COS 86-1 - Forest stand variables affecting break and uproot of trees after the occurrence of wind and snow damage

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Wednesday, August 9, 2017: 8:00 AM

E145, Oregon Convention Center

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Background/Question/Methods

The impact of snow and wind damage on forests is an important component on forest dynamics. In order to explain what makes a forest more vulnerable to suffer from snow and wind related damage, we need to understand the linkage between forest variables and the magnitude of the damage. Typical damages produced by snow and wind are the break of branches or trunk and the uproot of trees. We used generalized linear models to predict the proportion of uprooted and broken trees on mixed stands, and those dominated by spruce (*Picea abies*) or birch (*Betula spp.*). We also used boosted regression trees to predict the occurrence of wind and snow damage on forest stands. Our models were developed using variables that describe the state of the forest before it was damaged. The data is based in a 20 years' National Forest Inventory dataset in Norway. Each predictive model is represented as a function of forest variables that can be modified though forest management.

Results/Conclusions

Forest parameters controlling the magnitude of damage varied by species and damage type. Consistent with other studies, our results showed that variables describing composition and diversity affect the stand stability against wind and snow. We also found that the occurrence of snow and wind damage was higher on stands of broadleaves than in

stands of conifers but also that the damage type was linked to the species dominance as each of them has different anatomical properties. For example, taller and slender trees were more vulnerable to breakage, but not to get uprooted. Increasing basal area reduced the stand vulnerability to be damaged. In the case of mixed stands, we also found that more diverse stands were less prone to uprooting damage. These results emphasize the need and possibility of creating management alternatives that account and mitigate the negative impact that snow and wind damage has on ecosystem services.

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