venue that is free from obstructions. Accessible spaces should be as close as possible to the venue, and not more than 50m away (although the greater the distance, the less likely disabled users will frequent the venue). They should be as close to a level gradient as possible as wheelchair users will be transferring and unloading equipment, and various disabled adapted vehicles have ramps which are already sloped. A solid, firm, slip resistant, surface is important.

Many car parks are fitted with height restrictions to avoid overnight parking. However, users with mobility impairments may have larger vehicles to transport mobility scooters, and some vehicles are adapted such that wheelchairs are automatically lifted from top boxes. This should be considered in car park design.

Ticket machines also need to be accessible, with wheelchair space to come alongside the ticket machine which is preferably near to the accessible parking.

2.5 Signage and Maps

As well as providing necessary information, good signage clearly demonstrates that different users are welcome from the outset. For example, if the site contains different walks/trails/paths, it should be clear where these are, how accessible they are and how suitable they are for different users. This should include information on the type of path (e.g., surface, width, gradient), their length with a clear key indicating who they are suitable for (e.g., older adults, wheelchair users, mobility scooter users, families with buggies). The

length should be clearly indicated, as well as any rest stops, and sheltered areas, to enable users to properly plan their outings in the full confidence that they will be safe and comfortable. Signage should also seek to convey information in alternative forms where appropriate (e.g., text, braille, and widely recognisable symbols). Providing detailed site maps such as a relief map (physical or digital) which indicate toilets, rest points and gradients can also help with this.

The Department for Transport (2021) provide very specific guidance on signs, text size and colour (dark text on a light background is preferable for those with visual impairments), sign positioning, and making signs tactile where Braille is not used. As well as visual signs, audio information should be considered.

2.6 Toilets

Although there is legal guidance in place for the design of disabled toilets, the specifications for these in the Building Regulations (2010) are based on wheelchair users. They do not consider that many users with mobility impairments will use larger mobility scooters, nor do they consider space and design requirements required for those with profound and multiple learning disabilities or for physical disabilities such as spinal injuries and multiple sclerosis who need extra equipment and space to allow them to use the toilets safely and comfortably. Providing additional space and equipment avoids visitors needing to be manhandled by carers and removes the discomfort and indignity of being unable to easily change incontinence wear. Toilets should also be large enough to accommodate mobility equipment, otherwise they may cause difficulty and inconvenience for users who would then have to switch between a mobility scooter and a wheelchair in order to use the facilities. This is particularly the case if a site is hiring out large mobility equipment such as Trampers.

Guidance on toilets can be found at [Changing Places](#) who campaign for better and more accessible toilets. The Department for Transport (2021) also provide guidance on accessible toilets. Importantly, if the National Trust want people to use the entire Sandilands site, they need to provide multiple toilet facilities throughout the site. Concerns about access to facilities can be a significant barrier for a range of users who may not feel confident in exploring the site (e.g., elderly, those with small children).

It is also important to consider relief areas for dogs, as this is a particular consideration for those that use assistance dogs and more broadly will help keep the site clean for all users (see Department for Transport (2021) guidance).

2.7 Accessibility equipment

Many National Trust sites provide equipment to aid accessibility. For example, many allow hire of Trampers, which are all terrain mobility scooters. However, few sites make use of these by talking to potential users about routes that might be suitable for these but that are not suitable for other mobility scooters or wheelchairs. [Disabled Ramblers](#) are a charity working across England and Wales to help make the countryside more accessible to people with limited mobility. They have a useful system of categorising routes (see 2.8) that aids users in understanding what types of trails are suitable for different types of mobility vehicle. If the National Trust invest in Trampers, they should consider how to use these to best enable users to connect with nature.

Other types of accessibility equipment can also be provided, including manual wheelchairs, all terrain child buggies and child/baby carriers.

2.8 Paths and Routes

There are a number of sources of advice regarding creating better access to the countryside including The Department for Transport (2021), Disabled Ramblers UK (2021), Sustrans (2019, 2022), Scottish National Heritage (2016) Environment Agency (2012), DEFRA (2010), the Equality Act 2010, and Fieldfare Trust (2005). These all provide information on the specific accessibility requirements for paths with a focus on a range of users from wheelchairs and mobility scooters to blind persons with guide dogs.

As already noted, where possible, multiple paths should be available to allow visitors to choose routes most suitable for them, with information about key aspects of those paths and their suitability for different visitors clearly provided.

2.8.1 Path classifications

The Fieldfare Trust (2005) made clear the importance of improving countryside access for disabled people. As they note

“Everyone working to provide public access to the countryside now has a responsibility to do their job without discriminating against disabled people. The countryside contains many challenging and sensitive environments which at first sight may appear to present insurmountable difficulties with respect to providing access for all and for disabled people in particular. However, there are also a great many countryside situations where access for all can and should be provided to the benefit of all concerned.”

In their 2005 “*Countryside for all*” publication, the Fieldfare Trust set out guidance and recommendations on different types and specifications of footpath that are tailored to different environments (urban and formal landscapes, urban fringe and managed landscapes, rural and working landscapes, open country, semi-wild and wild land). Natural Resources Wales (2017) in their “*By all reasonable means. Least restrictive access to the outdoors*” publication set out three Zones (A-C) that take these categories further, providing clear guidance on a variety of pathway characteristics, from width, surface, step levels, gradients and barriers.

The Disabled Ramblers have also developed a set of four categories for their routes <https://disabledramblers.co.uk/route-categories/>. The characteristics of these paths broadly map onto the Natural Resources Wales Zones A-C. However, they also differentiate routes based on suitability for different types of user. This is a very user-friendly way of grading routes because the user can clearly understand what is needed for each route.

