

Active engagement with trees, woods and forests

A review of the literature on motivations and barriers to volunteering, community ownership and other types of active woodland engagement.

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Table of Contents

Table of Contents	3
List of Figures	5
Executive summary	6
1 Introduction	14
1.1 Policy context	14
Table 1: Engagement in woodland volunteer activities	15
Table 2: Percentage of people in Wales stating willingness to participate in urban tree volunteering activities	16
1.2 Programme 3: Introduction	16
1.3 The search topic	17
1.4 Key search terms	17
Table 3: Search terms and topics of interest	17
1.5 A spectrum of engagement	18
1.6 Search strategy	19
Table 4: Numbers of publications after each screening stage	19
1.7 Report structure	21
2 What are peoples' motivations for visiting woodlands and forests?	22
3 Active engagement with trees and woodlands.....	23
3.1 Tree planting - Motivations.....	23
3.1.1 Receiving or requesting a free tree to plant	24
3.1.2 Taking part in tree planting programmes.....	25
3.2 Tree planting - Barriers.....	27
Table 5: Motivations and barriers to volunteering to plant trees	28
3.3 Tree stewardship - Motivations	28
3.4 Tree stewardship - Barriers	30
Table 6: Motivations and barriers to volunteering as a tree steward.....	31
3.5 Citizen science - Motivations.....	32
3.6 Citizen science - Barriers.....	33
Table 7: Motivations and barriers to engage in citizen science.....	34
3.7 Activism - Motivations	34
Table 8: Motivations and barriers to engage in activism	35

4	Very active engagement with trees and woodlands.....	35
4.1	Formal forestry education - Motivations	35
4.2	For forestry education - Barriers	36
	Table 9: Motivations and barriers to enrolling in forestry education.....	36
4.3	Community ownership or management of woodlands – Motivations for involvement.....	36
4.4	Community ownership or management of woodlands – Barriers to involvement.....	39
	Table 10: Motivations and barriers to involvement in community woodland ownership or management group	40
4.5	Membership of a tree committee - Motivations.....	40
	Table 11: Motivations to being a member of a tree committee	41
4.6	Professional involvement in citizen science - Motivations.....	41
4.7	Professional involvement in citizen science - Barriers.....	42
	Table 12: Motivations and barriers for professionals involved in citizen science programmes	42
5	Who does and does not volunteer?.....	43
5.1	Who does or does not engage in tree planting?.....	43
5.2	Who does or does not engage in tree stewardship?	44
5.3	Who does or does not engage in citizen science?.....	44
5.4	Who does or does not engage in activism?	45
5.5	Who does or does not enrol in forestry education?	45
5.6	Who does or does not volunteer on a tree committee?.....	45
5.7	Who does or does not become a forestry professional?	46
	Table 13: Who does and who does not actively engage with trees, woods and forests?.....	46
6	Conclusions & evidence gaps	47
6.1	Key findings	47
6.1.1	Motivations.....	48
6.1.2	Barriers.....	49
6.1.3	Who does or does not engage?	50
6.2	Gaps in the evidence	51
6.3	Concluding points.....	52
7	References (the studies reviewed).....	52

8 Other references57

List of Figures

Figure 1: Publications reviewed; by country and activity7
Figure 2: Spectrum of woodland engagement activities..... **Error! Bookmark not defined.**
Figure 3: Year of publication of reviewed studies**Error! Bookmark not defined.**

Executive summary

In the proposal for Forest Research's core funded [Programme 3](#) – "Societal benefits of trees, woods and forests" - is a requirement to carry out a review into how people can be encouraged to move from using trees, woods and forests for recreation or sport, to a more active form of engagement such as volunteering and management. The interest is in how to develop pathways and support for people through appropriate guidance and other interventions to facilitate this.

This review has investigated the motivations and barriers that are relevant to different groups of people when seeking to engage with trees, woods and forests. This understanding is vital for designing support and interventions for encouraging more people to actively engage.

Having drawn up a 'spectrum of engagement' activities from volunteering to plant trees, through to professional involvement in forestry, among others, a search strategy was designed utilising key terms and relevant sub-topics. This was used in a search of the literature using Scopus (a database of academic literature and other publications) and consultation with topic experts which resulted in 40 relevant publications published from 2002 to 2023. Figure 1 shows the distribution of the reviewed publications across activities and country of study. Studies conducted in the United Kingdom (UK) span four activities, namely citizen science, tree stewardship, professional involvement in citizen science, and community ownership. Additional evidence is drawn from other countries, notably the USA, Canada, and a number of European countries.

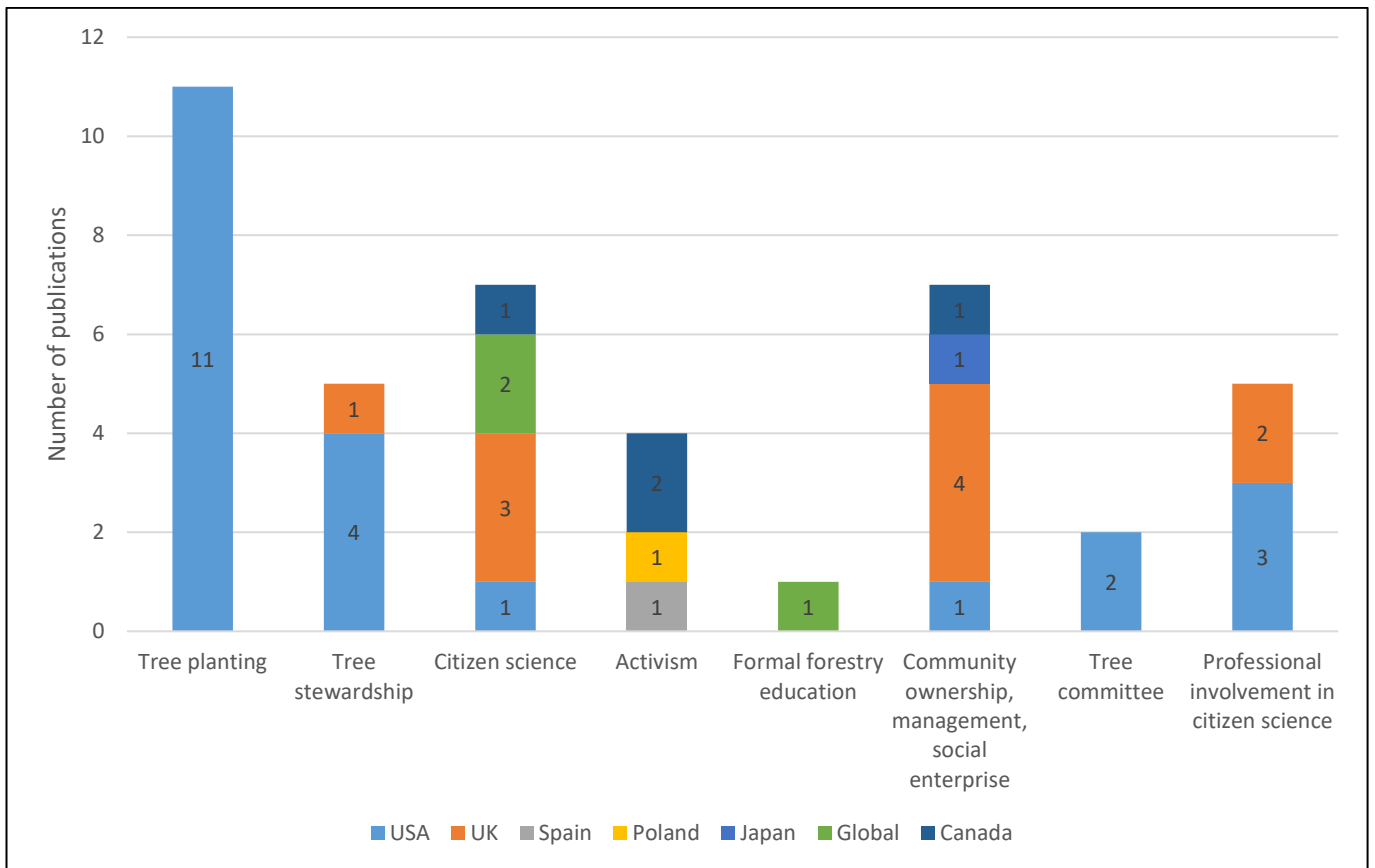


Figure 1: Publications reviewed; by country and activity

A wide range of motivations and barriers were revealed by the review, and in many cases these were specific to particular activities. The findings are therefore summarised in the following tables, each with a focus on a different activity: tree planting, tree stewardship, citizen science, activism, formal forestry education, community ownership/ management of woodlands, membership of a tree committee¹, professional involvement in citizen science.

¹ These involve a group of citizens voluntarily coming together to provide community input into tree management decisions, usually in urban areas.

