Forest Research

Public perspectives of treescape creation, expansion, management and maintenance

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The Research Agency of the Forestry Commission

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Table of Contents

List of tables & figures

Executive summary

This review aims to answer the question "what are the public perspectives of woodland creation, expansion, management and maintenance?" (where woodland is taken to refer to trees in any location and context).

Using a combination of structured search strings and key word searches, the search process uncovered 95 relevant publications from 17 individual countries (note that eight of the studies were conducted in multiple countries), published between 1994 and 2022 (inclusive).

Given the policy ambitions for tree planting and woodland expansion across Great Britain, from the United Kingdom (UK), Welsh and Scottish Governments, the findings from this review are timely. The findings provide valuable evidence of possible public reactions to new planting, afforestation and changes to management, and identify gaps in the evidence where further work is required.

Key points from the review

Key points from the review are split into two parts, the first focuses on creation and expansion, the second on management and maintenance. It is important to note, however, that there are overlaps between the two topics (for example, some attitudes towards new tree planting are influenced by previous experiences of management and maintenance).

Creation and expansion

- There is a need for public engagement with regard to tree planting programmes (and subsequent arrangements for on-going management) so as to generate public support and a sense of ownership.

- With regard to trees in urban and peri-urban locations, there is no clear picture about 'what people prefer and where' in terms of trees: there are differences between different people. The evidence reviewed frequently highlights a variety of perspectives of tree planting from different socio-demographic groups, and stresses the importance of recognising there is a diversity of 'publics'. This makes public engagement all the more important so as to capture a diversity of views.
- Decisions made about tree planting by homeowners with gardens may not support the aims of local authorities in terms of wanting to maximise provision of ecosystem services from trees. Choice of tree species by homeowners for garden planting may be at odds with local authority strategies for urban tree cover, as buying choices are often based on size of garden space, and aesthetic and management considerations. For example, if homeowners select exotic, non-native species for aesthetic purposes these may not provide the same biodiversity benefits as native tree species.
- Community tree planting initiatives benefit from external funding and support for volunteers to ensure success and longevity.
- Peoples' connection to nature and pro-environmental behaviours have been found to influence their willingness to engage in tree planting programmes.
- Green-space users tend to favour tree planting as a strategy for climate change adaptation if they believe that individual actions can reduce climate change impacts.
- It is useful to make the distinction between people getting involved in tree planting action themselves and people supporting tree planting efforts by others. The two things are not always correlated and they can involve different motivations.
- Level of public support for tree planting programmes can relate to the benefits and risks that people perceive in relation to the trees. If their

perceived benefits outweigh their perceived risks they are likely to support such programmes and initiatives; if the opposite is true, they are unlikely to be supportive.

Management and maintenance

- Management and maintenance is particularly important in urban areas where a lack of maintenance can be perceived to create unsafe areas. Overgrowth of shrubs and trees can be seen as obscuring views and lights, and potentially making areas unsafe. In managing urban greenspace networks that include trees it is important to ensure that natural-looking places are well maintained.
- Some of the literature about attitudes to street trees includes concerns about lack of on-going maintenance. Negative experiences previously, for example with regard to the maintenance of street trees, can lead to negative attitudes towards new planting.
- Generally, there is broad support for management of trees and woodlands where the goals are 'environmental', particularly if connected to wildlife and conservation goals.
- Involving the public in decisions, plans and actions helps increase the acceptability of management activities.
- There is a complicated picture and some contradictory evidence about how socio-demographic characteristics are related to perspectives of management and maintenance.
- Views on management and maintenance can vary depending on whether people express opinions from a personal, work or societal perspective (i.e. a woodland visitor, forest manager or general citizen).

- Management of trees in private gardens can lead to a reduction in canopy cover and ecosystem services due to concerns by residents about over-sized trees in their garden. This activity may be at odds with Local Authority goals to increase tree cover.
- Views of intensive forest management are often negative but can be assuaged by approaches to management that promote continuous cover, have fewer monoculturel blocks, and develop planting and felling regimes that are more complementary to the landscape. Enabling public access can also help to overcome negative perspectives.

Gaps in evidence

In this section, details are provided of topics where additional evidence would be of value, based on the review findings and the gaps therein.

- There are differences in attitudes between different people concerning woodland creation, expansion, management and maintenance. Given that this review failed to uncover a consensus there is value in additional research into how socio-demographic characteristics, people as citizen or consumer, and peoples' environmental values are related to their attitudes to trees, planting and management.
- Better understanding is needed of the link between attitudes to trees and support for local government activity in establishing and managing trees in urban and peri-urban areas. Such work would need to uncover what other issues affect peoples' support for local government activity, as there is unlikely to be a direct relationship between attitudes to trees and support for local authority planting.
- There is a need for more evidence of what type of street trees are preferred, and with what characteristics. There is currently little evidence of this, from a

British perspective. Given the proximity of street trees to peoples' homes, understanding their preferences is of considerable importance.

- There is a need to understand more about the perspectives of British people for new peri-urban woodlands. Again, there is little evidence of this currently, and yet peri-urban woodland development may provide many more people with access to local woodlands, especially where there is limited available brownfield space within towns and cities for new woodland or woodland expansion.
- As noted above, the choices that homeowners make with regard to their garden trees may be at odds with local authority goals for increasing tree cover and maximising ecoystem service delivery from those trees. For these reasons, better understanding is needed of the tree planting choices made by those with gardens (what and why) and options for tree stock available to them.
- What might be the willingness of the British public to engage in decisions about forest/woodland restoration projects? This topic is largely unexplored. Given the extent of current unmanaged woodland and the policy aims for bringing un-managed, or so-called under-managed woodlands into active management there is value in understanding likely acceptability of such activities, particularly where such woodland spaces are commonly accessed.
- Perspectives of people in the English Community Forest areas - what are their views of the changes since inception? There are tree planting activities taking place across the UK with local communities through Non-Governmental Organisations (NGO) like Trees for Cities, Community Forests, and Llais y Goedwig, however there is little evidence at present on the impacts of these activities on local community perspectives and views of local landscape change.

- Public views about the management of 'small' woodlands, such as those in per-urban locations, in semi-rural locations and agricultural landscapes. This topic is largely unexplored as much focus has been on public attitudes to largescale afforestation and commercial timber forests.

Overall, this review provides useful evidence for understanding how the public views the creation, expansion, management and maintenance of treescapes, but also reveals much scope for further work to fully understand how the future changes with regard to trees and tree'ed landscapes are likely to be received.

1 Introduction

1.1 Policy context

Concerns over climate change and habitat loss, and the growing recognition of the importance of trees and greenspace for peoples' health and well-being have resulted in strong policy interest in tree planting and woodland expansion. The UK Government's '25 year Environment Plan' includes a focus on woodland to maximise its many benefits through supporting the development of a new Northern Forest and larger scale woodland creation (Defra, 2018). To address this, the UK government has set a target for tree planting rates in England to be 7,000 hectares each year by May 2024 as part of its England Trees Action Plan (Defra, 2021). The Welsh Government has an aspiration to plant 100,000 hectares of new woodland by 2030 to help Wales meet its carbon emission reduction targets (Welsh Government, 2018). In the spring of 2020, the Welsh Government announced a commitment to a 'National Forest for Wales' with the aims to create areas of new woodland and help to restore ancient woodlands[1]. The Scottish Government target is to increase tree cover from 18.8% in 2019 to 21% in 2032 (Scottish Government, 2019).

