



# Perspectives on Private Property Urban Forest Dynamics Among Arborists in Sweden

By Jeffrey Facto

**Abstract.** Arborists have been described as the frontline workers in the urban forest. They apply their craft at the intersection of workplace culture, regulatory frameworks, and social-cultural perceptions of the ecosystem benefits of trees. How this impacts the provision and distribution of social and ecosystem benefits is poorly understood. With specific focus on how these workers shape urban forest management on private property in Sweden, we attempted to bring these perspectives into focus through dialogue. This study method included both a questionnaire and long form interviews to probe 3 primary questions: (1) *What are the drivers of tree removal on private land from the arborist's perspective?* (2) *How do arborists perceive their role and responsibilities towards private trees?* (3) *How do regulatory frameworks impact arborists' work, and what are arborists' opinions on these regulations?* In total we received 88 responses to the questionnaire, from which 5 participants were selected for a follow-up interview. Significantly, we found consensus among respondents that arborists in Sweden consider it their role to educate clients on the value of trees and that private trees are under-protected, and yet, nearly half of the respondents were unsure if their working area had tree by-laws at all. This highlights a need for greater dialogue between the arborist community and policy makers in Sweden to align efforts in maintaining a healthy urban forest.

**Keywords.** Arborist Perspectives; Political Ecology; Tree Workers; Urban Forestry.

## INTRODUCTION

The threats to the biophysical order of the world require strategic action and new models of environmental stewardship (Ogden et al. 2013; Buck 2015; IPCC 2022). It is befitting of the challenges faced that many cities around the world are creating strategies to improve the provision of benefits apportioned by the urban forest (Pincetl et al. 2013). Often, these strategies are limited to improving urban forest conditions on public lands while neglecting to provide comprehensive management strategies for private lands (Clark et al. 2020). In doing so, they ignore the fundamental reality of how tree benefits are externalized (Gill et al. 2007). There are legal and political reasons for this exclusion, but at the world stage, cities are setting new precedents for private land management. Comprehensive urban forest strategies are those which account for the entire mosaic of vegetation in a city, as well as the array of actors involved in management.

At such fine scale, the number of actors involved are immense, as are the variations in vegetation conditions and possible management options. Improving oversight and governance of these spaces has required researchers to delve into the attitudes and perspectives of key stakeholders in these spheres. Studies have explored several key stakeholders: municipal arborists (Živojinović and Wolfslehner 2015; Khan and Conway 2020; Randrup et al. 2020), landscape architects (Conway and Vander Vecht 2015), and homeowners (Roman et al. 2014; Pearce et al. 2015; Klobucar et al. 2021). Woefully understudied are the perspectives of those for whom felling and caring for urban trees are their daily work (Bardekjian 2016). These perspectives could then inform the governance and management of trees on private property (Koni-jnendijk van den Bosch 2014; Roman et al. 2018).

Arborists have been described as the frontline workers in the urban forest (Bardekjian 2016). These workers are engaged in the care, maintenance, and

often, the removal of trees. Their work requires informal consultation between clients and navigating local government ordinances to define a course of action with regards to specific trees. It is through these micro-consultations that arborists come to determine the quality and compositions of great swaths of the urban forest, particularly where it occurs on private property. Especially in regions where tree protection ordinances are weak, arborists, in their daily work, come to impact the quality and health of the urban forest.

Despite their “on the ground” role, arborists are often excluded from the conversations at the policy and academic level. Elevating these workers within the discourse around sustainable arboriculture and fostering greater professionalism within the industry may not only lead to the enhanced deliverance of urban forest benefits, but they may also lead to better health and safety outcomes for workers (Lim et al. 2020; Gordon and Brodbeck 2024).

In Sweden, there is a history of industry-led activism to save and protect trees. Sveriges Arboristförbund (SAF), an organization which represents tree workers, was formed in 2011 with the explicit intention of improving the quality of decisions about trees and tree care in the country and to unite the industry. Sweden is also a country with few restrictions on the felling of trees on private property.

### **A Swedish Perspective**

Sweden is the largest and most populous country in the Nordics. It is a highly urbanized country with 88% of its population living in urban areas and roughly one-third residing in 10 cities with more than 100,000 people (Statistics Sweden 2021). In the largest cities of Stockholm, Gothenburg, and Malmö, building codes have supported a gentle density that have allowed for a diffusion of greenspace well into the urban core. In fact, the world’s first national urban park, Kungliga Nationalstadsparken, was inaugurated in Stockholm in 1995. This sprawling parkland embodies principles of ecosystem connectivity: a matrix of small and large patches of native vegetation which serve as stepping stones for a host of other species (Forman 1995).

Sweden has a young but vital arboriculture industry. Hvilan Utbildning is a technical college offering arborist education at both their campuses in Malmö and Stockholm. SAF holds numerous events throughout the year and focuses on certification and

continuing education. The Swedish Chapter of the International Society of Arboriculture (ISA), Svenska Trädföreningen (STF), broadly encompasses municipal foresters, landscape architects, ecologists, as well as arborists. In 2022 there were 900 members, of whom, approximately, 250 are arborists (personal correspondence).