Tree planting

Motivations	Barriers
<ul style="list-style-type: none"> - Trees have an aesthetic value - Trees provide environmental benefits - Trees provide ecosystem services e.g. shade - Desire to replace previously removed trees - People may be influenced to plant a tree if it is free - Trees provide community benefits (e.g. educational opportunities for children) - Feelings of enjoyment - Social interaction - Knowledge acquisition - Beneficial for personal health - Extrinsic motivations (community service or work requirements, school credit) - Social and cultural heritage 	<ul style="list-style-type: none"> - Trees might have disservices (e.g. damage from roots) that could cost financially - Negative past experiences with tree removal or maintenance - Lack of input in decision-making - Do not own the land being planted on - Lack of space - Unaware of tree planting activities or how to get involved

Tree stewardship

Motivations	Barriers
<ul style="list-style-type: none"> - Enjoy working outside or in nature (linked to childhood experiences in nature) - Opportunity for physical activity, exercise or to do something different - Taking part as a hobby - Able to learn or gain experience in new skills - Meet and interact with others or get to know neighbours - Contribute to environmental restoration - Help local neighbourhood (e.g. beautification) - Want to help by donating time rather than money - Increase property value 	<p><i>Barriers to initial involvement:</i></p> <ul style="list-style-type: none"> - Concerns around who tree maintenance costs would fall on - Time constraints - Physical access difficulties - Travel costs - Feeling that maintenance should not be their responsibility - Lack of awareness of opportunities to get involved - Lack of awareness of the benefits trees provide - Lack of confidence to get involved in the activities or work with others <p><i>Barriers to continuation:</i></p> <ul style="list-style-type: none"> - Frustrations around lack of equipment, inability to voice concerns and lack of organisation and planning of activities - Mundaneness of some tasks - Lack of involvement from others of a similar age - Lack of feedback prevented continued enthusiasm

Citizen science

Motivations	Barriers
<ul style="list-style-type: none"> - Learn new knowledge or skills - Protect the environment - Protect themselves from negative feelings (e.g. environmental concern) - Social benefits of participation - Personal values - Participation is interesting/fun/enjoyable - Appreciation and recognition motivate continued involvement 	<p><i>Barriers to continuation:</i></p> <ul style="list-style-type: none"> - Not finding any pests or diseases to report (null findings) - Need for additional training - Lack of IT support - Disappointment in lack of collaboration with other volunteers - Lack of feedback - Dissatisfied with their small role

Activism

Motivations	Barriers
<ul style="list-style-type: none"> - Wanting to stop tree felling - Wanting to see an increase in forest protection - Wanting to alert the public to tree felling - Desire to stop an activity considered to be environmentally damaging - Concern for the environment - Fears about environmental damage 	<ul style="list-style-type: none"> - No barriers identified in this review

Formal forestry education

Motivations	Barriers
<ul style="list-style-type: none"> - Enjoy wildlife, nature in general, outdoor recreation and being outdoors - Anticipation of job satisfaction - Concern for the environment - Interest in subject material 	<ul style="list-style-type: none"> - Concerns around future earning potential - Availability of funding or scholarships for degrees - Concerns around contentious political issues in the sector

Community ownership or management of woodlands

Motivations	Barriers
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<ul style="list-style-type: none"> - Want to provide space for public to use for recreational activities - To ensure protection of local water supplies - Prevent anti-social behaviour - Ensure woodland is safe and visually appealing - Protect the land as a cultural asset - Want to preserve the woodland, the environment or wildlife - Economic benefits e.g. timber production to boost local economy or job opportunities 	<ul style="list-style-type: none"> - Low timber value makes finding resources for woodland management difficult - Grant schemes are difficult to access and funding given is insufficient - Lack of support from councils and community members linked to austerity - Trade-offs between financial, environmental and social objectives - Challenges sourcing skilled staff
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Membership of a tree committee

Motivations	Barriers
<ul style="list-style-type: none"> - Personal interests in management of local urban forests - Professional experience or credentials in related fields - To gain career-related experience or seek out career opportunities - Express altruistic values by helping contribute towards humanitarian issues 	<ul style="list-style-type: none"> - No barriers found in the review

Professional involvement in citizen science

Motivations	Barriers
<ul style="list-style-type: none"> - Want to spend time outdoors - Have an interest in tree health - Motivated by enthusiasm of volunteers - Want to develop their skills - Share their passion and knowledge with others - Help the volunteers - Interest in the environment - Make use of relevant educational and professional backgrounds to help protect environment - Develop plant health capacity - Contribute to the greater good of protecting forests and trees 	<p><i>Barriers to continuation:</i></p> <ul style="list-style-type: none"> - Too much time and commitment required - Difficulty sustaining a work-life balance - Poor quality data produced - Work has little policy impact - Lack of recognition - Deficits in knowledge exchange between partners and professionals - Difficulties sourcing funding

Certain similarities were identified in the motivations to visit a woodland and the motivations to engage in other activities such as volunteering. For example, the aesthetics of environments with trees in them, for enjoyment, and for physical health and exercise are all motivations for both recreational and volunteering activities in relation to trees, woods and forests. This is positive where the aim is to encourage more people to engage in additional voluntary activities, as it suggests that the pathway to additional engagement can be focused on motivations that people already have for connecting with trees, woods and forests.

The review also uncovered some evidence about the characteristics of individuals more or less likely to engage in the range of activities considered, although the evidence was not always consistent. These are summarised in the table below.

Engagement type	Who does or does not engage?
Tree planting	<ul style="list-style-type: none"> - Higher income residents with degrees, those who identify as white, and people living in detached houses are more likely to participate. - Volunteer tree planters are likely to have high levels of pro-environmental behaviour, environmental awareness and personal efficacy. - Those in older homes, those who have lived in their home for less time, and those who already have street trees are more likely to engage in volunteer tree planting.
Tree stewardship	<ul style="list-style-type: none"> - Some evidence that volunteers are likely to be middle-aged, white, women and have lived in an area for over a decade. - Contradictory evidence regarding the connection between home ownership status, income and education levels and likelihood of engagement in voluntary tree stewardship activities. - Characteristics such as community engagement, stewardship-related self-efficacy and an awareness of the benefits of trees may be important for motivating engagement.
Citizen science	<ul style="list-style-type: none"> - Some evidence that those without degrees are less likely to be citizen scientists, while white people are more likely to be so. - Contradictory evidence with regard to whether males are more or less likely to engage in citizen science volunteering for trees. - Urban and rural dwellers equally likely to be engaged in this activity. - Childhood experiences may predict engagement later in life.

Activism	<ul style="list-style-type: none"> - Evidence that activists are more likely to be young. - Males and females equally likely to be engaged in this activity. - More likely to come from urban or peri-urban areas than rural areas. - Membership of an environmental organisation and biocentric value orientations may positively predict activism involvement.
Education	<ul style="list-style-type: none"> - Women and ethnicities other than white people less likely to enrol in forestry and related natural resources degrees compared to white males (limited evidence).
Membership of a tree committee	<ul style="list-style-type: none"> - Evidence that the average member is a white, well-educated, male in their 50s (limited evidence).
Professional involvement in citizen science	<ul style="list-style-type: none"> - Childhood engagement in citizen science and nature may influence later career decisions.

There are a number of gaps where this review did not find any evidence, or only limited evidence, and these are presented here to demonstrate where additional research may be of value.

- Limited evidence was found in this review relating to the motivations for, and barriers to, enlisting in formal forestry education, membership of tree committees or involvement in tree-related activism.
- Regarding volunteering to plant trees, the evidence identified by this review is from the USA. Hence there is scope to investigate motivations and barriers for citizen/resident engagement in volunteer tree planting programmes specifically in the UK.
- Searches for this review found relatively little evidence regarding the barriers to engagement in the relevant activities, particularly in relation to initial engagement (when compared to the amount of evidence relating to motivations).

- While this review identified some studies that considered who does and does not engage in the various activities, there is scope for further investigation of the importance of socio-demographic variables (e.g. gender, ethnicity, age) and socio-psychological variables (e.g. value orientations, childhood engagement with nature, environmental concern).

1 Introduction

1.1 Policy context

There is a drive from governments across Great Britain to encourage more people to volunteer and get actively engaged in activities in the natural environment, beyond recreation. There is a particular emphasis on volunteering and community engagement in woodlands. The Welsh Government, in their Strategy for Woodlands and Trees (2018), notes that there is a range of well-being benefits to be gained from environmental volunteering opportunities in woodlands and other treed areas. They refer specifically to the improvements in community cohesion and increases in social capital to be gained through community action and volunteering in urban woodlands. Further, they note that “community involvement in woodland management and use can build social cohesion and support local development” (p25). Hence, they stress the importance of encouraging greater community involvement in woodland, through management agreements, social enterprises, and collaboration between government and communities, to realise public and well-being benefits.

One of the Scottish Government’s priorities in ‘Scotland’s Forestry Strategy’ is to engage “more people, communities and businesses in the creation, management and use of forests and woodlands” (Scottish Government, 2019). The strategy goes beyond the idea that it is important for individuals to volunteer, for example, in tree planting activities, and emphasises that it is important for communities to be involved in decisions, management and ownership of woodlands and forests. They see this as an important route to greater empowerment of communities.

In England, the UK government has previously stressed the importance of increasing the engagement of members of the public and the wider voluntary sector in trees and woodland creation. The England Trees Action Plan (UK Government, 2021) outlined the Government’s desire to see an increase in people planting and

managing trees, and states that they will “engage more people in woodland creation” (p32).

Evidence from the Public Opinion of Forestry Surveys (POFS, 2023) demonstrates the current low levels of engagement with a range of woodland volunteer activities (Table 1). However, additional evidence suggests a much higher willingness to engage in Wales (Table 2).