Category 1 is designed for almost all scooters and buggies, and power-chairs. Additionally, users of manual chairs may manage the routes provided the rider is either powerfully built with plenty of upper body strength, or is assisted by able bodied pushers. The distance travelled along the ramble will usually not exceed 5 miles.

Category 2 is considered generally suitable for very many scooters and buggies, particularly those with medium size, or large, wheels and adequate batteries (at least 50ah capacity, or preferably 60ah). Four wheel machines are recommended, although some 3 wheelers are acceptable, if driven with care. Some heavy duty power-chairs may be used, if adequately supported by an able bodied helper who can steady the machine downhill or on cross cambers. Occasionally users of manual chairs may take part, provided the rider is exceptionally strong in the upper body, and/or has at least one strong fully able bodied helper. Maximum distance: usually 8 miles

Category 3 is designed for users of heavy duty and powerful scooters or buggies only. The distance covered may be highly variable – from 5 miles if along a very hilly route with long steep climbs, up to 8 miles along more level routes. Category 3 routes will present few problems to experienced users of heavy duty buggies.

Category 4 is only for adventurous users of heavy duty buggies, prepared to try routes that may prove impassable. The Disabled Ramblers do not offer this level of ramble.

2.8.2 Path surface and maintenance

Paths need to be made of material that is durable and does not become dangerous when wet. Ideally paths are smooth. The Fieldfare Trust (2005) define accessible paths as being compact/firm (e.g., should remain strong during use and able to withstand concentrated loads such as wheelchair tyres and walking sticks), stable, nonslip (even in wet conditions) and obstacle free (little to no loose material on path, with any loose pebbles less than 5mm in size).

The Fieldfare Trust (2005) and Natural Resources Wales (2017) provide information about the specification of paths. Various sources of information for specific surfaces are available although they vary in the extent to which they are focused on the user. Examples are Paths for All (2019) and the Environment Agency (2012) *Access for all design guide*. Recently, there has been greater use of plastic grids such as Geo grid or Bodpave. These are not detailed in these guides, but are plastic hexagons that are filled with gravel and provide a firm and flexible base that can be used for walkers, families with prams, bicycles, wheelchairs, power chairs and mobility scooters. Critically all potential path surfaces being considered should be evaluated in relation to the accessible criteria above.

For many users, paths can be rendered inaccessible by relatively small barriers. Lips at the start/end of bridges, boardwalks and other transitions between natural and manmade surfaces can grow over time and become as significant a barrier as a full step. These can be problematic for those using sticks as walking aids, but also for many types of mobility scooter that have relatively low ground clearance and so can easily get stuck, especially if lips coincide with gradients. Some disabilities mean that users are also unable to withstand jolts.

The consistency of path surfaces is also significant, particularly for people with visual impairments. Features such as drainage channels to manage rainfall runoff (especially on hills) can create impassable barriers, and on boardwalks the direction of grooves can render them difficult to navigate. The natural environment can also create its own barriers in terms of protruding tree roots, exposed stones or potholes.

Maintenance of paths is also a key issue. Paths need to be kept free of bumps or obstacles, with the sides of paths clearly identifiable, and appropriate and clear markings used for ramps or other inclines. In coastal sandy areas, this can present challenges as the sand shifts. Paths also need to be maintained so that they do not become overgrown. A small part of a path that is overgrown, worn away, waterlogged, or containing large stones, or broken sections of path can render an area inaccessible for many users.

2.8.3 Path width

The width of a path is a crucial element of path design and is dependent on usage. If areas are meant for recreational use, then paths need to have sufficient width to enable users to navigate it side by side. The Department for Transport (2021) as well as others recommend

a minimum path width of 2000mm, as this should enable two wheelchair users or mobility scooter users to pass. Where it is not possible due to the physical constraints then 1500mm is the minimum acceptable width, as this would enable a walker and a wheelchair user to pass each other. An unobstructed minimum height of 2300mm is also recommended. Whilst these guidelines are useful, it should be noted that assistive equipment such as mobility scooters require quite a lot of space to move round comfortably and safely, and to be able to turn round. Table 1 below provides an indication of the different sizes of wheelchairs and mobility scooters. The Fieldfare Trust (2005) outline the widths required by various additional types of user, such as those with sticks, guide dogs and pushchair users.

Table 1. Wheelchair and Scooter comparison sizes.

Type of wheelchair/mobility scooter	Length (typically)	Width (typically)
Standard wheelchair	42 inches/ 107 cm	40 inches/ 102 cm
Power chair (e.g., Pride Jazzy)	35 inches/ 90cm	24 inches/ 62 cm
Medium 4mph electric mobility scooter Class 2 (e.g., Pride Go Go)	40 inches/ 102 cm	21 inches/ 51 cm
Typical medium 8 mph mobility scooter Class 3 (e.g., Kymco Midi)	50 inches/ 127 cm	24 inches/ 60 cm
Tramper 8 mph off road scooter Class 3	60 inches/ 152 cm	28 inches/ 71 cm
TGA Supersport 3 wheel 8mph Class 3	68 inches/ 174 cm	30 inches/ 75 cm
Terrain Hopper 4Z off road scooter Class 3	71 inches/ 180 cm	34 inches/ 85 cm

2.8.4 Path gradients

Gradients are a significant area of consideration. Significant uphill gradients will require physical effort that may be beyond the ability of older adults, those with walking aids, or those with breathing or heart conditions or other health conditions that affect physical stamina. Powered mobility equipment will also have different capabilities in terms of the maximum uphill gradient that can be managed. Downhill gradients also create safety issues. Those using equipment, particularly manual equipment without brakes, will need to be able to control their descent safely, while even powered equipment will have limits as to the gradient that they can safely go downhill. In both cases the type of path surface is significant. A loose surface makes a downhill gradient more hazardous as it can be more difficult to control the descent and prevent skidding. This equally applies to those who are able to walk but are less steady on their feet. Cross gradients are also a significant concern, as these can be very difficult for those with mobility issues to navigate. Moreover, mobility equipment is often very difficult to manage on cross gradients.

