



Research Paper

The effects of decaying logs on the aesthetic experience and acceptability of urban forests – Implications for forest management



Kaisa Hauru^{a,*}, Saara Koskinen^a, D. Johan Kotze^a, Susanna Lehvavirta^b

^a Department of Environmental Sciences, University of Helsinki, P.O. Box 65 (Viikinkaari 2, Environment House), Finland

^b Botany Unit, Finnish Museum of Natural History, University of Helsinki, P.O. Box 7 (Unioninkatu 44), Finland

HIGHLIGHTS

- We explored the aesthetics and acceptability of decaying logs in urban forests.
- Aesthetic experience did not differ much between sites with old, fresh or no logs.
- Fresh logs were considered slightly more aesthetically appealing than old ones.
- Logs were accepted as natural features in urban forests.
- We suggest leaving decaying logs in urban forests.

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ABSTRACT

Decaying logs and other dead wood are ecologically important in boreal and hemi-boreal forests. However, allowing the creation of logs in forests, especially in urban settings, is difficult without the acceptance of residents. As aesthetic appreciation has been suggested to influence the acceptance of natural environments, understanding how dead wood affects forest visitors' aesthetic experiences is important. This study involved an on-site survey where respondents observed three types of urban forest environments with old, fresh or no logs, and evaluated them in terms of their multisensory aesthetic experience and acceptability. Aesthetic experience and acceptability were measured using a multiple-scale questionnaire consisting of 27 statements that were hypothesized to load on different perceived components of aesthetic experience and acceptability. We tested the loading of statements on components by using factor analysis, and the effects of decaying logs on the aesthetic experience with ANOVA. Statements formed five aesthetic components that were termed coherence, aesthetic diversity, biodiversity, restorativeness and order, and one component reflecting acceptability of the site. Of these components, perceived coherence and order varied statistically significantly between sites with old, fresh and no logs. In general, sites with fresh logs were considered more aesthetically appealing than sites with old or no logs; however, the differences between sites were small. Furthermore, respondents also accepted logs as natural features in urban forests in general. We recommend that downed logs be left in urban forests in places where they do not disturb recreational use, e.g. act as barriers along cycling and walking trails.

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1. Introduction

1.1. Dead wood in urban forests

Aesthetic quality is often included in guidelines for the planning and management of urban green areas and forests (e.g. Ode & Fry, 2002; Saukkonen, 2011). This means that the experiences and opinions of residents and urban forest visitors are (or could

be) used to guide management practices as well as to argue for or against them. An example of a contradictory management topic is that of dead wood, such as decaying logs on the forest floor: on the one hand they are considered key elements for forest biodiversity (e.g. Esseen, Ehnström, Ericson, & Sjöberg, 1997; Jonsson, Krus, & Ranius, 2005) and tree regeneration (Kuuluvainen & Kalmari, 2003; Lampainen, Kuuluvainen, Wallenius, Karjalainen, & Vanha-Majamaa, 2004; Zielonka, 2006) and are hypothesized to restrict excessive human trampling in forests (Lehvavirta, 1999), while on the other hand they are claimed to be disliked by the public and to reduce scenic beauty and recreational values of forests (e.g. Brown & Daniel, 1986; Edwards et al., 2012; Liao & Nogami, 1999; Ribe, 1989, 2009; Tyrväinen, Silvennoinen, & Kolehmainen, 2003).

* Corresponding author. Tel.: +358 44 3384763; fax: +358 9 19120308.

E-mail addresses: kaisa.hauru@helsinki.fi (K. Hauru), saara.v.koskinen@gmail.com (S. Koskinen), johan.kotze@helsinki.fi (D.J. Kotze), susanna.lehvavirta@helsinki.fi (S. Lehvavirta).

With increasing understanding of the importance of dead wood, or coarse woody debris (CWD; i.e. downed and standing logs, stumps, roots and branches), management strategies have emerged that aim at enhancing both ecological and aesthetic benefits of this forest feature (e.g. Brown, Ek, & Kilgore, 2007; Gurney, 2002; Stone et al., 2002). Regarding dead wood, for example, the management policy guidelines of the City of Helsinki (Finland) propose that downed logs are left in recreational areas to enhance biodiversity in places where they do not disturb recreational use or the scenery (Saukkonen, 2011). However, whether dead wood disturbs recreational use or the scenery (and if so, then how) remains unclear but would be important to understand in order to decide, for example, where and to what extent decaying logs can be left on the urban forest floor. If logs are disliked, they should probably be left in remote places, while a general positive attitude towards logs might facilitate the increase of this valuable ecological resource in city forests.

In this study we concentrated on decaying logs in hemi-boreal forests in the city of Helsinki. Our objective was to examine how urban forest visitors aesthetically experience logs, and whether they accept this feature in urban forests.

1.2. Theory of aesthetic experience and acceptability

We believe that environmental aesthetic experience builds on the instant multisensory response to the observed environment in an exact place at a particular moment of time (e.g. Bell, 2001; Brady, 2003, pp. 123–124). An aesthetic experience is essentially affective and intuitive, but it also includes the cognitive side of the perception that derives from the observer's knowledge base and background history. Based on previous research (see below) we suggest that aesthetic experience consists at least of the following perceived components: *multisensory intuitive experience, coherence, aesthetic diversity, biodiversity, restorativeness and order*.

