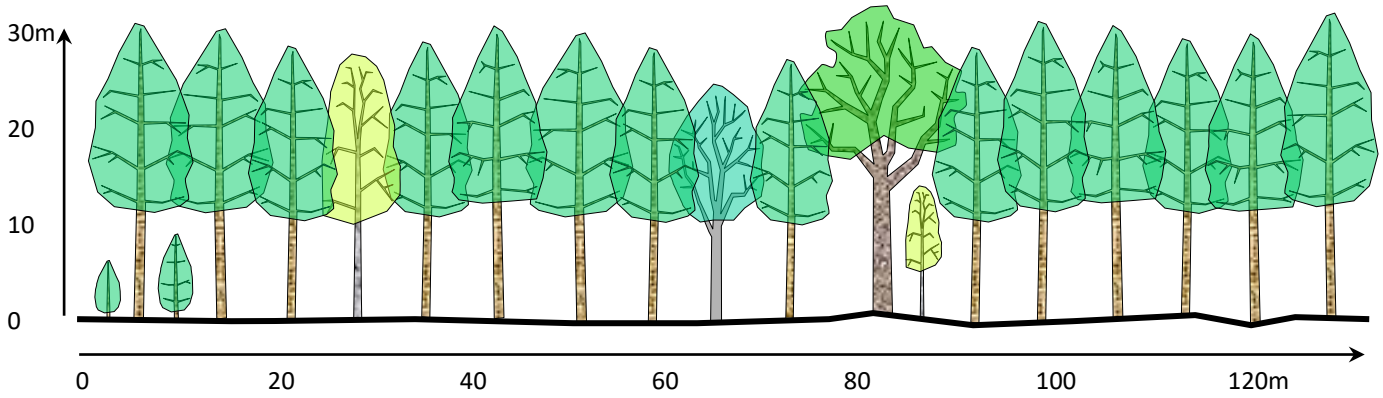
FDT 9.1.1 CAR

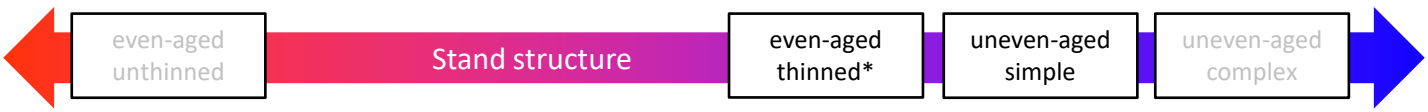


1. Structure and dynamics:

Single-storeyed CAR stand with category B minor species such as BI, AH and POK, occasionally also SY, EM, ASP, WIL, ROW, SS and NS in single tree to large group mixture.

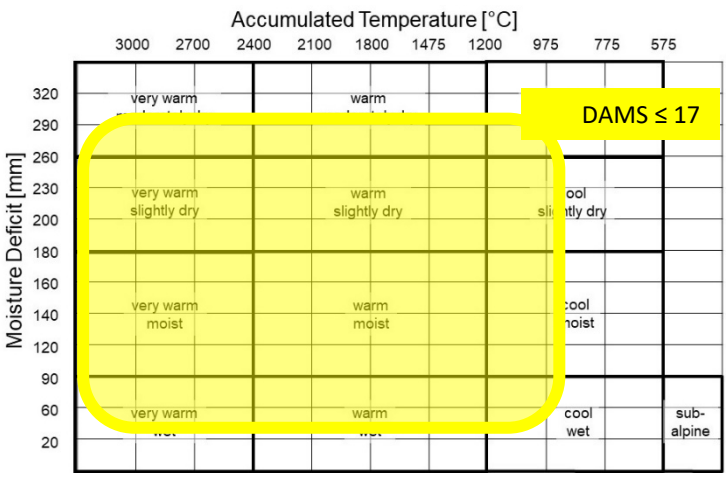
Species distribution: CAR 80 – 100% minor species: < 20%

