

Appendix 1. Description of the Bayesian network nodes.

Table A1.1. States of the Bayesian network nodes, organized into the categories input nodes, nodes representing quantification procedures and nodes representing valuation procedures. Nodes that are updated by expert knowledge are bold.

Node	# states	Description of states	Data source
<i>Input nodes</i>			
Height	2	< 1800, > 1800 [m]	Digital elevation model (DEM25, Swiss Federal Office of Topography)
Temperature	3	Average June temperature: < 6.5 and > 12, 6.5 – 8 and 10.5 – 12, 8 – 10.5 [°C]	Swiss National Weather Network
Forest cover within 500m	3	< 60, 60 – 70, > 70 [%]	Predicted spatially explicitly by forest model described in section ‘Case study’
Topography	3	Numeric values based on different terrain characteristics: < -40, (-40) – 30, > 30	Modeled according Grêt-Regamey et al. 2008
Distance to roads and settlements	4	< 30, 30 – 100, 100 – 200, > 200 [m]	Vector 25 (Swiss Federal Office of Topography)
Forest type	5	Canopy cover: 0, 0 – 20, 40 – 60, 60 – 80, 80 – 100 [%]	Predicted spatially explicitly by forest model described in section ‘Case study’
Harvesting method	4	From ground, mobile cable way, conventional cable way, helicopter	Evidence: expert survey Modeled by Bont 2009
Modeled pressure	6	0, > 0 and <= 3, > 3 and < 10, > 10 and < 20, > 20 and < 30, > 30 [kPa]	Deterministic relations, modeled with RAMMS (Christen et al. 2010)
Building type	18	Agricultural building + garage, one-family house, multiple-family house, administration, school, hotel, industry, hospital, living + work, chair-lift, apparthotel, staff house, restaurant, trafo, reservoir, shop, church, depot	Hard labeling based on location of buildings from Communal cadastral register of Davos (unpublished data)
<i>Nodes representing quantification procedures</i>			
CO ₂ sequestration aboveground biomass	5	0 – 8.64 [t/ha/y]	Table A2.1 and A4.1
CO ₂ sequestration belowground biomass	5	0 – 2.24 [t/ha/y]	Table A2.1 and A4.1
CO ₂ sequestration dead organic matter	5	0 – 2.56 [t/ha/y]	FOEN 2011
CO ₂ sequestration soil	4	0 – 2.4 [t/ha/y]	FOEN 2011
Habitat suitability	6	0, 0.0625, 0.125, 0.25, 0.5, 1	Modeled based on regressions by Graf et al. 2005
Forest attractiveness for recreation	5	None, low, medium, high, very high	Based on Brändli and Ulmer 2001 and discussed with local expert
Harvestable amount of wood	5	0 – 6.72 [m ³ /ha/y]	Table A2.1
People’s presence in buildings	2	Yes, no	Presence “yes” = T*D/24*7 (Bart et al. 1999, p.64), where T is average presence time in hours per day, D is average presence time in days per week

House construction	6	Agricultural building, administration building, one-family house, multiple-family house, armed concrete, safety construction	Based on Bart et al. 1999 (p.125)
Persons per building	81	Numeric values: 0 – 80	Wilhelm 1997
Lethality in buildings	3	Yes, some, no	Barbolini et al. 2003 (Figure 4), added state “some lethality”: 50% of lethality = “yes”
Building damage	3	Yes, some, no	For one-family and multiple-family houses: Barbolini et al. 2003 (Figure 4), otherwise Bart et al. 1999 (p. 125), added state “some damage”: 50% of damage = “yes”
<i>Nodes representing valuation procedures</i>			
CO₂ sequestration social value	8	10, 30, 50, 75, 100, 150, 200, 250 [CHF/t]	Based on EcoSecurities 2009, Tol 2005 Evidence: expert survey
Habitat replacement costs	8	0, 140, 250, 360, 470, 580, 690, 800 [CHF/ha]	Based on Schweizerischer Forstverein 2004 Evidence: expert survey
Travel and subsistence cost	8	0, 150, 1000, 3000, 5500, 8000, 10'000, 12'000 [CHF/ha]	Prior: Beck 2008 Evidence: expert survey
Timber price	7	86, 96, 106, 115, 120, 150, 170 [CHF/m ³]	Based AfW GR 2008 and personal communication with forester Evidence: expert survey
Harvesting costs	4	90 – 160 [CHF/m ³]	Grêt-Regamey et al. 2013, personal communication with forester, AfW Gr 2008
Cost of human death	1	5 '000'000 [CHF]	Life Quality Index approach according to Merz et al. 1995
Cost of destroyed building	37	0 – 17'402'000 [CHF]	Communal cadastral register Davos (unpublished data), added state “some damage” : 50% cost of “total damage”
Indirect cost of destroyed building	37	Belongings: 24%, infrastructure: 15%, socio-economic: 10% of building value [CHF]	Wilhelm 1997 (p. 230), communal cadastral register Davos (unpublished data)