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Appendix 1 - Description of management regimes

A total of 19 different management regimes were designed to be applied to the stands under consideration. Depending on the initial conditions of the stand, and how the stand developed over time, not all 19 management regimes were applied to all stands. Most of the management regimes applied were based on the “best practices guide” for managing forest in Finland (Äijälä et al. 2014). A total of 17 management regimes were created based on variations of the standard *business as usual* management regime. In addition two alternatives allowed the forest to be *set aside* (no management actions were taken) and to be managed as a form of *continuous cover forestry*. These 19 management regimes allowed a very diverse set of decisions to be made for each specific stand, for explanatory purposes an example case for all management regimes is highlighted in Table S1.

The forest management actions for the standard *business as usual* (BAU) management regime are based on decision rules which depend on the site type, the height of the dominant tree species and the age of the stand. Depending on the site type, in order to conduct a final felling, the dominant height needs to be greater than 16 or 14 m high, and the age needs to be at least greater than 70 or 90 years old. Following final felling the stand prepared for regeneration and the stand is then artificially regenerated (either by planting or seeding). To promote growth, pre-commercial thinning is conducted to decrease the competition for resources.

To create a wide range of management regimes, adjustments to the timing of the final felling and a decision to conduct thinning operations before and after final felling, after final felling or to not allow thinning operations. If thinning is allowed, the thresholds for determining when to conduct thinnings depend upon site type using dominant height (m) and basal area

(m²/ha). The intensity of thinning operations is determined by specific basal area thresholds, which is site type specific. The timing of the final felling was modified by adjusting the required age where final felling can occur to at -5, +5, +10, +15 and +30 years compared to business as usual. Those regimes which did not allow thinning before final felling but allowed after final felling were named *BAU*. Those regimes which allowed thinning both before and after final felling were named *BAU w thin*. Those regimes which did not allow thinnings before or after were named *BAU w/o thin*. These regimes were created where the timing of final felling occurred at -20, 0, and +10 years. All of the BAU management regimes used artificial regeneration, with the exception of those identified as green tree retention *GTR*. This management regime used a seed tree method for regeneration, which maintains a small amount of larger trees to aid in natural regeneration. For the *GTR* management regime, a maximum of either 30 trees or total volume of 30 m³/ha were retained. As the simulator is aspatial, the configuration of how these trees were retained is not specified. Two management regimes used *GTR*, the standard *BAU*, and BAU with thinnings prior to final felling.

Continuous cover forestry (CCF) represents an alternative forest management regime, where timber is obtained through thinning from above, and allowing natural regeneration to restock the stand. As with thinnings in the BAU regimes, the decisions to conduct thinnings were site specific, and based on the stands basal area. The intensity of the harvest was based on a post basal area limit, and the amount of trees harvest aimed at getting as close to the limit as possible. The trees selected for harvest were the largest trees in the stand. For this management regime, the growth models are initially based on the models developed by Hynynen et al. 2002, and when the conversion to a CCF stand occurs, the growth models switch to those developed by Pukkala et al. 2013.

Set aside (SA) represents the choice of not conducting any forest management actions within the stand. Growth of the stand continues based on the previous management actions taken. For this management alternative, timber extraction is not conducted.

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	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Period 8	Period 9	Period 10	Period 11	Period 12	Period 13	Period 14	Period 15	Period 16	Period 17	Period 18	Period 19	Period 20
Set Aside	TEND																			
BAU w thin and Green tree retention	TEND			1st-THIN			THIN			THIN				CC-NS	PLANT	E-TEND				THIN
BAU w Green tree retention	TEND													CC-NS	PLANT	E-TEND			1st-THIN	
BAU w thin (-5)	TEND			1st-THIN			THIN			THIN			CC	PLANT	E-TEND				THIN	
BAU w thin	TEND			1st-THIN			THIN			THIN				CC	PLANT	E-TEND				THIN
BAU w thin (5)	TEND			1st-THIN			THIN			THIN					CC	PLANT	E-TEND			
BAU w thin (10)	TEND			1st-THIN			THIN			THIN					CC	PLANT	E-TEND			
BAU w thin (15)	TEND			1st-THIN			THIN			THIN						CC	PLANT	E-TEND		
BAU w thin (30)	TEND			1st-THIN			THIN			THIN										CC
BAU w/o thin (-20)	TEND									CC	PLANT	E-TEND								
BAU w/o thin	TEND													CC	PLANT	E-TEND				
BAU w/o thin (10)	TEND														CC	PLANT	E-TEND			
Continuous cover forestry	TEND			SEL CUT			SEL CUT			SEL CUT			SEL CUT			SEL CUT			SEL CUT	
BAU (-5)	TEND												CC	PLANT	E-TEND				1st-THIN	THIN
BAU	TEND													CC	PLANT	E-TEND			1st-THIN	
BAU (5)	TEND														CC	PLANT	E-TEND			1st-THIN
BAU (10)	TEND															CC	PLANT	E-TEND		
BAU (15)	TEND																CC	PLANT	E-TEND	
BAU (30)	TEND																			CC

TEND: tending of seedling stand
 PLANT: planting
 E-TEND: early tending of seedling stand
 THIN: thinning
 CC: clearcut
 1st-THIN: first thinning
 CC- NS: clearcut, with green tree retention
 SEL CUT: selection cut

Table S1. An example of the timing of the management actions for all 19 regimes. An example stand is used, the starting conditions were a recently clear-felled stand, which had been planted.