Forest Research

Sycamore in future treescapes: attitudes and values of tree and woodland professionals in the UK

Research Report

Grace van der Wielen and Beth Brockett

The Research Agency of the Forestry Commission

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Introduction

Resilience to climate change, the threat of pests and diseases, tackling the biodiversity crisis and the implications of these issues for the future of the tree and woodland sector are necessarily being foregrounded in management discussions. Through our research, we explored sycamore's place in those discussions, as a naturalised, fast-growing and adaptable species with increasing evidence to support its ecological value and potential contribution to future forest resilience[1]. Despite these characteristics, sycamore has long been perceived as a controversial species in the UK, particularly among conservation professionals. A 1991 Forestry Commission Occasional Paper acknowledges 'the antagonism which [sycamore] traditionally arouses among conservationists' (p15) and, in a review of the natural history of sycamore within Britain, Taylor described how the species is 'reviled by conservationists' (1985, p2). More recently, Rackham (2006, p30) argued that the status of sycamore in Britain has become 'contaminated by value judgements', Morecroft et al. (2008, p60) conclude that 'sycamore remains a controversial species' in Britain, and Rotherham and Lambert describe sycamore as 'the most despised of exotic trees in England' (2012, p9). With the notable exception of Taylor's (1985) survey of British conservation practitioners' attitudes towards sycamore - which found attitudes to be generally negative – claims that sycamore is a controversial species are anecdotal and not based on empirical social science.

Alongside a small indicative shift in the way sycamore is considered in policy and practice discourse, there is anecdotal evidence that suggests professional attitudes to sycamore in the tree and woodland sector are changing[2]. Some believe this shift in attitudes is linked to the loss of ash *(Fraxinus excelsior)* trees in the UK landscape as a result of ash dieback (*Hymenoscyphus fraxineus)* and emerging evidence of sycamore's positive ecological value and potential to act as a host for many of the species associated with ash. However, there has been no empirical exploration of this nor how any shift in attitudes and organisational policies are translating into how sycamore is managed in different landscape contexts and by different professional groups. Given increasing pressures on the tree and woodland sector to plan for climate change, pests and diseases, address biodiversity loss and deliver multiple other ecosystem services, it is important to understand how our shared values influence how we think about and manage different tree species. This is particularly true when – as is the case with sycamore – these values may be based on contested science and incite particularly strong emotions.

[1] Sycamore (SY) - Forest Research

[2] See, for example: Ashwood | NatureScot; Managing woodland SSSIs and ancient woodland with ash dieback (Hymenoscyphus fraxineus) - GOV.UK; Guidance on dealing with the changing distribution of tree species (Natural England)

This research sought to address this evidence gap by exploring the variety of attitudes and values associated with sycamore by different professional groups, how these translate into management practices and policies, and the implications of this for future consideration of sycamore in UK treescapes. This project was conducted in collaboration with ecologist colleagues who undertook a review of the current evidence in relation to the ecology of sycamore and the ecosystem services it provides. We began by reviewing the social sciences literature to ascertain what evidence exists to support anecdotal claims that sycamore is a controversial species amongst professionals in the tree and woodland sector. This was followed by empirical research with land managers and other tree and woodland professional communities of practice to understand the range of values and attitudes held in relation to sycamore and the future role it may play in the UK's treescapes.

This research set out to address the following questions:

1. What values and attitudes do different professional groups associate with sycamore?
2. Do these values and attitudes differ within and between professional groups?
3. Do these values and attitudes translate into professional practices?
4. How might these values be shaped by considerations of the future and regional and landscape contexts?

Methods

Scoping review of the social science literature

A scoping review was conducted to explore evidence relating to the social and cultural values associated with sycamore and to ascertain whether empirical evidence exists to support anecdotal claims that sycamore is a controversial tree species among tree and woodland professionals. Following Arksey and O'Malley (2005), the review followed five stages: Identifying the research question, identifying relevant studies, study selection, charting the data, and collating, summarizing and reporting the results.

The review aimed to gather information on the following research questions:

1. What does the literature say about a) attitudes and b) values associated with sycamore by specific publics (including landscape architects, policy colleagues, foresters, land managers, conservation practitioners, applied ecologists, among others)?
2. Does place context play a role in how sycamores are valued by these different publics (e.g. woodland, hedgerows, in-field, among others)?
3. Are there regional variations in how sycamores are valued by these different publics, particularly as a tree outside of woodland?

The search was conducted across Forest Science, Web of Science, and JSTOR using the following search strings:

Forest science: attitude* OR value* OR perception AND sycamore
Web of Science: (attitude* OR value* OR perception* OR perspective* OR preference* OR belief* OR experience* OR opinion*) AND (sycamore*)
JSTOR: (attitude* AND sycamore*)
The search returned a total of 413 results. After screening the results by title and abstract, only 16 studies were identified as relevant to the research questions. An additional 17 relevant studies were sourced from the bibliographies of the initial 16 studies. The search was broadened to include non-UK contexts given an initial lack of relevant results. However, the majority of studies identified as relevant are based in a UK context.
The results of the review were charted using Microsoft Excel and organised into four key themes which relate to the research questions: group identity, perceived benefits and disbenefits, classification and terminology, and regional and cultural context. These themes informed our lines of enquiry regarding professional groups, landscape context, and region, and the design of subsequent empirical research to explore these (interviews with land managers and focus groups with tree and woodland professionals).

Ecological literature review

In parallel to our review of the available social sciences evidence, ecologist colleagues conducted a review of the existing ecological literature. For details please see Manicom-Smith et al. (2024). A previous review (Barsoum et al 2024) had found that sycamore was relatively understudied in the UK, in comparison to its land cover. We presented the preliminary results of this review within the focus groups as a prompt for discussions about the ecological value of sycamore and its future in the UK.

Empirical methodology

Ethical approval was obtained through Forest Research's ethical approval process.

Interviews with land managers

We undertook interviews with five land managers to understand their values and attitudes relating to sycamore. This also served as a pilot study, to test our assumptions and research questions, given the paucity of the published evidence. We developed the interview guide to address the research questions and informed by the themes identified in the literature review and in work package 1 of the wider project[3]. Topics covered within the interview guide included: professional role and type of land management, experience of tree and sycamore management, specific sycamore trees on their land, perceptions and values of sycamores generally, and questions to support the ecological research (separate project, see below). The full

[3] Understanding the Social & Cultural Value of Trees outside Woodlands: Peri-Urban and Rural (ToWPUR) - Forest Research

interview guide is included in appendix III. As well as informing the project's overall findings (see subsequent sections), this data informed the discussion guide for subsequent focus groups with other tree and woodland professionals.

Interviewees were recruited from a sample of land managers already engaged with a sister ecology project (TWF-11) who had opted in to further research. Interviewees were all located in rural areas in the south of England. Ecology colleagues had found it difficult to identify sycamore ToWPUR for study in this region and so a focus in this location to explore possible causes related to land manager values was deemed appropriate. Interviewees were all land managers but came from a variety of professional backgrounds (farming, forestry, conservation, rural surveying, land agency, tree inspection, and local authority work) and their sites covered a range of management objectives (farming, woodland, parkland, common land, protected for biodiversity). Interviews were conducted over the phone or via video call. Informed consent was obtained for all participants.

All interviews were professionally transcribed. The interview transcripts were analysed thematically and for content using NVivo 14 following Braun and Clarke's (2006, 2021) reflexive thematic analysis framework (six iterative stages: i) familiarisation; ii) open coding; iii) generating initial themes; iv) developing and reviewing themes; v) refining, defining and naming themes; and vi) writing up the analysis). The analytical approach was inductive, identifying both semantic and latent content to address the research questions. Two researchers developed a coding framework based on a mixture of inductive codes derived from the interviews and deductive codes derived from the literature review themes. This analysis was conducted by the 1st author supported by discussions regarding the efficacy of the codes in the developing and reviewing stage with the 2nd author. Coded data was organised and annotated in Microsoft Excel according to theme. The results have been incorporated into the full report (attached in the appendix II) and below.

Focus groups with tree and woodland professionals

Learning from the interviews with land managers indicated that professional group identity plays a significant role in shaping perceptions and management of sycamore. We therefore decided to explore this further through focus groups with other tree and woodland professionals, to enable collection of data on participants' shared understandings and the ways in which individuals are influenced by others in a group situation (RQ2).