Table 1: Engagement in woodland volunteer activities

Activity	% engaged	Country
Been involved in an organised tree planting event	4%	UK
Been involved in an organised tree planting event	4%	England
Been involved in voluntary work in connection with a woodland	3%	UK
Been involved in voluntary work in connection with a woodland	4%	England
Become or are a member of a community-based woodland group	3%	UK
Become or are a member of a community-based woodland group	3%	England
Been involved or consulted about plans for creating/managing or using woodlands in my area	3%	UK
Been involved or consulted about plans for creating/managing or using woodlands in my area	3%	England
Attended a guided walk or talk (woodland)	8%	Scotland
Attended a school visit (woodland)	6%	Scotland
Attended an event at a woodland visitor centre	6%	Scotland
Attended another (woodland) learning event	7%	Scotland
Involved in voluntary work (woodland)	13%	Wales

Member of a community-based woodland group	10%	Wales
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Source: POFS 2023

Table 2: Percentage of people in Wales stating willingness to participate in urban tree volunteering activities

Activity	%
Participate in community planting programmes	40%
Raise concern with LA if notice a problem with trees	38%
Plant or tend trees in garden or communal outside area	38%
Water newly planted trees in public areas	32%
Monitor health and condition of public trees	22%
Accept higher council tax to be used for community tree programmes	12%

Source: Wales POFS 2023

Given the strong policy ambitions from across Great Britain, and the relatively low current engagement, this review has sought to present greater understanding of the evidence around what motivates people to engage in activities related to trees and woodlands, beyond visiting a woodland. Understanding the drivers and barriers to involvement is crucial if effective mechanisms and support are to be designed and implemented by the three governments to encourage more active engagement.

1.2 Programme 3: Introduction

Programme 3, one of seven Forest Research Core Funded Programmes, is called 'Societal Benefits' and focuses on the wider societal wellbeing benefits of, and relationships with, trees and woodlands to explore how these change across the urban-rural continuum and over time. Crucially, the programme aims to investigate

how best to maintain and improve the delivery of these benefits as new treescapes are being created, and existing ones expanded.

Programme 3 has two work areas (WA). This review report is an output for WA1: “Societal perspectives on and engagement with urban, peri-urban and rural treescapes”.

1.3 The search topic

The review considers evidence that has investigated what motivates people to engage with trees, woods and forests, beyond woodland visits for leisure, recreation or sport, and what barriers exist to such engagement. The full review question is as follows: *“What motivates people to actively engage with trees, woods and forests, and what are the barriers?”*

1.4 Key search terms

To help structure the search strings for this evidence review the following search terms were compiled and discussed (Table 3). These terms were broken down into population (who); pathway/mechanism (how); place (where); and activity (what). The ‘Activity’ column was further developed to provide the spectrum of engagement presented in Figure 2 below. Note that not all terms were included in the search strings but rather were used to assist the authors when structuring the strings and later when sifting publications by providing guidance for inclusion/exclusion.

Table 3: Search terms and topics of interest

Population (who?)	Pathway/ Mechanism (how?)	Place (where?)	Activity (what?)	
Public Resident Household Visitor Tourist People Children	Motivations Opportunities Promoting Encouraging Fostering Barriers Programme	Tree* Wood* Forest* Hedge*	Volunteering Voluntary action Charity Citizen science Pro-environmental behaviour	Ownership Management Training Education Membership Stewardship

Students	Policy Funding Pathways		Pro-social behaviour Civic service Activism Advocacy Campaigning Decision-making	Community action Community engagement Community acquisition
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1.5 A spectrum of engagement

O'Brien et al (2008) identified levels of 'access' to woodlands, starting with level 0 which represented experiencing woodland through visual or virtual means such as an image or a memory, through to level 6 which was ownership or management of woodland. In their reasoning for such a typology they explained that different levels of 'access' will likely provide people with different experiences and benefits. To consider the different ways in which people might engage with woodlands, beyond recreation, this review utilises a spectrum of engagement from less active to very active (Figure 2). Similar to O'Brien et al (2008), the different parts of the spectrum can be expected to result in different benefits to participants and also, significantly, will require more or less commitment and effort from participants.





Figure 2: Spectrum of woodland engagement activities

1.6 Search strategy

The items and terms in Table 3 and the activities from Figure 2 were used to construct search strings. A twofold approach was applied: the use of Scopus (the largest abstract and citation database of peer reviewed literature) for structured searches; and expert consultation for other references, including grey and unpublished literature. Scopus searches were limited to searching within the 'title, abstract, key words'. Additional restrictions were applied. These were: publication year 2000 onwards; a filter by subject area - limited to: social sciences, environmental science, agricultural and biological sciences, earth and planetary sciences, arts and humanities; and language - limited to English.

Having run the searches using seven search strings, hits were sorted by relevance and the first 100 titles and abstracts were exported to Excel for each search. Titles, abstracts and full texts were read in stages with publications being excluded at each stage if they were not considered relevant. The filtering task at title and abstract stage was carried out by two members of the project team, independently, and any discrepancies subsequently discussed. Table 4 shows how many studies remained after each filtering stage once agreement on exclusion/inclusion was reached. There were 75 publications taken through to full text reading and this resulted in 33 final publications for inclusion. To those were added an additional seven publications after consultation with subject experts.

Table 4: Numbers of publications after each screening stage

	After reading titles (no of	After reading abstracts (no	After reading full papers (no of relevant studies)

	relevant studies)	of relevant studies)	
Scopus search			
1	51	30	14
2	44	15	4
3	37	15	6
4	5	3	1
5	13	5	5
6	0	0	0
7	7	7	3
Additional literature from expert consultation	-	-	7
Total number of studies	157	75	40

Figure 3 shows the publication dates of included publications and demonstrates an increase in relevant publications over time, particularly from 2018 onwards.

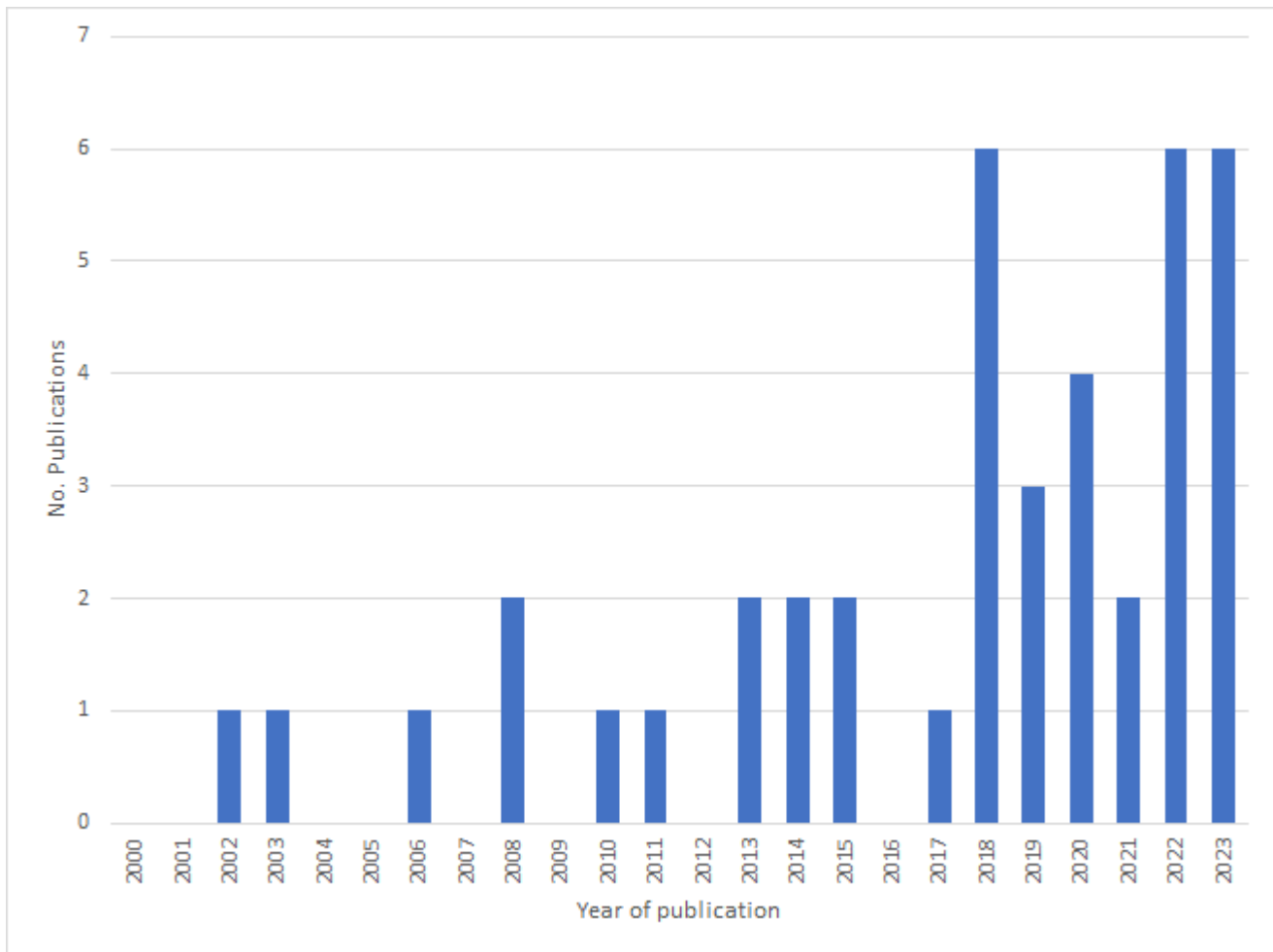


Figure 3: Year of publication of reviewed studies

1.7 Report structure

The report is structured as follows. The next section briefly presents some information from previous studies as to what motivates people to visit woods and forests for leisure, recreation or sport. Following that, and using the 'spectrum of engagement' presented above, section 3 begins to address the motivations (and barriers) that people have for engaging (or not) in some of the more active woods and forests engagement activities, such as tree planting and citizen science. This is followed by section 4 which covers the most active engagement activities such as education choices, professional roles, and community management and ownership of woodlands and forests. Section 5 presents findings from the review about who does and does not engage in volunteering and other activities. Finally, section 6

summarises the findings of this review, including identifying gaps in the evidence, and presents some final conclusions.

