

Appendix 2

Calculation of the General Forest Protection Index (GFPI)

The GFPI simulates the ability of forests to provide protection against all gravitational hazards considering tree species mixture, structural profile of the forests, rooting stability and regeneration potential. Based on the guidelines developed by Frehner et al. (2005) the GFPI was calculated as follows:

$$GFPI = \frac{50 * \alpha_1 + 25 * \alpha_2 + 15 * \alpha_3 + 10 * \alpha_4}{100} \quad A2.1$$

where,

$$\alpha_1 = \min \left[\left(\frac{\# \text{ trees/ha with DBH} > 24}{400} \right), 1 \right] \quad A2.2$$

$$\alpha_2 = \min \left[\left(\frac{\# \text{ cohorts with trees} > 24 \text{ cm DBH}}{4} \right), 1 \right] \quad A2.3$$

$$\alpha_3 = \min \left[\left(\frac{\# \text{ species}}{3} \right), 1 \right] \quad A2.4$$

$$\alpha_4 = \min \left[\left(\frac{\# \text{ cohorts with trees} < 12 \text{ cm DBH}}{2} \right), 1 \right] \quad A2.5$$

The weighting that was given to each attribute in equation A2.1 is based on an amalgamation of the forest protection evaluation that Frehner et al. (2005) did. It is structured such that a high number of stems is strongly favored. This reflects the impact of stem number on all the gravitational protection types. Additionally it reflects the view that achieving a forest structure that protects against gravitational hazards should be principle importance, while maintaining a mixed forest and a high level of regeneration potential is of secondary importance. The index ranges from 0 to 1 with 1 providing the maximum protection from gravitational hazards.

Reference

Frehner M., Wasser B., and Schwitter R. 2005. *Nachhaltigkeit und Erfolgskontrolle im Schutzwald. Wegleitung für Pflegemassnahmen in Wäldern mit Schutzfunktion*. Bundesamt für Umwelt, BAFU, Bern. S. 564.