The Department for Transport (2021) advise that pedestrian environments should not exceed slopes of 1 in 60, and if a level route is not possible than slopes should not exceed 1 in 20. Any slope steeper than this would be classified as a ramp. Where there are slopes it is recommended that for every 500mm of rise, then there is a level landing that offers users the space to rest. For wheelchairs there sometimes needs to be short ramps to allow access to particular areas. These should be avoided, but if required can be greater than 1 in 20, but a maximum of 1 in 12 and less than 1m in length. For mobility scooters, whilst some all-terrain scooters can climb steep gradients, most scooters would struggle on slopes of 1 in 8 and feel very uncomfortable for the user. The Disabled Ramblers [Route Categories](https://www.disabledramblers.co.uk) ([disabledramblers.co.uk](https://www.disabledramblers.co.uk)) use the following gradient specifications in relation to their different route categories.

Category 1: *There will be no steep hills greater than 1 in 12, except perhaps for very short stretches. Cross slopes will be normally very small, say up to 1 in 12. Occasionally cross slopes may be steeper, but there will usually be ways around such sections.*

Category 2: *Hills will generally be no more than 1 in 10, with occasional steeper stretches up to 1 in 8. Cross slopes will generally be very small, but sections of cambers, say up to 1 in 8, may occur for short stretches.*

Category 3: *Hills may be long and steep, with some stretches even up to 1 in 5, or very occasionally 1 in 4. Cambers may also be correspondingly steeper, sometimes in excess of 1 in 8.*

In order to make sites accessible, if a path is particularly steep, an alternative pathway should be provided. Consideration should also be given to the surface of path, especially the impact of weather on the how slippery a path becomes when on a gradient.

There is a wide range of other specific guidance around accessible design of paths, most notably in the Department for Transport (2021) publication. Here we have highlighted the central areas of concern that relate to access to nature.

2.9 Gates

Gates are a key consideration, as these can often be difficult to use and often impossible to navigate for many users, particularly those with mobility issues. The suitability of structures such as gates should always be considered assuming that someone with mobility issues may be navigating the route without more mobile helpers. This means that wheelchairs or mobility scooter users should be able to use open gates from seated positions. A Disabled Ramblers 2021 statement says that:

“New structures should allow convenient access to mobility vehicle riders as standard, and should comply with British Standard BS5709: 2018 Gaps Gates and Stiles which places the emphasis on Least Restrictive Access.”

In other words, it should always be considered whether a gate is necessary, because it will impede access. Clearly, in many rural locations, gates may be needed to control livestock. However, any barriers to prevent use from some users (e.g., motorcyclists), will end up impeding access for other users such as wheelchair users.

In recent years considerable research has been carried out aimed at increasing the accessibility of man-made barriers. This led to the launch of the [National Land Access Centre](#) in 2018 that explored different types of gates for different users.

There are a variety of different recommendations in terms of gates. [Sustrans](#) recommend gates have a minimum 1500mm width to accommodate a large range of users. The British BS5709: 2018 gate standard is not mandatory but strongly recommended and they cite a minimum clear width on gates of 1100mm. The Department for Transport (2019) recommend that prior to a gate there should be a 2000mm long clear space with an additional path width of 300mm. Crucially, the area before, during and after a gate should be flat, free of obstruction and gates should be able to move freely.

There are a variety of gates, and for most users, those that can be opened in both directions are easier to navigate. Those that open in only one direction may need additional room for

manoeuvre on the side that the gate opens into. Some mobility vehicles may need up to a 3000mm diameter space to manoeuvre effectively through such gates.

Latches can also make operating a gate complicated. Many latches are simply not navigable for those who using a wheelchair or mobility scooter. The ease of use of latches can therefore make a significant difference. There are various companies (e.g., Centrewire) that produce more accessible latches. For example the [Easy latch](#) is designed with use from mobility scooter users in mind.

2.10 Benches, Perches and Shelters

Benches and perches provide important rest points for those with reduced mobility as well as offering an opportunity for visitors to relax and take the time to appreciate their surroundings. The Department for Transport (2021) recommend that in pedestrian areas seating is required every 50m as those with mobility impairments will need to sit at regular intervals. Perches can also play an important role here, as they can be less intrusive and can be easier for some users to get up and down from or for those who only need to rest briefly. Benches should also have arms to make getting up and down from them easier and have space either side so those using mobility equipment can sit with those using the benches and be placed adjacent to (and not obstructing) a path.

If there are designated spots where the National Trust wants visitors to stop (e.g., a café) then it is important to provide seating. If there is an intention of having larger groups at the site, then adequate seating for such groups would be needed. Indeed, not having such spaces can be a barrier to some groups accessing natural spaces (see Section 3). Similarly, whilst providing benches and perches, to be truly accessible to a wide variety of user, areas within natural spaces need to have some areas of shelter, particularly if the site covers a significant area. Areas where people can shelter from the wind, precipitation and sun are important as users with mobility issues, or families with small children will need rest spaces in order to get away from the elements. This is particularly the case if the site is open all year round or in an area known for rain/snow or high winds.

Rest spaces and viewpoints also offer the opportunity to create spaces of engagement that actively try to connect people with nature (see Section 4).