The literature review and land manager interviews also highlighted the difficulty in eliciting values and the need for data collection to be able to account for tensions between values. For subsequent data collection phases, we decided to focus on gathering data on management practices and policies in relation to sycamore, on the basis that these would, to some extent, reflect how sycamore is (or isn't) valued by different professional groups.

We stratified our sample into three broad professional groupings based on the ways in which each professional group (or community of practice) conceptualises or interacts with sycamores in their role:

- **Strategic** – those who make decisions about sycamore (or that will indirectly affect sycamore) e.g. policy-makers.
- **Tactical** – those who view sycamore as an object of interest, who may 'absorb' sycamore into their work e.g. landscape architects, scientists, ecologists, ecology consultants.
- **Operational** – those who directly manage or otherwise 'deal with' sycamore e.g. land managers, arboriculturists/arborists (including hedge-layers), conservation practitioners, foresters.

This stratification was intended to facilitate analysis of differences in attitudes and values within and between professional groupings, as per the research questions. Participants were recruited through internal networks and by approaching relevant organisations directly. The focus groups were broadly recruited and organised into sessions according to the categories above (strategic, tactical and operational). Focus groups one (n=9) and two (n=7) consisted of a mix of professional groupings, though focus group one was largely tactical and two was largely strategic. Focus group three (n=9) only included operational participants. The focus groups were held online via video call and facilitated by two social sciences researchers. Informed consent was obtained from all participants.

The focus group discussion guide was developed by the researchers with reference to the themes from the literature review and findings from the interviews with land managers. The full discussion guide is included in appendix IV. Topics included: distinctions in perceptions of sycamore inside versus outside of woodland, terminology and classification, how they encounter sycamore in their role, perceptions of sycamore's value, organisation and sector views on sycamore, experience of management or other practices in relation to sycamore, reflections on the ecological evidence presented and sycamore's future role in UK landscapes.

The sessions included a poll which asked participants to select the terms they would use to describe sycamore and a summary presentation of the ecological evidence review on the ecosystem services provided by sycamore (as described above). The latter was included on the basis that the new review provides additional information on the ecological value of sycamore, known to be particularly contested in discussions about the value of sycamore in professional circles. Its inclusion part way through the session was intended to explore participants' awareness of the evidence referenced and their reactions to it.

The focus groups were professionally transcribed. The data was analysed as for the interviews (described above). Prior to the focus groups, participants were asked to share any resources or policy documents that had shaped their perceptions of sycamore and how it should be managed. Analysis of these documents was incorporated into the findings of the research. Some participants preferred their

quotes to be fully anonymised, and in these cases their organisations are not listed in the results below.

Results from literature review: professional perceptions of sycamore

The literature review showed that there is little in the way of empirical evidence on professional values, nor social and cultural values, associated with sycamore in the UK, despite frequent references to negative cultural perceptions of the species, especially in the scientific literature. Aside from Taylor (1985) we were unable to source empirical evidence on professionals' (or any other groups') attitudes to sycamore (or values related to, perceptions of, etc.). Please bear this in mind when reading this review. We used the anecdotal evidence to suggest avenues which could be empirically explored within our research where the commentators were likely to have experience of the sector.

Several documents were returned within which authors anecdotally highlight controversy around sycamore and provide a variety of (unevidenced) explanations for this, these explanations included: sycamore's non-native status, the attitudes of conservation organisations, perceptions of its benefits and disbenefits, and an absence of robust ecological evidence about the species. Landscape context was considered a factor in shaping attitudes towards sycamore, primarily in terms of negative perceptions of its ability to invade and dominate ancient semi-natural woodland (Leslie 2005; Peterken 2011; Morton Boyd 1993; Taylor 1985). A small number of sources also suggest that there may be regional variations in attitudes to sycamore, based on factors like its historic distribution and its related suitability to certain geographical and climatic conditions (Green 2005).

Some authors commented that sycamore provokes strong emotions and reactions from conservation organisations in particular. Green (2005, p184) notes that 'Sycamore *Acer pseudoplatanus* has always excited strong emotions, especially in conservation circles', Good et al. (1991, p15) describe how 'sycamore is generally regarded as distasteful and is often strenuously discouraged by conservationists', and Leslie (2005, p19) notes sycamore's 'poor reputation amongst conservationists due to the perception that it supports only low levels of biodiversity, that it is not native and that it is invasive in ancient semi-natural woodlands'. Authors suggest that much of the controversy provoked by sycamore can be attributed to the threat it is perceived to pose to the values of conservation organisations, and that these perceptions are based on social and cultural values as opposed to scientific evidence alone. Taylor (1985) and Stern (1982) suggest that the negative attitudes of conservation organisations towards sycamore have shaped the attitudes of other professional groups towards the species (with Taylor's assertion based on empirical evidence). Taylor also describes how sycamore has been 'largely ignored by foresters' (1985, p2). However, Green (2005, p184) suggests 'most foresters find it valuable, especially outside the range of grey squirrels'. Likewise, Morton-Boyd described

sycamore as 'one of the most valuable hardwoods grown in Britain' and predicted that the species would be 'increasingly favored [sic] by lowland timber growers, particularly in the north of England where grey squirrels are not a threat to the trees' (Morton Boyd 1993, p425)[4].

Peterken (2001, p40) claimed that 'the problem with *A. pseudoplatanus* is partly one of principle: it is a non-native and thus unwelcome in native woodlands'. Some respondents to Taylor's survey took this principle further, believing that 'sycamore is non-native and therefore has no place in British communities of any type' (1985, p7). Taylor concluded that management of sycamore has been 'based on very little evidence, and, no doubt, a good deal of misguided prejudice' (Taylor 1985, p41). In addition to Peterken and Taylor, several authors have argued that the classification of sycamore as non-native has shaped negative attitudes towards the species (Green 2005; Lundberg 2010). Sycamore's non-native status is understood to be a 'source of prejudice against the species' (Leslie 2005, p21) which informs attitudes and management practices that are not based on sound ecological evidence but, rather, a principle (Green 2005; Peterken 2001). Leslie (2005, p21) claimed that 'efforts to eliminate or reduce sycamore as a component of woodland' in British nature reserves were based on perceptions of it as an 'exotic tree species'. In his case study of the role of conservation values in the management of sycamore in Norway, Lundberg claims that 'the invasive character of sycamore in the study area is overestimated' (2010, p333).

A number of authors claim that negative attitudes towards sycamore are due to its perceived disbenefits, including: invasive regeneration (Peterken 2023; Morecroft et al. 2008; Leslie 2024; Taylor 1985), low value to wildlife or biodiversity value (Taylor 1985; Leslie 2024; Morton Boyd 1993), and heavy honeydew production (Leslie 2024). The authors contest the invasive potential and low biodiversity value of sycamore and Leslie (2024) notes that heavy honeydew production is only a nuisance and therefore should not be considered a major disbenefit. In 1985, Taylor explained that perceptions of sycamore as an 'ecological disaster' (p41) were, in part, being driven by an absence of scientific evidence on the species: 'The truth is that very little work has been carried out on the ecology and status of sycamore in Britain…so no-one knows with any degree of accuracy to what extent it is likely to continue to invade woodland and other communities if left to its own devices. Even less evidence is available to support the view that sycamore is detrimental to wildlife.' (p3). This sentiment is reiterated by Binggeli in the 1990, speaking to the UK context: 'little scientific work has been carried out in order to compare the value of sycamore and associated tree species with different taxonomic groups in native and invaded ranges. Any statement on sycamore's wildlife value is therefore sketchy and possibly misleading' (1993, p143). The call for evidence is made again a decade later by

[4] Note the date of the publication, grey squirrels are now known to be more prevalent in northern England (Spring Monitoring Programme).

Morecroft et al. (2008, p60) who describe how 'the necessity for control [of sycamore] to protect conservation sites is still a matter for debate. Much information on the species is essentially anecdotal and there is a need for more detailed scientific study'. In 2024, Leslie describes how, from a forestry perspective, there is 'a paucity of strong experimental research, and silvicultural recommendations for sycamore are largely based on anecdotal observations' (p3). A recent review of the evidence available on the biodiversity of commercial plantations in the UK concluded that 'biodiversity studies were least common in larch, sycamore and Douglas fir' and that 'understudied woodland types in relation to cover included Sitka spruce, sycamore, larch and ash' (Barsoum et al 2024, p18). In addition to the lack of evidence, authors have also pointed to the misrepresentation of evidence and Taylor (1985) describes how evidence has been ignored.

Results of empirical research

This section organises the results of the research according to key themes from the analysis. These themes will be explored in relation to the research questions in the discussion section.

