

Consequences of large-scale windthrow on the regeneration and diversity of two boreal forests in the Central Urals

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Since 1994, the natural development of two boreal forests including the development of flora, fauna and soil was investigated after windthrow on two permanent study areas located in the Central Urals. The forest types were dominated by *Pinus silvestris* and *Larix sibirica* in the North and by *Abies sibirica* and *Picea obovata* in the South.

Over 7 years following windthrow, the number of trees on the two study areas sharply increased in general, mainly due to broadleaf species with *Betula pendula* and *Populus tremula* prevailing. After windthrow, the type of silvicultural management - clearing, no clearing, planting with machines - greatly affected the number of young trees surviving. Using the regeneration data for modelling long-term forest development showed that tree species richness will continuously decrease. Although there were almost no substantial changes in the diversity of shrub, herb and bryophyte species, considerable changes in the relative abundance of individual species were noted. The inventory of the windthrow soil complex showed that, on the one hand, windthrow dries the top soil layers and, on the other hand, the surface level of phreatic water increases.

A large quantity of xylophilous organisms are promoting the natural decomposition of up-rooted trees. The stages of natural decomposition of coniferous and deciduous species differ in character and duration. The study on the development of insect populations and its influence on young trees showed that coniferous species are less damaged by insects than deciduous species, and they show a lower insect diversity. There was also an increase in number and diversity of small mammals species.

On the two study sites in the Urals, windthrow leads, in every respect, to an increasing species diversity of plants and animals at least during the first years after the blowdown. Many species establish which either accelerate the decomposition of the fallen timber or the process of regeneration. This juxtaposition of differently targeted processes could possibly be the main reason for the great species diversity noted. This might affect their long-term regeneration processes positively. Therefore it is suggested that natural processes should be integrated more often into managing forest.