Yet these figures from a maturing industry are contrasted with the relatively weak protections placed on trees on private lands. Outside of special development areas and a few historic neighbourhoods where tree felling permits are required, only trees of either great age (140+ years), great size (> 100-cm DBH) or with large cavities require consultation with the local county administrative body (Länstyreslerna) to be felled.

In a review of Swedish municipal tree inventories, it was found that only 2% of municipalities collected information or monitored private trees (Östberg et al. 2018). Lack of monitoring and poor tree protection legislation means that homeowners have ultimate discretion in how they manage their trees. As studies in Canada have shown, this can put private property management out of alignment with urban forest goals (Conway 2016). Arborists then have 3 possible roles: they become an accessory to tree felling, they may decline the job, or they may press for alternative prescriptions which result in retaining the tree. While difficult to quantify how many trees arborists save through their consultations with clients, a qualitative investigation of the industry might shed light on why arborists sometimes decline jobs or seek compromises to avoid felling.

Poorly researched areas include the ethical motivations and perspectives of these skilled workers. As such, we have conducted a questionnaire and interviews for arborists in Sweden to gain their insights on their role within the urban forest. Perspectives were gathered in relation to what arborists believe are homeowner’s motivations in seeking tree removal, their knowledge of and attitudes towards tree protection legislation in their region, and whether they take a passive or active role in advocating for trees and their benefits. This study also seeks to explore the relationship between an arborist’s experience, their level of certification, and how they perceive their role vis-à-vis trees.

This qualitative study is aimed to promote dialogue which may improve urban forest governance especially in relation to what Ordóñez-Barona et al.

(2021) consider the 2 primary mechanisms by which government can protect trees on private land: through regulations or incentives. It has long been commonplace for cities to develop and support a legal framework for the protection of trees on private property (Profous and Loeb 1990). With such limited legislated tree protection in Sweden, the extent to which they influence behaviour is uncertain. How can the commercial tree industry be encouraged to make ethical decisions? The broader implications of this study may provide some insight as to how arborists as a worker group may be studied and how they may be incentivized to work in concert with broader urban forest strategies.

The following research questions were defined:

1. What are the drivers of tree removal on private land from the arborist's perspective?
2. How do arborists perceive their role and responsibilities towards private trees?
3. How do regulatory frameworks impact arborists' work, and what are arborists' opinions on these regulations?

## METHODS

### Questionnaire Development

We deployed a qualitative lens on the phenomenological conditions which exist between arborists and their work and between arborists and the broader urban forest (Creswell and Poth 2024). The primary mode of data collection involved surveying the Swedish arborist industry to explore sentiments relating to tree felling and tree protection. A questionnaire was developed in English and translated into Swedish. Links in both languages were published to capture a wide range of arborists both native and international who have worked in Sweden in recent years. This was done using a web-based service called Pollfish.com which was free to use and promoted on SAF's and STF's Facebook Groups.

The questionnaire included 18 questions and was designed to be completed in approximately 10 minutes using a mixture of single selection and open-ended questions. It was developed around topics discussed on online arborist community message boards as well as on a review of the literature, particularly around topics of tree protection regulation. The survey was piloted by a selected group of arborists to ensure nonbias and that the questions were relatable

for the targeted audience. First, 2 qualifying questions were asked: whether the participant had worked within Sweden in the past 5 years, and if they responded "yes", they were then asked to specify the county (län) in which they worked, after which, they would qualify to complete the questionnaire.

The subsequent 6 questions related to arborist demographics and business organization. Demographic information included gender; years worked in the industry; industry role (grounds-person, climber, sales representative, consultant, entrepreneur); company size; relevant certifications and education; and frequency with which individuals touched trees as part of their practice in arboriculture.

This was followed by an open-ended question asking respondents to describe the most common reasons for felling trees on private property.

The next series of questions (9 through 13) engaged with respondents' sense of obligation for advocacy on behalf of trees. The questions were framed to provoke honest expression of the individual respondent's perception of their role when on a residential jobsite with an emphasis on jobs where felling healthy trees is the task at hand. Questions investigated whether respondents believe their duty towards the client requires a duty towards their trees as well. If so, do they feel conflicted by the requests they encounter, and do they see it as their role to educate clients? An opportunity for open-ended feedback followed the question, "Has there been a time in the past year when you declined a tree felling job for ethical reasons?"

The final set of questions investigated arborist perceptions of tree protection bylaws in Sweden as well as to explore the level of knowledge regarding tree protection legislation in the respondents' specific working region.

### Participant Selection

Arborists can be a difficult group to study, as they often work independently and memberships with industry associations are voluntary. To cover the widest range of actors, the questionnaire was provided on several platforms. We determined that the most pragmatic method to reach out to Sweden's climbing arborists, independent contractors (entreprenörer), sales representatives, and consultants was to distribute our questionnaire on the Facebook pages of 2 industry associations: Sveriges Arboristförbund (SAF) and Svenska Trädföreningen (STF).