Some participants preferred their quotes to be fully anonymised, and in these cases their organisations are not listed.

Negative perceptions and shifting attitudes

Participants described hearing negative attitudes to sycamore in the past, particularly from conservation organisations. A number of participants had been involved in removal of sycamore from sites managed by conservation organisations earlier on in their careers. A strategic participant reflected that sycamore was something that, in the 90s, *'people would be spending a lot of money trying to get rid of'*. An operational participant, whose first job in the conservation sector was *'chopping out'* sycamore trees, described them as being *'highly undesirable'* at the time. Another participant, who had also spent time *'pulling out sycamore'* as a conservation volunteer in the 1980s described the time period as *'the very bottom of the curve for sycamore'* in terms of negative attitudes towards the species (Tactical, Forestry Commission).

Some participants explained that these attitudes were based on the understanding that sycamore was invasive and would come to dominate native habitats. One operational participant described how, as a 17-year-old working for the Nature Conservancy Council in the Chiltern Hills, *'we spent weeks, upon weeks, upon weeks, removing sycamores from our woodland because we all thought they were going to take over the world'*. Similarly, a strategic participant (Natural England) described how *'in my early career, we were still spending a lot of money removing sycamore from sites because of its non-nativeness. And because of its invasive behaviour'*. One operational participant (Natural England) thought that *'the dominance of the shade and the impact on ground flora, particularly if they start over dominating in SSSI [Sites of Special Scientific Interest] has maybe historically coloured people's opinions*

about it'. Some participants highlighted the lack of evidence around sycamore's perceived disbenefits; one strategic participant (Natural England) described how *'I think there is a view, there's a starting point in the sector, that's almost like, "Sycamore is bad." People just absorb that in their career...there is no evidence to back it'*. Similarly, another participant described a shift in his attitude towards sycamore once he had found that evidence of its perceived disbenefits was lacking:

> *Well, like others, in the '80s I was definitely part of the anti-sycamore "because it's non-native and it's highly-invasive and it doesn't support many species". Then you start to look at it and the evidence, actually, wasn't that strong on it being highly invasive. It wasn't that strong on it necessarily being bad for a range of species. Tactical, University of Oxford*

Participants described how attitudes to sycamores are changing and it is becoming more widely accepted in the UK's landscapes. An operational participant reflected how *'I was just thinking then, "Have I heard recently, in the conservation sector, people bemoaning the presence of sycamore in a wood?" and I don't think I have. It's much more widely accepted now than it used to be'*. Similarly, a strategic participant thought that *'things have changed'* since the late 1990s – *'I think, generally, the feeling then was that it was seen as a nuisance. I'm pretty sure the views of sycamore have changed since then'*. An operational participant (Woodland Trust) who had also done *'quite a bit of work in a SSSI [Site of Special Scientific Interest] in Essex removing sycamore'* twenty-three years ago reflected that *'whether that would be something that would be done now, I don't know. I think things have changed'*. While participants recognised this shift in attitudes towards sycamore, they were uncertain about how widespread this shift is and how it is translating into management practices. An operational participant reflected that *'I still think most ecologists I speak to would still have severe reservations about planting it extensively'*. A tactical participant (University of Oxford) described how there is still *'baggage'* that sycamore is in the invasive category. Similarly, a strategic participant (Natural England) emphasised that *'I still wouldn't plant sycamore into a site',* reflecting that, with regards to negative attitudes towards sycamore *'I don't think it's reversed entirely'*.

Perceptions of ecological benefits and disbenefits

Ecological review summary of findings as presented to focus groups

Invertebrates

Sycamore supports many species including leafhopper, aphid, butterfly, moth, lace bug, ladybird, scale bug, weevil and beetle species and supports the highest density of 'true bugs' compared with oak, birch, and hazel. The bark of sycamores provides an important overwintering site for some of these invertebrates. Sycamore flowers are an important source of nectar for bees and pollinators and the attractiveness of the species to aphids provides an important direct and indirect food source via honeydew production. Sycamore has also been identified as primary host for multiple

invasive invertebrates, although a lack of research means it is hard to understand how notable this is relative to other tree species.

Fungi, bryophytes and veteran attributes

Sycamore provides habitat for an abundance and diversity of mosses and liverworts, is as species rich in fungi as oak, and is richer than ash and alder. The alkaline bark of sycamores provides a suitable habitat for lichens and bryophytes and supports communities similar to those found on elm and ash. Although a decline in diversity of broadleaved species overall will reduce biodiversity, the sycamore is able to support many of the species that live on ash and oak and so could be a possible partial replacement option in this regard. Mature sycamore trees have relatively lower abundance of veteran attributes, such as trunk rot and epiphytes, when compared to ash, alder, oak, birch and beech.

Landscape contexts: farms and woodlands

Sycamores do not tend to negatively impact agricultural output and can work well in silvopasture arrangements, offering nutritious food to sheep and cows. However, farmers may be deterred from planting or retaining sycamore trees as they host large aphid populations that could impact crop yields. Additionally, sycamore seedlings and seeds are known to be poisonous to equines and can cause serious illness and death.

At high densities, the continuous canopy of sycamore can shade out ground species and therefore impact the surrounding biodiversity (although also potentially reducing its own seedling success). However, while sycamore is highly opportunistic and will colonise disturbed land, it intrudes little into dense, undisturbed, tall woodland and therefore may not be a threat to ancient woodland.

Risks and resilience

Sycamores are a resilient tree that stand up well to a variety of common air pollutants, are able to weather major storms, and are relatively less impacted by Phytophthora. However, they are not particularly resilient to climate change. With increased drought stress, the impact of pathogens for Sycamore is likely to become more severe and it is vulnerable to a number of pests and diseases. This includes sooty bark disease which flares up in sycamores following long and dry summers. Grey squirrels are also a major pest for sycamores and can badly damage trees through bark stripping.

Perceptions held by the participants

Participants explained that their perceptions of sycamore's ecological benefits and disbenefits are largely context dependent. An operational participant articulated this in terms of how the traits which make sycamore valuable in the context of ecological restoration are the same ones which make it undesirable in other settings:

> *It'll grow anywhere, it seems, so it has pioneer species habits. It's a prolific seeder. It has a fair range of dispersal. So, I think the reasons why it's chosen for soil restoration, due to its resilience and ability to withstand difficult*

> *circumstances, I think, in all of the other environments where it pops up, it's those traits that people tend to take a dislike to. Operational*

Sycamore was perceived as a viable replacement for ash in the context of ash dieback. An operational participant (Forestry England) described sycamore as *'a natural replacement that could be definitely utilised'* and, similarly, a strategic participant (Defra) described how sycamore *'fulfils a similar place in the woodlands that elm did, and [has] potential to replace ash, I think, or to make up for the loss of ash'*. Another strategic participant (Natural England) described how he often comes across sycamore being discussed in the context of its ecological similarity to ash, but caveated this by pointing out that '*ash was squirrel proof and sycamore is the opposite'*. Other participants also added nuance to this perception – a strategic participant (Woodland Trust) described how '*in larger trees, because the bark does flake, it can be not as good as ash but it still supports a good lot of ash species [species living on ash]'*, and another tactical participant (Future Trees Trust) emphasised that '*you need a suite of trees to fulfil that whole ecological function that ash did'*.

Participants identified sycamores as a useful habitat for other species, both as a living tree and as deadwood. Some participants explained that sycamores veteranize relatively quickly – one operational participant (Woodland Trust) described this as a '*useful'* feature, while another operational participant (Royal Parks) explained that '*as a deadwood habitat, it's quite decaying, it's phenomenal for a lot of generalist and invertebrate species'.* Participants observed that Sycamores are particularly attractive to pollinators. One operational participant (Woodland Trust, Operational) described how '*sometimes, when the flowers are out, you can just stand by and it's buzzing'*. Similarly, another operational participant observed that *'when you see a sycamore tree in flower and you look at what's on those flowers, it's not just honeybees, it's a whole host of different insects. That's fabulous'.* Growing up in Birmingham, another operational participant (Forestry England) remembers how '*it felt like [sycamore] was the sort of haven of life in these urban areas where you'd see bees and things all around it'*. A tactical participant (environmental consultancy) highlighted that sycamore is a particularly important habitat for native species, something which he felt was not recognised in how sycamore are currently considered within woodland quality assessments:

> *Sycamore is acting as a stronghold for native species. Whilst the species itself is not necessarily native, it is providing a home and habitat for species that are native, that would not necessarily still be there if the sycamores were gone. And I think that's the- one of the issues that I have with ranking sycamores as bad. Tactical, Environmental consultancy*

Similarly, in the context of '*depleted', 'over-grazed*' and '*over-burnt'* landscapes, an operational participant described sycamores as *'a reservoir for certain species until woodlands are re-established around them'*. The same participant had observed the way in which '*there are some species that seem to favour sycamore over other trees'*

and that '*the sycamore has its own flora, I actually think it's quite important for that up here [in Scotland]'.* The perception of sycamore as a tree that encourages the establishment of other tree species was shared by an operational participant based at a Forestry England-managed arboretum, who highlighted the benefits of sycamore's fast growth habit: '*with it being a fast-grower, and that kind of stuff, it is really good for protecting some of the more vulnerable trees that we have on site* (Operational, Forestry England).

