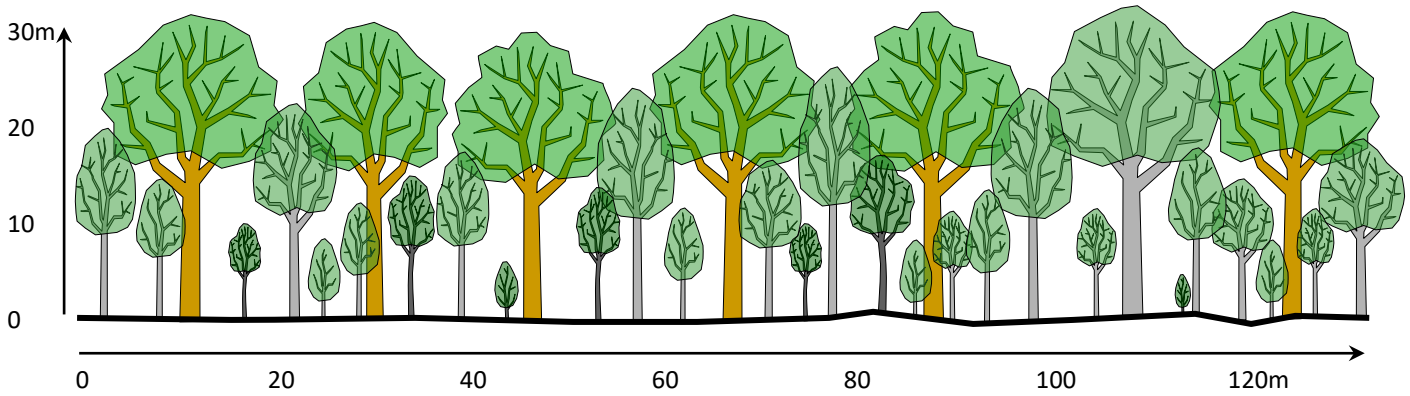
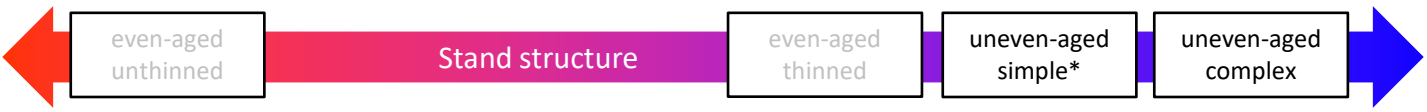
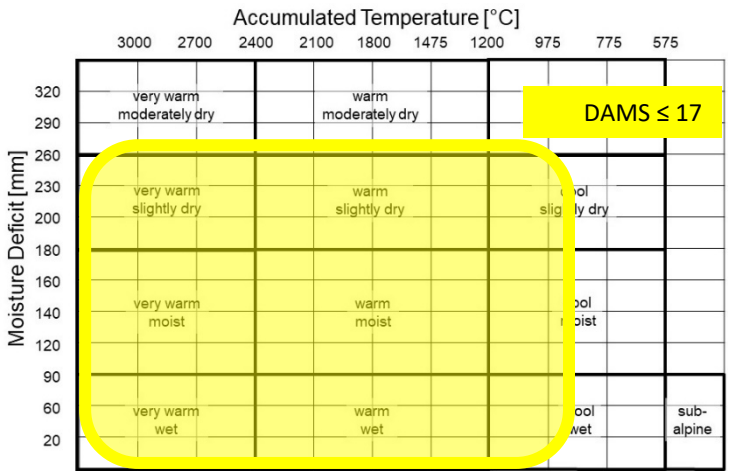
FDT 5.3.1 OK and BE

