

# Assessment of the scenic beauty and attitudes towards deadwood experiment plots in the Bavarian Forest National Park, Germany

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## Introduction

Forests cover almost one third of Germany. After centuries of cultivation, only a few forests are now developing naturally, e.g. the core zones of national parks, like in many other European countries. An essential element of natural forest development is deadwood, which occurs in most managed forests in Germany only to a small extent. However, deadwood is considered as an important factor in preserving forest biodiversity, which has been proved by many studies (Seibold et al., 2015; Kirchenbaur et al., 2017). Thus, it plays an important role in implementing measures according to the German national strategy on biodiversity from 2007. Nevertheless, there is little knowledge about the impact of artificially enriched deadwood on the scenic beauty perception of forest visitors.

Within the framework of the research project BioHolz ([www.bioholz-projekt.de/node/153](http://www.bioholz-projekt.de/node/153)), the influence of deadwood on forest biodiversity is investigated from an ecological perspective by creating experimental plots characterized by different arrangements of deadwood structures. From a social-science perspective, it is of great interest to assess the perception and valuation of the deadwood experimental plots by forest visitors who were 1) intentionally led to them or 2) were confronted with pictures of the plots at the visitor center of a national park. Finally, we draw conclusions about the preferences of forest visitors, which are relevant when implementing measures for (artificial) deadwood enrichment in managed forests. Similar methods using scenic beauty valuation approaches are often implemented in landscape or forest preferences studies (e.g. Daniel, 2001; Kohsaka & Flintner, 2004; Ribe, 2009; Edwards et al., 2012).

## Survey Area and Methods

The present study was carried out over several weeks in the summer and autumn of 2017 at deadwood experiment plots in the Bavarian Forest National Park, Germany, as well as in the main visitor center of the Park, where the participants were randomly approached and selected. Visitors, who were willing to participate in the onsite study, were then taken by bus to the deadwood experiment plots.

The nine deadwood experiment plots (plus one control plot) were artificially created and differ systematically in structure and distribution of the deadwood. The standard plot size is 50x50 meters within a block design in stock. The deadwood is either concentrated in one place or dispersed, there are standing or lying pieces, as well as stumps and combinations of all. The experimental areas are intended to depict various possibilities of artificial deadwood enrichment in order to foster forest biodiversity, and are intensively monitored regarding species diversity.

The respondents were guided past the experiment plots along a newly established path, where they were asked to make a scenic beauty valuation on a scale from -5 (extremely negative) to +5 (extremely positive) based on their visual impressions of each of the plots. Finally, they were asked about their attitudes towards nature, their forest activities and their socio-

demographics in a standardized interview. To control for the influence of the level of information about deadwood and the experiment, we systematically informed every second group of respondents about the purpose of the experiment before the visit, while other groups only afterwards. In addition, the direction of the route along the path was randomized.

The remainder of the respondents was interviewed at the visitor center, using the same questionnaire, except that standardized photos of the experiment plots were used. A total of 292 forest visitors participated in the study, with 76 interviewed onsite and 216 interviewed offsite.

## **Preliminary results**

First results using general mixed models show that the scenic beauty assessments of the onsite and offsite respondents differ significantly between the experimental plots. Overall, with one exception, all plots were valued positively by the respondents, whereby the offsite participants rated the experimental plots significantly more positive (+1.4 on average). Both groups share a higher preference for experimental plots with a dispersed deadwood distribution. Onsite participants rated the reference plot, where the forest was not manipulated at all, the most positive (+2.4), while the offsite participants rated the plot with dispersed standing deadwood elements best (+2.9). Both groups rated the plot with concentrated standing logs worst (onsite -1.6, offsite -0.4). It seems that the respondents preferred dispersed deadwood and they disliked the striking appearance of concentrated standing dead trees. In both groups knowledge as well as walking direction had no significant influence on the overall valuation of the plots.

The questions concerning the attitudes towards transferring these deadwood enrichment concepts to managed forests showed that most respondents would continue to visit the forests (over 70%) and not displace (15.9%). More than 70% also think that these plots make sense and nearly two thirds (63%) support the idea of deadwood enrichment in general.

## **Conclusions**

In this study, forest visitors' scenic beauty assessments of experimental plots evaluating different forms of deadwood enrichment were conducted for the first time. Preliminary results show that several variations of deadwood enrichment are evaluated quite positively by forest visitors, especially dispersed, shaded and rather unobtrusive measures. In general, a majority of the respondents also supports the idea of enriching deadwood in managed forests in the way illustrated by the experimental plots. Most respondents would also not change their forest recreation patterns due to the existence of deadwood enrichment plots.

The results lead to some recommendations for forestry: It is possible to artificially enrich deadwood without impairing the recreational experience and the aesthetic feeling of forest visitors. However, care should be taken to avoid overly conspicuous deadwood clusters close to forest paths and transparent information should be provided.

Future research should control for the following aspects: The national park setting of the study might lead to a sampling bias towards respondents who are more interested in forests compared to the general public and who have the tendency to favor pro-biodiversity measures. Therefore, we need to expand the study with a representative offsite sample. Finally, it is worth repeating the study on a regular basis as the deadwood on the plots only begins to decompose which will most likely change their visual characteristics.

## **References**

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