2.11 Pedestrian Bridges, Boardwalks and Viewing Platforms.

Pedestrian bridges and boardwalks are often required to traverse areas that are difficult to pass or to create viewpoints where visitors can rest and enjoy their surroundings. As it is not possible to leave the path to the side of these, then the width of the walkways is even more important than at other parts of a path. The Fieldfare Trust (2005) trust recommend a width of 2000mm for bridges and boardwalks and that if a sufficient width for easy passing cannot be maintained along the full length, then regular passing places will be required. The edges of any walkway should be clearly defined, and care should be taken that the surface does not get slippery, especially when wet. As indicated above, moving from a path to a bridge or boardwalk can create a barrier through additional lips, and it is important these are minimised. The Fieldfare Trust (2005) recommend a lip no higher than 5mm. It is also recommended that boards on boardwalks are laid at right angles to pedestrian flow to reduce the likelihood of wheelchair wheels or sticks/canes getting stuck in them.

3. Connection with Nature and Accessibility

Having the opportunity to connect to nature is a central way through which people can enjoy nature and appreciate its value and importance. Providing such opportunities can also help us relate to nature and form a stronger connection with it. Connecting with nature is vitally important, because it is associated with pro- environmental and conservation behaviours, with people who feel emotionally connected to nature doing more to protect it (Hughes et al., 2018; Mackay & Schmitt 2019; Richardson et al., 2020b). At the same time, there are many physical and social issues that impact the degree to which different users can access nature and the extent they can connect with it when accessing it. This brief review outlines the current understanding of nature connectedness and summarises literature relating to how different users (children, older adults, ethnic minorities, low income, disabled) access and connect with nature. The review is not intended to be exhaustive, but to highlight important considerations and direct the reader to further research.

3.1 Nature Connection

While it has been suggested that humanity has an innate affinity towards the natural world (Kellert & Wilson, 1993), those in westernised societies tend to see themselves as separate from, and even superior to the ecosystems to which we belong (Schroeder, 2007). This resulting disconnect from nature can cause nature to be used as a commodity and thus leads to harm through climate change and loss of species (Richardson et al., 2020). It may also affect human wellbeing and mental health as the impact of the loss of nature for these outcomes are currently unclear (Maller et al., 2009). This has led to research and initiatives to reconnect people with the more-than-human world to which we belong, positioned to be the feeling of belonging to a wider community of nature (Maller et al., 2009). One evidenced way to achieve this is through the five pathways to nature connectedness (Lumber et al., 2017). These pathways of senses, beauty, meaning, emotion and compassion (see Table 2) have all been shown to play a role in facilitating nature connectedness over and above what simple engagement/time spent in nature could provide (Lumber et al., 2017; Richardson et al., 2020, 2021). Each of them represents a distinct way of engaging with, and reacting to, nature.

Table 2. Definitions of the pathways to nature from Lumber et al., (2017).

Pathway	Pathway Definition
Contact	The act of engaging with nature through the senses
Beauty	The perception of aesthetic qualities including shape, colour and form that please the senses
Meaning	Using nature or natural symbolism to communicate a concept that is not directly expressed
Emotion	An affective state or sensation that occurs as a result of engaging with nature
Compassion	Extending the self to include nature, leading to a concern for other natural entities that motivates understanding and helping/co-operation

Whilst many studies explore how we connect with and relate to nature, it is important to note that they do so in different ways, often using scales which measure different aspects of this such as the connectedness to nature scale (Mayer & Frantz 2004; Cheng & Munroe 2012) or the nature relatedness scale (Nisbet & Zelenski 2013; Nisbet et al., 2009). For example, the nature relatedness scale has the subcomponents of self (how much people identify with the natural world), perspective (how people's relations to nature are exemplified by their attitudes and behaviours) and experience (familiarity and how people are attracted to nature). The scales and their sub-components all tap into subtly different ways in which we connect and relate with nature (although Tam (2013) has suggested they all tap into the same underlying construct). These scales have also been criticised in focusing on cognitive

beliefs rather than emotional connection to nature (Perrin & Benassi 2009, Tam, 2013) and their wording often makes it difficult to use with particular groups, such as children, and as such have had to be adapted (Price et al., 2022; Richardson et al., 2019). It is important therefore to be mindful of these limitations.

3.2 Nature Connectedness, Wellbeing and Mental Health

It is well established that spending time in nature can improve physical health (Jimenez et al., 2021) as well as mental health (White et al., 2021) often through reducing stress (Ewert & Chang, 2018). Critically, for mental health and wellbeing benefits, connecting to nature itself appears to be most important (Martin et al., 2020), with greater connectedness to nature associated with improved mental and physical wellbeing (Mayer et al., 2009; Capaldi et al., 2014; Cervinka et al., 2012; Richardson et al., 2016; Frantz & Mayer, 2014) over and above time spent in nature (Richardson et al., 2021). Specifically, being connected to nature is associated with both hedonic wellbeing (feelings and the evaluation of an individual's own situation) and eudemonic wellbeing (being in control and having a choice) (Pritchard et al., 2020). As such it is important to recognise that creating spaces in which people can connect with nature is a way of not only supporting wildlife but promoting wellbeing.

There is increasing evidence to suggest that the relationship between nature connectedness and wellbeing/life satisfaction is partially derived from connectedness increasing an appreciation of the beauty and aesthetics of the natural world (Capaldi et al., 2017; Richardson & McEwan, 2018; Zhang et al., 2014). As such, creating spaces in which people can take the time to admire and engage with natural beauty can be an important way of enhancing wellbeing.

3.3 Meaningfully Connecting to Nature

Access to nature alone is not enough to foster relatedness (Arbuthnott et al., 2014) with many studies concluding that active engagement rather than passive presence in nature is required to increase relatedness (Richardson et al., 2020a; Williams et al., 2018). Active engagement does not have to require much more than simple activities, such as ones that involve the senses, or noticing nature and talking about it with others (Richardson et al., 2020a; McEwan et al., 2020). Indeed, Passmore and Holder (2017) found that attending to the emotions that nature evokes increases connectedness to nature, not simply spending time in nature. Similarly outdoor adventure programs were found to not lead to increases in nature connectedness, but nature-based sporting activities did so (Eigenschenk et al., 2019; Martin 2004).