Given the tree planting and woodland expansion targets of the UK, Scottish and Welsh governments it is important to understand the public's views of woodland creation, expansion, management and maintenance.

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

[1] National Forest for Wales | GOV.WALES

urban-rural continuum and over time[2]. Crucially, the programme will aim 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". The review considers evidence that has investigated public perspectives of woodland creation, expansion, management and maintenance.

1.3 The approach and the search strategy

The full review question is as follows:

"*What are the attitudes and perspectives of different publics towards woodland expansion, creation, management and maintenance*?" (where 'woodland' is taken to incorporate trees in all settings).

1.3.1 Search terms

The first step was to draw up key terms relevant to the searches by breaking down the review question into four aspects. These are shown in table 1 where they have been structured into separate parts of the review question.

[2] Programme 3- Societal benefits of trees, woods and forests - Forest Research

Table 1: Search terms

Population	Interest	Place	Action	Action
			Expansion and Creation	Management and Maintenance
Community Public Resident Household Visitor Tourist Citizen Volunteer People Children	Perspective Attitude Opinion Perception Perceive Viewpoint Preference	Trees Woods Forests Street trees Hedgerows	Expansion Creation Planting Regeneration Rejuvenation Rewilding Reclamation Restoration Afforestation Re-forestation Land use change	Management Maintenance Felling Thinning Silviculture Disturbance Reclamation Conservation Coppicing Pruning Continuous cover Arboriculture

1.3.2 Search strings

From these key words and terms, search strings were constructed and tested through numerous iterations. The final search string used for 'creation and expansion' is as follows:

(community OR public OR resident OR household OR visitor OR tourist OR citizen OR volunteer OR people OR children) AND (perspective OR attitude OR opinion OR perception OR viewpoint OR preference OR perceive) AND (tree* OR wood* OR forest* OR woodland OR "street trees" OR hedge* OR treescape*) AND (reclamation OR restoration OR rejuvenation OR regeneration OR afforestation OR re-forestation OR re-wilding* OR "land use change") AND (uk OR england OR "United Kingdom" OR britain OR wales OR scotland) AND NOT (australia)

The search string used for 'management and maintenance' was as follows:

(community OR public OR resident OR household OR visitor OR tourist OR citizen OR volunteer) AND (perspective OR attitude OR opinion OR perception OR viewpoint OR perceive OR preference) AND (tree* OR wood* OR forest* OR hedge*) AND (manag* OR maintenance OR felling OR thinning OR silvicultur* OR disturbance OR reclamation OR conservation OR coppic* OR prun* OR "Continuous cover") AND (uk OR england OR "United Kingdom" OR britain OR wales OR scotland) AND NOT (australia))

1.3.3 Search limits

'Scopus', the largest abstract and citation database of peer reviewed literature, was used and the search string was limited to searching in 'Title, abstract, key words'. There was also a date limit set – from 1990 to 2022.

1.3.4 Selection of studies

Having run the search using the search string, hits were sorted by relevance and the first 100 titles and abstracts were exported. Titles, abstracts and full texts were read in stages with publications being excluded at each stage if they were not considered relevant.

1.3.5 Searching in Google Scholar

In addition, key word searches were conducted in Google Scholar. In all cases, a custom date range was used, from 1990-2022, results were sorted by relevance, and then the first five pages of results were read through. All search terms plus number of hits and number of titles saved are shown in table 2.

Table 2: Google Scholar search terms and hits of relevance

Search terms	Number of hits	Number selected and saved
"public perspectives" tree management	1250	6
"public perspectives" woodland maintenance	98	2
"public perspectives" tree planting	711	3
"Public attitudes" tree management	16,600	5
“Public attitudes” woodland maintenance	2240	3
“Public attitudes” woodland expansion	3330	2
“Public attitudes” tree planting	13400	8

2 The studies

As described above the selection of studies for inclusion in the review passed through various stages. Table 3 shows how many papers were retained after each stage. A total of 95 papers were deemed relevant across the two aspects of the review and are included in this report[3].

Table 3: Number of studies at each stage of screening

	Number of studies		
	After reading titles	**After reading abstracts**	**After reading full papers**
Creation and expansion			
Scopus Search	59	37	35
Additional Scopus search (including country search terms)	4	4	3 (1 of these was included in M&M)
Google Scholar	24	5	5
Management and maintenance			
Scopus Search	48	28	25
Google Scholar	24	21	13
Key informant and additional grey literature	-	-	14
		TOTAL	**95**

[3] In the final edit of this report in early 2022 an additional publication was added (at that point it was still in pre-publication form) that was not part of the formal search strategy.

2.1 Location of studies and year of publication

Over a quarter of the studies (36) were conducted in the UK but there were an additional 16 countries where at least one study was conducted, plus a further eight studies that had been conducted in multiple countries (Europe and elsewhere) (figure 1). Given that this review aims to inform future research in Great Britain it is important to bear in mind the differences in cultural, geographical, political and social context, when considering the evidence presented from other countries.

In terms of year of publication there has been a general trend of increasing numbers of publications in this subject area, with 2012 and 2019 showing particular spikes (figure 2) (note that no relevant studies were found that were dated 1990-1993).

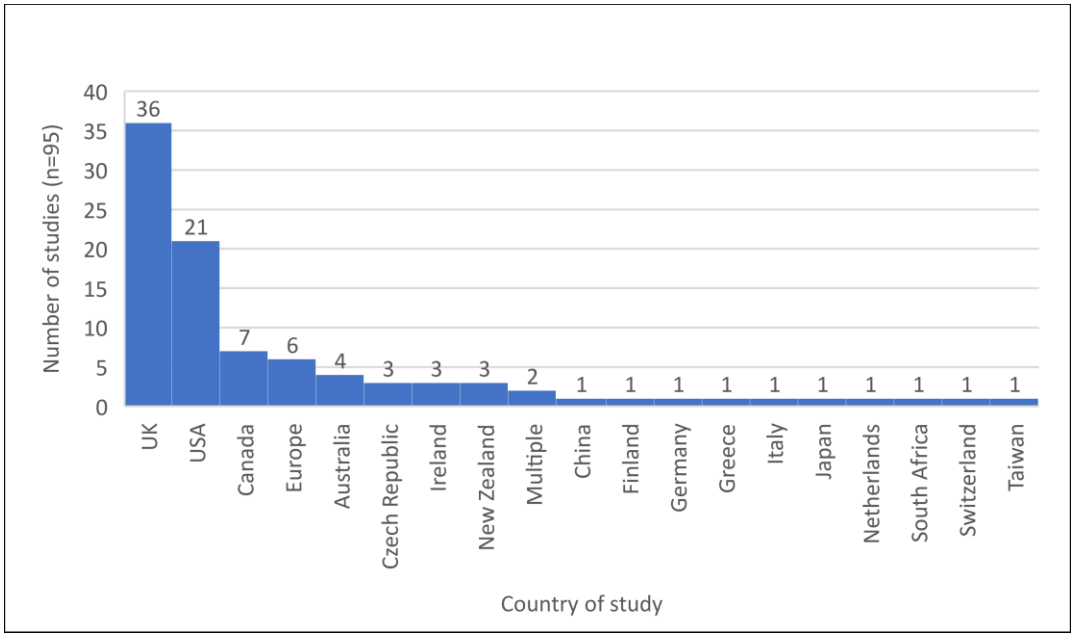

Figure 1 Country of study (N=95)