In addition to the ecological benefits outlined above, participants also mentioned a number of broader environmental benefits they associated with sycamore. Due to its large leaves, fast growth-rate, and ability to tolerate poor growing conditions, sycamore was perceived as a useful tree in terms of its ability to improve air quality in polluted areas – for example, adjacent to intensive agricultural environments (Operational, Natural England), or in urban settings (Operational, Royal Parks). Highlighting the way in which this usefulness is not accounted for in '*conservation rules*', an operational participant (Royal Parks) described how '*for essentially what makes urban life better to live in, sycamore consistently ranks quite high for carbon absorption, air pollution filtration, etc. So, completely away from nature conservation rules, as an urban tree, in spite of the drought weakness, it has a lot of value there'.* Another operational participant also commented on sycamore's ability to store carbon: *'if you put it with the right mix of species, you actually get more carbon being stored in the soil. It hangs around for longer, which I guess would be a useful thing*'.

Participants also discussed the ecological disbenefits associated with sycamore, including its perceived invasiveness, dominance, shadiness, and low biodiversity value. The perception of sycamore as invasive was contested among participants. When participants stated that sycamore can be invasive, they tended to highlight that this invasiveness is context dependent. Some participants mentioned sycamore becoming invasive when growing in fertile soil; an operational participant observed that '*even up here [in Scotland], it can still be invasive in certain places where the soil is quite good'* (Operational). Overall, it was suggested that this invasiveness only becomes problematic in woodlands, particularly ancient woodlands (rather than as a ToWPUR). An operational participant (Woodland Trust) described how '*in the Southeast and Essex, it could still be a problem in some places because it's quite fertile land and, in ancient woodland, it can become a bit of an issue'*, while another operational participant (Natural England) described how, in woodlands, sycamores '*dominate'*. Similarly, a tactical participant (environmental consultancy) described how '*in certain situations, it can spread and it can dominate a small habitat',* acknowledging that *'I think we all agree that it can be a bit of a nuisance tree in woodland settings'*. Reflecting on negative attitudes towards sycamore, one strategic participant had observed that '*the more of the woodland was towards the ancient woodland type, the more [sycamore] was perceived to be as a nuisance'*. Contrary to the perception that sycamore will dominate the woodland it colonises, one strategic participant (Defra) had observed that:

> *You see [sycamore] finding its place in oak wood and beech wood, and establishing there, but it's not often that I've seen it outcompeting and overtaking and dominating. It dominates open, disturbed, land…but I rarely see it bullying its way into established native woodland. Strategic, Defra*

One tactical participant (Future Trees Trust) explained how '*I don't think of [sycamore] as an invasive species*', commenting that she hadn't come across the idea of sycamore as an invasive species at all: '*I'm coming at a forestry perspective, not an ecology perspective, but I've never come across sycamore as invasive. Is that just my ignorance?'.* One tactical participant (University of Oxford) explained that perceptions of sycamore's invasiveness are not well-evidenced: '*there isn't actually that much evidence. There are sites where it will spread very rapidly but it's not as invasive as people have often thought of it'.*

Participants observed that, in a woodland context, sycamore can create a dense, shady canopy which can in turn lead to low levels of ground flora. One strategic participant (Defra) reflected that '*I think, maybe, part of the reason it's so disliked in woodland, as well, is because it's often a big, dark tree and shades out a lot of the herb layer*'. Likewise, an operational participant observed that '*there's not a lot that grows underneath [sycamore] in woodlands'*, another described sycamore in woodlands as 'shady' (Operational, Natural England), and another described how sycamore has '*a denser canopy and you wouldn't have as much, I guess, forest-floor herbaceous growth, compared with ash'* (Operational). Some participants pointed out that lower levels of associated ground flora and the ability to prolifically regenerate are not unique to sycamore, nor do these traits correspond to native versus non-native status. An operational participant (Woodland Trust) argued that '*all sorts of other species'* can also be disruptive to ancient woodlands, including native species like beech *(Fagus sylvatica)*, aspen *(Populus tremula)* and white poplar *(Populus alba)*, and an operational participant (Natural England) reflected that *'I find beech more problematic than sycamore in terms of the dense shade'*. A tactical participant (environmental consultancy) hinted that sycamore is subject to different (more negative) perceptions than trees with similar status: '*I know for a fact that there are plenty of native trees that if planted just a little bit around in a range that they weren't naturally in, can act as the same problem'*. Addressing claims that sycamore reduces the biodiversity of woodlands, one tactical participant (University of Oxford) argued that the biodiversity of the woodland *'will change but it's not necessarily meaning that it's a decline in biodiversity. It's just a shift in biodiversity'.*

Implications of classification as non-native

Participants expressed a lack of consensus about how they would classify sycamore and highlighted that sycamore's status as a non-native species is contested. In response to a poll which asked participants to select any number of terms they would use to describe sycamore, 'naturalised' received the most votes out of a total of 59 votes cast (39%), though 'advancing or honorary native' (19%), 'non-native' (15%)

and 'invasive' (13%) also received significant shares of the vote. 'Neophyte' received 7%, 'native' received 5%, and 'exotic' received 2%. An operational participant (Royal Parks) pointed to the existence of various *'schools of thought',* and that *'there are a lot of people who do class it as a native'*. Conversely, a strategic participant (Natural England) expressed that *'I find it Orwellian to say, "When is it going to be described as native?" Because unless I had evidence that it was originally here, I wouldn't describe it as native'.*

Several participants questioned the logic behind sycamore's classification as a non-native species. One strategic participant (Natural England) described how *'in some ways, this isn't a scientific, it's almost a philosophical question around it, I think... Which is why it's so difficult, because there isn't a right or wrong answer, is there?'*. Several participants (Strategic, Defra; Tactical, Woodland Trust; Tactical, University of Oxford) pointed out that sycamore is a natural component of European woodlands: *'It's evolved in that situation in Europe so to say it doesn't belong here or it's not compatible with our woodlands, I think, is a bit simplistic'* (Strategic, Defra). Relatedly, participants also highlighted that the proximity of sycamore in Europe to the UK means that it could have made its own way to the UK: *'whether it would've blown over and a seed would've landed on the Kent coastline by now, you know, and it would've worked its way up, you could probably make a case that that's likely to have happened'* (Strategic, Defra).

Throughout the discussions, participants gave examples of how the classification of sycamore as a non-native species impacts how it is considered and managed. Several participants suggested that the classification of sycamore as non-native has shaped wider attitudes towards the species. They posited that non-native species are perceived to be less culturally desirable than native ones and that non-native species are often perceived as posing a threat to native species and habitats. A strategic participant (Defra) reflected that *'I think that a lot of the negative attitude to [sycamore] centres around it being non-native. If it was native, would we have a different view on it?*'. Similarly, an operational participant (Natural England) expressed that *'sometimes I think it's just a cultural thing…It's, culturally, seen as not native and maybe like a less desirable species'*. Reflecting on shifting attitudes to sycamore among foresters, an operational participant described how *'10 years ago it was kind of untouchable. It was kind of, "No, we just don't plant it. It's not native, we're not going to stick it in our woods"'.* In addition to the association between classification and negative perceptions, participants also pointed out the ways in which being a non-native species excludes sycamore from consideration in various contexts. A tactical participant (environmental consultancy) reflected that sycamores have been an *'enigma'* throughout her career as a landscape architect and that *'[sycamores] don't tend to come up in mixes that we would propose or put forward'* because her organisation errs *'towards more native mixes'*. As a result, sycamores *'slip through the net a little really'* or are *'ignored'* (Tactical, environmental consultancy). Another tactical participant (environmental consultancy) observed that *'some [within a named botanical society, are] more prone to dismiss sycamore just*

because of its view as a non-native tree'. An operational participant had observed that there is a *'certain amount of demand'* for sycamore in the northern Highlands of Scotland, but that the exclusion of sycamore from grant schemes means that *'it's not really going into the bigger woodland schemes'* and *'it doesn't always fit in with the grant schemes that people are using'.*