Education, at least where it focuses purely on factual information about ecology, has been found to have little impact on nature connectedness (Luck 2011; Lumber et al., 2017). However, Kuldna et al (2020) did find that learning about nature, as well as other activities requiring engagement such as watching wildlife and listening to birdsong did increase the reported satisfaction of visitors to green spaces more than simply walking through them, picking fruit or resting. This suggests that educational measures can be appreciated by visitors and enhance their experience. However, careful consideration is required of the type of experience in order to truly foster increased connectedness with nature as it is unlikely that increasing knowledge alone will create more connection with nature.

In developing the pathways to nature connectedness above, Lumber et al (2017) explored effective yet simple and low-effort interventions that tap into these pathways that increase connectedness (Richardson et al., 2020, 2021). One intervention related to the emotion pathway is noticing Three Good Things in Nature. Noticing three good things a day in nature resulted in an increase in nature connectedness compared to a control group who were

merely asked to record three facts (Richardson & Sheffield, 2017). McEwan et al (2019) expanded on this further by having participants, a subgroup of which had mental health conditions, record good things they noticed in nature via a smartphone app. Crucially, a greater presence of biodiversity led to greater mood and connection benefits with people able to notice and benefit from, higher quality levels of nature. In addition to improving nature connectedness of participants, this also positively impacted quality of life. This intervention has also shown effectiveness in improving mood in clinically relevant groups for example those with depression and anxiety (Keenan et al., 2021). Mindfulness techniques used to treat mental health conditions such as anxiety, have also been found to strongly impact nature connectedness when used outdoors, as they will usually incorporate the sensory contact and emotion pathways (Richardson et al., 2020a; Choe et al., 2021).

Over several years, the Wildlife Trust ran a 30 days wild campaign in which respondents had to engage with wildlife in different ways over 30 days, in ways that were informed by the nature connectedness pathways. These included various activities, with the four main types being noticing wildlife, sharing wildlife experiences, proactively doing things to enhance wildlife, and connecting with wildlife (e.g., through art). This campaign was shown to increase nature connectedness as well as measures of health, happiness and conservation behaviour, with those who had the lowest levels of nature connectedness benefitting the most (Richardson et al., 2016).

3.4 Age and Nature Connectedness

Chawla (2019) recently reviewed the literature on age and connectedness to nature and pointed to a range of evidence showing that young people with more chance to experience and access nature have higher levels of nature connectedness. Importantly research also shows that connectedness with nature as an adult is related to greater accessing of nature during childhood. For example, those who have positive nature experiences in childhood are found to have greater connectedness to it in later life (Rosa et al., 2018). Parental or guardian influence has also been found to greatly affect children's connectedness to nature (Passmore et al., 2020) and family values towards nature influence children's interest in pro-environmental behaviours (Cheng & Monroe 2012). Importantly, adolescents' pro environmental behaviour and intentions can also influence parental pro environmental behaviour and intentions, showing the importance of adolescents as potential agents of positive environmental change (Žukauskienė et al., 2021).

As we age, nature connectedness appears to change quite significantly. A number of studies have found that nature connectedness is highest in early childhood (e.g., 5-7) but then substantially dips as children move towards adolescence before then improving gradually throughout adulthood (Hughes 2019; Price et al., 2022; Richardson et al., 2019). This trend has been shown to be the case in a number of countries (Chawla, 2019) and demonstrates the importance of considering particular age groups independently.

3.4.1 Young Children

Young children are naturally curious and emotive, and so opportunities to connect with nature can come from providing enjoyable opportunities for children to notice nature and explore the sensory aspect of the natural world (Elliot et al., 2014; Pelo, 2018; Price et al., 2022). Young children can become fascinated by sensory detail or the way living things move, and so creating opportunities for this and allowing children to express their thoughts and feelings in nature can help foster an ecological identity (Wilson, 2018). This can be facilitated through providing stimuli to help create opportunity to notice nature, for example by noticing the weather and the seasons (Price et al., 2022) or noticing and describing the details of animals and plants or patterns in nature (Pelo, 2018). Indeed, when children notice

good things in nature, they refer mostly to the activity of animals in nature, or the changes in weather (Harvey et al., 2019). Similarly, facilitating sensory engagement is also important, whether through play, collecting or simply enabling children to be outside in different kinds of weather (Price et al., 2022).

The natural world can also be an important place in which children challenge themselves and get a sense of achievement and this is an important step in feeling able to later explore nature independently (Chawla, 2019). Promotion of challenge and mastery in nature and praising achievements is also key to giving children the impetus to develop positive life-long associations with nature. As such, challenge and achievement may be a fundamental stepping-stone for children, that makes them want to spend more time in, and connect with, nature in later life.

3.4.2 Adolescents

The substantial dip in nature connectedness as children move towards adolescence does not mean that there is a loss in environmental values during this time, simply that there are other barriers young people face that impact time spent in nature and their connection with it. As Price et al (2022) outline, as children get older, their school days become more structured and intense, and their priorities become more focused on their social identity and networks. For many, this means focusing on activities that mean less time to spend in natural environments (Price et al., 2022). Indeed, Price et al (2022) found that other barriers included weather, schoolwork and screentime and wanting to relax at home. At the same time these young people mostly listed natural places as their favourite place, indicating an appreciation of the natural world. Importantly, adolescence is a time in which mental health is a key concern and adolescents' rated importance of connection to nature and experience in green areas is associated with a reduction in psychosomatic mental health symptoms (Chawla, et al., 2014; Piccininni et al., 2018; Li et al., 2018; Van den berg et al., 2010).