2 What are peoples' motivations for visiting woodlands and forests?

There is some evidence in the existing literature regarding the reasons people choose to visit woodlands and forests, or greenspaces more generally. This may provide useful comparison when considering why people engage with activities relating to trees, woods and forests which go beyond a visit.

In Wales in 2023, the Public Opinion of Forestry Survey (POFS) (Forest Research, 2023) presented a wide range of options regarding peoples' reasons for choosing to visit woodlands. Based on a sample of 753 people, the POFS found that the woodland being at a convenient distance was a strong motivator for many people (71%). The fact that they found it to be peaceful and quiet was a motivator for 60%, and attractive scenery motivated 50%.

In England, the People and Nature survey (PANS) (Natural England, 2023) found that in 2022-23, from a sample of 4450 people, 56% visited a 'green and natural space' to get some fresh air, and 51% were motivated to visit to get some physical health and exercise.

A further survey, also in England in 2023, carried out by Forest Research, asked a sample of 2000 people what was their main reason for a visit to the countryside or greenspace (Hall et al, 2024). Similar to the PANS results the largest percentage (33%) said for physical health and exercise. The next most frequently mentioned reason was for mental health and well-being (19%). The Welsh POFS survey found that 41% said they visited a woodland because it was a good place to unwind or de-stress. The English PANS found that 36% visited a green and natural space for mental health and well-being.

To sum up, reasons stated as being a motivation for visiting woodland, according to these surveys, include:

- woodland being at a convenient distance,
- finding it to be peaceful and quiet,
- attractive scenery,
- to get some fresh air,
- to get some physical health and exercise,
- for mental health and well-being,
- and as it is a good place to unwind or de-stress.

In the following sections evidence is presented relating to more active engagement with trees, woods and forests, that goes beyond visiting.

3 Active engagement with trees and woodlands

Motivations to become more actively engaged with trees and woodlands may be similar or different to those which motivate people to visit trees, woods and forests. In the following sections these motivations (and barriers) are reviewed, firstly, in relation to tree planting volunteer activities.

3.1 Tree planting - Motivations

Several studies explored the motivations of those involved in tree planting activities, where people, usually residents, volunteer to help plant a tree in the local area, including accepting a free tree or requesting a tree to plant. Individuals say they volunteered for a variety of reasons, and these are not always consistent across studies.

3.1.1 Receiving or requesting a free tree to plant

With land managers in many locations seeking to increase tree canopy cover, initiatives to plant trees on both public and private land are common. Among these are initiatives which provide free trees for residents to plant on their properties or that allow residents to request a tree to be planted for free on their street. Several of the studies that were identified explored the motivations for requesting or accepting a free tree to be planted. The aesthetic value trees provide to their property, or to their neighbourhood is particularly important in motivating people to accept or request a free tree to plant (Morgan & Ries, 2022; Geron et al. 2023; Locke et al. 2015; Conway et al. 2023). For example, in a study in Philadelphia (USA), perceptions that trees would improve the look of their property was a highly motivating factor in accepting and requesting free trees being given out as part of a green infrastructure programme (Conway et al., 2023). Additionally, trees provide a range of environmental benefits, such as provision of habitat for wildlife and carbon sequestration, and recognition of these benefits often motivates people to accept a free tree (Morgan & Ries, 2022; Geron et al. 2022; Locke et al. 2015). Where people recognise the wider ecosystem services that trees provide, such as shade, this can also motivate the acceptance of free trees (Geron et al. 2023; Conway et al. 2023).

Another motivation for requesting free street trees is a desire to replace previously removed trees (Locke et al, 2015) suggesting that residents are keen to see canopy cover maintained by seeking replacement trees when some are lost or removed.

Many studies assessed the impact of trees being free on participants' motivations for accepting them. This factor did not act as a key motivator, with this being infrequently mentioned, or not mentioned at all by participants (Morgan & Ries, 2022; Geron et al. 2023; Locke et al. 2015; Conway et al. 2023). However, when prompted, 85% of residents indicated that this did impact their decision to accept a tree for planting, suggesting this factor may have some underlying influence (Morgan & Ries, 2022).

The motivations that prompt people to accept or request trees to plant may also affect the extent to which they subsequently care for those trees, and hence impact likely survival rates. Residents who accepted trees for their aesthetic or ecosystem service benefits were more likely to care for their trees than those who accepted the tree for their environmental benefits (Geron et al., 2023). Those motivated by environmental factors to plant a tree may be more likely to have a 'let nature take care of itself' attitude, reducing the likelihood of carrying out after-care.

Overall, residents who request or accept a free street tree are commonly motivated by the aesthetic value they believe the trees will provide, as well as by their ecosystem and environmental benefits. Residents may be less motivated to request or receive a tree simply because it is free.

3.1.2 Taking part in tree planting programmes

Some of the studies explored the motivations for taking part in tree-planting programmes. These programmes typically take place in urban or peri-urban areas and include events where members of the local community come together to voluntarily assist with tree-planting. A number of motivations were identified. Firstly, participants reported an appreciation of the environmental benefits trees provide and thus saw the planting event as a means of delivering these (Moskell et al. 2010; Pike et al. 2020; McNamara et al. 2022). For example, Pike et al. (2020) found that a desire to help the environment made up 16% of the total reported motivations for volunteering at a CommuniTree tree-planting event in the US. An appreciation for nature made up an additional 13% of responses.

Volunteers at tree-planting events also cite a desire to deliver benefits to the community or neighbourhood as a motivation for their involvement (Pike et al. 2010), including wanting to provide benefits to the local youth (Moskell et al. 2010) and to make the neighbourhood more attractive (McNamara et al. 2022). Hence, volunteers cite the educational opportunities the trees may bring for children as a

motivator (Moskell et al., 2010). Others appreciate the aesthetic value of trees, and choose flowering species to plant (McNamara et al., 2022).

Other important motivators for those taking part in tree-planting events are a feeling of enjoyment from planting the trees (Moskell et al. 2010; Pike et al. 2020); seeing the events as an opportunity for social interaction or knowledge acquisition (Pike et al. 2020) and believing that taking part would be good for their own health (McNamara et al. 2022).

Some immigrant volunteers have been found to be motivated by a desire to live in green areas similar to where they used to live so that they could regain the benefits trees provided to them growing up (Riedman et al (2022). Individual factors, such as residents' cultures, therefore, are also important in motivating people to participate in tree planting activities.

While these intrinsic motivators are important, extrinsic factors also feature. For example, some volunteers may have to take part in tree planting as part of their community service requirements (Moskell et al. 2010), to gain school class credits or as a work requirement (Pike et al. 2010).

There is some evidence that the motivations of community leaders who are responsible for organising tree planting events in their local areas are somewhat consistent with those of the volunteer tree planters themselves (Riedman et al, 2022). Hence, volunteer community leaders are driven by an expectation of community benefits, such as reductions in violence and mental health in the area, benefits they believe may arise because tree planting events helped communities communicate and come together.

To sum up, understanding the environmental and community benefits trees provide is a key motivator for volunteers and community leaders involved in tree-planting, and overall, they are motivated by a broad range of both intrinsic and extrinsic factors.

3.2 Tree planting - Barriers

Some studies also identified a range of barriers to people volunteering to plant trees in their local area. One such barrier is concern around the potential dis-services the planted trees may bring (Morgan & Ries, 2022; Riedman et al. 2022). Residents and businesses can be fearful of accepting free trees to plant because they believe that the trees could cost them financially in the future through having to pay for repairs arising from root damage, or incurring liability costs (Riedman et al., 2022).

Individuals also have prior experiences which have created negative perceptions of or attitudes towards new trees. Some individuals are reluctant to invest resources in new trees if they have witnessed developers remove trees previously and fear it could happen again, hence wasting time and effort (Riedman et al., 2022).

Additionally, when residents have previously seen trees not being maintained and hence detracting from the appearance of the neighbourhood, this can be a reason to refuse receipt of a free tree for planting (Carmichael & McDonough, 2019).

When residents do not have any input into decisions about the species choice and maintenance responsibilities of new tree planting this can result in refusal to accept free trees for planting (Carmichael & McDonough, 2018).