The classification of sycamore also has implications for how it is valued in various conservation metrics. A tactical participant (environmental consultancy) described how within current woodland condition assessment metrics (UK habitat mapping system), woodlands with high amounts of sycamore *'score very badly'*. This participant highlighted how this metric is not based on the actual ecological value that sycamore may bring to a habitat and so does not account for contexts in which sycamore is an important source of biodiversity:

> A *lot of the woodlands I look at tend to be small little scrappy woodlands along the edge of industrial parks…So, when people ask me why it's so poor quality, I said, "Well, comparatively to a rich natural woodland, yes. However, for the area, because of how matures quickly, and how it creates habitats for invertebrates, how it creates coverage for other species, you can't underestimate it." Tactical, environmental consultancy*

Participants highlighted the way in which sycamore is negatively regarded in conservation metrics has implications for the restoration of protected sites affected by tree loss to disease. One strategic participant (NatureScot) pointed out that the criteria involved in the notification of a SAC (Special Area of Conservation) also evaluate sycamore negatively on the basis of its non-native status. The participant pointed to the implications of this criteria for a SAC woodland that had been affected by the loss of ash and elm to disease and where sycamore would naturally regenerate in their place. The participant emphasised that such examples don't fit into the *'"native is good, non-native is bad"'* framework he perceived the criteria to be based on and which, he suggested, seem to support the de-notification of protected woodlands should they become dominated by sycamore:

> *This summer, the last elm died. The ash are at least 50% down and declining rapidly. That ash-elm wood is going to become a sycamore wood, and that's a huge challenge to the way we define success. Is that alright? Is that not alright? What are the wider implications when we're faced with something else? Strategic, NatureScot*

In a similar vein, another strategic participant described experiences with land managers in which the SAC restoration criteria had not allowed for the planting of sycamore on such sites. The participant explained that *'it would be fantastic if we were able to say that sycamore would be an acceptable replacement to plant in those sites, to meet the SAC restoration criteria'.* The participant pointed out that indecision around 'acceptable replacement' species is impacting restoration targets:

> *We're not going to be able to do much more restoration until we've decided what trees we're happy with replacing things like ash with. So, it means that that work isn't being done, which means we're failing on those targets. Strategic*

Resilience to environmental change

Across all professional groups, participants described how climate change adaptation, mitigation and uncertainty is informing their perceptions of sycamore and how they value it in professional contexts. They highlighted the importance of species diversity for enhancing forest resilience to environmental change, particularly pests and diseases, and made a case for the place of sycamore within that. An operational participant described how *'we don't know what's going to happen with climate change, and you have to plant woods centuries before they mature, you're having to just kind of hedge your bets, if you don't mind the pun, and just plant as many different things as you can'.* Similarly, a tactical participant (Forestry Commission) argued that *'the elephant in the room is the perfect storm between climate change and pests and diseases. There is not one solution to this, there are many solutions'*. Another operational participant argued that *'diversity is the key to resilience, in terms of climate change and the general establishment of treescapes, and the more we can incorporate in the right place, then the better the results are going to be'*.

Sycamore was also perceived as a strategic species choice in itself, in that: it has resilient traits including being relatively disease-free (Strategic, Defra; Operational, Forestry England) and is tolerant to harsh environmental conditions, including exposed areas, salt spray off the coast, storms (Operational, Natural England), and poor and polluted soil (Operational). Although this was caveated with the species' susceptibility to grey squirrel damage and sooty bark disease *(Cryptostroma corticale)*. The way in which participants framed the value of sycamore's tolerance and adaptability had regional and landscape dimensions; for example, locations that have exposed or poor growing conditions provide a context in which these traits become more necessary and therefore valuable. An operational participant described how there is a demand for sycamore from the Western Isles in the Outer Hebrides of Scotland: '*the sycamore is just bomb-proof, you can plant it in really exposed coastal positions, it'll grow fairly straight, it'll provide protection and actually give you an opportunity to establish other trees in behind it'.* Similarly, another operational participant (Woodland Trust) observed how *'I definitely see it as a useful landscape tree towards the West of the country, all the way from, I suppose, Scotland down to the Southwest. It, particularly, seems to do very well where other trees don't'.* Likewise, another operational participant reflected that, because of its salt tolerance, sycamore is *'useful in coastal situations'*. Emphasising sycamore's ability to grow in poor soils, one operational participant described how sycamore would do well on a landfill site with 'soil that had been made out of crushed brick, and silt from lake beds, and clay that had been scraped out of building sites, all mixed up together'. Another operational participant (Forestry England) described how this trait makes

sycamore an important tree on a community site in the northwest of England: *'we've got a lot of old collieries and that's generally, again, very, very, poor soil. [planting sycamore] actually enables us to get some trees away'.* Participants described sycamore as a relatively disease-free tree (Strategic, Defra; Operational; Forestry England), with the notable exception of its susceptibility to sooty bark disease in the South and South-East of England (Operational, Royal Parks). One strategic participant (Defra) describes how *'compared to others, they're relatively free of anything that's likely to decimate them'.* Likewise, an operational participant (Forestry England) argued that, given the growing threat of pests and diseases, sycamore's resilience to disease would shift attitudes towards the species:

> *When you look into the future, trees for the future, sycamore is bomb-proof. I think, in terms of considering what we have in the future when you can see stuff struggling, sycamore is one of those that will stand the test of time. I think that, naturally, will change the attitude towards it. Yeah, hopefully anyway. Operational, Forestry England*

However, the impacts of sooty bark disease and sycamore's susceptibility to grey squirrel damage mean that some participants saw planting sycamore in the South/South-East of England as unviable. One operational participant (Royal Parks) described that '*the rate at which we're starting to lose and develop symptoms of city bark disease and how quickly the tree can go from perfect health to dead is scary…I wouldn't recommend planting it in the parks I'm in'.* This participant anticipated that the changing climate would increase the geographical reach of sooty bark disease within the UK, causing more issues in the future. Likewise, another operational participant argued that *'you're not going to plant sycamore in the southeast of England, or southern England generally because it's not going to survive until we address the grey squirrel problem, and potentially sooty bark disease as well now'*.

Participants highlighted a tension between the drive towards species diversity and existing conservation policy and value metrics which exclude or negatively evaluate sycamore as a non-native species. Some participants emphasised the need to move away from the native/non-native framework where it is creating barriers to planting the 'right tree in the right place', particularly in light of the pressures of climate change, pests and diseases. One operational participant described how 'w*ith climate change and managing adaptation, we've got to get away a little bit from this native/non-native argument and look at, again, the general benefits that trees might provide to the site or where you're planting'* (Operational). Another participant (Tactical, Future Trees Trust) accepted that sycamore is not a native species but argued that *'it's barking nonsense not to consider it naturalised. It grows extremely well here. When so many of our native species are struggling, so many pests and diseases, we need to be augmenting the species that we plant and promote, not narrowing that restriction because of this quasi, "Is it naturalised, is it native?" argument'.* Similarly, a strategic participant (NatureScot) argued that:

> *The world is changing. It's hard to predict how it's going to change. It's hard to predict what new pests and pathogens are coming through…I tend to use the phrase 'natural woodlands' these days, rather than 'native woodlands', for exactly this reason, because we need a level of diversity in our woodlands to cope with the losses that are likely to happen. Otherwise, we face catastrophe as the whole woodland structure comes apart. Strategic, NatureScot*

Most participants describe the need to approach sycamore with a 'right tree, right place' attitude