Addressing this dip in nature connectedness for adolescents is an important focus. Providing opportunities for trips either through school or other youth groups as well as hosting regular group conservation work that allows young people to socialise while in nature are therefore important. Consideration should be taken of how to create social spaces in nature for adolescents that are a place to come together and relax. Often, many adolescents spend time outside through sporting activities, Nature-based sporting activities can increase nature connectedness levels (Eigenschenk et al., 2019) and so engaging sports clubs with nature challenges may be an important avenue to explore. Having facilities that enable adolescents to access nature in all kinds of weather is also important. Finally, providing opportunities to build in use of screens into an experience in order that adolescents can tap into online conversations (e.g., sharing of pictures) can allow connection of nature alongside developing online social networks. At the same time, family experiences are also essential, as young people can influence their younger siblings to connect with nature and influence parents' pro-environmental behaviour. Moreover, nature related family experiences can also form some of the most positive associations with nature (Lee & Burns, 2022).

3.4.3 Older Adults

Being in nature has been shown to have positive impacts on the health and wellbeing of adults (e.g., Tyrväinen et al., 2014; Van den Berg et al., 2010). In terms of older adults, accessing walkable green spaces appears to increase longevity (Takano et al., 2002) and access to neighbourhood green space appears to reduce physical decline (Dalten et al., 2016).

Being older is one of the key characteristics associated with reduced access to natural environments (Boyd et al., 2018). A typology of barriers to accessing woodland, indicated that for older adults the barriers included facilities, distance, transport, safety, not wanting to visit alone and mobility issues (Morris et al., 2011). Similarly in a review of the use of green spaces by the elderly, Wen et al (2018) concluded that older adults worry much more about mobility, accessibility and safety because they have to adjust their nature-based activities around changes in physical abilities. The elderly therefore have a high demand for safety and convenience facilities such as benches and restrooms (Hung & Crompton, 2006; Jorgensen & Anthopoulou, 2007). The existence of good path networks is therefore key, but these need to be well maintained as the condition of paths may limit use for older adults with limited mobility or who are afraid of falling (Sugiyama, Thompson, & Alves, 2009).

Concerns over safety can also explain why elderly people with close social networks have been found to visit green spaces more often than those who are socially isolated (Enssle & Kabisch, 2020), as the addition of friends or family can decrease feelings of vulnerability if there are health or mobility issues. Older adults also report on the importance of the social element of visiting green spaces (Lee & Burns, 2022).

Despite being less physically able to access nature, adults over the age of 50 rated observing nature as much higher in importance than younger age groups (Kuldna et al., 2020). Connecting with nature appears to be strongly influenced by getting older, with increased time available to spend in nature, but changing accommodation (downsizing, moving to retirement homes) impacting this as well as health conditions that reduce mobility and access (Freeman et al., 2019). Despite these barriers to accessing nature, older adults do show a clear desire to create opportunities to connect with nature and often relish the chance to do so (Freeman, et al., 2019).

3.5 Ethnicity

In the UK there is a strong relationship between ethnicity and use of green spaces with black and minority ethnic groups significantly less likely to use green spaces such as parks (Snaith 2016; Edwards et al., 2022a) or forests and woodland (Morris et al., 2011). This is cause for concern in of itself, but also given the known health and wellbeing benefits associated with feeling connected to nature and because it may impact longer term pro-conservation behaviours.

There has been some investigation into the causes of this disparity, mostly with a focus on access to green spaces. The main issues highlighted were lack of awareness of the spaces available, feeling unwelcome, a lack of facilities for social gathering as well as cultural attitudes (Morris & O'Brien 2011; Edwards et al., 2022a). Ethnic minority groups tend to use green spaces differently, with social connection being a much stronger factor that drives use (Slater 2022), with many ethnic minorities being more likely to use green spaces in groups rather than alone (Jay et al., 2012).

The disparity may also be driven by advertising and events in green spaces, as these rarely focus on, or are targeted at, ethnic minorities (Edwards & Larson 2022). For example, marketing of many natural spaces often uses “wilderness” imagery, and this has been shown not to appeal to Muslim communities in the UK because it does not embrace family-oriented and collectivist cultural values (Edwards et al., 2022a). It is also the case that some ethnic minority communities feel excluded from natural spaces, with this perceived exclusion arising from a set of barriers that impact functional use of spaces. These barriers include the imagery used about sites that often focuses on white individuals and relatively narrow ways of interacting with natural spaces (e.g., bird watching), lack of multi-use and multi-faith areas, lack of seating for larger groups, a lack of diversity within these spaces, concerns about safety and a lack of confidence in knowing how to interact with natural spaces (Edwards et

al., 2022). Many of these barriers can be addressed through community engagement that focuses on how to create and market a space in which more communities feel welcomed and invited to access nature, as well as inviting different communities to natural spaces and putting on activities that link to cultural events/celebrations (Edwards et al., 2022). Slater (2022) also found that community-based initiatives were an integral way through which barriers to accessing rural spaces were overcome. These initiatives helped overcome practical barriers (e.g., transport) but also social barriers.