Further, we reached out to Arboristbutiken, a major distributor of arborist equipment in Scandinavia, to reach a broader cross-section of workers. Arboristbutiken advertised the questionnaire on their Instagram page.

The questionnaire was posted on all 3 platforms on 2022 January 9 and was available for 3 weeks.

Arboristbutiken generously provided a gift certificate amounting to 2,500 SEK (approximately 260 USD) to be raffled as an incentive for potential participants. The prize was awarded in 2022 March.

### Statistical Analysis

Continuous variables were summarized as mean (standard deviation [SD]) or median (interquartile range [IQR]). Categorical variables were described as frequency (percent). Bivariate analyses used chi-square tests or student's *T*-tests.

Education was classified as "Higher education" based on having at least a college diploma or higher (Bachelor's degree, Master's degree, or PhD). Company size was categorized as "< 5 persons" and "≥ 5 persons".

Logistic regression models were built to explore the direction of the relationship between demographic and work-related variables and the main outcomes of interest (did you fell a tree in the last year against your better judgement—yes or no; did you decline a tree-felling job in the last year for ethical reasons—yes or no). An ordinal regression model was used to determine if there were factors which were associated with the response to a question regarding the frequency with which it is appropriate to challenge clients' opinions ("sometimes", "often", or "always"). Findings were reported as odds ratios (OR) with 95% confidence intervals (CI).

### Thematic Analysis

Responses to long-form questions were categorized based on the general theme or sentiment. This method for analyzing the long-form data was chosen for its potential to summarize important features within the dataset (Nowell et al. 2017).

### Interviews

At the end of the questionnaire, respondents were asked whether they would like to be contacted for a follow-up interview. Of those who said yes, we randomly selected participants until we had conducted 5 interviews (3 from the Swedish questionnaire and 2

from the English questionnaire). All interviews were conducted primarily in English. These interviews would take place via Zoom or over phone and would be loosely structured and pertaining to the themes of the questionnaire. The rationale for a follow-up interview would be to more deeply explore the ethical and legal conditions that arborists navigate in the work. The written transcripts of these follow-up interviews would be subject to thematic analysis (TA). By organizing these statements around common themes, we can then use them to expand on the data (Braun and Clarke 2012).

### Data Handling

It was made clear that providing contact information either for the raffle prize or for the follow-up interview was not obligatory. Further, collected data were not used for any purposes outside of those defined in the consent form of the survey. The data recorded on the returned forms was entered into an excel spreadsheet, with all identifying information removed, and saved securely to ensure respondent confidentiality and privacy.

## RESULTS

### Questionnaire

#### Demographics

Over the period from 2022 January 10–31, 88 complete responses which met the eligibility requirements were received. The questionnaire was completed by 62 of the respondents in Swedish and by 26 in English. The participants mostly identified as male (75 [85.2%]) and as climbing arborists (83 [94.3%]). Of the 21 counties in Sweden, 14 were represented by respondents, with the majority having worked in Stockholm (39 [44.3%]). A summary of the demographic and work-related variables is provided in Table 1.

#### Perceptions of Role

To determine the extent to which arborists are passive or active actors in the urban forest, several questions were designed to interrogate how they perceive their role.

In response to the question of whether arborists feel conflicted by work specifications that go against their own understandings of tree-biomechanics or tree ecology, 75 respondents (85.2%) said "yes", 12 said "no", and 2 were unsure. Most respondents stated that it is their role to educate clients on the



**Table 1. Demographic characteristics of the questionnaire respondents ( $n = 88$ ). IQR (interquartile range); ETW (European Tree Worker); ISA (International Society of Arboriculture).**

<b>Gender, <math>n</math> (%)</b>	
Men/Women	75/11 (87.2/12.8)
<b>County, <math>n</math> (%)</b>	
Blekinge	1 (1.1)
Gävleborg	3 (3.4)
Gotland	1 (1.1)
Halland	1 (1.1)
Jämtland	1 (1.1)
Jönköping	1 (1.1)
Örebro	1 (1.1)
Östergötland	3 (3.4)
Skåne County	23 (26.1)
Södermanlands	2 (2.3)
Stockholm	39 (44.3)
Uppsala	5 (5.7)
Västernorrlands	1 (1.1)
Västra Götaland	6 (6.8)
<b>Company size, <math>n</math> (%)</b>	
1	48 (54.5)
2 to 4	8 (9.1)
5 to 10	24 (27.3)
> 10	8 (9.1)
<b>Years worked in the industry</b>	
Median (IQR)	7.5 (3.0 - 12.0)
<b>Current role(s), <math>n</math> (%)</b>	
Entrepreneur	8 (9.1)
Consulting Arborist	20 (22.7)
Sales Representative	2 (2.3)
Climbing Arborist	83 (94.3)
Groundsperson	16 (18.2)
<b>Certifications, <math>n</math> (%)</b>	
Chainsaw licence	81 (92.0)
ETW certification	40 (45.5)
ISA certification	11 (12.5)
Higher education	46 (52.3)
<b>Frequency of touching trees, <math>n</math> (%)</b>	
Daily	70 (79.5)
Weekly	15 (17.0)
Monthly	1 (1.1)
Rarely	2 (2.3)