Most participants suggested that decisions about how to manage Sycamore should be done on a site-by-site basis. Summarising this approach, a tactical participant (Forestry Commission) described how '*there are some very sensitive sites from a nature conservation point of view. And there are sites in the wider rural environment which are less sensitive. So, actually, a detailed knowledge of your site, along with the landscape context, are really key in terms of how we view sycamore'.* An operational participant explained that '*it's the right tree in the right place. [Sycamore] is opportunistic and it has certain situations where it's not the best tree in the world'.* Similarly, another operational participant (Woodland Trust) described how management '*depends on the site, I suppose, whether it is a potential issue or not or whether, actually, just accepting regeneration is part of the good management of the site'*. On an organisational level, an operational participant described how their organisation's approach to sycamore is site-dependent: '*if you're managing a herb-rich grassland or a raised bog or something then you've probably got zero tolerance to sycamore seedlings popping up. Whereas more established mature woodland, they might be more tolerant'.* Likewise, an operational participant (Woodland Trust) described how '*the Woodland Trust is fairly agnostic to sycamore…It is in our planting guide and design guide, as a tree that can be a component of woodland. I think it's nuanced, though, in that it can be problematic in some woodlands, so it's not a black-and-white thing where there is relatively pristine habitat'.*

The place of sycamore on protected sites was contested within the discussions and conservation professionals expressed a range of attitudes towards the species in those contexts. Some of these attitudes have already been covered in the previous section on 'Classification of sycamore as non-native', where some participants advocated for the inclusion of sycamore on protected sites where there is a case for its benefits (e.g. where there has been a loss of trees to disease). Regarding the acceptability of sycamore on protected sites, one strategic participant (Natural England) put forward that: *'I think that's still a decision that needs to be made on a site-by-site basis'*. He went on to describe how *'I wouldn't plant it, and in some sites, I would actively manage it out'*. Another strategic participant (Natural England) explained how, on SSSIs, sycamore is regarded as '*part of the problem'* and concurred that she wouldn't actively plant sycamore on such sites. The participant went on to say that she would take '*a similar line if the objective of the new woodland creation was to create native woodland, I would say let it in seed in. But I don't want*

you to put it in', in situations where sycamore was put forward as a proposed planting species. Similarly, an operational participant described how '*I don't think I've spoken to an ecologist who would encourage planting it. If it arrives you manage it, but probably not planting it'.* Many participants saw sycamore as '*problematic'* (Operational, Woodland Trust) in contexts in which they perceived sycamore to be a potential threat to the integrity of existing habitat. Referring to some hazel woods he had recently visited off the west coast of Scotland, an operational participant (Woodland Trust) reflected that '*somewhere like that you'd probably want to think twice about allowing sycamore, or rhododendron or anything, really, getting a hold in those sorts of woodlands'*. Similarly, a strategic participant (Defra) reflected on a sycamore he had come across in an ancient pine wood in the Cairngorms, which he described as '*one of our most valuable woodland habitats'*:

> '*Out of nowhere, there was this sycamore. I just found it quite striking that all around it there was nothing, it's completely supressed all of that acid vegetation that you see in the pine woods. That's certainly a situation where it's undesirable'. Operational, Defra*

Participants with arboricultural backgrounds described how sycamore tends to be perceived as a '*weed'* in the profession (Strategic, Defra) because they '*grow wherever'* (Operational, Woodland Trust) and is '*such a prolific self-seeder'* (Strategic, Defra), explaining how much of their contact with sycamore involved removing them from places where they are unwanted. Two participants involved in hedgelaying described how sycamore are not generally viewed as a good hedgerow tree within the hedgelaying community. Both highlighted that sycamore are difficult to prune and one explained that sycamores are 'going to be throwing seeds all over the place' and will subsequently dominate the hedge, leaving 'nothing really much underneath them'. To this, the other added that '*we come across them and we see the shade problems'* and that *'from the angle of hedge-laying, it's a bit of a feeling of a fight against them'*, so that generally hedgelayers don't want to see sycamores in hedges, and certainly not plant them.

While there were a mixture of views expressed about sycamore from a forestry perspective, several participants involved described sycamore as '*underutilised'* by the sector (Tactical, Future Trees Trust; Operational, Forestry England; Tactical, Edinburgh Napier University). One tactical participant (Forestry Commission) explained this as being due to a focus within the sector on Sitka spruce: '*there's a lot of inertia in forestry. We can be following, kind of, the business plan that we had in the '70s and '80s in terms of species choice. Basically Sitka spruce, you know'.* Another tactical participant (Edinburgh Napier University) reflected on the sector's shift towards other species due to the impacts of pests and diseases: '*for a long time, we were just looking at Sitka spruce because that's what the industry wanted us to look at… then Phytophthora [disease] came along and I think that opened up people's minds to the possibility that we might need to do research on other species just in case'.* A strategic participant thought that the forestry sector had approached

sycamore *'on a pragmatic basis, as a potential useful tree that can give you a half decent crop quite quickly'*. From an operational perspective, one participant described how, in the context of managing a forestry plantation, sycamore is considered to be a *'labour-intensive tree'*. This participant thought that some of this perception is based on '*preconceived ideas of [sycamore] being just this invasive species'*. He went on to observe how these perceptions have shaped management of the species: *'I think my colleagues just really don't consider it. It's considered on the really poor sites, only the poor sites, and it's planted and forgotten about…You know, it's under-utilised and it's sort of just thrown in and leave it…It's very overlooked, from our colleagues'.* Several participants (Strategic; Tactical, Edinburgh Napier University; Tactical, Future Trees Trust) highlighted the cross-sectoral role that sycamore could play as both a resilient and commercially valuable tree species. One strategic participant described how, in her experience, sycamore could be a *'good compromise species in some applications for productive forestry'.* A tactical participant (Future Trees Trust) argued that '*I do think there's a big role for sycamore in productive woodlands but also in native woodlands, maybe production isn't necessarily the objective, just because we're facing so many pest and disease issues'.* She went on to add that the incorporation of sycamore in our woodlands is '*crucial'*, given that '*we know this species is adapted well to growing in the UK and it yields valuable timber'.* One strategic participant echoed this perception of sycamore's multifunctionality, but anticipated that the strategic drive to include more sycamore in the landscape wouldn't be accepted by some commercial foresters:

> *In some ways, sycamore is one of – would be one of – those species that could fill that gap. It's broadleaf. It has some productive capacity. It grows pretty well in many different places, particularly exposed places. It's a pretty tough tree, but any commercial forester in Scotland would only think to see that as the fluffy bit on the edge, to be honest. Strategic*

Organisational and sectoral positions on sycamore

Participants described how attitudes to sycamore vary within organisations. One operational participant (Natural England) explained that *'I wouldn't say there is a set position, even within my area team, about sycamore*'. She went on to describe how *'I think there're the newer people, like me, who are probably a lot more relaxed about sycamore but it's so regionally dependent and site-specific'*. Similarly, a strategic participant (Natural England) described how '*we probably broadly agree at the centre, with a bit of noise around the edges, but I think, as you then drift out into an organisation, individuals on the front line, in a big organisation like ours, will carry their own personal views'.* Some participants identified that this gap between practitioners and those in strategic roles creates a sense of uncertainty about how policy is translating into practice. In the context of forestry, one strategic participant expressed uncertainty about how the move towards resilience and species diversity as objectives within commercial forestry is translating '*on the ground'* … '*so, we are doing a lot more work with [sycamores]. I'm not entirely sure it's making any*

difference practically, on the ground, just yet, but the foundations are being laid for trying to encourage a wider range of tree species to be planted in Scottish forests'. Speaking to this concern from a conservation angle, another strategic participant (Natural England) expressed uncertainty about the implications of the Forestry Commission's shift towards resilience for the management of protected sites:

> *There's an increasing demand to plant sycamore, and I have to respond to that…In SSSI terms, we would not encourage planting sycamore into a site that does not already have sycamore. And if a site already does have sycamore, I would be encouraging natural regeneration, but not planting. So, that's the position that I've taken. I don't know whether it's right or not. Strategic, Natural England*

As referenced in earlier sections, several participants emphasised the way in which ash dieback, in particular, is driving the shift in attitudes towards sycamore. A strategic participant (NatureScot) noted that '*the value of sycamore [is] changing from being something we want to remove to something we at least tolerate, if not want to keep and expand because we are losing ash. We're losing elm, and it's the most obvious, easy, default replacement'*. Similarly, another strategic participant (Defra) described how '*especially with ash dieback, now, [sycamore] can be an important tree'.* Another strategic participant (Natural England) described how ash dieback has '*been something of a caution*' on the removal of sycamore, and her colleague (Strategic, Natural England) concurred that on sites that have been impacted by ash dieback, sycamore is '*possibly more accepted than it used to be'.* Referring to changing management practices within an organisation he had previously worked for, a participant highlighted that sycamore's ecological benefits are being recognised more now:

> *The recommendation from 10 years ago was, if the sycamore was there, it was always a case of we were to eradicate sycamore. It was undesirable, full stop. I think, yeah, the short-sightedness of that in some situations, I think, has been realised more. It does have benefits and it occupies a niche. Strategic, Defra*