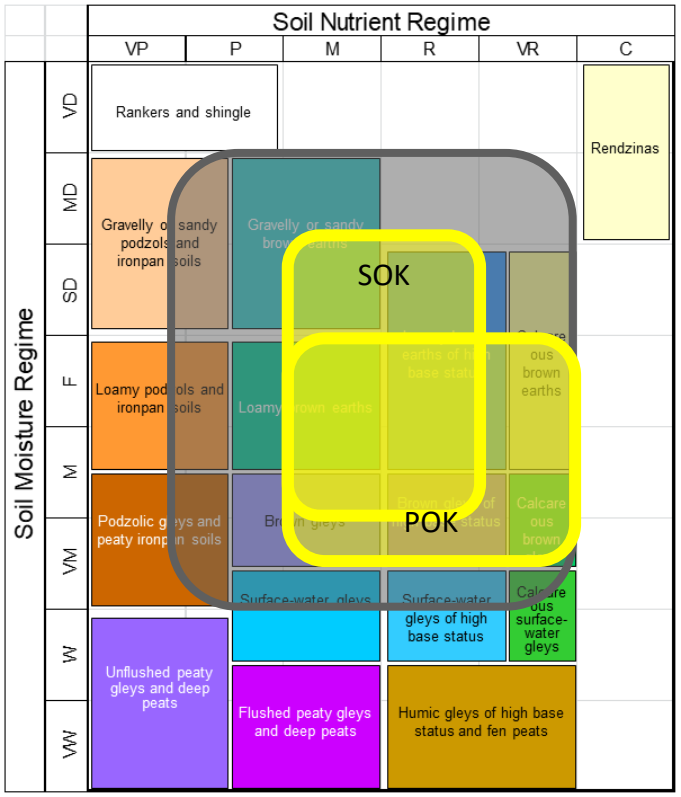


1. Structure and dynamics:
Two- or multi-storeyed stand of dominating OK with BE in single tree to small group mixture. BE occupies mainly the middle and understorey, some groups in overstorey are possible. Interspersed with single trees or small groups of category C minor species like HBM, SY, SLI, BI, ASP, ROW, HAZ and others.
Species distribution: OK 60 – 80% BE 20 – 40% minor species: < 10%
Likely originating from OK stands underplanted with BE, minor species from infill. Stands should be managed under LIMA / CCF regimes with best possible use of natural regeneration of OK.



2. Ecological suitability:
Resembles NVC types W8/9 and W10/11, or early stages of W12, W14 and W15. Suitable for a wide range of soils, with POK being preferable on moister, richer and heavier, and SOK on drier, poorer and lighter soils. A good option to diversify pure OK stands by enrichment planting.





3. Management objectives:

Economic (OK GYC > 4):	OK – optional, veneer / planking grade, target DBH > 70cm in 120 – 180yrs OK – sawlogs, target DBH > 60cm in 100 – 160yrs BE – sawlogs, target DBH > 50cm in 80 – 140yrs
Environmental and social:	Diverse woodland of natural appearance providing a range of habitats and high conservation value. BE element serves to add productivity, improve timber quality and control ground vegetation. Attractive to visitors because of its diverse structure and tree size.

4. General management principles for the FDT

This FDT aims to produce high quality timber in a two-storey stand structure. OK as the more light demanding primary species must always dominate the overstorey. Careful selection of FC trees for timber quality is essential. Due to the good self-pruning ability, weak apical dominance and phototropic growth behaviour of OK management by Q/D approach is advised, achieving timber quality first and ensuring FC trees can grow into large dimensions later. Thinning should start when the majority of FC trees have achieved the desired length of clean bole, usually at 16 – 18m top height and generally as crown thinning. OK and BE are very compatible to grow in mixture (CS = 1) and both species respond well to thinning interventions throughout their lifetime. Thinning at later stages must maintain a two-storey stand structure and not let BE encroach into the OK canopy. Rotation length is driven by target DBH. LIMA / CCF methods should be the preferable option for final harvesting / restocking, diversifying the stand structure further.

5. Timeline

stage	H_{100} [m]	intervention
Establishment		• Natural regeneration in densities of > 10000 seedlings/ha, planting of 5000 – 10000 trees/ha, or direct seeding. Numbers can be reduced by planting 20 – 30 individual OK per cluster (0.3 – 1m spacing), with the number of clusters corresponding to the envisaged number of FC trees. BE should be introduced by underplanting later.
Young stand	< 3	• Protection against animals / plants as necessary. • Regulation of species composition and minor species as required.
Thicket stage	6 – 10	• Negative selective respacing – removal of wolf and other undesirable trees. Cleaning or pollarding of aggressive infill if necessary. • Closed canopy must be maintained to ensure self-pruning and differentiation (remove no more than 5 – 10% of trees).
Pole stage	10 – 14	• Continue negative respacing if necessary, otherwise the focus should shift to positive selection – carefully promote up to 200 FC tree candidates/ha by removing 1 – 2 competitor(s). Maintain closed canopy for ongoing self-pruning and differentiation process.
Pole to small timber stage	16 – 18	• Thinning interventions start when the majority of FC tree candidates have reached the desired length of clean bole. Select 50 – 80 FC trees/ha, and crown thin to release their crowns from competitive neighbours. • Underplant with < 3000 BE trees/ha after first or second thinning in OK. BE may be placed throughout OK matrix or concentrated around FC trees. • Protect BE against animals / plants as necessary.
Timber stage		• Monitor the development of FC trees and continue thinning to keep them free from competition. Live crown length should be > 50% of tree height. • Maintain and develop BE understorey in order to suppress epicormic growth in OK, and to control ground vegetation. Suitable individual BE may be managed for timber (FC trees). Apply crown thinning to prevent BE from encroaching into the crown area of OK FC trees. • Plan for final harvesting when FC trees approach target DBH.
Final harvesting and regeneration stage		• Apply fast irregular shelterwood methods for harvesting, or use selective target diameter harvesting to achieve a more complex stand structure. • Remove BE understorey immediately before harvesting and time operations with OK mast years if possible. • Monitor light level, ground vegetation, occurrence and growth rate of regeneration, supplement by planting if necessary, or restock.