3.6 Income

People with higher incomes and social status tend to have greater access to green spaces (Rigolon et al., 2018). For example, Li et al (2018) found that adolescents from a lower income background were exposed to places with lower concentrations of nature than other adolescents. Despite this however, socioeconomic status did not impact the positive impact of nature, in this case the positive impact nature can have on mood. An area of debate in the literature is the extent to which access to nature or greenspace can impact those from different socioeconomic backgrounds differently, and in particular whether it can reduce socioeconomic differences in physical and mental health. Some literature is supportive of this (e.g., Mitchell et al., 2015; McEachan et al., 2016., Wang et al., 2022). For example, Mitchell et al (2015) looked at large scale data over 34 European nations and showed that socioeconomic inequality in mental well-being was narrower when there was greater access to green space. However, Feng and Astell-Burt (2017) showed that, whilst there was evidence that green space improved health outcomes for children from 0-13 years old, this was not greater for those from disadvantaged areas.

In terms of nature connectedness the picture is also mixed. Richardson et al (2019) found nature connectedness was consistent across socioeconomic groups. In contrast Passmore et al (2020) found that those from more deprived areas had greater levels of nature connectedness whereas other research shows that children at fee-paying schools (a potential indicator of socioeconomic status) have greater nature connectedness than those at non-fee-paying schools (Price et al., 2022).

It might be expected that living in rural areas would provide a benefit for connecting with nature. Price et al (2022) did find that this was the case, although the effect was greater in primary schools. However, the RSPB (2013) did not find this relationship, and in fact found the reverse, suggesting that there are a number of complex factors involved in connecting with nature that do not simply depend on proximity to it.

Although the data is mixed, the one consistent finding is that those from a lower sociodemographic status have less contact with green space and nature, and thus consideration of how to provide accessible opportunities for this demographic to access nature is key.

3.7 Disability

Whilst accessing green spaces is highly valued and seen as very positive by those with disabilities (Corazon et al., 2019), accessing and use of forests and woodlands in Great Britain is proportionally lower for those with disabilities (Morris, 2011). Corazon et al (2019) found that access to the most pristine and untouched green spaces appear to be the most highly valued by those with mobility impairments, but also present the largest physical challenges in terms of access, with one interviewee in this study saying, *“I would really like to visit the forest but it is just too difficult”*. Like many, mobility impaired individuals also wanted to be able to access pristine green spaces in ways that did not compromise their

naturalness and highly valued being able to (e.g., using a wooden track to cross through sand dunes). They also reported the importance of sensory contact with natural spaces and to be able to get close enough to get the full sensory experience (e.g., to get to the shore to hear waves lapping or feel the water). Not being able to do this often led to feelings of exclusion. Even within urban parkland, disabled people see these as important spaces within which to connect to the self, to nature and to others and see them as vital spaces that can be uplifting and important for holistic health (Perry et al., 2021).

There are a range of factors that impact disabled people accessing nature, with consistent themes across multiple studies. Having appropriate access to transport to access woodland or forests (Morris, 2011), green spaces (Corazon et al., 2019) or urban parks (Perry et al., 2021) is a significant barrier to access. Disabled people are often reliant on others to facilitate access, such as family and friends, or mixed able bodied and disabled groups that organise activities. A central barrier to access is the amount of information about sites, with insufficient information about sites and their suitability (Morris, 2011), amenities offered (Perry et al., 2021) or webpages simply focusing on accessibility in relation to structures and not to paths (Corazon et al., 2019). Without sufficient information, disabled people are not able to plan appropriately in advance, which can feed into significant concerns around safety. Many disabled people have wide ranging factors that impact feelings of safety. For example, for mobility scooter users these include issues relating to structural design, visibility, sufficiency of space and other pedestrians (Guest et al., 2019, 2023). Within green spaces, having access to toilets, having frequent rest spaces (e.g., benches) and places to shelter from the elements is seen as vital (Perry et al., 2021) and signage saying where parking is, where facilities are and where the next rest space is allows disabled visitors to use spaces with confidence (Corazon et al., 2019).

Within natural spaces, areas can be made inaccessible by gates, stiles or poorly designed or maintained paths (Corazon et al., 2019; Morris et al., 2011; Perry et al., 2021) and alongside a lack of accessible facilities or inclusive design (e.g., lack of inclusive picnic tables) this can make disabled people feel excluded from these spaces and unsafe. Corazon et al (2019) found that often disabled people felt that in some spaces the value of aesthetics was promoted over accessibility. Whilst disabled people also want places to look natural they also need them to be accessible. Importantly, the principle of universal or inclusive design from the outset ensures these two things do not have to be traded off by having to make modifications to existing features. Grouix et al (2022) reviewed the extent academic literature in relation to making nature accessible in tourism and recreation and noted little evidence of accessibility related planning standards. Moreover, they also noted that whilst many barriers are physical and structural in nature, there are also barriers around service guidelines for supporting those with disabilities, and elsewhere others have reported the feeling that disabled people are not made to feel as if they belong in woodland spaces (Morris et al., 2011).

It is also important to note that a one size fits all approach toward accessibility within disabled populations (and indeed wider populations) is not appropriate. As what some users want, others do not (Corazon et al., 2019). For example, some disabled users want spaces in which they can be around others and feel safer, whereas others want to be able to be on their own or find that seeing others access nature in ways they cannot is stressful. Grouix et al (2022) also note that there is a bias towards thinking about nature as consumed through the visual sense, which alienates many disabled visitors. Similarly Morris et al (2011) note the bias about thinking about disability as a physical disability, and not enough being done to consider how non-physical forms of disability impact access to green spaces.

4. Recommendations

The following table sets out recommendations to improve accessibility and connection to nature.

