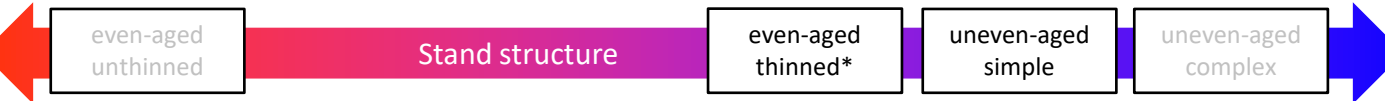
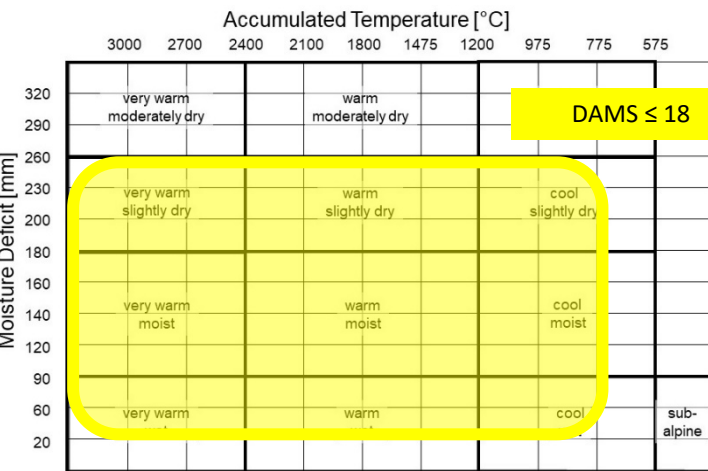


1. Structure and dynamics:
Single-storied stands of LA (preferably EL), with a component of SP and category B minor species. Mixture type ranges from intimate to small areas.
Species distribution: LA 60 – 90% SP 10 – 40% minor species: < 10%
Management may be by clearfell-and-restock or LIMA / CCF methods using natural regeneration as far as possible, but must take account of the light demanding nature of the species.



2. Ecological suitability:
Contains elements of NVC type W18 and provides niches for components of W17, W11, W15 and W16. Appropriate on poorer sites with sandy to loamy soil texture where LA achieves GYC < 10 and there are few alternative secondary species other than SP. Unsuitable for frost hollows and sites of low air circulation.



		Soil Nutrient Regime					
		VP	P	M	R	VR	C
Soil Moisture Regime	VD	Rankers and shingle					Rendzinas
	MD	Gravelly or sandy podzolic soils		Gravelly or sandy podzolic soils			
	SD						
	F	Loam peaty iron podzols	EL/HL	Loam peaty iron podzols	Loamy brown earths of high base status	Calcareous brown earths	
	M						
	VM	Podzolic gleys and peaty iron podzols			Brown mires of grassland status	Calcareous brown earths	
	W	Unflushed peaty gleys and deep peats	Surface-water gleys		Surface-water gleys of high base status	Calcareous surface-water gleys	
	VW		Flushed peaty gleys and deep peats		Humic gleys of high base status and fen peats		

3. Management objectives:
Economic: LA – sawlogs, target DBH > 40cm in 80 – 120yrs
SP – sawlogs, target DBH > 50cm in 100 – 140yrs
Environmental and social: The SP component increases stand diversity and helps mitigating against the risk of disease in pure LA stands. Bright and visually attractive stands with a mix of species and autumn colour provide a good environment for recreation and amenity.

4. General management principles for the FDT

LA and SP are quite compatible ($CS = 2$) to grow in mixed stands, however mixture design requires some attention to account for the different growth rate of both species. Management of young stands should aim to develop tree stability, timber quality and achieve even and rapid growth. LA and SP follow a similar pattern with growth responding strongly to thinning interventions early in life and diminishing rapidly thereafter; thinning must therefore not be unduly delayed and should focus on pole and small timber stage. Thinning should start at 10 – 12m top height, generally as crown thinning. Despite their similar growth pattern, LA and SP require regular monitoring and corrective action taken quickly should one species outgrow and dominate the other. Thinning at later stages must aim to maintain tree stability, target species composition and steady growth. Clearfell-and-restock as well as simple LIMA / CCF methods such as strip, seed tree and fast shelterwood systems provide options for final harvesting / restocking.

5. Timeline

stage	H_{100} [m]	intervention
Establishment		<ul style="list-style-type: none"> Planting of 2000 – 3000 trees/ha or natural regeneration.
Young stand	< 3	<ul style="list-style-type: none"> Protection against animals / plants as necessary. Respacing if $N > 3000$ trees/ha at 1 – 2m tree height. LA – systematic respacing to ≤ 2000 trees/ha. SP – negative selective respacing (removal of wolf tree candidates). Clearing of any damage caused by felling / extraction of overstorey trees. Regulation of species composition and minor species as required.
Thicket stage	3 – 10	<ul style="list-style-type: none"> Generally no interventions, except for: Negative selective respacing and careful promotion of 150 – 300 FC tree candidates/ha if respacing in the previous stage has been missed.
Pole stage	10 – 12	<ul style="list-style-type: none"> First selective crown thinning, mainly removing dominant / co-dominant trees with visible defects, coarse branching or poor shape. Selection of 100 – 150 FC trees/ha (LA + SP). Pruning of some FC trees may be considered.
Pole to small timber stage	12 – 20	<ul style="list-style-type: none"> Continue crown thinning at height growth intervals of 3m. Focus on competition status of FC trees and maintain target species composition.
Timber stage		<ul style="list-style-type: none"> Monitor species composition, stand density, stability and health, and thin accordingly. Apply crown thinning as long as necessary for the benefits of FC trees. Reduce thinning intensity and / or lengthen thinning cycles as LA / SP become less responsive to thinning. Plan for final harvesting when FC trees approach target DBH. Consider LIMA / CCF methods and assess potential for natural regeneration, improve conditions if necessary.
Final harvesting and regeneration stage		<ul style="list-style-type: none"> Carry out harvesting / restocking operations according to agreed method. In shelterwood scenarios, reduce BA to 20 – 25m²/ha initially and then further once regeneration has established. Design strip systems with regard to prevailing wind direction and climatic requirements of LA / SP regeneration; keep strip width < 50m. In seed tree scenarios, retain 20 – 50 seed trees/ha into second rotation. Monitor light level, ground vegetation, occurrence and growth rate of regeneration, supplement by planting if necessary, or restock.