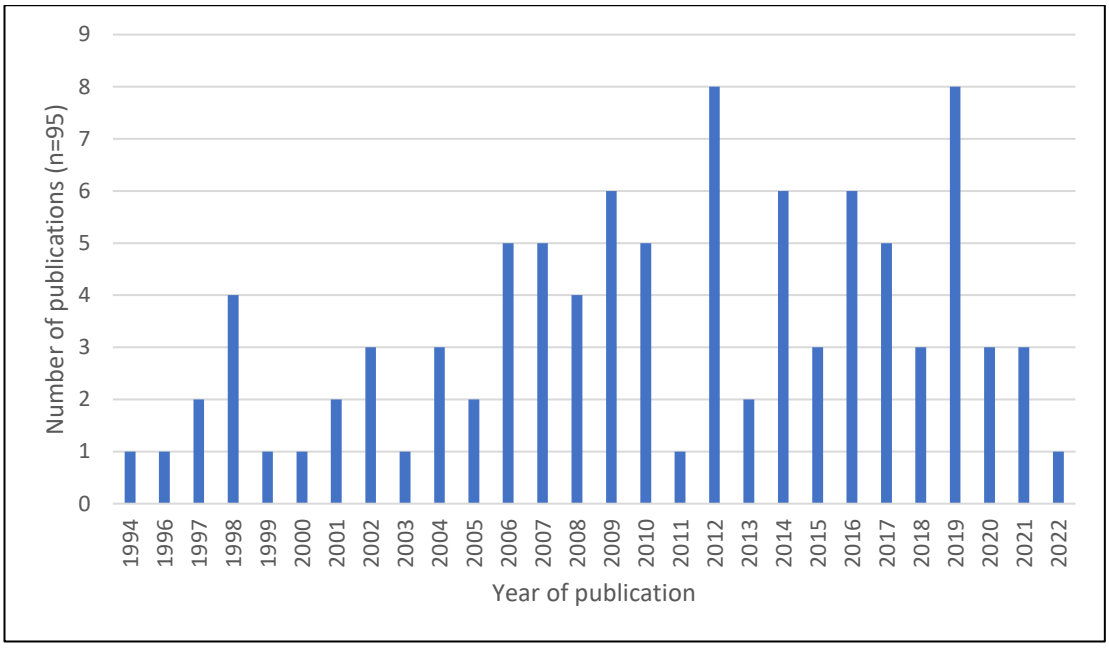

Figure 2 Year of publication (N=95)

3 Public perspectives of woodland creation and expansion

3.1 Public perspectives of trees in urban settings

As described in the introduction there are ambitious tree planting and woodland expansion targets across Britain. Much of the new tree planting may take place in urban and peri-urban spaces close to populations, such as the new Northern Forest in England, the National Forest for Wales and the Clyde Climate Forest in Scotland. It is therefore important to understand public perspectives of trees and tree planting in and around urban areas. This section reviews literature on this broad topic, and is structured according to urban street trees, trees in other public urban spaces, and trees in private urban gardens.

3.1.1 Public perspectives of urban street trees

The benefits of street trees for urban dwellers have been given wide attention over recent years (Todorova et al., 2004). Research focusing on street trees identifies these benefits, but also reveals concerns by residents about maintenance, vandalism (Richardson and Shackleton, 2014), and lack of consultation about street tree planting programmes (Carmichael and McDonough, 2018; Battalgia et al., 2014). For example, a study focusing on a (non-profit organisation) street-tree planting programme in Michigan, USA showed that many residents felt they were unable to have their values integrated into the programme, due to a lack of decision-making involvement about tree species selection and maintenance responsibilities. Negative experiences with trees, particularly lack of city tree maintenance, contributed to residents' views of the problems with a tree planting programme (Carmichael & McDonough, 2018).

Interviews exploring residents' support for tree planting in their neighbourhoods (East Baltimore, USA) showed that some participants supported tree planting because of perceived benefits such as shade and beauty (Battalgia et al., 2014).

Other participants opposed tree planting for other reasons, mentioning several negative perceptions, including concerns about pests and allergies associated with trees, and the management of existing trees. The need to address residents' negative perceptions of trees was recognised as being important when considering future tree planting initiatives.

Authors have found differences between various sections of society, in terms of their perspectives of street trees, making it clear that there is not one unified view amongst urban residents. In Scotland, Hitchmough and Bonugli (1997) found that residents in four different streets did not all see trees as important in improving the quality of their street. Trees were seen as most important in two affluent streets, and least important in a low-income street with many elderly residents. Male respondents were significantly more likely to favour street tree planting than females. A survey carried out across Britain found that 78% of respondents were supportive or strongly supportive of new tree planting in their neighbourhood and town or city (Ambrose-Oji et al., 2022). Focus group participants as part of this study expressed a desire for more equitable tree cover with new tree planting needed in areas with fewer trees (Ambrose-Oji et al. 2021). Saldarriaga et al (2020) found that some people in Sydney, Australia, preferred to live along a tree-lined street where aesthetic and environmental values of trees were paramount. However, attitudes varied with income, education and dwelling type.

An important question for tree planting programmes is what type of trees and tree cover would residents favour. Residents in an area where ash trees were scheduled for removal because of attack by emerald ash borer, (in Ohio, USA), were shown to highly value large trees with a variety of summer and autumn foliage characteristics, suggesting that they would be happy for the ash trees to be replaced with a mix of species rather than planting streets with a single species (Heimlich et al., 2008).

3.1.2 Public perspectives of trees in other urban spaces

Research focusing on urban trees in other public spaces includes those in urban forests, the grounds of shopping malls (Wolf, 2008), urban parks, school grounds (Akoumianaki-Ioannidou et al., 2016), cemeteries (Quinton et al., 2019) and peri-urban areas (Ives and Kendal, 2013). The preferences of urban populations should help to determine the character and function of peri-urban landscapes and it is therefore important to understand the landscape preferences of the urban population (Ives & Kendal, 2013). Studies have identified various factors influencing urban tree planting preferences in such spaces (Nam and Dempsey, 2019). In Britain, research found that urban residents most valued urban trees in woods, parks, public recreation grounds, community gardens and amenity areas (Ambrose-Oji et al, 2022). The same study confirmed the value of these spaces to residents as they hosted more diverse and larger trees and people could access them for recreation and enjoyment (Ambrose-Oji et al., 2021). In Australia, research by Saldarriaga et al. (2020) recognised the importance of understanding people's attitudes towards the urban forest to advance sustainability goals. Findings demonstrated that trees located on public land were appreciated. However, in line with attitudes to street trees, there were differences depending on income, education and dwelling type.

