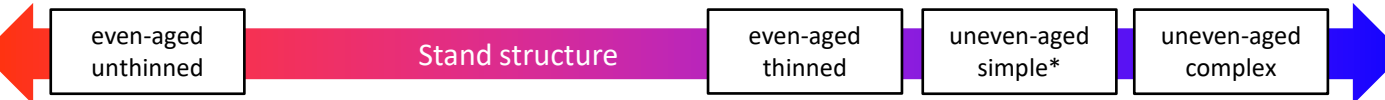
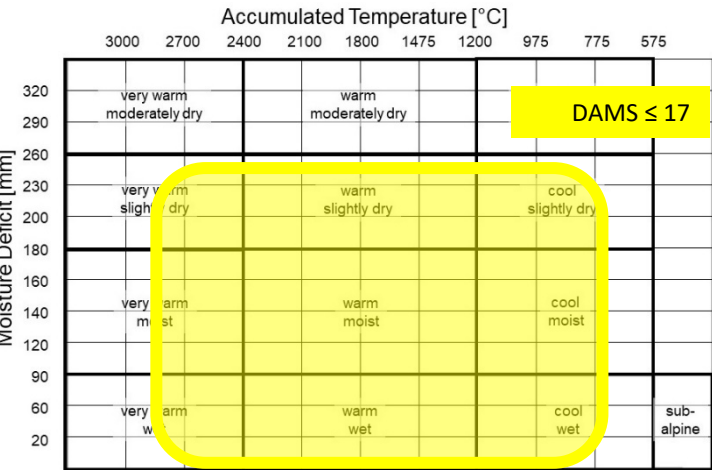


1. Structure and dynamics:
Mixed stands of NS and one or several XCST species, likely to include DF, WH, firs, WRC and others. Stands may be even-aged and single storied, or may develop into a complex structure. Mixture can be intimate, in small or large groups, or in patches. Supplemented by minor species of category A.
Species distribution: NS 60 – 80% XCST 20 – 40% minor species: < 10%
Management is likely to be by clearfelling and restocking, or by LIMA / CCF, making use of natural regeneration wherever possible.



2. Ecological suitability:
Resembles NS-dominated natural woodland communities of central European mountain regions. Provides niches for elements of W4, W11, W15, W16 and W17. Suitable for freely draining, loamy soils.



		Soil Nutrient Regime					
		VP	P	M	R	VR	C
Soil Moisture Regime	VD	Rankers and shingle					Rendzinas
	MD	Gravelly or sandy podzols and ironpan soils		Gravelly or sandy brown earths			
	SD					Loamy brown earths of high base status	Calcareous brown earths
	F	Loamy podzols and ironpan soils		Loamy brown earths			
	M						
	VM	Podzolic gleys and peaty ironpan soils		Brown gleys		Brown gleys of high base status	Calcareous brown gleys
	W					Surface-water gleys	Calcareous surface water gleys
	WW	Unflushed peaty gleys and deep peats		Flushed peaty gleys and deep peats		Flushing gleys of high base status	Flushing gleys of high base status and fen peats

3. Management objectives:
Economic: NS – sawlogs, target DBH > 50cm in 80 – 120yrs
XCST – sawlogs, target DBH > 50cm in 80 – 120yrs
Environmental and social: Increased habitat diversity, stand stability and maintenance of soil quality compared to pure stands. The mixed-species and potentially diverse age structure of the stand is likely to be attractive and popular for amenity and recreation. May be an opportunity to introduce emerging species.

4. General management principles for the FDT

Generally these mixtures are compatible (CS = 1 or 2) as shade tolerance is similar but there may be small differences in growth rate. Also, XCST are likely to reproduce earlier and more prolifically than NS (the presence of WH could actually lead to similar problems as SS in FDT 1.2.3). Monitoring the species composition of regeneration will be key and interventions such as planting and respacing will be essential to achieving a desirable species composition. Management of young stands will be similar to FDT 1.2.2. A no thinning approach is possible but will limit management options and achievable target DBH. NS as well as XCST respond well to thinning throughout their lifetime, however thinning must not be unduly delayed in order to achieve good tree stability. Thinning regimes should generally start at around 10 – 12m top height and use crown thinning as long as necessary to develop good individual tree quality and stability. LIMA / CCF methods should be the preferable option for final harvesting / restocking on sites conducive to natural regeneration as many XCST may struggle to establish under open ground conditions. Complex CCF systems are a realistic option for this FDT.

5. Timeline

stage	H ₁₀₀ [m]	intervention
Establishment		<ul style="list-style-type: none"> Planting of 2000 – 3000 trees/ha or natural regeneration XCST may be planted as beat-up or to supplement 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. Reduce N to 1500 – 2500 trees/ha; in areas of difficult access, along exposed edges and on sites of high wind damage risk reduce N to 800 – 1000 trees/ha. Clearing of any damage caused by felling / extraction of overstorey trees. Steering of NS / XCST proportion in natural regeneration, promotion of minor species as required.
Thicket stage	3 – 10	<ul style="list-style-type: none"> Generally no interventions, except for: Release 300 – 400 FC tree candidates/ha in areas of difficult access or high wind hazard 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 150 – 250 FC trees/ha (NS + XCST).
Pole to small timber stage	12 – 20	<ul style="list-style-type: none"> Continue crown thinning at height growth intervals of 3m, focussing on competition status of FC trees.
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, otherwise thinning type may gradually change to low. Plan for final harvesting when FC trees approach target DBH. Decide on LIMA / CCF methods to be used and assess potential for natural regeneration – improve conditions if necessary.
Final harvesting and regeneration stage		<ul style="list-style-type: none"> Carry out harvesting operations according to agreed method. In shelterwood scenarios, reduce BA to 35m²/ha initially and then further once regeneration has established. For complex scenarios interventions should create an irregular canopy cover, encouraging regeneration in groups. Monitor light level, ground vegetation, occurrence and growth rate of regeneration, supplement by planting if necessary, or restock.