Multisensory intuitive experience is based on the immediate impression one gets from the environment mainly via visual but also auditory, olfactory, tactile and even gustatory senses (Brady, 2003, pp. 123–128). We see this component as an instant link between the observer and the environment, and thus regard it as an essential part of the aesthetic experience. Perceived *coherence* has been claimed to be an important component in the overall experience of natural environments (e.g. Hauru, Lehvävirta, Korpela, & Kotze, 2012; Purcell, Peron, & Berto, 2001; Tennygart Ivarsson & Hagerhall, 2008). It has been suggested to reflect e.g. the understandability, consistency, relatedness, unity and harmony of the environment (e.g. Coetier, 1996; Hauru et al., 2012; Sevenant & Antrop, 2009; Tveit, Ode, & Fry, 2006). Diversity (sometimes referred to as complexity or variation; e.g. Sevenant & Antrop, 2009; Tveit et al., 2006) has also been shown to be an important component in the aesthetic quality of an environment (e.g. Ode & Fry, 2002; Sevenant & Antrop, 2009; Stamps, 2004; Tveit et al., 2006). We explored two dimensions of diversity: (1) *aesthetic diversity* that refers to the perceived variety of structural and functional features in an environment (e.g. patterns, shapes and the variety of visual elements and sounds), as well as (2) *biodiversity* that refers to the perceived variety of species and habitats in an environment (definition adapted from Ode & Fry, 2002). Perceived biodiversity (reflecting e.g. wilderness, naturalness, variety of species and functions, and other aspects that refer to the type of natural environment) together with aesthetic diversity (reflecting e.g. structures and colours that may be characteristics of any aesthetic object, such as paintings) are important components of the environmental aesthetic experience (Gobster, Nassauer, Daniel, & Fry, 2007). *Restorativeness* in this study refers to the perceived recovery from stress and getting away from everyday worries. Natural environments, such as forests, provide good

potential for stress recovery (e.g. Hartig, Evans, Jamner, Davis, & Gärling, 2003; Hartig, Korpela, Evans, & Gärling, 1996; Hauru et al., 2012; Herzog, Maguire, & Nebel, 2003; Kaplan & Kaplan, 1989; Ulrich et al., 1991) thus, it presumably is an important component of the overall aesthetic experience in a forest. Finally, an aesthetic experience in a natural environment also includes aspects of perceived stewardship and care (e.g. Gobster et al., 2007; Nassauer, 1995; Tveit et al., 2006). We name this component *order* and here it mainly means how people experience forests that are managed in certain ways in their cultural context: do they, for example, feel that the forest is uncared for or messy.

Besides the above-mentioned aesthetic components, we were also interested in whether people accept urban forests with decaying logs. *Acceptability* of a certain environment or a single element (e.g. decaying log) basically reflects one's attitudes towards the studied condition or an object (cf. Brunson, 1996). Acceptability may include aspects other than aesthetic, and it may exist without perceiving the environment: it may be knowledge- or experience-based (or both simultaneously), it can be based on conceptual understanding of what is seen and the normative interpretation of it, but it may also be a simple undefined opinion of the environment (e.g. Gobster, 1996; Ribe, 1999).

Studying both aesthetic experiences and the acceptability of an urban forest is essential in order to achieve understanding about the approved forest management options (e.g. leaving decaying logs on the forest floor), as aesthetically appealing environments are also likely to be acceptable and protected (e.g. Gobster et al., 2007).

1.3. Aims and hypotheses

The purpose of this study was to determine how urban forest visitors respond to decaying logs on-site, and to explore whether logs really matter to them. More specifically, our aims were to study whether people find urban forests with decaying logs as aesthetically appealing as forests without decaying logs, and whether they accept logs in urban forests. Our theoretical aim was to clarify the definition of an aesthetic experience in natural or semi-natural environments by studying the formation of a priori named components (described above) that were supposed to indicate the different dimensions of the aesthetic experience and acceptability. As we hypothesized these components to form a uniform aesthetic experience, and are associated with each other, we studied the correlations between these components. We also explored the correlation between forest visitors' general (i.e. non site-specific) attitudes towards dead wood and the on-site experiences. Our hypotheses were:

- 1) The components of the aesthetic experience and acceptability vary between sites with old logs, fresh logs and no logs.
- 2) An aesthetic experience in urban forests comprises of six components reflecting *multisensory intuitive experience, coherence, aesthetic diversity, biodiversity, restorativeness and order*. Besides these, *acceptability* of the forest site is part of the overall experience, and it is interlinked with aesthetic components.
- 3) The general (non site-specific) acceptance of dead wood correlates positively with the aesthetic experience and acceptability of forest sites with decaying logs (i.e. those respondents who accept dead wood in general also give higher ratings for sites with decaying logs).

2. Materials and methods

2.1. Study sites

The survey was conducted in Helsinki, Finland, in 12 spruce-dominated *Myrtillus*-type urban forests with mature tree

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