Another survey in Ontario, Canada (Almas and Conway, 2018) explored residents' attitudes towards the planting of native tree species in urban forests. The results indicated that residents generally had positive attitudes toward native trees, although fewer were interested in planting native species if they created a hazard or had increased management costs, and these positive attitudes did not always correspond with their stated preferences about what species should be selected for planting. Research with visitors to three parks in Tennessee, USA, showed that park visitors preferred planting more trees, and increasing species richness and density of trees, over planting trees in straight rows and pruning or caring for trees

(Jennings et al., 2016). This suggests that increasing tree cover and species diversity may be considered more important than active and visible management of trees. However, this is at odds with other evidence (reported elsewhere in this review), about concerns about lack of management. Park visitors similarly preferred native trees, as well as those that were less hazardous, resistant to pests and diseases, with a longer lifespan, and able to provide shade and wildlife habitat, over having trees that screened the cityscape. These preferences affected visitors' support for tree planting in city parks (Jennings et al 2016). In one study, park users in London believed more park trees should be planted, and questionnaire respondent characteristics such as age of respondent and the frequency with which they visited parks, had a small influence on their perceptions of how important trees were to the aesthetics of the park (Collins et al., 2019).

Hoyle et al's (2017) UK-wide survey found that while participants appreciated the aesthetics of colourful flower displays, 'subtle' greenery had a psychologically restorative effect, with implications for the acceptance of more 'natural' planting in urban areas.

Peri-urban landscapes are undergoing transformation due to urban expansion in many parts of the world including in Great Britain. Research in Italy estimated the willingness to pay (WTP) for different future woodland in the Venice hinterland (Vecchiato & Tempesta, 2013). Respondents were presented with five options for the percentage of woodland cover that they would prefer: 100, 75, 50, 25, 0. Findings showed that people preferred a wood–meadow mix which included 75% woodland. WTP findings were related to age of respondent and the distance of their home from the proposed afforestation site. Respondents were willing to pay less for future woodlands if they lived further away from the proposed planting site, and younger people were willing to pay more compared to older respondents.

3.1.3 Public perspectives of trees in private gardens

Urban tree planting and management on residential property is the subject of several studies, in Canada (Conway 2016; Shakeel and Conway, 2014; Conway and Bang, 2014), Australia (Shaw et al., 2017; Kirkpatrick et al., 2012) and the USA (Summit and McPherson, 1998). Conway (2016) examined residents' tree planting and removal decisions in Ontario, Canada, to better understand the way household-scale actions shaped urban forests. Kirkpatrick et al. (2012) also looked at motivations for planting and removing garden trees in eastern Australia. Findings showed that residents were actively managing their garden trees in various ways, rather than just planting and then leaving them unmanaged (Conway, 2016; Conway and Bang, 2014; Summit and McPherson, 1998). Tree planting and species selection decisions were primarily motivated by aesthetic preferences and maintenance concerns, rather than ecosystem service provision (Conway, 2016; Kirkpatrick et al., 2012; Summit and McPherson, 1998). Shakeel and Conway (2014) also found that in many cases it was the physical characteristics of properties that dictated the number and size of trees on residential property. Conway (2016) noted that residents' actions did not align with local authority plans that were based on ecosystem service provision. This could affect the sustainability of the urban forest mainly because of the desire for low maintenance trees in gardens, and lack of tree care knowledge. Conway and Bang (2014) did find that the majority of residents had neutral to very positive attitudes toward local authority policies encouraging planting and restricting removal of trees. However, the level of support for such policies was related to age of household members, education level, property level tree density, recent tree planting activity and the age of the property (Conway, 2016; Kirkpatrick et al., 2012). In Melbourne, Australia, research by Shaw et al. (2017) asked whether the general public was interested in planting native tree species in their gardens. The results showed that the public perception of the aesthetic appeal of native trees was generally positive. Residents had considerable interest in planting native species in their gardens and a

large number wanted to see wildlife in their gardens, understanding that this was more likely with native trees species in situ. In Britain 71% of urban residents who responded to a survey said they were 'supportive' or 'strongly supportive' of planting new trees in private gardens (Ambrose-Oji et al. 2022).

3.2 Public perspectives of afforestation and plantation forestry

In the UK, forests have increasingly been managed for multi-purpose objectives, a policy which has been underpinned by international agreements on sustainable forestry (Garrod et al., 2009; Sing et al., 2019; Nijnik and Mather, 2007). Research by Garrod et al. (2009) recognised the need to understand public preferences for forest landscapes in designing policies that meet the needs of multi-purpose forestry. The study estimated public willingness to pay (WTP) for views of forest landscapes from home and on regular journeys. Their findings confirmed the importance of landscape in contributing to the social and environmental benefits provided by forests, and suggested that policies of woodland expansion can generate additional benefits especially if more woodland is located close to urban populations (Garrod et al., 2009). To help incorporate public perspectives into future planting schemes, Van der Horst (2006) suggests using GIS to identify suitable sites for new woodland schemes in Scotland, based on visibility, population and preference for amount of forest cover.

Focus group participants in England and Scotland felt there was a need for more broadleaved trees, and while afforestation with conifers was seen as acceptable in more remote parts of the countryside, people did not want it nearby (Lee, 2001).

Ireland has undergone a substantial afforestation programme over recent decades (Upton et al. 2012; Ní Dhubháin et al., 2009; Fléchard et al. 2007). A study investigating public preferences and values for an extensive afforestation programme in Ireland revealed that the Irish public held strong, positive views for

afforestation and forest management (Upton et al. 2012). Gaining access to new forests was especially highly valued. Three case studies in Ireland also revealed that greater community involvement in the planning of afforestation proposals was needed to improve consultation and to help dispel negative perceptions (Ní Dhubháin et al.,2009; Fléchard et al. 2007). The case studies also highlighted that perceptions of forestry within an area are dynamic and are influenced by the history of forestry development in that area. This may be particularly pertinent in areas like the south Wales valleys where largescale commercial timber plantations created a disconnection between residents and their environment.

Karjalainen and Komulainen (1998) used two case studies to examine how people perceived field afforestation in two landscape areas in north eastern Finland (composed of fields, forests and lakes with important amenity values for tourism). Afforestation disturbed local residents, who had learned to highly appreciate their everyday landscape. The preference was to locate afforestation at the edge of an existing forest, with location in the middle of a field (most noticeable) seen as the most disturbing. The choice of tree species did not affect preferences and Karjalainen and Komulainen (1998) suggest that the shapes of afforestation should reflect the surrounding environment. The authors noted that the effect of afforestation could be different in less attractive areas.

Forests cover approximately 17% of the land area in Scotland (Forestry Commission, 2010 (cited by Nijnik et al., 2016)), and conifer plantations, primarily of sitka spruce, dominate many landscapes (Nijnik and Slee 2008 (cited by Nijnik et al., 2016)). A study in Scotland (Nijnik et al., 2016) sought to identify public attitudes towards woodland expansion, as part of a wider investigation into the legacy of past afforestation and policy objectives for the future of forestry in Scotland. The findings showed a diversity of public attitudes towards afforestation, with three predominant attitudinal groups being distinguished. The first group (productivists) saw the creation of new jobs in remote rural areas as an important

policy objective, with the legacy of sitka spruce therefore being regarded as something positive. They placed an emphasis on woodland expansion and considered the social and economic aspects of forestry development as crucial. The second group (recreationists) supported the policy for expansion of woodlands but were preoccupied with aesthetic values of landscapes and people's rights to enjoy landscape beauty. The third group (conservationists) recognised the intrinsic value of nature and were primarily ecologically oriented. This group supported extensive native woodlands regeneration and biodiversity conservation.

In New Zealand a survey in the Gisborne/East Coast community (Langer and Barnard, 2003) explored public attitudes to land use change and development, including attitudes towards plantation forestry. A fifth of respondents selected forestry as the industry they would prefer to see developed in the region, mainly because of the potential for greater job opportunities in rural areas. A major concern about forest industry expansion was the planting of trees on good farmland, alongside other potential issues including environmental damage, logging trucks affecting road safety and causing road damage, and forestry having negative effects on the community, such as depopulation.