value of trees (83 [94.3%]). Nearly all respondents stated that it was part of their role as arborists to challenge client's opinions about trees, particularly when a client's opinion contradicts their own experience. Because only 3 participants replied that it was not their duty to educate clients, further analyses were precluded due to lack of statistical power. In response to the question regarding the frequency with which it is appropriate to challenge clients' opinions, no respondents felt that it should be "rarely or never". An ordinal logistic regression was used to determine if any factors were associated with the belief that clients should be challenged "sometimes", "often", or "always". None of the factors examined were significantly associated with this outcome (Table 2).

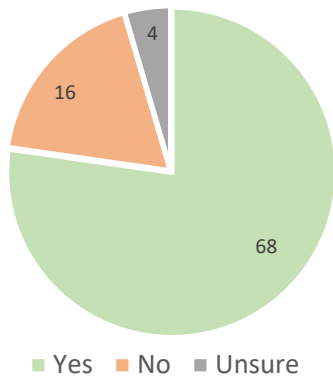
Of the respondents, 68 (77.3%) noted that they had felled a tree that they believed should have been retained in the past year (Figure 1). Conversely, 47 (53.4%) had declined a tree felling job for ethical reasons in the past year (Figure 2).

Logistic regression analyses were performed with the answer to each of these questions binarized as

**Table 2. Results of ordinal logistic regression exploring factors associated with arborists' perspectives that clients' opinions about trees should be challenged, particularly when a client's opinion contradicts their own experience. The odds ratio represents the odds of answering "Always" or "Often" versus "Sometimes". CI (confidence intervals).**

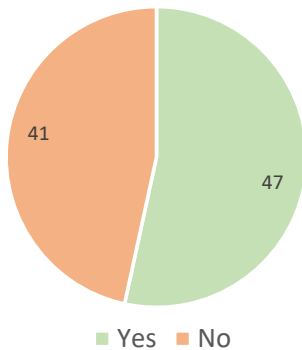
<b>Variable</b>	<b>Clients should be challenged "Always" or "Often" vs "Sometimes"</b>
<b>Gender</b>	<b>Proportional odds ratio (95% CI)</b>
Women	0.91 (0.27 - 3.17)
<b>Years worked in industry</b>	
Continuous	1.04 (0.97 - 1.11)
<b>Higher education</b>	
College or higher	1.08 (0.49 - 2.36)
<b>Company size</b>	
5 or more people	0.90 (0.39 - 2.05)
<b>ETW certification</b>	
Yes	1.09 (0.50 - 2.41)
<b>Touch trees daily</b>	
Yes	0.93 (0.33 - 2.56)

In the past year, have you felled a tree that you believed should have been retained?



**Figure 1.** Number of respondents who felled a tree that they believed should have been retained in the past year (“Yes”, “No”, or “Unsure”).

Has there been a time in the past year when you declined a tree felling job for ethical reasons?



**Figure 2.** Number of respondents who did and did not decline a tree felling job for ethical reasons in the past year (“Yes”, “No”).

“yes” or “no” (reference category), results of which are presented in Table 3. Only 2 factors were statistically associated with the decision to decline a tree felling job for ethical reasons: ETW membership (OR: 4.39; 95% CI: 1.81 to 11.24) and years worked in the industry (OR: 1.13; 95% CI: 1.05 to 1.24). In other words, members of the ETW were over 4 times more likely to decline a felling job for ethical reasons. For each additional year worked, persons were 1.13 times more likely to decline a felling job. No factors were found to be significantly associated with felling a tree that they believed should have been retained.

When asked to elaborate on a scenario in which the arborist had declined a job in the past year, positive and negative outcomes for these decisions were described. In some cases, respondents took similar action to prevent a felling but the trees in question met alternate fates. One response from the questionnaire gives an example of what a positive outcome may look like:

*The customer wanted to take down a tree that I considered particularly worthy of protection. I informed the customer it was protected by law due to size and species and I will not take it down. They initiated an application for exemption from the County Administrative Board, which was denied. Now the county administrative board knows about the tree and the customer knows it is protected.*

A similar scenario led to a negative outcome for the tree in this response:

*A customer wanted to fell trees that were worthy of protection due to a neighbor who complained. I informed them of the value of the trees, sent them links to more info and tried to make them understand. They contacted another company that did not care, and the trees were felled.*

### Arborist Perspectives of Homeowner Motivations

The most common sentiment relayed as to why homeowners seek tree removal on their properties was to improve sunlight exposure: “tree obscures the sun”, “bring light to patio”, “more sunlight/better view”. Statements in this vein were given by almost 80% of the respondents. The next most cited reason related to clients fears and perceptions around risk from the trees. Other common reasons were statements relating to annoyance over tree debris, perceptions of risk, and, put simply, “ignorance” (see Figure 3).