When residents feel satisfied with the numbers of trees in their local area this can act as a barrier to volunteering to plant new trees (Morgan & Ries, 2022). Other barriers include concerns from residents who do not own their properties, that they do not have the authority to plant a tree on the land (Morgan & Ries, 2022), concerns around lack of space for planting trees, and not knowing about the tree planting activities or how to get involved (Conway et al. 2023).

To sum up, there are a variety of reasons that may prevent individuals from participating in tree-planting activities, including the concerns that individuals may have around the potential dis-services of trees, negative historical experiences of planted trees, and a lack of involvement in decision making.

The motivations and barriers discussed in these two sections are summarised in table 5.

Table 5: Motivations and barriers to volunteering to plant trees

Motivations	Barriers
<ul style="list-style-type: none"> - Trees have an aesthetic value - Trees provide environmental benefits - Trees provide ecosystem services e.g. shade - Desire to replace previously removed trees - People may be influenced to plant a tree if it is free - Trees provide community benefits (e.g. educational opportunities for children) - Feelings of enjoyment - Social interaction - Knowledge acquisition - Beneficial for own health - Extrinsic motivations (community service or work requirements, school credit) - Social and cultural heritage 	<ul style="list-style-type: none"> - Trees might have disservices (e.g. damage from roots) that could cost them financially - Negative past experiences with tree removal or maintenance - Lack of input in decision-making - Do not own the land being planted on - Lack of space - Unaware of tree planting activities or how to get involved

3.3 Tree stewardship - Motivations

Studies also explored the motivations of those taking part in activities aimed at looking after or maintaining trees (or the area around trees) after their planting (e.g. watering, pruning, mulching, leaf clearance, erecting fences). These studies include stewardship behaviours of residents with street trees outside their homes, individuals volunteering in activities at, for example, environmental charity sites, and volunteers involved in stewardship activities at a broader neighbourhood scale. Two of the studies included here involve tree planting alongside stewardship activities but are included in this section as after-care and maintenance behaviours are the main activities participants were involved in.

A range of motivations were identified for engagement in tree stewardship activities. Firstly, volunteers noted that they enjoy working outside or in nature and that taking part in tree stewardship activities facilitated this (Austin, 2002; O'Brien

et al. 2008). In some cases this motivation type stems from childhood experiences in nature (O'Brien et al., 2008). That is, spending time in natural environments as a child may create an appreciation for spending time in them in later life, and this may drive individuals to volunteer within them.

Studies also identified recreational motivations for volunteering in stewardship activities. These include wanting to take part in physical activity and exercise (Austin, 2002; O'Brien et al. 2008; Elton et al. 2023); wanting to do something different (O'Brien et al. 2008) and taking part as a hobby (Austin. 2002). A need for getting outside to exercise is reported particularly by older, retired people (O'Brien et al., 2008).

In some instances, those involved in tree stewardship activities were provided with knowledge or skills-based training to help them undertake the work and this proved to be a motivation. In some cases this was an opportunity to learn or gain experience in new skills directly related to tree maintenance, such as how to identify invasive species, or in other cases there was an opportunity to learn other transferable skills such as how to perform first aid in emergencies (O'Brien et al. 2008).

Individuals also cited social reasons for taking part in tree stewardship activities (Austin, 2002; O'Brien et al. 2008; Elton et al. 2023). Many of the tree stewardship activities described in these studies involved working in groups to maintain trees or areas with trees and this provided opportunities for individuals to meet and interact with others. In a neighbourhood context, tree maintenance activities can provide participants with a means to get to know their neighbours and this can be a motivation for getting involved (Austin, 2002).

Individuals are also motivated by environmental and altruistic values and tree stewardship activities are a means to contribute towards environmental restoration (O'Brien et al. 2008; Elton et al. 2023) or to help their local neighbourhood, for example, through beautification of the local area (Austin, 2002).

Financial motivations have also been identified for involvement in tree stewardship activities. Individuals felt that taking part in tree stewardship and after care would help to cut energy costs, by cooling their homes and thus reducing use of air conditioning, or they felt that planting and looking after trees would add to the appeal of the local area and increase the value of their property (Elton et al., 2023).

Overall, those engaged in tree stewardship activities are motivated by a range of reasons. Taking part in such activities provides opportunities for recreation, learning, skills acquisition, socialisation and environmental protection and improvement, as well as a chance to contribute to environmental care while potentially saving money.

3.4 Tree stewardship - Barriers

Several barriers to involvement with tree stewardship activities were reported across studies. For some, volunteering presents costs which prevent involvement. For example, some individuals are concerned that the costs of tree maintenance (e.g. watering the trees) might fall on them personally (de Guzman et al. 2018) or felt that taking part would be too costly in terms of their time (Elton et al. 2023). Such concerns act as barriers to involvement. Additionally, accessing the areas where volunteering activities such as tree stewardship takes place can sometimes be difficult for people, and there may be costs associated with travelling to these areas (O'Brien et al., 2018). These, for some people, act as barriers to participation. Other barriers include: some people consider that the maintenance of newly planted trees is not their responsibility and should instead be the role of authorities (de Guzman et al., 2018); a lack of awareness of the opportunities to get involved (O'Brien et al. 2008); a lack of awareness around the benefits trees provide (Elton et al. 2023); and a lack of confidence to either get involved in the activities or to meet others involved (O'Brien et al. 2008).

Even if people get involved in tree stewardship volunteering tasks there may be factors which prevent them staying involved. People can experience frustration, for example, if there is a lack of appropriate equipment available to complete tasks; or if they feel unable to voice concerns or raise issues (O'Brien et al., 2008). There can be other frustrations relating to the perceived lack of organisation and planning around the tasks needing completion; or the mundaneness of some tasks; or the lack of feedback from organisers regarding volunteers' performance. Such frustrations make it difficult for volunteer tree stewards to stay enthusiastic about the volunteering and thus are barriers to their continued involvement (O'Brien et al, 2008).

The motivations and barriers presented in these two sections are summarised in Table 6.

Table 6: Motivations and barriers to volunteering as a tree steward

Motivations	Barriers
<ul style="list-style-type: none"> - Enjoy working outside or in nature (linked to childhood experiences in nature) - Opportunity for physical activity, exercise or to do something different - Taking part as a hobby - Able to learn or gain experience in new skills - Meet and interact with others or get to know neighbours - Contribute to environmental restoration - Help local neighbourhood (e.g. beautification) - Want to help by donating time rather than money - Increase property value 	<p><i>Barriers to initial involvement:</i></p> <ul style="list-style-type: none"> - Concerns around who tree maintenance costs would fall on - Taking part might take too much time - Physical access difficulties - Travel costs - Feeling that maintenance should not be their responsibility - Lack of awareness of opportunities to get involved - Lack of awareness of the benefits trees provide - Lack of confidence to get involved in the activities or work with others <p><i>Barriers to continuation:</i></p> <ul style="list-style-type: none"> - Frustrations around lack of equipment, inability to voice concerns and lack of organisation and planning of activities - Mundaneness of some tasks - Lack of others of a similar age - Lack of feedback prevented continued enthusiasm

3.5 Citizen science - Motivations

A significant number of studies also explored the motivations of those engaged in tree-related citizen science programmes. These programmes tend to involve members of the public voluntarily assisting professional scientists by collecting data for use in research, reporting or monitoring. Relevant citizen science programmes largely focus on tree health matters, such as identifying tree pests and diseases.

A wide range of motivations for volunteering in citizen science projects were identified across studies. A common motivator was a desire to learn something new or be educated (Johnson et al. 2018; Hall et al. 2017; Gupta et al. 2022; Ferster et al. 2013; de Groot et al. 2022). Participants commonly understood citizen science programmes as a means of gaining knowledge or skills, for example about tree pests and diseases (de Groot et al. 2022) and thus engaged in them to satisfy knowledge or skills acquisition goals.

Individuals may also engage with citizen science programmes for environmental reasons (Hall et al. 2017; Gupta et al. 2022; Dunkley. 2019; Ferster et al. 2013; de Groot et al. 2022). Taking part in citizen science was seen by certain participants as an action they could take to help protect the environment (Hall et al. 2017) or to protect themselves from associated negative feelings such as a sense of threat or environmental concern (protective motive; Ferster et al. 2013; de Groot et al. 2022). Some citizen science volunteers want to help collect data about forest fires because of concerns about the risk to the 'outdoors' and the community, and felt participation would help reduce this risk (Ferster et al., 2013).

Another important motivation is the social benefits derived from volunteering in citizen science programmes. Citizen science activities often involve meeting and interacting with a variety of people, including other volunteers, scientists and those involved with organising or training the volunteers (Gupta et al. 2022). Some volunteers take part in citizen science programmes as a means of meeting, working and socialising with others (Hall et al. 2017; Gupta et al. 2022; Ferster et al. 2013).

Not only does a desire to engage with other people motivate initial involvement in citizen science programmes, but the enthusiasm and motivation of others involved can drive volunteers to continue their involvement (Hall et al. 2017; Gupta et al. 2022; Ferster et al. 2013).