Although not concerned with forestry plantations, the Public Opinion of Forestry Survey (Forest Research, 2021) found that 83% of UK respondents who had visited woodlands in the last few years, agreed or strongly agreed that "A lot more trees should be planted" because of the threat of climate change.

3.3 Public perspectives of land use change

Upland regions in the UK are increasingly under consideration as potential areas for the creation of woodlands. This is driven by a combination of factors, including the aims of UK forestry policy to increase woodland cover, changes in current upland land use and management, agri-environment schemes in national and international

policy, and an increasing public awareness of the ecosystem service benefits landscapes can deliver for society (Iversen, 2019).

Nijnik et al. (2009) used Scotland as a case study in research which explored public preferences concerning natural landscape components. The purpose was to show how land use development should be based on landscape content and interactions with societal connections. The overall conclusion was that although some people in Scotland were in favour of native woodland conservation and their extensive regeneration, others were more concerned with socio-economic aspects of forestry development, e.g., with new employment opportunities in remote areas. There was agreement across sectors of the population of the need for multi-functional forestry with integration of woodlands in rural landscapes.

Swaffield and Fairweather (1996) investigated public preferences for proposed changes to land use in the New Zealand high country. Land use options included forestry, agriculture and conservation. Participants sought two types of outcome: on the hills and lower slopes they valued the role of large plantations in promoting economic production, whilst on the higher lands, their role in soil conservation was recognised. Swaffield and Fairweather (1996) noted that these participants saw trees as a way of using and improving the productivity of the land.

3.4 Public perspectives of land reclamation

Most of the research on land reclamation and forestry focuses on the visual preferences for physical attributes of post-mining landscapes (Kohlova and Melichar, 2017; Svobodova et al., 2012; Sklenicka and Molnarova 2010). A study by Svobodova et al. (2012) of residents in the Czech Republic showed positive preferences for reclamation of post-mining areas, and this positive effect increased in reclamations containing forest and mature woody plant communities. The results showed the importance of mature woody vegetation in landscape preferences and

showed its essential role and high potential in the reclamation of post-mining landscapes.

A study by Sklenicka and Molnarova (2010) also focused on visual preferences expressed by respondents for five habitat types used in land reclamation projects in the Czech Republic. The findings showed that non-native managed coniferous forests were preferred by older people with a lower level of education and low income living in the post-mining area. Native, deciduous forest received the highest perceived beauty score by younger, more educated respondents with higher income, living outside the post-mining landscapes. The study confirmed differences in the perception of various forms of land reclamation by residents vs. non-residents. Kohlova and Melichar (2017) showed that environmental preferences towards forest growth in post-mining landscapes differed according to tree species, and age of the forest, but not whether they were planted or growing through natural colonisation on the reclaimed site. Preferences also differed according to the place of residence of the respondent. People living in the vicinity of the spoil tips found the reforestation less attractive than people from a control region further away, suggesting that familiarity with the spoil tips may influence preferences for reforestation.

In England, a significant project centred across ex-mining areas is the National Forest. Initiated in 1995, the programme had the aim of creating a new English forest over 200 square miles, across parts of Leicestershire, Staffordshire and Derbyshire. The National Forest's purpose is to increase woodland cover to a third of The National Forest area and it has been largely considered a success (House of Commons Environment, Food and Rural Affairs Committee, 2010). One aspect of this success is the extent to which residents across the region believe the National Forest has improved their local area. For example, in 2008, 86% of people surveyed said they thought the National Forest had improved the local environment. This was based on a survey by the National Forest Company of 995

people who participated in citizens panels and 202 submissions received from Forest residents (referenced in: House of Commons Environment, Food and Rural Affairs Committee, 2010). Morris and Urry (2006) also found that for many in the National Forest area there is a close association between the Forest and the noticeable improvements to the area's physical environment.

A study by Rink and Arndt (2016) in Liepzig, Germany, focused on public perception of the use of afforestation for urban brownfield re-development. Afforestation on brownfield sites was accepted more than natural succession. However, residents' preferences were for urban park green infrastructure and designed urban nature areas.

3.5 Public perspectives of tree planting as part of natural flood management

Natural flood management is now well established for reducing flood risk. It involves implementing solutions that work with natural processes such as wetlands, riparian vegetation and river channel rehabilitation (D'Souza et al., 2021). A UK study by D'Souza et al. (2021), addressing preferences for natural flood management, revealed that self-transcendence values (including values for other people and the environment) were positively associated with preferences for tree planting and wetlands, and negatively associated with preferences for dams and weirs. This favourable attitude by the public towards natural flood management involving trees was driven largely by people associating natural flood management with attractiveness and benefits to wildlife (D'Souza et al., 2021). China is increasingly facing climate change impacts, including intense heat waves, flooding and increased severity of storms (e.g., typhoons and thunderstorms), and research by Byrne et al. (2015) examined whether increased tree planting could help Hangzhou City adapt to some of these impacts. Survey results showed that green-space users tended to favour tree planting as an adaptive strategy if they were

older, believed that individual actions could reduce climate change impacts, and believed that future climate change impacts would be economically disruptive.

3.6 Public participation in tree planting initiatives

In the 2021 Public Opinion of Forestry Survey (Forest Research, 2021) 16% of respondents in the UK said they had been involved in organised tree planting events. In a survey with urban residents across Britain, 34% of people said they had planted a tree in their garden and 16% had planted a tree in their neighbourhood, town or city (Ambrose-Oji et al. 2022). From the same study those with a higher education were more likely to have planted a tree in their garden. There are many tree planting initiatives and activities that have taken place within the UK, particularly through the twelve Community Forests in England, Community Woodland Groups across Britain, and initiatives such as Trees for Cities. However, there is little published evidence concerning peoples' involvement in these programmes. Therefore, many of the tree planting initiatives discussed in this section are from the USA. Tree planting programmes have been shown to both improve the neighbourhood and to bring the community together (Summit and Sommer, 1998; Still and Gerhold 1997). Addressing the needs of local residents, as well as the trees, in neighbourhoods can have positive impacts on tree survival, community development, and improved relationships between foresters and the public (Austin, 2002; McPherson and Luttinger, 1998).

Austin (2002) explored resident involvement in tree planting and maintenance projects on vacant land in Michigan, USA. Individuals involved in follow-up care of tree planting sites were surveyed to understand their motivations for involvement and their perception of local neighbourhood greening projects. The desire by residents to help or improve their neighbourhood was rated equally as high as the motivation to work with nature. Austin (2002) noted that residents strongly

motivated by community concerns did not initially recognise the social rewards of engaging in tree planting. However, recognising the opportunities offered by tree planting projects for strengthening community ties, should encourage greater local participation in these efforts. The main reasons that long-term residents of New Haven, USA, took part in tree planting initiatives were to replace a felled tree, or because they valued the aesthetics, and to a lesser extent the environmental benefits provided by the trees (Locke et al., 2015). Gonçalves (2019) showed that willingness to participate in a tree planting programme in Massachusetts, USA, was related to the community's awareness of the benefits generated by urban trees, their environmental knowledge, and experience in tree care practices.