In the long answers, respondents provided examples of clients being poorly informed about risk: “Some trees along a border were considered dangerous because they were within striking distance of a house. However, they were healthy”; “In my experience, homeowners are often afraid of their trees. That maybe the next time a storm comes it will fell the trees on their house”.

At other times, homeowners were reported to conceal motivations they may consider in poor faith behind statements relating to their risk tolerance:

**Table 3. Bivariate analyses of demographic and work-related variables in relation to 2 outcomes of interest: declining a tree felling job and felling a tree that should have been retained in the past year. Significant results are shown in bold. OR (odds ratio); CI (confidence intervals).**

Variable	Declined tree felling job in past year ("yes" versus "no")	Felled tree in past year that should have been retained ("yes" versus "no")
<b>Gender</b>	<b>OR (95% CI)</b>	<b>OR (95% CI)</b>
Women	1.11 (0.31 – 4.14)	0.60 (0.15 – 3.01)
<b>Years worked in industry</b>		
Continuous	<b>1.13 (1.05 – 1.24)</b>	0.97 (0.89 – 1.06)
<b>Higher education</b>		
College or higher	0.90 (0.39 – 2.09)	0.43 (0.12 – 1.31)
<b>Company size</b>		
5 or more people	0.81 (0.34 – 1.93)	1.36 (0.44 – 4.73)
<b>ETW Certification</b>		
Yes	<b>4.39 (1.81 – 11.24)</b>	3.18 (0.99 – 12.29)
<b>Touch trees daily</b>		
Yes	2.83 (0.98 – 8.94)	1.41 (0.35 – 4.83)

"The customer wants to fell and top trees with the excuse that they are dangerous, but the underlying reason is for the view or more sun". In some cases, it bordered on outright deception: "A tree with branches hanging in from municipal land over private plot. The private landowner had been lying to the local authority about a dangerous tree which had no visible structural weaknesses and good vitality". And "A BRF (residential apartment association) wanted to take down a lot of healthy trees because of a water leak in an underground garage. It didn't make sense to me, so I questioned their assumptions. This was not appreciated by the client and we agreed to go our separate ways".

### Ethics in Arboriculture

Over half of respondents (53.4%) expressed having declined one or more jobs in the past year based on ethical considerations. In 13 of the 47 responses, their description of events ended with some variation of the following statement: "they probably found someone else to fell it anyway". In some of these statements, companies which did take the jobs were denounced for not having ethical integrity or for being unscrupulous: "They contacted another company that did not care, and the trees were felled" and "...another company that is more desperate for money".

When arborists sometimes managed to intervene and save trees, an array of different techniques were

suggested in substitution for felling, from simple interventions like crown lifting and end weight reduction to more advanced prescriptions:

*...the tree was a veteran oak. Instead of removing it, a ruin was made whilst retaining some lower growth for retrenchment. I used an array of special cuts to encourage cell distortion, through natural fracture pruning, threw in a few bat slits on the main trunk and on the underside of some lower boughs for good measure.*

Dealing with an array of different clients and such a spectrum of beliefs and prejudices involves a pragmatic approach:

*Saying no can be wrong, but I have had many customers who wanted to cut down trees for what they often consider to be safety-related reasons where I have convinced them to do another procedure, such as a relief pruning or safety pruning instead of felling. I have also convinced the customer not to touch the tree at all, but each time it has been customers who wanted help with several trees, so I have almost not left empty-handed. There have also been customers who have listened to my opinions and knowledge. However, I can really see a scenario with the right type of customer (one who*