Despite this broad shift in attitudes towards sycamore, participants – like the one quoted above (Strategic, Natural England) – expressed uncertainty about how to interpret existing guidance relating to the inclusion of sycamore on sensitive sites. Participants pointed to guidance from Natural England, NatureScot, and the Woodland Trust that advises practitioners not to plant sycamore where it does not already exist, but to manage the species if it arrives '*naturally'* (Strategic, NatureScot). '*The idea is that, with sycamore, if it's already there, that's okay. If it's not there, don't introduce it*' (Strategic, Natural England). Some participants found the distinction between natural colonisation versus planting arbitrary, particularly if sycamore may present a valuable replacement for trees lost to disease. One strategic participant (NatureScot) argued that this distinction '*makes no sense in terms of woodland ecology or the practical outcomes'*. Reflecting on Natural England's

guidance, another strategic participant (Natural England) queried its logical basis and highlighted the lack of clarity: *'I've just flicked through a document and not worked out the difference, but it's, 'Don't allow it to go above 15 [percent cover], or don't allow it…We have this position on that, on the basis of something, and I don't know. Where do you get a figure of 15% from?'*. For some participants, this uncertainty about existing guidance was symptomatic of broader uncertainty around how the sector perceives and values sycamore. One strategic participant (NatureScot) highlighted the implications of this for our ability to respond to tree loss, particularly in Scotland where they are *'simultaneously losing elm and ash. It's all happening now, at once, because the glen here is full of dead elm that I remember from Somerset, 50, 55 years ago. So, the focus on tree loss is acute in these kinds of places'.*

Regional and cultural values

Participants highlighted that sycamore is valued as an important historical, cultural and aesthetic feature of certain landscapes, particularly in the north of England and Scotland. A tactical participant (Forestry Commission) described how he associated sycamore trees with the *'Yorkshire Dales and isolated farmhouses, usually on limestone, with these sycamores on the skyline'*. The participant went on to reflect that sycamore are *'a real feature of the Pennine Spine. And without them, probably wouldn't have the kind of landscape that we would, that we expect actually, in parts of the Pennines'*. A strategic participant (NatureScot) described how *'certainly around the north and west of Scotland, it's quite a characteristic tree of crofting communities, some clearance villages, that kind of thing'*. Another strategic participant reflected that in *'Northumberland, where I live, we have quite a lot of veteran trees, and a good handful of them are sycamores. They have been there as cornerstones of the community, for the people living here, for generations, and generations, and generations'.* Participants emphasised the landscape value of sycamores as trees outside of woodlands, particularly in open-grown or parkland settings. One strategic participant (NatureScot) highlighted how the Sycamore Gap tree demonstrates how sycamores (because of their resilience to harsh, exposed conditions) can become *'a large tree where others won't'*, and therefore become important and characteristic features of certain landscapes as trees outside of woodland. While he didn't think sycamores were *'the ideal tree for hedgerows'*, one operational participant expressed *'absolutely love them in parkland and open-growing trees. They're gorgeous'*. Another operational participant (Royal Parks) felt similarly: *'I love sycamores as a park tree, I think it's a phenomenal landscape feature'*. A different operational participant (Woodland Trust) described how *'when they become big trees, I think they're just fantastic. I think they're just great. I love massive sycamore'.* Another operational participant reflected that sycamore is *'a much more interesting tree outside woodland. I mean mature. I mean like the Sycamore Gap tree. A mature sycamore is fantastic. Inside woodlands, I was thinking, was rather boring'.*

Some participants expressed personal connections to specific trees and to sycamore as a species in general. A strategic participant (Defra) expressed that *'I think big open grown sycamores in the Lake District are just fantastic things. It's such an important part of the landscape. Certain sycamore trees that I grew up near, I feel a sentimental attachment to it'.* He added that sycamores are '*so nice to climb as well'*. An operational participant also reflected on a childhood familiarity with sycamores: '*You know, I was brought up in the suburbs of Birmingham and it was there then. It was a great inner-city tree. It felt like it was the sort of haven of life in these urban areas where you'd see bees and things all around it. Growing up, it was something that I always, sort of, loved about it'*. Likewise, a tactical participant (environmental consultancy) also expressed a personal fondness for sycamores '*from a personal point of view, I think they're great trees actually…As I say, there's something very synonymous with my childhood around them I think. I don't quite know why'.* An operational participant (Royal Parks) identified himself as '*a sycamore enthusiast and defender'*, reflecting on his familiarity with the species: '*I get up in the morning, look out my window, there's a big mature sycamore'*. Another operational participant (Forestry England) highlighted how his familiarity with sycamore growing up in Mid-Wales has shaped his perception of the species:

> *You know, seeing sycamore all the time. I grew up in Mid-Wales and I didn't really count it as an invasive species. You know, it's been there for my whole lifetime and actually it's just one of the many trees that we have here. Forestry England, Operational*

Some participants felt that the way that sycamore is perceived and managed by professionals does not reflect how trees are valued by members of the public. Participants used the example of the public response to the felling of the Sycamore Gap tree as an indicator of 'what matters' to the public with regards to trees: that people value specific trees based on landscape context, familiarity, age and size, rather than whether a species is native or not, or even its relative ecological value. Reflecting on the public expression of sadness about the felling of the sycamore gap tree and the views of some ecologists that he had observed, an operational participant (Royal Parks) argued that '*the Sycamore Gap thing to me epitomised what is quite a substantial failure, in my view, amongst the professional sector to completely fail to understand the public's views on trees over and over again. How the public view trees in a very, very different way to we do'.* In a similar vein, another strategic participant (Natural England) argued that *'a lot of this discussion around whether sycamore is the right tree is a slightly esoteric discussion among ecologists, and arboriculturalists and so on. Bluntly, I suspect the vast majority of people who engage with and get value from them don't give a monkey's, as long as it's a big, good-looking tree'*. Similarly, a tactical participant (Environmental consultancy) argued that '*the British public don't necessarily care as much as we do whether a tree is native or not'* and that after a tree reaches a certain age:

> *It's viewed by the public as something that should be there. Because if it has lasted this long, then by definition, it has gained the right to be classified as part of that area. So, if you'd asked anybody, I think, the general public, if the Sycamore Gap tree was native, I think 90% of people would have said yes because, in their mind, it's been there such a long time that it deserves to be there. Tactical, environmental consultancy*

In contrast, an operational participant described how *'I would say the majority of the enquiries that I get from parishioners is, "Can you help me get rid of this horrible thing growing at the end of my garden?" and it's inevitably a sycamore'.*

Participants expressed conflicting views about how the public value sycamores in an urban setting. Some thought that the familiarity the public would have with sycamore as urban trees would stand sycamore in good stead: '[*The public] want to imagine very big trees, in very wide areas. And in urban settings, they want to see very big trees, and sycamore have often been those trees'* (Tactical, environmental consultancy). However, others thought that sycamore would be unpopular with the public in urban areas due to the association of sycamores with honeydew getting stuck onto cars: *'I think the amount of complaints, they'd have to cut them down because of all of the cars, I would gather'* (Strategic, Defra). Similarly, a strategic participant thought that sycamore would be '*vilified'* in an urban context, because '*people hate the sap'*.

Discussion

This section will discuss the results in relation to our research questions. While many participants were advocating a 'right tree, right place' approach to managing sycamore, it is clear that there is inconsistency within the sector related to how the species is considered in tactical, strategic and operational settings. This in turn can lead to confusion and tensions in practice. The results detail a number of instances where professionals were uncertain about how to proceed with regards to sycamore. This indicates that more sector-wide (and internal organisational) discussion is required about when sycamore is the 'right tree in the right place', with complex real-world examples considered. Findings from this research indicate that these discussions should attend to ecological evidence alongside the history and geography of species and the wider values and attitudes held in relation to the species.

RQ1 What values and attitudes do different professional groups associate with sycamore?

Having initially approached this topic by making a distinction between attitudes and values, our empirical research demonstrated that these are difficult to disentangle in practice. As outlined in the introduction to this report, values are sometimes framed as attitudes (Stålhammar 2021), and the nature of the relationship between the two concepts is a grey area. While stratification of the sample by professional group

(strategic, tactical, operational) was useful for recruitment and research design, analysis of the focus group results did not reveal a correlation between our assigned professional groupings and values/attitudes recorded. The relationship between the values/attitudes of professional groups versus individuals and wider social and cultural values proved to be complex and differences between professional groups could not be comprehensively distinguished.