In Taiwan afforestation and carbon reduction are important forestry policies of the government. Lin et al. (2012) recognised the important role that public attitudes and behavioural intentions towards afforestation and carbon reduction would play in the effectiveness of these forestry policies. Survey results revealed that people aged over 36 not only had a positive attitude towards afforestation for carbon reduction but were also more willing to participate in afforestation activities, such as tree planting. Level of monthly income was identified as the main factor stopping people participating in afforestation activities, with older people with high income shown to have the highest intention to participate (Lin et al., 2012).

A study focusing on forestry funding in Iowa, USA, (Vitosh and Thompson, 2000) showed that four-fifths of the communities showed an increase in some forestry-related activities (e.g., volunteer tree-planting group, fund-raising activities, tree inventory work) after they received external tree-planting funds. Four-fifths of the respondents also agreed that their community tree-planting programme would not have started without external funding. Vitosh and Thompson (2000) conclude that the benefits of tree-planting programmes are enhanced by assistance provided to communities by a funding agency or a volunteer-coordinating organisation.

Results reported by Whitburn et al. (2019) from Wellington (New Zealand), showed that participation in a tree-planting scheme was positively associated with the resident's level of 'Pro-Environmental Behaviour' and environmental attitudes. The findings indicated that people who develop a relationship with nature are more willing to protect it.

Another study in New Zealand by Becken (2004) asked whether tourists would be willing to participate in tree-planting to offset their greenhouse gas emissions. About half of the tourists questioned thought there was a link between climate change and tourism, and 48% were willing to plant a tree, with tourists associating much broader benefits with trees than their function as carbon sinks. Planting a tree appeared to represent a symbolic act that could mitigate any behaviour (not only greenhouse gas emissions) that is destructive to the environment.

4 Public perspectives of woodland management and maintenance

Once trees are planted and established they may require management and maintenance for many years. There is a need to better understand what affects the public's perception of the management and maintenance of trees, woods and forests (Fuller et al., 2016), especially as the perception of the public and those undertaking the work has been shown to differ (Bradley & Kearney, 2007). Public perspectives and attitudes to management and maintenance of trees, woods and forests have been found to vary between location and management goals, and those factors are used to structure this section. Importantly, the evidence reviewed here frequently highlights contrasting perspectives from different socio-demographic groups and stresses the importance of recognising there is a diversity of 'publics'. In many cases, evidence suggests that a move away from top-down policy and increased use of community engagement and involvement is a more effective way to gain support for the management and maintenance of trees, woods and forests (Pommerening et al., 2020).

4.1 Factors affecting public perspectives of management and maintenance of trees, woods and forests: Location and context

Trees in different areas, both geographically and contextually, require different management and maintenance regimes and this can lead to different public attitudes towards management. Understanding the location of the woodland in relation to the wider landscape allows management and maintenance approaches to be considered in relation to public preference (Garrod et al., 2009). This section considers public perspectives of management of trees in urban landscapes, peri-urban landscapes, parks, streets, gardens, and forests.

4.1.1 Management of trees and woodland in urban landscapes

In an urban environment, trees are distinct against the urban landscape. They provide areas with cultural value and support opportunities to connect with nature (Jorgensen et al., 2007; O'Brien, 2006). However, woodlands in urban areas can be seen as a security threat or perceived to provide opportunities for increased anti-social behaviour. For example, social housing residents surrounding a small woodland in London expressed concerns about overgrown vegetation which reduced visibility in the woodland, and which had signs of littering and fire setting (O'Brien, 2006). Residents felt the woodland would not be used and enjoyed by the local community if it was not maintained and signs of abuse removed. A controversy arose concerning the removal of street trees in Sheffield in 2016 by the council with the Local Government and Social Care Ombudsman asking the council to apologise to the people of the city after problems were found with the way it removed street trees via a highways maintenance contractor (Local Government and Social Care Ombudsman, 2020). Local people in the streets affected were not consulted or involved in decision making and this led to a situation where there was no support for the Council's actions.

Trees in urban parks are of high public value. In a study with park users in London questionnaire respondents worried about the removal of trees. For management decisions about trees in urban parks to receive long-term support from the public, they need to feel involved through the provision of information and supportive education by park managers (Collins et al., 2019).

A 2005 survey in southwest England found residents had a generally good overall opinion of the trees near their home (Flannigan, 2005). The aesthetics of the trees were rated as the highest benefit, and dealing with fallen leaves in autumn was recorded as the most annoying feature. Some people also found that trees casting shade over their gardens was an annoyance. This survey found some dis-satisfaction with the local council's management of street trees, especially in relation to the need for pruning and leaf clearance. The authors suggested the need

for councils to prioritise management of tree debris outside elderly people's homes or those less physically able to deal with clearing the debris themselves (Flannigan, 2005). Ambrose-Oji et al. (2021) found mixed results from focus groups in Britain when discussing the management of trees in urban areas. Generally, management such as 'trimming' was welcomed and seen as positive for people and ecosystem services. However, severe and poorly executed "chopping back" was observed and regretted by many participants in their study. Participants did not appreciate excessive management of trees such as anti-wildlife measures sometimes seen in urban area, as they affected the aesthetic and environmental benefits of the trees (Ambrose-Oji et al. 2022). People were most likely to be annoyed when damaged trees were left unmanaged and when street trees were felled.

Zhang et al., (2007) found factors such as employment status, awareness of forestry-related programmes, and age, all influenced individual's willingness to contribute money and time towards an urban forestry programme, more so than characteristics such as ethnicity, gender and residence (Zhang et al., 2007). Results showed that individuals who are aware of forestry-related programs, hold a full-time job, are younger than 56 years, and earn an annual income greater than U.S. $75,000, have a positive relationship with willingness to donate money and voluntarily contribute time toward urban forestry programs and activities.

A case study from Warrington (Birchwood Forest Park) used content analysis of local documents to reveal concerns about woodland maintenance. Two hundred and thirty four quotes about concerns relating to Birchwood Forest Park were found in the local archives. The most common concern was about the maintenance of the woodland (33.3%). Overgrowth of shrubs and trees was seen as obscuring views and lights, and potentially making areas unsafe. The authors concluded that in managing urban greenspace networks that include trees it is important to ensure that natural-looking places are well maintained (Tzoulas & James, 2010). More recently, Ambrose-Oji et al. (2021) have also found a dislike of un-managed woodlands in urban areas, but also a dislike for over-managed woodlands. A clear

theme from focus group discussions across Britain was that tree management is an important issue influencing people's perceptions and attitudes to trees. Perceived poor management, including both excessive intervention and neglect, can lead to dissatisfaction and contributes to recognition of disbenefits.

While some of the evidence here suggests that signs of maintenance in 'tended' woodlands can create feelings of security, Van den Berg et al. (2014) found that the differences in management style did not have a significant effect on the restorative potential of natural spaces for students in Sheffield.

Overall, research shows it is important to engage the local community with the management of local trees and woods, particularly in urban spaces where management and maintenance is likely to be more noticeable. Community participation results in an increased sense of ownership and engagement with the trees in the area and their management (Jorgensen et al., 2007; O'Brien, 2006).