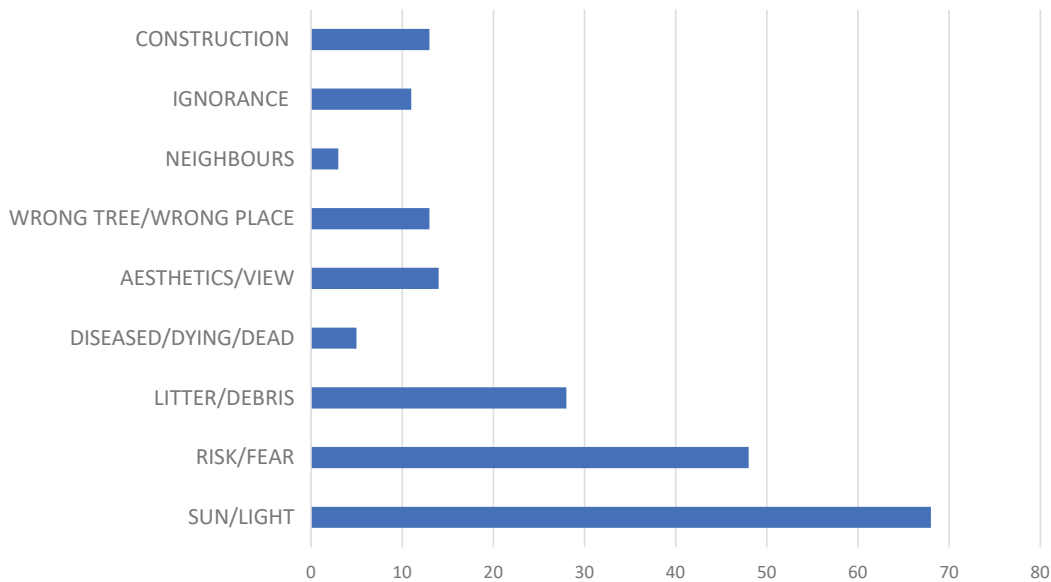


Figure 3. How arborists perceive client's motivations for seeking tree felling on their property.

*refuses to listen) and the right type of tree (worth preserving) that I would say a resounding no to.*

Moving their practice away from the provision of basic tree services towards a sustainable management approach seemed to be a common sentiment in the short answers. However, it is worth considering that 46.6% of respondents did not express declining a job for ethical reasons. This suggests that very many arborists are still either not in a place to ask questions or not interested in asking them.

### Tree Protection Bylaws

County level protections were referenced 8 times in the long answers from the proceeding questions with several arborists informing their clients about the rules. Most arborists felt that their local region does not do enough to protect trees from unnecessary felling (65 persons [73.8%]). However, many were unsure of whether the region in which they worked had tree protection bylaws. Of respondents, 34 (38.6%) persons were unsure, while 48 (54.5%) responded that their region did have bylaws.

### Interviews

In-depth interviews were conducted with 5 persons who were randomly selected and contacted. The average length of each interview was 30 minutes. Topics of discussion mirrored the topics from the

questionnaire—namely, the arborist's role; ethics of tree-felling; and bylaws.

### Arborist's Role

In relation to the question of the arborist's role, the interviewees were consistent in their belief that arborist's have a significant, but often underappreciated, role in the sustainable maintenance of the urban forest on private property. This was summed up nicely by one interviewee: "I would like to do real tree care, not so much what the customer wants but to do what the trees want". The reality is less idealistic, as one interview stated: "At the end of the day you are providing a service. Do the right thing for the tree but don't forget we're providing a service".

All interviewees noted the disparity between the quality of the work on offer in their region. One interviewee stated that in their working area, they knew of "people who like trees and like to protect them but also people who just like to cut wood and don't care"; another echoed this point: "there seems to be a place for all kinds of workers in this field; professionals and cowboys. I want to be optimistic but it's just the reality".

Insight from interviewees paralleled responses from the questionnaire that clients were uninformed. As one interviewee noted: "Sometimes clients aren't sure what they want. When I come on site, I have to figure out what they are after".



The variability in arborist perspectives were further considered: “arborists are often afraid to use their power to compel clients to take alternative actions with their trees”, while noting how “time in industry makes arborists more confident in their opinions on tree retention”.

Challenging paradigms around tree stewardship came up as a driving motivation for one interviewee who commented that in Sweden “it’s all a bit absurd, most homeowners are just renting off the bank anyway”.

### **Ethical Arboriculture**

Interviewees were generally more empathetic towards peers who accept work with few questions asked: “since our company has become more established, with more clients calling, we’re more comfortable turning down work”. Another captured the sentiment that ethical work is an aspirational goal for some arborists: “I would like to do real tree care, not so much what the customer wants, but to do what the trees want”.

Another was pragmatic: “I still enjoy the odd felling, but it’s heavy work and I wouldn’t mind focusing my work on lighter stuff”. Presently “there seems to be a place for all kinds of workers in this field; professionals and cowboys. I want to be optimistic but it’s just the reality”.

### **Tree Protection By-Laws and Industry Regulation**

Tree protection by-laws and regulations could serve as valuable cornerstones for a better, gentler arboriculture industry. One interviewee was skeptical about the prospects of regulations having an impact in the private sphere because only big contracts could stipulate against “macho-male attitudes as a sole qualification”. Two interviewees noted that it is not a huge stretch to regulate the work on private property. One referenced New Zealand and the UK where tree-protection ordinances exist, while another laid theoretical groundwork for such regulation: “homeowners are limited by building codes which stipulate what can and cannot be constructed on a given property. Why should they be able to destroy trees, which have stood for a century, on a whim?”

When asked about regulations on tree removal, we heard from two interviewees that the current framework is too loose. Already the county administrative bodies can protect trees of a certain age, size, or morphological value; why not “expand the definition of

protected trees to trees of over 60 cm instead of 100”. Another echoed this sentiment: “100 cm is way too large for a minimum protected size of tree”.