Participants described how conservation organisations, or those in a conservation role, have historically expressed negative attitudes towards sycamore. They explained that these attitudes were largely based on the understanding that sycamore was invasive and posed a threat to native habitats. Some argued that there was little evidence to support these claims. Participants had observed that attitudes towards sycamore within conservation were shifting to become more accepting, but they were uncertain about the impacts of historical negativity towards the species. In other professions, sycamore was described in positive and negative terms. In negative terms, the species was described as a weed (arboriculture), difficult to work with (hedgelaying and forestry), ignored (landscape architecture, forestry), and dominant and undesirable (hedgelaying). Participants involved in forestry gave a mixed picture of attitudes to sycamore within the sector. In some regions it was seen to be more desirable recently. One participant thought, on the whole, forestry had a 'pragmatic' attitude towards sycamore. Conversely, other forestry participants described how sycamore is either 'ignored' or negatively regarded due to its status as an invasive non-native species.

As individuals, participants expressed a variety of ways they value sycamore: as a resilient tree with unique ecological and environmental benefits; an important aesthetic and cultural feature of certain landscapes; and a tree with strategic potential to mitigate tree cover loss to disease and contribute to resilient and multifunctional woodlands of the future. Participants highlighted sycamore's value as a habitat and to wildlife, particularly pollinators, and to other plant species including lichens. Sycamore was valued as a resilient tree that contributes to various ecosystem services (including carbon absorption, shade, shelter, pollution filtration) particularly in urban or degraded environments. While none of these ecological and environmental benefits were directly disputed within the focus groups, the level of agreement and shared awareness of them appeared to be variable. In contrast, there was near consensus across participants that sycamore was valued as one species (among others) which could contribute to species diversity objectives in relation to striving for forest resilience to environmental change. Some participants expressed positive personal values in relation to specific sycamore trees, as well as affinities for the species in general. These were often framed in terms of a familiarity with the tree (sometimes from an early age), a recognition of its cultural and historical importance in certain landscapes, and a sense of the intrinsic value of trees. Participants also described what they saw as the relational value ascribed to sycamore trees by members of the public who, in their experience, valued trees that they are familiar

with, for their age, historical presence, contribution to landscape aesthetics and provision of ecosystem services.

RQ2 Do these values and attitudes differ within and between professional groups?

We found that site and management context (e.g. in a forestry plantation, in a hedge, on a site protected for biodiversity, on farmland, in a peri-urban area lacking tree cover, on an ash-depleted site) was more likely to affect participants' attitudes to sycamore and its acceptability than membership of professional group. 'Right tree, right place' can act as a barrier to stakeholders recognising and reflecting on their preferences regarding sycamore. Thus, differing approaches to managing or researching sycamore in similar contexts can be divorced from understanding of why conflicting approaches and subsequent tensions might occur (and how to address them).

The research highlighted some points of tension between the values associated with sycamore (detailed above) and what can broadly be understood as the priorities and norms of certain professions. In this sense, sycamore could be considered as a proxy for some of the tensions inherent in multi-functional treescapes. Participants explained that sometimes the traits of sycamore (e.g. prolific natural regeneration, difficulty to work with in hedge-laying, as a 'labour-intensive' plantation tree) conflict with the objectives of their role, profession or organisation.

Sycamore's non-native status is commonly the basis for assessing its value and some participants expressed frustration that this means the holistic, context-specific value of sycamore is not fully accounted for. While this conceptualisation originates from within the conservation sector, evidence from both our empirical research and the available literature suggests that the negative associations accompanying the classification of sycamore as non-native have also influenced how sycamore is perceived within other professions.

We observed a diversity of attitudes and values relating to sycamore within professional groupings and that individuals can hold what could be seen as conflicting attitudes and values. It is therefore unsurprising that a variety of values and attitudes towards sycamore can exist within an organisation. This becomes problematic when there is a lack of organisational clarity in relation to sycamore and how it should be considered in practice, particularly in the context of forest resilience.

RQ3 Do these values and attitudes translate into professional practices?

Historically, negative attitudes towards sycamore within the conservation sector corresponded to a significant investment in their removal from sites managed for biodiversity or conservation. Changing attitudes towards sycamore by conservation professionals has corresponded with various organisations publishing guidance indicating when and how sycamore can be included on sensitive sites. However, some participants expressed uncertainty about how to interpret this guidance in practice,

some continued to remove it, and some were taking the approach that they would allow sycamore to 'seed in' to native woodlands or sensitive sites but were opposed to the idea of planting it 'on purpose'. Other participants, particularly those who were responsible for the management of sites affected by tree loss due to disease, found the distinction between planting and natural colonisation arbitrary (i.e. not evidence-based) and pointed to cases in which it would be ecologically beneficial and, in their view, a priority, to plant sycamore. This scenario relates to a broader tension (referenced above) between sycamore's ecological/environmental value and its position within some current conservation value metrics and classification which inhibit recognition of its ecological/environmental value (and relational/landscape value) and the 'realisation' of its ecological/environmental value on sites where there may be a case for its benefits (e.g. restoration of ash or elm-depleted sites). Participants also highlighted a tension between what they saw as professional or scientific perceptions of the (lack of) value of sycamore (because it is a non-native species) and the way in which members of the public perceive the value of sycamore. By extension, they felt that public (social and cultural) values are not currently being translated into professional practices.

There appears to be an absence of up-to-date evidence within guidance and policy documentation about the ecological/environmental benefits and disbenefits of sycamore in different contexts.

RQ4 How might these values be shaped by considerations of the future and regional and landscape contexts?

This research has shown that a range of values and attitudes have historically influenced and continue to influence how sycamore is perceived by tree and woodland professionals. However, uncertainty and tensions in how sycamore is valued are now being foregrounded as the sector feels the impacts of and the need to adapt-to and mitigate-for rapid environmental change (i.e. increasing prevalence and impact of tree pests and diseases, changing climate, biodiversity loss). Some of the professionals we spoke with are observing and experiencing the consequences of such uncertainty and tension; in terms of tangible impacts on the capacity-for and speed of tree and woodland habitat restoration and adaptation, but also in relation to a broader question about the efficacy of current metrics of conservation value and success in the face of environmental change. In a forestry context, participants highlighted the growing pressures on woodlands to deliver multiple benefits (i.e. productive forestry and other public goods) and related uncertainty and tensions around the role of sycamore in this.

This research has highlighted the role regional and landscape contexts play in shaping values and attitudes in relation to sycamore. Sycamore trees are valued as important aesthetic, cultural and historic features of certain landscapes, particularly in Scotland and in the west coast and north of England. Participants described how sycamore are 'often the only tree growing' in harsh or exposed environmental conditions and are

ascribed particular value as mature trees outside of woodlands. Regional and landscape contexts are also significant determinants of where sycamore will be considered 'useful' or viable to plant now and in the future. For example, participants highlighted the impacts of sooty bark disease and grey squirrel damage in the south and southeast of England. In contrast, other participants highlighted the acute tree loss of both ash and elm and the absence of grey squirrels in Scotland, alongside different climatic conditions to the south and southeast of England.

Recommendations

- Acknowledging the diversity of values that sycamore has in different professional contexts will allow for better and more strategic decision-making about where it should be included and why. This could include a review of current assessment systems associated with tree species classification as native/non-native, which often don't account for the value of sycamore in a holistic, context-specific way.
- Participants spoke about the need for cross-sectoral discussions about the role of sycamore in treescape resilience and articulated a need for a more 'joined-up' approach to managing trees in the landscape for multiple benefits. There were also calls for a more consistent approach to sycamore across organisations in the sector.
- More up-to-date evidence about sycamore in different UK settings is needed, including something which addresses the range of terminology used to describe the species (e.g. naturalised, non-native, invasive, advancing native). Participants also called for 'philosophically coherent' guidance about the inclusion of sycamore on sensitive or ash-depleted sites.

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Alice Holt Lodge
Farnham
Surrey, GU10 4LH, UK
Tel: **0300 067 5600**

Northern Research Station
Roslin
Midlothian, EH25 9SY, UK
Tel: **0300 067 5900**

Forest Research in Wales
Talybont Research Office
Cefn Gethiniog
Talybont-on-Usk
Brecon
Powys, LD3 7YN, UK
Tel: **0300 067 5709**

info@forestresearch.gov.uk
www.forestresearch.gov.uk

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