

Utilization indicates the fraction of trees which have been cut that are removed from the forest. By selecting none, trees are cut but no carbon is removed. By selecting very high utilization virtually all the trees that are cut are removed from the forest ecosystem to the forest products sector.

The tree parts removed is defined by the kind of harvest (e.g., stem only, aboveground, whole tree) that is used. The parameter values have been chosen to reflect the range of harvest utilization used in the Pacific Northwest. Very low would be typical of harvests prior to the 1940's in which a very large fraction of cut stems were left onsite. There is also an effect of harvest type on utilization in that aboveground and whole tree harvest started when stem utilization standards were relatively high.

Branches are not harvested when stem only harvest is employed, but this occurs with either aboveground or whole tree harvest. Coarse roots are only harvested when whole tree harvest is employed. Harvest of branches and coarse roots is less effective than harvest of stems.

Therefore branch removal is 10% less than stems and coarse root removal is 20% less than stems. This accounts for branch breakage and inability to extract all coarse roots from the soil.

The exact amounts removed are as follows:

Type of Harvest	Utilization level	Stems	Branches	Coarse Roots
Percent removed after cutting				
Stem only	Very low	50	0	0
	Low	75	0	0
	Medium	90	0	0
	High	95	0	0
	Very high	97	0	0
Aboveground	Very low	85	75	0
	Low	87	77	0
	Medium	90	80	0
	High	95	85	0
	Very high	97	87	0
Whole tree	Very low	85	75	65
	Low	87	77	67
	Medium	90	80	70
	High	95	85	75
	Very high	97	87	77