

24 The influence of deadwood on forest recreation – results of a choice experiment in Bavaria/Germany

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Introduction

Forests cover one third of the land area of Germany. They are among the most important land use forms in the country and provide important ecosystem services (ESS). After centuries of human influence, only a few forests develop without human interferences. In particular, the core zones of large-scale protected areas like national parks have to be mentioned here. One characteristic feature of natural forest development is deadwood, which occurs in most managed forests only to a small extent. However, deadwood is an important factor for biodiversity and long-term health of forests and should be preserved instead of removing it (Thorn et al. 2020). The importance of deadwood for forests was also recognized in the German National Biodiversity Strategy of 2007. This also includes programs for the enrichment of deadwood in mainly commercially used forests which are often visited for recreational purposes.

Thus, the question of how the general public will react to different deadwood management measures in terms of recreational behavior is of great interest. Ultimately, the goal of this research was to identify trade-offs that arise between a more biodiversity-oriented forestry and recreational values of forest.

Deadwood and forest recreation

There are a number of studies analyzing people's preferences for and/or attitudes towards deadwood in forests (Pastorella et al. 2016; Pelyukh et al. 2019; Rathmann et al. 2020). However, most of them focus on aesthetic values and preferences for several forest characteristics, including deadwood, but not on how these preferences will affect forest recreation behavior.

Deadwood is an important structural attribute when it comes to people's perception of forests (Filyushkina et al. 2017), especially when it occurs in extreme forms (e.g. bark beetle infestations). However, it remains unclear whether recreationists would avoid forests with higher

deadwood shares, especially those that are still economically used, without being assigned to the special case of protected areas (and thus not showing special conditions) and how more deadwood in those forests would explicitly affect their recreational value.

Survey Area and Methods

In order to better understand the relationship between deadwood and forest recreation, an online survey was carried out in 2018 in the German federal state of Bavaria (Sacher 2020). 1572 respondents participated in the study. A semi-standardized questionnaire was applied. Core was a choice experiment (CE) in which the respondents should select the forest they would like to visit next time. They could choose between three alternatives, differing in terms of tree species composition, deadwood amount and structure, habitat availability for endangered species (measure for biodiversity quality) and travel distance (measure for the willingness to travel (WTT) instead of the usually used willingness to pay since visiting forests in Germany is for free). In each choice set, the status quo consisted of the respondents' last visited forest. The participants could virtually "rebuild" it by answering questions about specific defining characteristics. The forest alternatives were visualized by drawings (at least 144 different for all possible attribute-level-combinations).

To test for effects of deadwood as a forest element three modified choice tasks (treatments) were applied. They differed in the number of attributes that described aspects of deadwood and attributes that described other characteristics of forests that might be important for forest visitors. Thus, it was investigated whether the presentation of the deadwood affects choices. The number of deadwood related attributes was reduced from treatment T1 to T3 and replaced by other forest characteristics.

The CE was analyzed using multinomial logit (MNL) and latent class models (LCM).

Results and Conclusions

The MNL shows a strong and significant preference for shorter distances to forests indicating the theoretically assumed negative demand curve. Furthermore, in T1 and T2 one of the alternatives is preferred over the last visited forest. This shows that the forest alternatives differing from the status quo apparently provide a higher utility and WTT. However, in T3 such a preference could not be identified.

The results show that deadwood amount does not essentially influence respondents' choices; only slight differences occurred between the levels and the preferences did not vary significantly between the three different treatments. In contrast to the often-identified bell-shaped curve in previous studies (Edwards et al. 2012; Giergiczny et al. 2015) regarding deadwood amount (preference for medium levels), there was a rather neutral effect on forest recreation. One explanation could be that the study's focus was on commercially used forests which usually do not have extreme deadwood amounts.

In the LCM, most of the respondents have a high probability to be members of class 1 (37.7%), labelled as "deadwood variety seekers". Second most respondents are members of class 2 (34.5%). As their preferences were quite similar to class 1 they

were labelled as "variety seekers sensitive to higher deadwood amounts". Class 3 makes up the smallest group (27.8%), labelled as "satisfied with status quo". Their members – unlike the other two groups – prefer their last visited forest which is characterized as "tidier" (less deadwood and structural variety).

The analysis also indicated that deadwood quality is relevant for forest recreation. This is important because particularly standing structures often provide valuable habitats. Respondents showed strong preferences for the improvement of habitats of endangered species. However, there is a discrepancy between preferences for deadwood amount and habitat availability. Respondents do either not seem to know, understand, recall or deliberately ignore the ecological link between these factors. This is meaningful for forest management as more efforts are needed to gain knowledge of the Bavarian public about the typical signs of natural forest development. In principle, an increase in the amount of deadwood in commercially used forests would not lead to a decrease in the ESS recreation. Thus, trade-offs between more biodiversity-oriented forest management and recreation are most likely not critical and recreation purposes are no valid argument against more natural structures in Bavarian forests.

References

- Edwards et al. 2012. <https://doi.org/10.5751/ES-04520-170127>. Filyushkina et al. 2017. <https://doi.org/10.1016/j.ecolecon.2017.04.010>. Giergiczny et al. 2015. <https://doi.org/10.1016/j.ecolecon.2015.07.032>. Pastorella et al. 2016. <https://doi.org/10.15287/afr.2016.482>. Pelyukh et al. 2019. <https://doi.org/10.17221/144/2018-JFS>. Rathmann et al. 2020. <https://doi.org/10.1007/s10342-020-01260-0>. Sacher P 2020. ISBN 978-3-88452-123-6. Thorn et al. 2020. <https://doi.org/10.1038/s41467-020-18612-4>.