Participants across the identified studies cited additional personal reasons for taking part in citizen science programmes. These include being driven by personal values, that is, the things that are important to them (Johnson et al. 2018; Ferster et al. 2013; Dunkley. 2019), feeling as if they are taking part in something useful (Hall et al. 2017) and finding the programme interesting, fun or enjoyable (Gupta et al. 2022; Hall et al. 2017).

While extrinsic motivations are less significant in initial motivation for taking part in citizen science programmes than the intrinsic ones above, they are important in retaining participants once engaged. For example, participants in tree pest and disease citizen science activities sought appreciation and recognition for their efforts (Gupta et al., 2022). Also, feedback to, and communication with, volunteers about their work is crucial for keeping them motivated and engaged (de Groot et al., 2022).

Overall, volunteers involved in citizen science programmes may be motivated to take part for different reasons. While some are driven by a desire to contribute to the environment, others are motivated by other factors, such as wanting to socialise, have fun, or learn new knowledge and skills. Volunteers in citizen science programmes have intrinsic motivations for taking part but are often encouraged to continue volunteering through external factors, such as by receiving feedback and recognition for their work.

3.6 Citizen science - Barriers

Studies also identified barriers which prevent participation in citizen science volunteering. All the studies identified only report barriers to continuation with participation in the programmes, and not barriers to taking part initially (Hall et al.

2017; Gupta et al. 2022; Pocock et al. 2020). One key barrier to continuation was that volunteers often did not find anything relevant to report, such as tree pests or diseases (Hall et al. 2017; Gupta et al. 2022; Pocock et al. 2020). While this tended to be acknowledged as a positive thing, it sometimes made participants feel that their efforts had been wasted, and thus made it difficult to find motivation to continue (Hall et al. 2017; Pocock et al. 2020). Studies also reported a range of other barriers to continuation, including feeling the need for more training (Hall et al. 2017) or (IT) support (Gupta et al. 2022); disappointment in the lack of collaboration with other volunteers; lack of feedback to volunteers from professionals, and feeling dis-satisfied with the small role they were being asked to play (Hall et al. 2017). All motivations and barriers presented here are summarised in Table 7.

Table 7: Motivations and barriers to engage in citizen science

Motivations	Barriers
<ul style="list-style-type: none"> - Learn new knowledge or skills - Protect the environment - Protect themselves from negative feelings (e.g. environmental concern) - Social benefits of participation - Personal values - Participation is interesting/fun/enjoyable - Appreciation and recognition motivate continued involvement 	<p><i>Barriers to continuation:</i></p> <ul style="list-style-type: none"> - Null findings - Need for additional training - Lack of IT support - Disappointment in lack of collaboration with other volunteers - Lack of feedback - Dissatisfied with their small role

3.7 Activism - Motivations

Searches identified studies exploring the motivations of those involved in forestry-related activism. Activities included alerting the media, creating social media pages, engaging in formal correspondence with decision-makers and creating petitions to help acknowledge the environmental and social value of forests, and promote their better management (Niedziałkowski & Chmielewski, 2023). Engagement in such

activities was prompted by seeing felling of trees and wanting to stop that felling, wanting to see an increase in forest protection, and alert the wider public about the tree-felling. Other activism activities included setting up a group to organise collective action (Cidras, 2022). This activity was also prompted by a desire to prevent an action considered to be environmentally negative, in this case, the expansion of eucalypt plantations connected to a local wood pulp factory and perceived failings in local spatial planning. The common motivator across these examples of activism was concern for the environment and fears about environmental damage (table 8).

Table 8: Motivations and barriers to engage in activism

Motivations	Barriers
<ul style="list-style-type: none"> - Wanting to stop tree felling - Wanting to see an increase in forest protection - Wanting to alert the public to tree felling - Desire to stop an activity considered to be environmentally damaging - Concern for the environment - Fears about environmental damage 	<ul style="list-style-type: none"> - No barriers identified in this review

4 Very active engagement with trees and woodlands

This section presents evidence relating to engagement with trees and woodlands across several activities from the “most active engagement” part of the spectrum presented in Figure 2.

4.1 Formal forestry education - Motivations

When students who had enrolled on forestry or related natural resource degree programmes were asked how important a variety of factors were when making their degree choice, among the most important factors were: that they enjoy wildlife, nature in general (highest scoring individual reason), outdoor recreation

and being outdoors. Other important motivating reasons for enrolling in forestry degrees were anticipating job satisfaction, concern for the environment and an interest in the subject material (Bal et al., 2020).

4.2 For forestry education - Barriers

Students on forestry or related natural resource degrees were also asked about the factors that may have caused them to question whether or not to enrol on such courses. The two most important barriers were economic in nature. Students were concerned about their future earning potential and the availability of funding or scholarships for their degrees. Students were also hesitant about contentious political issues in the sector (Bal et al., 2020). These motivations and potential barriers are summarised in Table 9.

Table 9: Motivations and barriers to enrolling in forestry education

Motivations	Barriers
<ul style="list-style-type: none"> - Enjoy wildlife, nature in general, outdoor recreation and being outdoors - Anticipation of job satisfaction - Concern for the environment - Interest in subject material 	<ul style="list-style-type: none"> - Concerns around future earning potential - Availability of funding or scholarships for degrees - Concerns around contentious political issues in the sector

4.3 Community ownership or management of woodlands – Motivations for involvement

A number of studies focussed on motivations of people involved in community woodland groups, whereby local community groups own, have shares in, or have an agreement to be involved in management decisions of a woodland site (Lawrence & Ambrose-Oji, 2013). The motivations of people involved in a social enterprise are also presented in this section.

Case studies were presented in multiple publications and identified several motivations for purchasing or becoming involved with the management of

woodlands as a community group, or as a collective group of landowners. Firstly, groups sought to provide good outcomes for their community (Urquhart et al. 2010; Lyman et al. 2014; Takahashi et al. 2021; Lawrence & Ambrose-Oji, 2010; Furness et al. 2015). Some groups were motivated to purchase or manage woodlands as a way of providing a space for the local community to access for recreational activities (Lyman et al. 2014; Furness et al. 2015), to ensure protection of local water supplies (Lyman et al. 2014; Takahashi et al. 2021); prevent anti-social behaviour (Lyman et al. 2014) or as a means of ensuring the woodland is safe and visually appealing for its users (Urquhart et al. 2010). Some community groups are motivated to protect the woodland as a cultural asset for both locals and visitors (Lyman et al. 2014), or for indigenous groups who use the woodland to express and practice their individual cultures (Lyman et al. 2014; Furness et al. 2015).

Community groups were also motivated by feeling a need to preserve the environment, including the woodlands themselves and the wildlife which use the woodlands (Lyman et al. 2014; Furness et al. 2015; Urquhart et al. 2010; Takahashi et al. 2021; Lawrence & Ambrose-Oji, 2010). One community forest was set up to preserve the forest's natural capital, including the ecological services (e.g. air quality, carbon sequestration) it provides, after there were local threats from developers and observed increases in timber harvesting (Lyman et al., 2014).

Another community group entered a management agreement with a woodland owner to improve the poor state of the woodland and the wildlife conservation practices within it (Lawrence & Ambrose-Oji, 2010).

A final motivation identified was purchasing or managing woodland sites to sustainably produce economic benefits from them (Lyman et al. 2014; Lawrence & Ambrose-Oji, 2010). Some community groups seek to preserve and create new raw materials from the woodlands (including both timber and non-timber products) to help boost the local economy (Lyman et al., 2014). However, for many community

woodland groups, timber production is a secondary motivation, or a means of creating funding to sustain their activities, and not the sole motivation for purchasing or managing the woodland (Lawrence & Ambrose-Oji, 2010). One case study group was identified where one objective of the purchase of the woodland was a means of providing employment opportunities through 'productive woodland management' (Lawrence & Ambrose-Oji, 2010).

While not a community woodland group, Zhang et al. (2021) found similar organisational motives for a social enterprise in Scotland. This is defined as a group that does not trade for profit, but instead aims to produce social or environmental benefits (Zhang et al. 2021). The key objectives of the group were to: (1) improve the wellbeing of local community members by getting involved in forestry activities (e.g. tree planting); (2) increase individuals' employability by providing them with forestry skills and (3) educate the community on environmental issues (e.g. through promoting a 'woodland culture').

Another way in which community members might seek to engage with local woodlands is through foraging. While this is considered to be different to community ownership of woodlands it is included in this section as it represents an informal community utilisation of woodland. Individuals may be motivated to forage non-timber forest products from woodlands so that they can be used personally or by family members, but also to sell or trade (Robbins et al., 2008). Individuals may therefore be influenced to forage in woodlands if they can financially benefit from it.

Overall, community groups and social enterprises are largely driven by delivering benefits for both people and the environment, with different examples illustrating the context-specific nature of these benefits. For some, economic benefits may be an objective, but this is in cases where it will benefit the community, rather than individuals personally, or as a secondary objective to sustain the group's activities.

4.4 Community ownership or management of woodlands – Barriers to involvement

While the initial barriers to creating community woodland groups and the barriers to community acquisition of the land are less clear, studies have explored factors which constrain the functioning of these groups. These are dominated by issues attributed to a lack of resources (Urquhart et al. 2010; Sharma et al. 2023; Furness et al. 2015). Community woodland group owners would be better able to manage their woodlands through activities such as coppicing, managing invasive species and replanting, if they had more resources to do so (Urquhart et al., 2010). Low timber values were therefore a barrier to successful management. Funding from grant schemes to provide financial support for woodland management was also found to be too low, too complicated to access (requiring payment for professional support to assist applications) or required too much time to apply for (Urquhart et al., 2010).