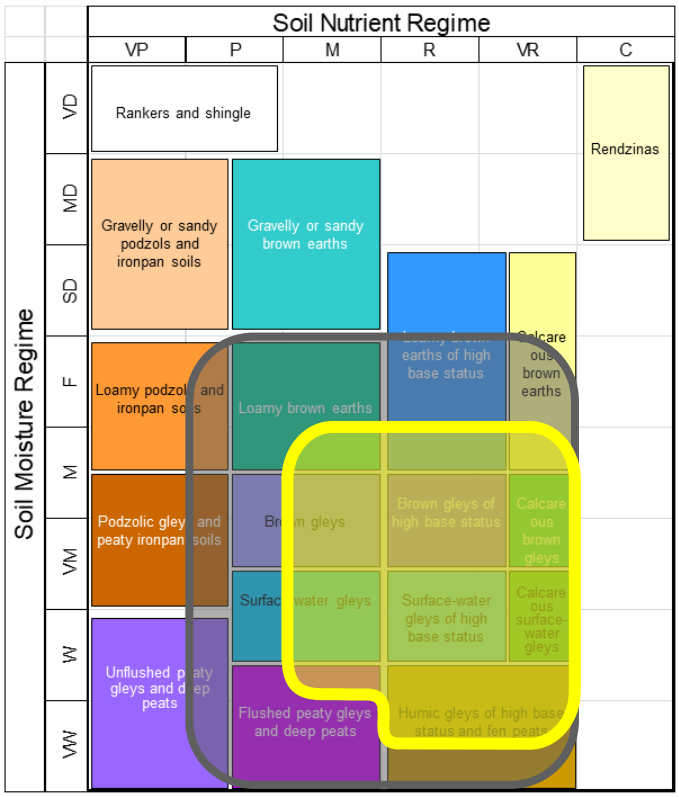
Stands are likely to be managed extensively under clearfell-and-restock regime, however opportunities for CCF / LIMA and use of natural regeneration should be used wherever possible. Coppice management is an option and may be considered on sites where access is difficult.



2. Ecological suitability:

Represents NVC types W2, W5, W6 and W7 and provides niches for elements of W1, W3 and W4 in the upland and lowland climate zones. This FDT is generally suitable for mineral and organic soil of high water supply except the poorest and strongly acidic sites. Soil improvement through Nitrogen fixation.





3. Management objectives:

Economic:	CAR – logs / pulp / biomass / charcoal
Environmental and social:	Woodland of natural appearance, providing habitats for wet woodland specialist species. Presence of veteran trees and deadwood. High value for soil improvement and water quality management in wetlands and riparian zones.

4. General management principles for the FDT

This FDT is designed for even-aged stands of CAR where management wishes to increase species and structural diversity over time. In order to achieve high timber quality the Q/D management approach is recommended, using moderate to high initial stocking density and careful quality selection during respacing and thinning. The ability of CAR to coppice may be used to achieve a high initial stocking density. Dominant trees of poor quality need to be eliminated by selective respacing, desirable FC trees promoted by thinning. The growth response of CAR to thinning interventions is strong at a young age but diminishes quickly later; silvicultural interventions must therefore ensure the crowns of FC trees are fully developed at an age of about 40yrs. Crown thinning should be applied throughout. Thinning at later stages must aim to maintain steady growth of FC trees. With increasing age CAR becomes prone to heart rot; rotation should therefore be kept below 80yrs, aiming for a target DBH of 35 – 50cm depending on site conditions. Small scale clearfell-and-restock or LIMA methods should be used to introduce and maintain the desired horizontal and vertical stand structure. On wet sites timber extraction may be difficult and consideration must be given to the use of appropriate harvesting methods and technology.

5. Timeline

stage	H_{100} [m]	intervention
Establishment		• Planting of 3000 – 5000 trees/ha or natural regeneration. Numbers may be reduced if coppice from current stools can be expected.
Young stand	< 3	• Protection against animals / plants as necessary. • Regulation of species composition and minor species as required.
Thicket stage	4 – 8	• Generally no interventions, except for: • Negative selective respacing (removal of undesirable trees), and cleaning or pollarding of aggressive infill overtopping promising CAR. • Singling of coppice shoots where applicable.
Pole stage	8 – 12	• Continue negative respacing if necessary, otherwise shift to positive selection and carefully promote up to 200 FC tree candidates/ha by removing 1 – 3 competitor(s). Maintain closed canopy for ongoing self-pruning, consider artificial pruning in low density scenarios.
Pole to small timber stage	12 – 16	• Thinning interventions start when FC tree candidates have reached the desired length of clean bole. Select 80 – 140 FC trees/ha, and apply crown thinning to release their crowns from competitive neighbours. Seed-grown trees are to be preferred over coppice.
Timber stage		• Monitor competition status of FC trees, stand density, stability and health, and thin accordingly. Apply crown thinning as long as necessary for the benefits of FC trees; crowns of FC trees must remain completely free from contact with neighbouring trees. • Maintain and develop understorey where present. • Assess potential for natural regeneration and decide on harvesting method when FC trees approach target DBH.
Final harvesting and regeneration stage		• Carry out harvesting operations according to agreed method. Due to the high light demand of CAR small scale clearfell and LIMA methods are preferable over regeneration under canopy. • Monitor ground vegetation, occurrence and growth rate of regeneration, supplement by coppicing / planting if necessary, or restock.