4.1.2 Management of trees in gardens

Residents with trees in their gardens have been found to have concerns about the risk of damage to their property from those trees. A majority of homeowners were prepared to restrict the size of the trees in their front garden in response to feeling protective of their home. They sought to avoid any detrimental impacts from over-sized trees on the value of their property. The impact of such attitudes towards garden trees is a reduction in the tree canopy cover and a reduction in biodiversity gains (Andrew & Slater, 2014). These are important considerations in terms of public perspectives of tree management and maintenance, given that garden trees are, by definition, on private property and the management of them is thereby in the control of the homeowner.

Tree removal was motivated by perceived poor tree health, but lack of knowledge about tree care and species characteristics had led to the removal of some healthy trees. (Conway, 2016; Kirkpatrick et al., 2012; Summit and McPherson, 1998).

4.1.3 Management of woodlands and forests

There is extensive research into public views of woodland and forest management (in settings other than urban) (Bauer et al., 2009; Charnley & Donoghue, 2006; Edwards et al., 2012a; Nijnik et al., 2016). One important aspect of woodland and forest management is the landscape-scale impact that changes to these environments can have. Large forests are often multi-use, with commercial, recreational and environmental value.

Research conducted across Europe has found geographical differences in preferences for forest structure and for a level of maintenance which keeps the forest looking 'tidy' (Edwards et al., 2012b; Petucco et al., 2018). A pan-European (Great Britain, Nordic Region, Central Europe and Iberia) survey examined public preferences for different management practices of woodlands and forests (Edwards et al., 2010a; Edwards, et al., 2010b). This research found a range of differences and similarities between countries, and provides insight into some national preferences. Overall, there was a preference for tidy, managed naturalness over unmanaged forest (Edwards, et al., 2010b). Particularly in the UK there was a preference for close-to-nature and multi-objective forest management. Some members of the UK public have been found to prefer relatively open, heavily thinned stands (Petucco et al., 2018).

Conifers are associated with intensively managed monocultures and short length rotations, and for this reason the public often express a preference for woodlands and forests with broadleaf trees. However, findings from Edwards et al. (2012a) suggest that antipathy towards conifers, and expressed preferences for broadleaves in many parts of Europe, may not be due to the choice of tree species per se, but the use of conifers in intensive management regimes or geometric forest designs within the wider landscape that are considered negatively from an aesthetic perspective. Such a conclusion should lead forest managers and policy makers to support long-term retention of forest stands, and conversion of intensively managed forests to continuous cover forestry and other low-impact silvicultural

systems. In short, the public generally prefers mixed forest stands over monocultures (Edwards et al., 2012b; Edwards, et al., 2010b).

There is a need for an in-depth understanding of local communities' and public's perception of different commercial forestry management regimes, as a negative response can result in a loss of support for policy objectives and industry development (Robinson et al., 2001; Sing et al., 2019). In the USA, a survey found that urban and rural residents had a similar preference for timber management, with positive views about the use of successional stages in forest management (Enck & Odato, 2008).

Research in the UK by Nijnik and Mather (2007) stressed the importance of incorporating social values into forest management decisions by shifting from a timber management model to a multiple resource management model, and from a forest-focused to a people-focused approach.

In Scotland, forest users and local residents in Lochaber were surveyed to understand attitudes towards different types of forestry (Sing et al., 2019). The results showed that people do like forested landscapes, especially native woodlands, and also revealed predominantly positive attitudes towards all stages of commercial forests, except clear felled sites. Sing et al. (2019) recommended diversified management approaches, particularly where recreation is an important objective, and increased public engagement to demonstrate the multiple benefits of productive as well as native forests.

A small number of focus groups run in Scotland and England found respondents expressing a preference for broadleaved, 'natural' woodlands rather than coniferous plantations. Forests dominated by conifers, particularly in Scotland, were seen as more 'closed in' than broadleaved woodlands and were sometimes associated with a fear of getting lost (Lee, 2001). Respondents in the study accepted that timber production was a necessity but were not keen on the close growing, single species

forests associated with the forestry industry, and were less likely to see these sites as places of amenity but rather as a source of profit for the owners (Lee, 2001).

A study in England found, through focus groups and a survey, that people valued a wide range of forest types but particularly native broadleaved, with conifers perceived as less attractive (Carter et al. 2009). However, most valued variety over one particular type of woodland and were more concerned with having public access than having a specific type of woodland. Industrial plantations were seen as uninviting but recognised as important for timber and therefore economic reasons (Carter et al. 2009).

Bradley & Kearney, (2007) found that foresters interpreted the impact of timber harvesting from a management perspective, whereas the public were more likely to view clear-cut forest areas from an aesthetic or landscape damage perspective. An aversion to clear-cut commercial forestry was also found among the Scottish general public (Sing et al., 2019), and concerns about clear felling were raised by some in the local community that was part of the Neroche landscape partnership scheme in the South West of England (Carter et al. 2011). In Canada a growing public concern around intensive forestry management methods has led to some forest management approaches being considered socially unacceptable. To achieve more publicly acceptable and sustainable forest management requires increased citizen decision-making engagement, and integration of different stakeholders and communities (Robinson et al., 2001).

Between them, these studies highlight the need for further understanding of the differences in preferences and perspectives of forest management and maintenance practices, based on individual characteristics of members of the public, and differences in location and context (Charnley & Donoghue, 2006; Enck & Odato, 2008). However, the UK Public Opinion of Forestry found a third of those who had visited a forest in the last few years did not know who it was owned or managed by (Forest Research, 2021). This latter point suggests there is a challenge in more

closely connecting visitors and the public to decisions about forest and woodland management and maintenance.

Examining public views of woodland management in both rural and urban settings, O'Brien (2005) found widespread acceptance of the need for some formality to be imposed on what would otherwise be wild areas. The reason for this is that people considered wild, unmanaged woodland would be more likely to be vulnerable to damage (for example from picking wildflowers and the use of motorbikes) or mis-use such as fly-tipping. Nevertheless, the different locations did reveal differences in preferences. For example, in an urban woodland setting respondents liked the idea of managed woodland; but for participants in a rural village location, wilder woodland had a greater attraction, particularly for younger respondents.

4.2 The connection between perspectives of management and maintenance of trees, woods and forests and the reasons for management

The evidence reviewed for this study uncovered differences in public perspectives of tree management and maintenance that varied depending on the purpose of management. The literature reveals predominately positive responses to tree management where the focus is on environmental aspects such as wildlife conservation or controlling tree pests and diseases. However, it is not straightforward. For example, a 1991 survey of Oregon residents asked whether they agreed or disagreed with different statements about forest management (Steel et al. 1994). Respondents slightly disagreed that forests should be used primarily for timber and wood products, that more trees should be harvested to meet the needs of a larger human population, and that the primary use of forests should be to obtain products useful to people. They agreed that forest resources can be improved through silvicultural practices. Such findings highlight the range of possibilities to be considered when investigating public perspectives of forest management and the reasons for management.

4.2.1 Managing trees and woodlands for conservation and wildlife

As noted above, the reasons for tree management can affect public perspectives and acceptability of the management actions. In the US Pacific Northwest, Charnley and Donoghue (2006) found that over a decade the local population's opinion remained reasonably constant, with support for environmental over economic management objectives. Whilst visitors may have limited awareness of their own impact on conservation efforts, they were found to broadly support forest management methods that reduced recreational disturbance and increased awareness of conservation practice (Levêque et al., 2015).