A lack of resources presents issues for community woodlands in Scotland, linked to public sector austerity (Sharma et al., 2023). Community woodland groups felt that public sector austerity has constrained the ability of local councils to support both the community woodlands themselves and the wider communities. This means community woodland groups receive little support from councils on complex matters such as planning, land management and finance. Such resourcing issues also present trade-offs when balancing objectives (Sharma et al. 2023; Furness et al. 2015). Some groups experience tensions between social objectives (e.g. providing a space for those with mental health problems), environmental objectives (e.g. increasing biodiversity) and financial sustainability (Sharma et al. 2023; Furness et al. 2015). Zhang et al. (2021) also found similar barriers for the social enterprises. They discuss the internal challenges of sourcing skilled staff and external challenges of financial insecurity, largely due to issues with external funding and fears of becoming too focussed on trading activities in attempt to

become self-sufficient. These motivations and barriers to involvement are summarised in Table 10.

Table 10: Motivations and barriers to involvement in community woodland ownership or management group

Motivations	Barriers
<ul style="list-style-type: none"> - Want to provide space for public to use for recreational activities - To ensure protection of local water supplies - Prevent anti-social behaviour - Ensure woodland is safe and visually appealing - Protect the land as a cultural asset - Want to preserve the woodland, the environment or wildlife - Economic benefits e.g. timber production to boost local economy or job opportunities 	<ul style="list-style-type: none"> - Low timber value makes finding resources for woodland management difficult - Grant schemes are difficult to access and funding given is insufficient - Austerity linked to lack of support from councils and community members - Trade-offs between financial, environmental and social objectives - Challenges sourcing skilled staff

4.5 Membership of a tree committee - Motivations

Two studies from the USA explored the motivations of citizens volunteering to be members of tree committees, also known as tree boards. These involve a group of citizens voluntarily coming together to provide community input into tree management decisions, usually in urban areas (Harper et al. 2018; Greenleaf & Ries, 2020).

The studies identified a few motivations for serving on tree committees. Firstly, committee members tended to have a personal interest in the management of local urban forests (Greenleaf & Ries, 2020) or in trees and urban greening (Harper et al. 2018). Involvement in the tree committees allowed volunteers to satisfy these interests. Some committee members also have professional experience or credentials in related fields, such as arboriculture, or natural resources (Harper et

al. 2018). Joining the tree committees, for some, was a way to gain further career-related experience and seek out opportunities related to their careers (Greenleaf & Ries, 2020). Members chose to serve on a committee because doing so provided an opportunity to express their altruistic values. This was particularly the case for retired committee members (Greenleaf & Ries, 2020). Table 11 summarises these motivations.

Table 118: Motivations to being a member of a tree committee

Motivations	Barriers
<ul style="list-style-type: none"> - Personal interests in management of local urban forests - Professional experience or credentials in related fields - To gain career-related experience or seek out career opportunities - Express altruistic values by helping contribute towards humanitarian issues 	<ul style="list-style-type: none"> - No barriers found in the review

4.6 Professional involvement in citizen science - Motivations

Studies explored the motivations for professional involvement in citizen science programmes aimed at improving tree health through combatting tree pests and diseases. Three categories of motivation were identified. Firstly, individuals had personal motivations. These include wanting to spend time outdoors (Gupta et al. 2021), having an interest in tree health, being motivated by the enthusiasm of the volunteers and wanting to develop their skills (Hall et al. 2017). Participation in a citizen science programme was seen as a means of fulfilling these. Secondly, there were social motivations for involvement. Professionals felt that by working on citizen science programmes that they would be able to share their passion and knowledge with others and help the volunteers, as well as be able to work with and engage with others (Hall et al. 2017; Gupta et al. 2021). Finally, there were environment-related motivations. Professionals had a general interest in the environment and wanted to make use of their relevant educational and professional

backgrounds to help protect it by mitigating the risk of pests and diseases (Gupta et al. 2021). They also wanted to help develop plant health capacity, or more generally, contribute to the greater good of protecting forests and trees (Hall et al. 2017).

4.7 Professional involvement in citizen science - Barriers

Studies also reported factors that prevented continuation with professional involvement in citizen science. Both Hall et al. (2017) and Gupta et al. (2021) found difficulties with project outputs. The discussed citizen science projects were viewed by professionals as requiring too much time and commitment (Hall et al. 2017) and made it difficult to sustain a work-life balance (Gupta et al. 2021) for the outputs being produced. For example, professionals were concerned with the poor quality of the data produced (Hall et al. 2017) and the lack of impact the projects were having on policy (Hall et al. 2017; Gupta et al. 2021). Such lack of recognition or reward for their efforts can make it difficult to stay motivated to continue working in citizen science (Gupta et al. 2017). In some instances, professionals also experienced deficits in knowledge exchange between project partners and professionals which they stated could stand in the way of future involvement in the project (Hall et al. 2017). Finally, difficulties in sourcing adequate funding to run the projects and finding ways to continue the project after the funding period had ended made it difficult for professionals involved to continue working in citizen science projects (Gupta et al. 2017). Table 12 summarises these motivations and barriers.

Table 92: Motivations and barriers for professionals involved in citizen science programmes

Motivations	Barriers
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<ul style="list-style-type: none"> - Want to spend time outdoors - Have an interest in tree health - Motivated by enthusiasm of volunteers - Want to develop their skills - Share their passion and knowledge with others - Help the volunteers - Interest in the environment - Make use of relevant educational and professional backgrounds to help protect environment - Develop plant health capacity - Contribute to the greater good of protecting forests and trees 	<p>Barriers to continuation:</p> <ul style="list-style-type: none"> - Too much time and commitment required - Difficulty sustaining a work-life balance - Poor quality data produced - Work has little policy impact - Lack of recognition - Deficits in knowledge exchange between partners and professionals - Difficulties sourcing funding
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5 Who does and does not volunteer?

The evidence relating to who does and who does not volunteer in the activities considered in this review is summarised at the end of this section in Table 12. In the sub-sections that follow the evidence relating to the specific activities is described.

5.1 Who does or does not engage in tree planting?

Some studies explored who engages in tree planting activities and if certain variables may predict engagement. Higher income residents with degrees, who identify as white, and live in detached houses are more likely to participate (Conway et al, 2023; Pike et al, 2020). Participants in tree planting activities are more likely to have high levels of pro-environmental behaviour, high understanding of environmental issues and high personal efficacy, in terms of ability to influence decision making (Pike et al., 2020). People who live in older homes, have lived in their home for less time and already have street trees, are more likely to plant more trees (Donovan & Mills, 2014).

5.2 Who does or does not engage in tree stewardship?

Tree stewardship volunteers may not be representative of the communities they serve, and instead are often well educated, middle-aged, white women who own their own home and have lived in the area for over a decade (Elton et al., 2023). In contrast, de Guzman et al. (2023) investigated tree-stewardship in the context of protection against heat-health risk and found such socio-economic variables were not predictive of stewardship behaviours. Home ownership status, income and education levels did not impact the likelihood of engagement in tree stewardship behaviours. However, additional characteristics studied were deemed important. Residents who received higher engagement from an on the ground community organisation, those with higher stewardship-related self-efficacy, and those with higher awareness of the benefits of trees were more likely to volunteer to carry out tree stewardship behaviours.

5.3 Who does or does not engage in citizen science?

A few studies reported the characteristics of those involved in citizen science volunteering and findings are not entirely consistent. While Johnson et al. (2018) report that males and those without degrees, are less likely to volunteer in the reported citizen science activities, Ferster et al. (2013) found men made up 76% of volunteers and that 56% of volunteers had a degree. Ferster et al. (2013) also found the mean age of volunteers was 46 years old and that there was a balance between those from urban and rural areas. White people were found to be more likely to be volunteering as citizen scientists (Johnson et al, 2018).

Motivations for citizen science may stem from childhood experiences of play, exploration, and observation in similar environments to those in which citizen science activities take place. Those volunteering in citizen science therefore may be more likely to have had childhood experiences in nature (Dunkley, 2019).

5.4 Who does or does not engage in activism?

Activist groups have been found to comprise young adults, aged between 25-45 years, with a balance of males and females (Cidras, 2022). Even when the landscapes comprising the focus of activism are in rural areas, activists have been found to come from predominantly urban or peri-urban areas (Cidras, 2022). Belonging to an environmental organisation helps to predict activist behaviours (McFarlane & Boxall, 2003) as members of such organisations are socialised into a particular worldview which impacts their attitudes and behaviours. Value orientations can also predict activism behaviours (McFarlane & Hunt, 2006). For example, those with biocentric value orientations have been found to be more likely to view forest management as unsustainable and this in turn influenced involvement with forestry-related activism (McFarlane & Hunt, 2006).

5.5 Who does or does not enrol in forestry education?

There may be differences between demographic categories of those enrolled in forestry-related degrees (Bal et al, 2020). In particular, it is less likely that women and ethnicities other than white people will enrol in forestry and related natural resource degrees when compared to white males. Ethnicities other than white people were more likely to rate financial or economic reasons as important barriers to enrolment in such courses than were white people.

