

## **Impact of windthrow on mountain protection forests**

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Protection against natural hazards such as avalanches and rock fall is a well appraised effect of steep mountain forests. After a breakdown due to windthrow this protective effect is not lost. The remaining stools and stumps of broken trees, pits and mounds caused by uprooted trees, and criss-crossing stems reach several meters above the ground surface and create a pronounced surface roughness. They can effectively prevent any release of avalanches and stop rolling stones, rocks and stools. In the first decade after the blow-down the protecting effect even increases as compared to the previous living stand. Within a few decades, however, the decaying wood is gradually losing its strength, and as a consequence its protective effect. Therefore, leaving the thrown timber on the spot is often a good option with regard to safety, whereas removing the fallen timber and clearing the area impairs the safety to a degree lower than in the preceding stand. Forest regeneration may be quick enough to assume the protective effect from the rotting wood before it falls below a critical level. This restoration process is enhanced if numerous saplings from the previous stand (advance regeneration) are present. It can be speeded up by planting trees.