The Public Opinion of Forestry (POF) survey across the UK identified that the general public express support for forestry with the main perceived benefit being its value as a place for wildlife (Forest Research, 2021). This suggests that there would be support for forest management that was concerned with wildlife protection or enhancement. Similar results were found in earlier work by Lee (2001) of a survey across parts of Britain with respondents suggesting nature conservation was the most important purpose of forests followed by scenic attraction and recreation and in work by Carter et al. (2009) which highlighted the importance of wildlife and biodiversity and outlined that these aspects need to be managed in a sustainable way.

In a willingness-to-pay study, White and Lovett (1999) found that the public would be willing to pay to support conservation efforts in areas such as the North Yorkshire Moors, where their preferred habitats were semi-natural broadleaf woodlands.

The consistent evidence from across these studies is that there is generally public support for tree and woodland management where the goals are broadly connected to wildlife and conservation.

4.2.2 Management of trees for pest and disease control

Management and maintenance of trees for pest and disease control has been found to be broadly supported by the public (Fuller et al., 2016; Jepson & Arakelyan, 2017; Sheremet et al., 2017). However, there are some differences in preferences for different types of management and organisation approach. Overall, more targeted 'natural' management techniques are preferred, such as biological control rather than chemical control (Fuller et al., 2016; Sheremet et al., 2017). There is also a more positive response to forestry management undertaken by charities rather than private landowners, with the public more willing to pay for pest and disease control in those cases (Sheremet et al., 2017).

There are also socio-demographic differences in acceptability of different pest and disease management approaches (Chang et al., 2009). Fuller et al., (2016) found that men and older people are more likely to support management interventions than females and younger people (Fuller et al., 2016). Different generations were also found to have ~~a~~ different responses to altering forest management through the introduction of genetic modification solutions, with younger generations being more supportive (Jepson & Arakelyan, 2017). As these two studies show key differences in relation to findings by age this is an area that warrants further investigation in specific contexts.

4.2.3 Management of trees and woodlands for ecosystem services

The public's perception of management and maintenance of trees, woodlands and forests may be affected by the ecosystem services the environments provide. Calder (2004) found that some ecosystem services provided by forests, such as benefits for the hydrology of an area, were not necessarily understood in the same way by the public as by scientists. Wilton (2002) also found public uncertainty about the concept of forest ecosystem health created challenges for securing positive responses to alternative management actions (for example, controlled burning or thinning). These gaps in evidence and knowledge, and subsequent links

to perception, can lead to difficulties in establishing acceptance of policies relating to tree management and ecosystem services (Calder, 2004).

Nevertheless, public attitudes may influence policy development and management strategies. Kreye et al. (2019) found that evolving public attitudes to timber production was affecting government policy. The American public had a preference for timber harvesting that prioritised ecosystem maintenance over timber production and this was thought to drive developments in management (Kreye et al., 2019). Qualitative research in England highlighted a strong desire in publicly accessible woodlands for management and maintenance of access infrastructure which can provide cultural ecosystem services (O'Brien et al. 2012). For large forests it was felt that there could be accommodation of more managed areas while parts of the forest could have less access infrastructure and appear more natural and unmanaged but not neglected. Work by Lee (2001) found well marked paths, nature trails and signposts were important in terms of management for recreation.

The Public Opinion of Forestry found that the general UK public supported management of woodlands and forests for the benefit of lessening people's impact on the environment (Forest Research, 2021). This was considered in relation to climate change, again emphasising the point that the public may be supportive of forest management when it aims to support ecosystem services such as climate change mitigation and adaptation. As noted above, this depends on understanding the ecosystem services being provided by the trees and woodlands in question.

4.2.4 Public perspectives of restoration

In Holland one study investigated hiker perceptions of perceived attractiveness of nature before and after efforts to restore exotic conifer plantations to native communities containing bog and wet forest habitats (van Marwijk, et al, 2012). In a study using photographs, visitors to a Dutch National Park found the most attractive landscape types were bog and wet forest communities containing visible water, and resulting from restoration. The least attractive landscape types were

young deciduous and coniferous forest which typically were present before restoration. However, there was a "middle category" consisting of landscape types existing both before and after restoration efforts. Visitors valued old coniferous and old deciduous forests as much as landscapes that resulted from restoration but that lacked water. This poses a potential challenge for practitioners wanting to carry out forest restoration with public support, if preferences also include landscapes without restoration management.

In Arizona, a study with local residents about forest restoration projects following on from forest fires, found that 47.5% of residents surveyed strongly agreed that residents should be involved in community forest restoration projects. A further 41% moderately agreed (Ostergren et al., 2006). This demonstrates a high level of interest in community involvement is such restoration projects.

4.3 Personal or societal perspectives?

As noted above, understanding the response of the public is vital to the long-term success of management and maintenance of trees, woods and forests. In recent years the importance of public perception of management approaches has increased. The multi-dimensions of a forest, encompassed in commercial, cultural and conservational demands, mean that practitioners and policy makers have to balance the demands of both nature and people (Lambert, 2008). A distinction has been found between importance given to landscape attributes depending on whether participants are responding from a personal perspective, as a recreational user of a forest, or whether they are responding from a societal perspective as a citizen. In one study, citizens were found to prioritise some management aspects that were not as visually obvious or appealing (Van Rensburg et al., 2002). Diversity of tree species and age of trees were both considered more important from a societal perspective than a personal one. The Public Opinion of Forestry survey for the UK asks about the importance of woodlands to the public and to the individual. There are some small percentage differences with people giving higher

scores for some of the public benefits than those gained by the individual. However, the importance of woodlands for wildlife comes out as most important for the public (Forest Research, 2021). Evidence such as this points to the need for a nuanced understanding of the different public perceptions.

5 Conclusions

This review has explored the evidence concerning public attitudes to woodland and treescape creation, expansion, management and maintenance. This topic is an increasingly important one, given the policy aims for woodland expansion, tree planting and restoration in the immediate term across the UK.

The search strategy enabled an exploration of the international literature but was restricted to post-industrial societies. Thirty six out of 95 referenced publications report studies from the UK.

The existing evidence highlights some key opportunities for approaches to be developed or strengthened that can support publics in engaging with and taking action for treescapes, and potentially in enabling greater public acceptability of woodland and treescape creation and management activities such as:

- Take an active and effective approach to engaging and communicating with people about treescape creation and management.
- Provide a variety of opportunities through which people can get involved.
- Frame treescapes creation and management as important for conservation, biodiversity and climate change.
- Ensure funding and volunteer support for tree planting initiatives.
- Ensure effective communication through a variety of media.
- Provide access, and recreation and leisure opportunities for diverse interests and needs.
- Enable communities to enjoy ownership of new treescapes through opportunities for tree wardening.

- Engage with homeowners (particularly in new housing developments) about their garden planting choices to maximise opportunities for ecosystem services from garden trees.

What the review process reveals is that research on treescapes creation and management has often been more thoroughly covered in other contexts and countries. There is therefore scope for further studies focused on British publics.

Importantly, there has been greater emphasis on trees in certain locations, such as urban parks, urban streets and large-scale commercial afforestation. This leaves large gaps in the understanding of perspectives of and attitudes towards trees in many other contexts, including peri-urban, small scale woodlands in agricultural landscapes and other semi-rural locations. Given that these likely constitute the environments where many people come into contact with trees and woodlands these are significant gaps.

Another gap relates to the English Community Forests and the National Forest in England. This review found very little academic evidence of public views of the changes and impacts of these initiatives, despite their now long-established presence across different parts of England.

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