Table 1. Mathematical formulae to calculate loss of mechanical resistance of wood in living trees.

|  |  |  |  |
| --- | --- | --- | --- |
| Source | Formulae | Threshold  | Comments |
| Wagener, 1963 | (d3/D3) x 100 | 33% | Adjusted formula to account for discontinuities in trunks. Applied only to conifers without aggravating defects.  |
| Coder ,1989 | (d4/D4) x 100 | 20<x<44% Precautionx>50% Danger | Based on engineering formula for bending stress in a cylinder. Threshold based in experience.  |
| Smiley y Fraedrich, 1992 | (d3+r(D3-d3))/D3x100 | 33% | Modification of Wagener account for cavity openings. Using 33% strength loss as a threshold for action.  |
| Mattheck, Gerhardt y Breloer (1992) | t/R | <0.3 |  Based on buckling failure in cylinders. Measured t/r for fallen and standing trees. Using a t/r<0.3 as a threshold for action.  |

Source: Adapted from Harris et al. (2004 ).