One example of how Swedish authorities may have inadvertently spurred on a crisis of felling on private property comes in relation to a scheme called RUTavdrag, which allows businesses to pass on a savings of 50% to clients by getting reimbursed the remaining portion from the Swedish Tax Agency. This was introduced for “green-work and landscaping” to minimize the cash economy in the related industries. “RUTavdrag has made felling trees way too cheap. Clients often don’t blink at the cost of it”.

The arborists voiced opinions on what regulatory implementation could look like, ranging from the punitive, “Making certain acts illegal will dissuade a lot of people because fines don’t carry the same cultural shame that the threat of jailtime would”, to the more pragmatic, as one interviewee explained, when their local municipality began stipulating higher credentials on their contracts, they noticed that the standard of care improved across the board.

On the topic of communication and why there appears to be so much confusion over the rules in Sweden around tree-protection, interviewees noted that industry organizations like SAF and STF need to be more vocal in communicating the rules. But ultimately, it’s the regional governments who need to make sure their rules are clear.

## **DISCUSSION**

### **Residential Tree Loss**

Research recognizes the contributions of private trees to urban forest connectivity (Forman 1995; Pearce et al. 2013). Such research builds empirically on research which shows that trees on private property make up a sizeable portion of the urban forest (Nowak et al. 1996). In cities with temperate climates, this portion could make up as much as 90% of total urban tree cover (McPherson 1998). In Swedish cities this figure has been placed around 50%, owing to an abundance of publicly managed green space (Randrup et al. 2020). Trees on private lands in Sweden are poorly inventoried, thus poorly understood.

The decision-making to fell a tree on private property throughout Sweden begins with the client and ends with whoever they hire to do the work. In this study, we discovered that almost half of the respondents were self-employed, implying that they have

greater agency over the kinds of work they perform. We also see that arborists are not only able, but willing, to dissuade their clients from felling trees. This occurs when they identify trees worthy of protection or they recognize that their client's motivations are misinformed. Arborists who have invested in their careers by taking courses and certifying themselves are shown to be more likely to engage with their clients and intervene in this regard. Time in the industry also correlated with declining tree felling on ethical grounds. There are several ways to interpret this. It seems reasonable to think that with investment in one's career comes care, not just for their reputation, but for trees in general. Further, those who have been in the industry longer may have the economic security to turn down jobs.

Frequent interaction with clients reveals patterns in homeowner perceptions of trees and their motivations for seeking tree removal that differ from what homeowners self-report in other studies. Research has been exploring these motivations from the homeowner's perspective with variation in findings across different regions (Kirkpatrick et al. 2013; Conway and Bang 2014). Aesthetic attributes were found to inform tree-retention (Avolio et al. 2015), while tree debris was the most common annoyance, which often led to felling (Camacho-Cervantes et al. 2014; Delshammar et al. 2015; Guo et al. 2018). A recent survey conducted in the Southern Swedish city of Malmö asked homeowners for reasons for tree removal and found that the most significant variable was "inappropriate growing site" (20.3% of respondents) (Klobucar et al. 2021). However, the arborists in this study made little mention of this reason. Instead, the most common reason according to arborists in this study was the landowner's desire for more sunlight. This discrepancy underscores the ambiguity arborists sometimes face on-site.

The near ubiquity with which questionnaire respondents (79%) stated "lack of light" as a motivation for taking trees down on private property is logical within the Swedish context. The persistent darkness within these northern latitudes makes the arborist a handy accessory to daylight. However, felling healthy trees to make corridors of light is seen as frivolous by many arborists. The mild resentment arborists feel towards these requests may be, in part, due to scholarly notions that shading is actually a benefit in a changing climate regime (Nowak and Dwyer 2007)

as well as because arborists are often capable of improving light penetration through tree crowns in ways that do not necessitate felling. If a client is seeking more sunlight, an arborist can achieve shades of improvement by thinning the canopy, lifting the crown, or reducing parts of the canopy. Done correctly (i.e., without excessive stripping of epicormic shoots, lions-tailing, and limb removal) this kind of work may be scheduled bi-annually and provide for more consistent, lighter, and profitable work.

Clients with strong risk aversion produce different management challenges. Risk aversion has been hotly discussed in the literature as it profoundly relates to the loss of trees of public land and can, when mismanaged, have legal consequences (Delshammar et al. 2015; Kabisch et al. 2016; Lo et al. 2017). Trees are statistically far more dangerous for arborists than they are to a typical homeowner due to the high risk nature of their work (Julius et al. 2014; Zhu and Gelberg 2018). Recent trends in research have been advocating away from the hyper-sanitized approach to tree risk management of the past (Slater 2019), which can lead to new opportunities for arborists to employ their skills to improve ecosystem services. Still, fear is a powerful impulse, as many arborists know, and trees so often signify risk among the general population (Davison and Kirkpatrick 2014).

Sustainable management of the urban forest on private land requires regionally specific understanding of why trees are being removed. Arborists are not only witnesses to this phenomenon but actively entangled in it. Fostering dialogue at the regional scale could help address their needs as an industry and reaffirm their better instincts.