5.6 Who does or does not volunteer on a tree committee?

Serving volunteer members of tree committees in the USA were found on average to be white, well-educated, 58-years-old and male (Greenleaf & Ries, 2020). Committees were much less racially and ethnically diverse, when compared to national data.

5.7 Who does or does not become a forestry professional?

After being involved in a Forest Service citizen science project, many children in the USA expressed an interest in working in natural resource careers later in life, suggesting childhood involvement in citizen science could influence decisions to pursue a career in environmental professions (Pitt & Schultz, 2018; Pitt et al., 2019). Similarly, childhood exposure to nature alone or with friends positively predicted environmental citizenship and commitment to nature-based activities in adulthood of Forest Service employees (Asah et al., 2018).

Table 13 summarises the information about who does or does not get engaged across all the activities reviewed.

Table 10: Who does and who does not actively engage with trees, woods and forests?

Engagement type	Who does or does not engage?
Tree planting	<ul style="list-style-type: none"> - Higher income residents with degrees, those who identify as white, and people living in detached houses are more likely to participate. - Volunteer tree planters are likely to have high levels of pro-environmental behaviour, environmental awareness and personal efficacy. - Those in older homes, those who have lived in their home for less time, and those who already have street trees are more likely to engage in volunteer tree planting.
Tree stewardship	<ul style="list-style-type: none"> - Some evidence that volunteers are likely to be middle-aged, white, women and have lived in the area for over a decade. - Contradictory evidence regarding the connection between home ownership status, income and education levels and likelihood of engagement in voluntary tree stewardship activities. - Characteristics such as community engagement, stewardship-related self-efficacy and an awareness of the benefits of trees may be important for motivating engagement.

Citizen science	<ul style="list-style-type: none"> - Some evidence that those without degrees are less likely to be citizen scientists, while white people are more likely to be so. - Contradictory evidence with regard to whether males are more or less likely to engage in citizen science volunteering for trees. - Urban and rural dwellers equally likely to be engaged in this activity. - Childhood experiences may predict engagement later in life.
Activism	<ul style="list-style-type: none"> - Evidence that activists are more likely to be young. - Males and females equally likely to be engaged in this activity. - More likely to come from urban or peri-urban areas than rural areas. - Membership of an environmental organisation and biocentric value orientations may positively predict activism involvement.
Formal forestry education	<ul style="list-style-type: none"> - Women and ethnicities other than white people less likely to enrol in forestry and related natural resources degrees compared to white males (limited evidence).
Membership of a tree committee	<ul style="list-style-type: none"> - Evidence that the average member is a white, well-educated, male in their 50s (limited evidence).
Professional involvement	<ul style="list-style-type: none"> - Childhood engagement in citizen science and nature may influence later career decisions

6 Conclusions & evidence gaps

6.1 Key findings

This evidence review has summarised existing literature on the motivations and barriers for non-recreational engagement with woodlands, including the characteristics of those who may or may not be engaged. These include 'active' methods of engagement (e.g. taking part in tree planting, tree stewardship, citizen science and activism activities) and 'very active' methods of engagement (e.g. educational or professional involvement, being a member of a tree committee and community ownership or management of woodlands). The studies identified varied in their context. While some studied urban areas (e.g. street trees), others studied more peri-urban (e.g. garden trees) or rural areas (e.g. woodlands).

6.1.1 Motivations

Overall, a wide range of motivations for involvement in the different activities were identified, with key themes running throughout.

Across the majority of activities, the evidence suggests there are strong environmental motivations for participation. Many of the individuals interviewed or surveyed across the various studies report involvement in the different activities because they acknowledge the environmental benefits trees provide and want to help increase these, or because they want to help protect trees, wildlife or the environment more generally. For example, individuals may assist with tree-planting, manage a woodland as part of a community woodland group or enrol in a forestry or natural resources degree because they are keen to help protect the environment. Related to this, individuals also take part in the various activities because they enjoy being in nature, or the outdoors.

While many are motivated for environmental reasons, others are altruistically motivated. Trees are perceived as having the ability to deliver benefits to different communities. For example, people take part in tree-planting events because they feel it will benefit local youngsters, or improve community cohesion, while others join tree committees because they value helping others and can achieve this through the management of trees. Where activities do not have a local, place-based focus, such as citizen science programmes, or educational and professional involvement, community benefits are less frequently mentioned and thus are a lesser motivating factor for engagement in these activities.

Another finding is that individuals engage in the various activities because they feel they provide them with an opportunity to socialise with others or meet new, different people. This motivation type is more important in the 'active engagement' category where social factors were more commonly mentioned than in the 'most active engagement' category, underlining the fact that there are different motivators depending on the activity.

Other common reasons for involvement include having an interest in the activity (e.g. tree health in the case of citizen science), or wanting to acquire or develop knowledge, experience or skills. This was the case across both types of activities from the spectrum. For example, individuals got involved in tree stewardship activities because they wanted to gain new knowledge or skills, while those on tree committees were motivated by a personal interest in urban forestry.

Factors such as feedback, recognition and reward for involvement in the various activity types are important in maintaining engagement. While individuals may initially engage with trees and woodlands for a plethora of reasons, it is important that they are acknowledged for their efforts to ensure their continued participation.

A number of motivations identified were unique to the 'type' of engagement, or in some instances, the individual study. This highlights the importance of individual context when identifying motivations for engagement and the difficulty in predicting motivations for different types of behaviour across different circumstances.

Significantly, certain similarities were identified in the motivations to engage in woodland recreation and the motivations to engage in the activities beyond recreation. For example, the aesthetics of environments with trees in them, for enjoyment, and for physical health and exercise are all motivations to both recreational and volunteering activities in relation to trees, woods and forests. This is positive where the aim is to encourage more people to engage in additional voluntary activities, as it suggests that the pathway to additional engagement can be focused on motivations that people already have for connecting with trees, woods and forests.

6.1.2 Barriers

Less evidence was identified which explored the barriers to engagement in the various activities. Evidence that was identified was also less consistent across studies and engagement types. Many of the barriers are unique to the specific contexts of the research.

In many instances, the barriers were not ones which prevented initial engagement in the specified activity, but rather were barriers to continuation in the activity. For example, the time required to take part was presented as a barrier to continued engagement for both professionals involved in citizen science, and tree stewardship volunteers. Another barrier to continuation for some was a lack of funding to continue with the activity. For example, both community woodland groups and citizen science projects cited this as an issue. Furthermore, as previously mentioned, maintaining motivation for engagement in activities can be difficult. This can be affected by factors such as a lack of feedback, recognition and reward or the mundaneness of tasks being carried out.

In the few studies that explore barriers to initial engagement, costs were a concern for participants. These included the fear of incurring future costs connected to potential damage arising from planted trees, the time use associated with volunteering in tree stewardship activities, or financial costs associated with accessing activities (such as getting to locations for involvement). Findings also highlight the importance of allowing input into decision-making and addressing negative historical experiences (e.g. about tree-planting), as these may prevent individuals from engaging in different activities.

6.1.3 Who does or does not engage?

There was far less evidence identified about the characteristics of those involved in the various activity types. Also, the limited existing evidence is somewhat inconsistent, particularly in relation to gender, making it difficult to draw conclusions about who engages with trees and woodlands beyond recreation, and who does not. In terms of demographic variables, for some of the activities, white, well-educated individuals may be more likely to take part. Some evidence indicates that the length of residence in a locality may also positively predict engagement. There is also some, albeit limited, evidence to suggest that those with high personal

efficacy, awareness of environmental issues, and biocentric value orientations may be more inclined to participate in different activities.

A small amount of the evidence included indicates that childhood experiences in nature may promote engagement with trees and woodlands later in life, potentially highlighting the importance of encouraging children to access and engage with natural environments.

6.2 Gaps in the evidence

Overall, there is a significant body of evidence relating to engagement in volunteer tree-planting, with much of this coming from the USA. There is also a relatively large amount of evidence relating to engagement in citizen science and community ownership or management of woodlands.

However, some of the gaps that remain are as follows:

- Limited evidence was found in this review relating to the motivations for, and barriers to, educational involvement with trees and woodlands, membership of tree committees or involvement in tree related activism.
- With regard to volunteering to plant trees, the evidence found for this review is from the USA. Hence there is scope to investigate motivations and barriers for citizen/ resident engagement in volunteer tree planting programmes specifically in the UK.
- Searches for this review found relatively little evidence regarding the barriers to engagement in the relevant activities, particularly in relation to initial engagement (when compared to the amount of evidence relating to motivations).
- While this review identified some studies that considered who does and does not engage in the various activities, there is scope for further investigation of the importance of socio-demographic variables (e.g. gender, ethnicity, age) and

socio-psychological variables (e.g. value orientations, childhood engagement with nature, environmental concern).

6.3 Concluding points

In conclusion, there are a broad range of motivations for and barriers to engaging with trees and woodlands. Individuals, organisations and groups engage with trees and woodlands broadly for environmental, social and personal reasons. Positively, some similarities are present between motivations to engage in recreation in woodlands and forests, and motivations to engage in volunteering in those settings. This ought to help inform strategies for engaging more people in woodland related volunteering.

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