Recommendations	
Meaningful Time	Meaningful connection with nature does not arise through simply spending time in nature it is about what is done during time spent in nature. It is important that sites are designed with the intention of facilitating connection with nature.
Pathways to Nature	Consideration of how to connect people with nature should always be through the five pathways to nature: contact, beauty, meaning, emotion, compassion. Sites should be designed to provide spaces that enable appreciation of beauty, that promote engagement with nature through multiple senses, that create emotional connections, that generate compassion for wildlife and that add meaning to concepts or ideas.
More than Education	Educating people about nature can enhance the experience of visitors, but it does not facilitate connecting with nature. Any educational content should be complemented or delivered through the pathways to nature.
Connection and Accessibility	<p>To connect with nature, visitors must be able to easily access it. All practical guidance on facilitating accessibility (see Section 2) should be considered in the design phase of a site so that accessibility is designed in from the outset.</p> <p>Whilst Section 2 provides information on general guidance, consideration should always be given to how to adapt spaces for different users. For example:</p> <ul style="list-style-type: none"> • Hides might need different height windows for different visitors (e.g., children or people using mobility equipment) • Some visitors may prefer open viewpoints, others (e.g., older adults, young families) may need viewpoints in which there is shelter from the elements. <p>Enhancing accessibility whilst also providing spaces for all visitors to connect with nature means providing a variety of spaces in which different groups that need different ways of connecting with nature can utilise. For example, some areas may focus on encouraging children to actively connect with and explore nature, other areas on creating peaceful spaces for those with impaired mobility to observe nature. Creating routes around a site for different users can facilitate different uses of the space.</p> <p>Sites should work alongside other local sites to complement what is on offer and not compete for the same visitors, to ensure wider demographics are reached.</p>

<p>Connection For All</p>	<p>There are some key ways in which all visitors can be primed to notice and connect with nature;</p> <ul style="list-style-type: none"> • Mindfulness spots where visitors are encouraged to stop and notice their surroundings, through colours, sounds, smells, or focusing on wildlife. • Sensory spots where visitors are encouraged to interact with nature in a sensory way and opportunities for this are designed in, such as the feel of sand, grass, tree bark or running water on feet or hands. • Beauty spots where visitors are encouraged to appreciate and describe the surroundings and how it makes them feel • Compassion spots in which visitors are encouraged to extend concern to wildlife and given opportunities to act in simple but effective ways to enhance wildlife. <p>Smartphone apps can be used to complement or extend upon information that primes people to notice nature.</p>
<p>Young Children</p>	<p>Promotion of challenge and mastering nature can create positive life-long associations with nature for young children. Where possible, this should be facilitated (e.g., climbing fallen trees, integrating nature into children's play areas, creating spaces with stepping-stones).</p> <p>Young children can be fascinated by nature if primed to notice it. Stimuli that make children think about the weather, or about the sensory detail of wildlife can help children engage positively with nature. Examples include</p> <ul style="list-style-type: none"> • Encouraging interaction with touchable or smellable plants • Having larger scale models or sculptures of wildlife (or fossils) that can be felt and explored. • Using viewing areas to point out key features of wildlife that children can observe and describe. • Listening to and describing recorded birdsong and identifying if they can hear it in the wild. • Asking children to describe the weather and seasons and how this relates to the landscape • Drawing challenges / activity sheets that help children notice and describe their surroundings
<p>Adolescents</p>	<p>Engage adolescents through school trips or making sites available in the evening for youth groups.</p> <p>Consider ways in which adolescents can get involved in maintaining sites in order that the site and its conservation become an important part of their social identity.</p> <p>Create social spaces to encourage adolescents to come together and make use of the site.</p> <p>Provide opportunities for online conversations (e.g., sharing of pictures, drawings) that can tap into and develop adolescents' online social networks.</p>

<p>Older Adults</p>	<p>Ensure that older adults can easily access the site by:</p> <ul style="list-style-type: none"> • Providing good quality paths that are well maintained and adhere to guidance on accessibility • Providing frequent rest spaces and shelters • Providing adequate toilet facilities throughout the site • Providing clear signage and maps that detail the routes throughout the site and which are appropriate for different users <p>Ensure that older adults feel safe around the site by providing good signage, clear routes and well-lit facilities.</p> <p>Ensure there are spaces for older people to come together as a group.</p>
<p>Ethnic Minorities</p>	<p>Engage ethnic minorities in the nearby community to see what would make them feel welcome at the site and want to use it.</p> <p>Engage in outreach to invite different communities into the site in ways that allow them to access activities they may not be familiar with (e.g., bird watching).</p> <p>Use marketing materials that appeal to a wide variety of backgrounds that include different ethnic minorities and feature use of spaces that goes beyond wilderness imagery.</p> <p>Consider multi-use sociable areas and multi-faith areas.</p>
<p>Socioeconomic Disadvantage</p>	<p>Whilst connecting with nature is not dependent on socioeconomic status, those from disadvantaged backgrounds have less contact with green space and nature. Outreach with the local community (e.g., community groups, schools) can increase access for these groups by introducing them to a safe, accessible space in which they can be prompted to connect with nature.</p>
<p>Disabled Users (also see the section on Older Adults)</p>	<p>Like all visitors, disabled visitors want to be able to connect with nature through their senses. Consideration should be given as to how to provide disabled visitors equal opportunities to do this, so they do not feel excluded.</p> <p>Consideration should be given to how to facilitate non-visual methods of connecting to nature.</p> <p>Consideration should be given to how to provide disabled users immersive experiences in nature without disturbing it.</p> <p>Consideration should be given as to how to train staff to support visitors who have different types of disability.</p>
<p>Variety, Change and Improvement</p>	<p>In order to get visitors to notice and connect with nature, the ways in which this is done cannot stay static. They need to change to enable users to get different things out of repeated visits to the site. For example, changes can be implemented with the changing seasons in terms of what visitors are asked to notice, or the parts of the site they are encouraged to spend time in.</p>

Through ongoing engagement with users from all backgrounds, accessibility and connectivity to nature can be improved.

Analysis on how the site is used by different users can facilitate ongoing development and usage of the whole site, creating more opportunities for users to connect with nature.

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