### **Arborists as Ethical, Ecological Workers**

There is no shortage of research linking urban trees to biodiversity and human health (Gill et al. 2007; Haaland and van den Bosch 2015; Ugolini et al. 2015; Kabisch et al. 2016). The awareness exists at the industry level as evidenced by this study. It is a promising sign that so many in the industry find themselves so frequently mired in negotiations with clients. Nearly all of the arborists in this study considered it their duty to advocate for trees.

We can infer that a complex interplay of experience, unspoken codes of conduct, and proximity to trees produce ethically motivated arborists. Even as 54% of respondents stated that they were self-employed,

over 80% identified as climbing arborists. The desire to work with trees appears to be the common thread linking people to this work. Their approach to tree felling, ethical or apathetic, is a more complex matter which may ultimately come down to personal predispositions.

Many respondents and interview subjects recognize their role in making ethically sound decisions about felling trees. These decisions are informed not only by experience but also by ongoing investments in qualifications, certifications, and competencies, most of which are elective and expensive. Still, almost 25% of respondents did not acknowledge any ethical objections in the past year. It is possible that they simply did not experience a situation which required ethical objection. It is also possible that some arborists experience apathy towards their role.

This is relevant, as the literature frequently discusses “green job creation” as an unquestioned benefit of urban forest investment (Woodruff and BenDor 2016; Endreny 2018). The nature of these jobs needs to be more deeply considered. Arborists who are enabled, through regulations, to behave ethically may derive longer and more fulfilling careers than those left to compete in an unregulated environment. Sustainability and a stable delivery of urban forest benefits may also correlate with workers who stay in the industry longer. These topics remain to be explored by further research.

This research locates a sense of moral, ecological duty within a significant segment of the Swedish arboriculture industry. They express having the capacity to reverse poor decision making at the fine scale. It has been suggested that policy makers may be crucial in providing frames and legitimacy for new network governance arrangements (Konijnendijk van den Bosch 2014). Government can affect improved governance scenarios through strategic interaction with policymakers and arborists.

### **Perspectives on Tree Protection**

The results of this research depict a strong desire within the industry for greater tree protection but also a general confusion with regards to the rules. Nearly 75% of respondents did not believe that their local governments were doing enough to protect valuable trees from removal. This figure would suggest that tree protection by-laws or ordinances would be welcomed by the arborist community. This could open the doors for a combination of processes which exist

in many cities around the world. Where perceptive declines in urban forest canopy have occurred, some cities have managed to intervene by bringing tree protection by-laws into effect (City of Vancouver 2014; Ordóñez-Barona et al. 2021). Addressing the causal factors to this decline and avoiding a reactionary scenario could be viewed as a diligent goal of governance (Lawrence et al. 2013; Ordóñez et al. 2019). Arborists are unified in their assessment that trees in Sweden need greater protection. Given their proximity to trees, this should be a consequential finding.

Recent literature on the topic of tree protection regulations treat arborists with only cursory references (Clark et al. 2020; Ordóñez-Barona et al. 2021). Their treatment within a regulatory framework should be met proportionally with the value of the resource they attend to. In this way, investment in the urban forest means dignity and investiture for the people carrying out their maintenance.

There is little regulation of private land, so many arborists rarely encounter enforcement. From the responses gathered, the system appears to rely on arborists making the elective choice to report protected trees on properties where the owner is seeking to cut them down. However, based upon the results of the survey, this behaviour does not seem common. Further, 38.6% of respondents were not aware of whether their local regions even had tree protection bylaws. The current situation appears to be a failure of local governments to communicate these rules, suggesting an area for improvement.

### **Strengths and Limitations**

This was a novel study of an often-overlooked aspect of arboriculture. Nevertheless, it has important limitations to consider. The sample size of 88 participants was relatively small, and only 5 persons were selected for the full interview due to limited resources. The use of social media platforms for recruitment may have led to a biased selection of participants (Sledzieski et al. 2023). Individuals who subscribe to Swedish arborist social media companies are likely to represent a more engaged audience than the wider arborist and tree-worker community. The majority of participants reported feeling an ethical responsibility towards their work, but this sentiment may not be generalizable to the wider community. Future research should endeavour to build upon this work using a random sampling strategy and larger sample sizes.



## CONCLUSION

Arborists are highly skilled workers, caring for a resource that is increasingly recognized as vital to overall liveability and the ecological integrity of our cities. Within the Swedish arborist community, we recognize a significant element who aspire to building their practice around sustainable values. Nevertheless, there was a notable tension described by participants regarding their desire to protect trees and fulfill the desires of private landowners. This is made more difficult within the current reality of under-regulation, lack of mandatory qualifications, and weak tree protection by-laws. Future studies should investigate how increasing the standards of professionalism among arborists, through certification for instance, may lead to better outcomes for the urban forest. As well, arborists need to be recognized for their integral role as gatekeepers, components of the ecosystem itself, and included in the development of policies and regulations for the benefit of a sustainable urban forest.

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## Conflicts of Interest:

The author reported no conflicts of interest.